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MCQS

With key

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Muhammad.

January 22, 2014
Pakistani jets attack suspected militant hide-outs in North Waziristan for first time in years, signaling government's willingness to take fight to center of country's insurgency; air strikes appear to be in retaliation for recent terrorist bombings in Bannu and in Rawalpindi that killed at least 30 security force members.

January 21, 2014
Suicide bomber strikes near the Pakistani military's general headquarters in Rawalpindi, killing at least 13 people, including six soldiers.

January 20, 2014
Bomb explodes inside vehicle at Pakistani military compound in the country's northwest, killing at least 20 members of a paramilitary unit and wounding 30 more.

January 11, 2014
Pakistan's Prime Min Nawaz Sharif recommends that a high civil award for bravery be bestowed on Aitzaz Hasan, teenager who was killed while stopping a suicide bomber from attacking his school in northwestern Pakistan.

January 10, 2014
ncident in which 15-year-old Pakistani student Aitzaz Hasan tackled suicide bomber while on his way to school, only to be blown up by him, has truck deep nerve in Pakistan; citizens are calling Hasan a hero, pointing out that he gave his own life o save that of hundreds of students.

January 10, 2014
Muhammad Aslam Khan, Pakistani police official nown as Chaudhry Aslam who was at forefront of perations against the Pakistani Taliban, is killed bomb blast in Karachi along with two others.

January 8, 2014
Special court panel examines medical report on former Pakistani military ruler Pervez Musharraf to determine whether he may be excused from attending treason proceedings against him; Musharraf was rushed to military hospital for sudden heart problem on Jan 3; deliberations raise speculation that deal to allow him to leave country may be underway.

January 7, 2014
Dubai Journal; news that Pakistan and Afghanistan cast their votes for cities other than Dubai in the competition for the 2020 World Expo infuriates the United Arab Emirates; Dubai has won the competition, which offers the city a chance to grab global attention and celebrate its resurgent affluence.

January 3, 2014
Former Pakistani military ruler Pervez Musharraf is taken to a military hospital due to an unexplained heard condition, derailing for third time a scheduled court hearing in treason proceedings against him.

January 2, 2014
Explosives are found for second time along route to hearing for Pakistan's former military ruler Pervez Musharraf; he is accused of subverting the Constitution when he imposed emergency rule in November 2007; judge warns if he fails to appear for next hearing he could face arrest.

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Solved Model Paper of Computer Science for the post of (SESE)

INSTRUCTIONS

1. Candidates must read and follow instructions given on reverse of the answer sheet before attempting the question paper.
2. All answers are required to be written on the answer sheet and NOT on the question paper.
3. Attempt all questions which carry equal marks.

Time allowed: 2 hours (120 mints) Total MCQ's: 100

Total Marks: 100

Subject Related MCQs = 85

1. Consider the following code
Intz, x=5,y=-10,a=4,b=2;
z = x++ - --y * b / a;
What number will z in the sample code above contain?
A. 5 B. 6
C. 10 D. 15
➤ **Ans: C. 10**

2. What function will read a specified number of elements from a file?
A. fileread() B. getline()
C. readfile() D. fread()
➤ **Ans: D. fread()**

3. What will the above sample code produce when executed?
A. 0, 0, 1, 2, 3, 4,
B. 1, 2, 3, 4, 5, 5,
C. 4, 3, 2, 1, 0, 0,
D. 0, 1, 2, 3, 4, 5,
➤ **Ans: A. 0, 0, 1, 2, 3, 4,**

4. Consider the following code and what will be printed when the sample code below is executed?
int x = 0;
for (x=1; x<4; x++);
printf("x=%d\n", x);
A. x=0 B. x=1
C. x=2 D. x=4

5. inttestarray [3][2][2] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12};
What value does testarray[2][1][0] in the sample code above contain?
A. 3 B. 5
C. 7 D. 11
➤ **Ans: D. 11**

6. Which one of the following will read a character from the keyboard and will store it in the variable c?
A. c = getc(); B. getc(&c);
C. getchar(&c) D. c = getchar();
➤ **Ans: D. c = getchar();**

7. What will be output when the following code is executed
int y[4] = {6, 7, 8, 9};
int *ptr = y + 2;
printf("%d\n", ptr[1]); /*ptr+1 == ptr[1]*/
A. 6 B. 10
C. 9 D. 7
➤ **Ans: C. 9**

8. Which of the following strategic issues need to be addressed in a successful software testing process?
A. Conduct formal technical reviews prior to testing

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B. Specify physical design in a quantifiable manner
C. Use dependent test teams
D. None of the above
➤ **Ans: A. Conduct formal technical reviews prior to testing**

9. If there is a need to see output as soon as possible, what function will force the output from the buffer into the out0.put stream?
A. flush() B. output()
C. fflush() D. dump()
➤ **Ans: A. flush()**

10. The property that determines the order in which a control receives focus is:
A. Tab Order.
B. Tab Sequence.
C. Tab Index.
D. Sort Order.
➤ **Ans: C. Tab Index.**

11. Which one of the following functions returns the string representation from a pointer to a time_t value?
A. Limed
B. get time
C. string time
D. None of the above
➤ **Ans: D. None of the above**

12. Which of the following causes run time binding?
A. Declaring object of abstract class
C. Declaring overridden methods as non-virtual
D. None of the above
➤ **Ans: D. None of the above**

13. Which one of the following provides conceptual support for function calls?
A. The data segment
B. The system stack
C. The code segment
D. The text segment
➤ **Ans: B. The system stack**

15. C is which kind of language?
A. Machine
B. Procedural
C. Object-oriented
D. Assembly
➤ **Ans: B. Procedural**

15. The concept of hierarchical classification is related to
A. Abstraction
B. Inheritance
C. Function overloading
D. None of the above
➤ **Ans: B. Inheritance**

16. By the use of encapsulation a user can obtained
A. Information hiding
B. Least interdependencies among classes
C. Implementation independence among modules
D. All of given options
➤ **Ans: Information hiding**

17. with no using Deep copy constructor
A. System crash problem will

B. Memory Leakage problem will occur.
C. Dangling pointer problem will occur.
D. All of the above.
➤ **Ans: All of the above.**

18. Which of the following are valid characters for a numeric literal constant?
A. A comma
B. dollar sign ($)
C. A percent sign (%)
D. None of the above
➤ **Ans: D. None of the above**

19. **Choose one of the following**
A. Struct is encapsulation
B. Class is encapsulation
C. Functions is hiding the parameters.
D. None of the above
➤ **Ans: B. Class is encapsulation**

20. The parameters which are used to measure the efficiency of an algorithm are .
A. Processor and C.P.U,
B. complexity and integrity,
C. Time and space,
D. Data and space,
➤ **Ans: C. Time and space**

21. All of the following cases exist in complexity theory except
A. Best case B. worst case
C. None case D. Null case
➤ **Ans: D. Null case**

22. Which of the following is the complexity of bubble sort algorithm?
A. O(n) B. O(log 2)
C. $O(n^2)$ D. O(n log n)
➤ **Ans: C. $O(n^2)$**

24. According to the standard C specification, what are the respective minimum sizes (in bytes) of the following three data types: short; int; and long?
A. 1, 2, 2 B. 1, 2, 4
C. 1, 2, 8 D. 2, 2, 4
➤ **Ans: D. 2, 2, 4**

24. The second name of two dimensional arrays is
A. Table arrays B. Serial arrays
C. Both of above D. All of above
➤ **Ans: C. Both of above**

27. What are two predefined FILE pointers in C?
A. stdout and stdin
B. console and error
C. stdip and stderror
D. None of the above
➤ **Ans: D. None of the above**

26. The "push" and "pop" is correlated to which of the given?
A. Array
B. lists
C. Stacks
D. None of above
➤ **Ans: C. Stacks**

27. Which of the following option is a data structure which is linear?
A. String B. List
C. Queue D. All of above
➤ **Ans: D. All of above**

28. Which one of the following is NOT a valid identifier?
A. __ident B. auto
C. bigNumber D. g42277
➤ **Ans: B. auto**

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29. The ABEL notation equivalent to Boolean expression A+B is
A. A & B
B. A ! B
C. A # B
D. None of the above
➢ **Ans: C. A # B**

30. If a cache access requires one clock cycle and handling cache misses stalls theprocessor for an additional five cycles, which of the following cache hit ratescomes closest to achieve an average memory access of 2 cycles?
A. 75 B. 80
C. 83 D. 86
➢ **Ans: B. 80**

31. A template argument is preceded by the keyword
A. Public B. Class
C. Vector D. Private
➢ **Ans: C. Vector**

32. With multiplexer as parallel to serial converter requires
A. A parallel to serial converter circuit connected to the multiplexer
B. A counter circuit connected to the multiplexer
C. A BCD to decimal decoder connected to the multiplexer
D. A 2-to-8 bit decoder connected to the multiplexer
➢ **Ans: A. A parallel to serial converter circuit connected to the multiplexer**

33. The click event is most commonly associated with the:
A. text box. B. label.

34. Operating system provides the services of
A. I/O handling.
B. program execution
C. Communication
D. All of the above
➢ **Ans: D. All of the above**

35. While computer is turned on or restarted, a special type of absolute loader isexecuted; identify the name of loader?
A. Init boot loader
B. boot loader
C. Relating loader
D. Bootstrap loader
➢ **Ans: D. Bootstrap loader**

36. Which option is used in operating system to separate mechanism?
A. Two level implantation
B. Multilevel implantation
C. Single level implementation
D. Hierarchal implementation
➢ **Ans: A. Two level implantation**

37. Which is not included in the process state while executing single process?
A. Terminated B. running
C. Block D. Ready
➢ **Ans: C. Block**

38. Which of the following statement is true about non-preemptive scheduling?
A. A process switching from running state to the waiting state
B. A process switching from ready to running state
C. A process switching from waiting to ready state
D. A process switching from new to ready state

➢ **Ans: A. A process switching from running state to the waiting state**

39. What do databases and DBMSs directly support?
A. OLDP
B. OLTP
C. Databases
D. Operational databases
➢ **Ans: B. OLTP**

40. What file access method allows the user to directly access records organizedsequentially using an index of key fields?
A. Sequential access method
B. Indexed sequential access method
C. Direct access method
D. Relational access method
➢ **Ans: B. Indexed sequential access method**

41. Which of the following term describes each two-dimensional table or file in therelational model?
A. Database Management System
B. Relational database
C. Network database
D. None of the above
➢ **Ans: D. None of the above**

42. Which of the following statement is true about a data dictionary?
A. It is a two-dimensional table used to store data within a relational database.
B. It is a multi-dimensional table used to store data within a relational database.
C. **It is storage area where data about data is stored**
D. It is a two-dimensional table used to store data within a database.
➢ **Ans: C. It is storage area where data about data is stored**

43. Which of the following option is best indication about generic programming?
A. Reusability
B. Adaptability
C. Compatibility
D. None of the above
➢ **Ans: A. Reusability**

44. The logical structure of information in a database is contained in the
A. Data manipulation system
B. Data administration subsystem
C. Data definition subsystem
D. Data dictionary
➢ **Ans: D. Data dictionary**

45. The type which is used to declare a pointer is called its
A. Public type B. Private type
C. Default type D. Reference type
➢ **Ans: D. Reference type**

46. Which of the following try block to catch the object thrown?
A. Throw block B. Object block
C. Catch block D. Try block
➢ **Ans: C. Catch block**

47. Requirements validation review is conducted by
A. Testing the system model
B. Have the customer look over the requirements
C. The software requirement team
D. Use a checklist of questions to examine each requirement

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➢ **Ans: D. Use a checklist of questions to examine each requirement**

48. User interface development systems provide some mechanisms for buildinginterface prototypes including
A. Black box testing
B. Software engineering tools
C. Input validation
D. None of the above
➢ **Ans: C. Input validation**

49. Which of the following is true about many of the tasks from the generic tasksets for analysis modelling and design?
A. Can be conducted in sequential way.
B. Can be conducted in parallel with one another.
C. Is the most difficult task of the system engineering?
D. None of the above.
➢ **Ans: B. Can be conducted in parallel with one another.**

50. The sharing of a medium and its link by two or more than two devices is called
A. Modulation
B. De-multiplexing
C. Line discipline
D. Multiplexing
➢ **Ans: D. Multiplexing**

51. Which layer of OSI model is used to cover the specifications of transmissionmedia?
A. Session Layer
B. network layer
C. Physical layer

52. What is an encapsulation?
A. An action or occurrence such as click
B. A package of one or more components together
C. A set of statements that performs specific task on static objects.
D. A reference type variable which cannot dereference.
➢ **Ans: B. A package of one or more components together**

53. Which of the following error detection method uses one's complement?
A. Even parity check
B. Odd parity check
C. Checksum
D. Cyclic Redundancy Check
➢ **Ans: C. Checksum**

54. A technique which restrict the amount of data that the sender can send beforewaiting for acknowledgment.
A. Flow control
B. multiplexing
C. Data rate
D. Error control
➢ **Ans: A. Flow control**

55. Which of the IEEE specifications is used for wireless LAN which covers thephysical and data link layer of OSI reference model
A. IEEE 802.3
B. IEEE 802.11.4
C. IEEE 802.11
D. IEEE 802.3.5
➢ **Ans: C. IEEE 802.11**

56. Process's state after facing an I/O instruction is called

B. Blocked/Waiting
C. Idle
D. terminated
➢ **Ans: B. Blocked/Waiting**

57. Which of the following is an example of analog technique?
A. FDM B. WDM
C. ACM D. FCM
➢ **Ans: A. FDM**

58. Another name of data in a class is
A. Objects
B. Fields
C. Access identifier
D. Instance
➢ **Ans: B. Fields**

59. A register which is used to keep track of address of the memory location?
A. Address Register
B. Data Register
C. Instruction Register
D. Program Counter
➢ **Ans: D. Program Counter**

60. A time sharing system involve
A. More than one processor
B. More than one program in memory
C. More than one memory in the system
D. All of above
➢ **Ans: B. More than one program in memory**

61. The address of the instruction following the CALL instructions stored in/onthe when a subroutine is called is
A. Stack pointer
B. adder
C. Program counter
D. Stack
➢ **Ans: D. Stack**

62. The ALU and control unit of microcomputers are combined on a single silicon chip, called?
A. Minichip
B. microprocessor
C. ALU
D. CU
➢ **Ans: B. Microprocessor**

63. Which of the following statement is true about ANSI SQL?
A. Serializable isolation level will allow phantom reads and easy access.
B. Serializeableisolation level will not allow phantom reads, dirty reads, and no repeatable reads.
C. Serializeable isolation level will allow phantom reads
D. Serializeableisolation level will not allow dirty reads, and no repeatable reads.
➢ **Ans: B. Serializeableisolation level will not allow phantom reads, dirty reads, and no repeatable reads.**

64. The address space in ARM is _____.
A. 2^24 B. 2^64
C. 2^16 D. 2^32
➢ **Ans: D. 2^32**

65. The addressing mode where the EA of the operand is the contents of Rn is _____.
A. Pre-indexed mode
B. Pre-indexed with write back mode
C. Post-indexed mode
D. None of the above

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➢ **Ans: C. Post-indexed mode**

66. The CPU is also called as _____.
A. Processor hub
B. ISP
C. Controller
D. All of the above
➢ **Ans: B. ISP**

67. If L1 and L2 are regular languages; then which of the following are also regularlanguage(s).
A. L1 + L2 B. 1L2
C. L1* D. All of above
➢ **Ans: D. All of above**

68. Instantiation is the moment that
A. Memory is de-allocated for a specific object of a class.
B. Memory is allocated for a specific object, which is a member of a class.
C. A program which has static variables.
D. A memory is allocated for a specific object of a class.
➢ **Ans: D. A memory is allocated for a specific object of a class.**

69. If 99% portion of a program is written in FORTRAN programming language and the remaining 1%portion of the program in assembly language the percentage raise in the execution time, compared to writing the 1% portion of program in assembly language is
A. 0 B. 0.12
C. 10 D. 0.99
➢ **Ans: A. 0**

70. Which of the following is true about null able production?
A. A production is called null able production if it is of the form N → Λ.
B. A production is called null able production if it is of the form N → B.
C. A production is called null able production if it is of the form A → N.
D. A production is called null able production if it is of the form A → Λ.
➢ **Ans: A. A production is called null able production if it is of the form N → Λ.**

71. The output of the expression F=A+B+C will be ------Logic when A=0, B=1, C=1 while symbol '+' here represents OR Gate.
A. Undefined
B. One
C. Zero
D. None of the above
➢ **Ans: B. One**

72. The following grammar
$G = (N, T, P, S)$
$N = \{S, A, B, C, D, E\}$
$T = \{a, b, c\}$
$P: S \rightarrow aAB$
$AB \rightarrow CD$
$CD \rightarrow CE$
$C \rightarrow aC$
$C \rightarrow b$

$G = (N, T, P, S)$
$bE \rightarrow bc$ is
A. is type 3
B. Is type 2 but not type 3
C. is type 1 but not type 2
D. is type 0 but not type 1
➢ **Ans: C. is type 1 but not type 2**

73. Consider the following language $L = \{a^n b^n | n \geq 1\}$ then L is
A. CFL but not regular
B. CSL but not CFL
C. Regular
D. Type 0 language but not type 1
➢ **Ans: A. CFL but not regular**

74. Quick sort is
A. Stable & in place
B. Not stable but in place
C. Stable but not in place
D. Sometime stable & some times in place
➢ **Ans: B. Not stable but in place**

75. Fibonacci function fib(n) = fib(n-1) + fib(n -2) is an example of
A. Direct recursion
B. Indirect recursion
C. Linear recursion
D. None of the above
➢ **Ans: A. Direct recursion**

76. which of the following sort inserts each elements A (K) into proper positionin the previously sorted sub array A (1) ...A (K-1)
A. Insertion sort
B. Selection sort
C. Merge sort
D. None of the above
➢ **Ans: A. Insertion sort**

77. Let suppose a user want to check whether a given set of items is sorted or not.Which of the following sorting methods will be the most well organized if it isalready in sorted order?
A. Bubble sort
B. Selection sort
C. Quick sort
D. Insertion sort
➢ **Ans: D. Insertion sort**

78. An S-R latch can be implementing by means of
A. AND, NOR
B. NAND, NOR
C. AND, XOR
D. NOT, XOR
➢ **Ans: B. NAND, NOR**

79. Heap (represented by an array) constructed from the list of numbers 30, 10, 80,60, 15, 55, and 17 is:
A. 60, 80, 55, 30, 10, 17, 15
B. 80, 55, 60, 15, 10, 30, 17
C. 80, 60, 36, 17, 55, 55, 10
D. None of the above
➢ **Ans: B. 80, 55, 60, 15, 10, 30, 17**

80. Which of the following searching method requires that all keys must exist ininternal memory?
A. Hashing functions
B. Forwarding search
C. Binary search
D. None of these
➢ **Ans: C. Binary search**

81. Which of the following function is performed by the database administrator?
A. Plans for information resources

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B. Oversees the development of information resources
C. Defines the database structures
D. Monitors information resources
➢ **Ans: C. Defines the database structures**

82. A micro-program written as string of 0's and 1's is a
A. Binary microprogram
B. Binary instructions
C. Symbolic instructions
D. Sybolicmicroprogram
➢ **Ans: A. Binary microprogram**

83. The reason of ambiguity may be
A. Syntactic ambiguity
B. Multiple word meanings
C. Unclear antecedents
D. All of the above
➢ **Ans: D. All of the above**

84. **A process which is repeated, assess, and polished is known as**
A. Interconnected
B. Iterative
C. Interpretive
D. None of the above
➢ **Ans: B. Iterative**

85. In Breadth First Search the node with the largest value of height will be at the
A. Maximum priority to be picked.
B. Minimum priority to be picked.
C. Intelligent agent
D. None of the above
➢ **Ans: A. Maximum priority to be picked.**

PADAGOGY MCQ's = 10

1. The teacher should know the following thing:
(A) What information is required by children?
(B) What is known to the children before hand?
(C) In which field difficulty is faced by the children?
(D) What was last known to the children?
➢ **Ans: C. In which field difficulty is faced by the children?**

2. Which of the following is not emphasized in memory level of teaching?
(A) cramming of the learnt material
(B) presenting the subject matter by giving least freedom to pupils
(C) conducting tests along with teaching
(D) Helping the pupils generalize the acquired knowledge
➢ **Ans: C. Conducting tests along with teaching**

3. True or false items cannot provide accurate criterion of evaluation because
(A) chance of guessing on the part of examinees is at highest probability
(B) they do not require thorough study to attempt
(C) they generally inflate actual scores due to guessing or cheating

➢ **Ans: D.All of the above**

4. Teaching by small steps and frequent short assignment techniques are useful for:
(A) Slow learners
(B) Learning disabled
(C) Educationally backward children
(D) All of the above
➢ **Ans: D.All of the above**

5. Which of the following purposes is served by lesson plan?
(A) Suitable learning environment can be created in the class
(B) Psychological teaching is possible
(C) A teacher can stick to his content
(D) All of the above
➢ **Ans: D.All of the above**

6. You are a famous teacher, but students are not satisfied with your teaching style. **How** you will teach them?
(A) will tell about your style first
(B) will change your style according to students
(C) will take training again to reform the style
(D) will make harmony with student's style
➢ **Ans: D.Will make harmony with student's style**

7. Which of the following conditions must be fulfilled for proper adjustment in the environment?
(A) Physical fitness and health
(B) Free from psychological diseases
(C) Social acceptability of the person
(D) All of the above
➢ **Ans: D.All of the above**

8. Generally students like those teachers who:
(A) dictate notes in the class
(B) reveal important Questions before examinations
(C) remove the difficulties of the subject
(D) are self- disciplined
➢ **Ans: C.Remove the difficulties of the subject**

9. If students do not understand what is taught in the class the teacher should:
(A) repeat the lesson once again
(B) teach the lesson again giving more examples
(C) checkup the previous knowledge of the students in the topic
(D) proceed to the next Lesson so that syllabus could be covered
➢ **Ans: C.Checkup the previous knowledge of the students in the topic**

10. The able teacher is one who:
(A) helps all the students in passing the examination
(B) inculcates the interest in the subject among students
(C) maintains peace in the class
(D) engaged the students in their work

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➢ **Ans: D.Enagaged the students in their work**

GENERAL KNOWLEDGE MCQ's = 5

1. Who is current Chairman of Pakistan Electronic Media Regularity Authority (PEMRA)?
   (A) Chaudhary Rashid Ahmad
   (B) Arfat Ahmad
   (C) Wasim Sajjad
   (D) Rao Tehsin
   ➢ **Ans: A.Chaudhary Rashid Ahmad**
2. The 2013 World Population Data Sheet issued by the US Population Reference Bureau ranked Pakistan as the _____ most populous country of the world.
   (A) Sixth
   (B) Seven
   (C) Eight
   (D) Ninth
   ➢ **Ans: A.Sixth**
3. Which country moved nuclear capable Iskander Missiles closer to Europe's borders?
   (A) Russia
   (B) China
   (C) Poland
   (D) UK
   ➢ **Ans: A.Russia**
4. The World Health Organization (WHO) announced that _____ is the largest endemic Poliovirus "reservoir" in the world.
   (A) Lahore
   (B) Multan
   (C) Peshawar
   (D) Hyderabad
   ➢ **Ans: C.Peshawar**
5. The Current President of European Union belongs to which country?
   (A) Greece
   (B) Austrian
   (C) German
   (D) French
   ➢ **Ans: A.Greece**

Solved Model Paper of Computer Science for the Post of SSE

INSTRUCTIONS

1. Candidates must read and follow instructions given on reverse of the answer sheet before attempting the question paper.
2. All answers are required to be written on the answer sheet and NOT on the question paper.
3. Attempt all questions which carry equal marks.

Time allowed: 2 hours (120 mints) Total MCQ's: 100

Total Marks: 100

Subject Related MCQs = 85

1. Consider the following code
   Intz, x=5,y=-10,a=4,b=2;
   z = x++ - --y * b / a;
   What number will z in the sample code above contain?
   A. 5 B. 6
   C. 10 D. 15
   ➢ **Ans: C. 10**
2. What function will read a specified number of elements from a file?
   A. fileread() B. getline()
   C. readfile() D. fread()
   ➢ **Ans: D. fread()**
3. What will the above sample code produce when executed?
   A. 0, 0, 1, 2, 3, 4,
   B. 1, 2, 3, 4, 5, 5,
   C. 4, 3, 2, 1, 0, 0,
   D. 0, 1, 2, 3, 4, 5,
   ➢ **Ans: A. 0, 0, 1, 2, 3, 4,**
4. Consider the following code and what will be printed when the sample code below is executed?
   int x = 0;
   for (x=1; x<4; x++);
   printf("x=%d\n", x);
   A. x=0 B. x=1
   C. x=2 D. x=4
   ➢ **Ans: D. x=4**
5. charbuf [] = "Hello world!"; char * buf = "Hello world!";
   In terms of code generation, how do the two definitions of buf, both presented above, differ?
   A. The first definition certainly allows the contents of buf to be safely modified at runtime; the second definition does not.
   B. The first definition is not suitable for usage as an argument to a function call; the second definition is.
   C. The first definition is not legal because it does not indicate the size of the array to be allocated; the second definition is legal.
   D. They do not differ -- they are functionally equivalent.
   ➢ **Ans: D. They do not differ -- they are functionally equivalent.**
6. Which one of the following will read a character from the keyboard and will store it in the variable c?
   A. c = getc(); B. getc(&c);
   C. getchar(&c) D. c = getchar();
   ➢ **Ans: D. c = getchar();**

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What will be output when the following code is executed
int y[4] = {6, 7, 8, 9};
int *ptr = y + 2;
printf("%d\n", ptr[1]); /*ptr+1 == ptr[1]*/
A. 6 B. 10
C. 9 D. 7
➢ **Ans: C. 9**

8. When applied to a variable, what does the unary "&" operator yield?
A. The variable's value
B. The variable's binary form
C. The variable's address
D. The variable's data
➢ **Ans: C. The variable's address**

9. If there is a need to see output as soon as possible, what function will force the output from the buffer into the out0.put stream?
A. flush() B. output()
C. fflush() D. dump()
➢ **Ans: A. flush()**

10. The property that determines the order in which a control receives focus is:
A. Tab Order.
B. Tab Sequence.
C. Tab Index.
D. Sort Order.
➢ **Ans: C. Tab Index.**

11. Virtual functions allow you to
A. Create an array of type pointer-to-base class that can hold pointers to child classes.
B. Create functions that can never be accessed by the other functions.
C. Use the same function call to execute member functions of
D. Group objects of different classes so they can all be accessed by the same function code.
➢ **Ans: C. Use the same function call to execute member functions of objects from different classes.**

12. Which of the following causes run time binding?
A. Declaring object of abstract class
B. Declaring pointer of abstract class
C. Declaring overridden methods as non-virtual
D. None of the above
➢ **Ans: D. None of the above**

13. Compiler performs
A. Static type checking to diagnose type errors.
B. Dynamic type checking to diagnose type errors.
C. Bound type checking to diagnose type errors.
D. Unbound type checking to diagnose type errors.
➢ **Ans: A. Static type checking to diagnose type errors.**

14. Public methods of base class can
A. Directly be accessed in its derived class
B. Indirectly be accessed in its derived class
C. Simultaneously be accessed in its derived class
D. Cannot be access in derived class
➢ **Ans: A. Directly be accessed in its derived class**

15. The concept of hierarchical classification is related to
A. Abstraction
B. Inheritance
C. Function overloading
D. None of the above
➢ **Ans: B. Inheritance**

16. By the use of encapsulation a user can obtained
A. Information hiding
B. Least interdependencies among classes
C. Implementation independence among modules
D. All of given options
➢ **Ans: Information hiding**

17. with no using Deep copy constructor
A. System crash problem will occur.
B. Memory Leakage problem will occur.
C. Dangling pointer problem will occur.
D. All of the above.
➢ **Ans: All of the above.**

18. Which of the following are valid characters for a numeric literal constant?
A. A comma
B. dollar sign ($)
C. A percent sign (%)
D. None of the above
➢ **Ans: D. None of the above**

19. **Choose one of the following**
A. Struct is encapsulation
B. Class is encapsulation
C. Functions is hiding the parameters.
D. None of the above
➢ **Ans: B. Class is encapsulation**

20. The parameters which are used to measure the efficiency of an algorithm are .
A. Processor and C.P.U,
B. complexity and integrity,
C. Time and space,
D. Data and space,
➢ **Ans: C. Time and space**

21. All of the following cases exist in complexity theory except
A. Best case B. worst case
C. None case D. Null case
➢ **Ans: D. Null case**

22. Which of the following is the complexity of bubble sort algorithm?
A. O(n) B. O(log 2)
C. $O(n^2)$ D. O(n log n)
➢ **Ans: C. $O(n^2)$**

23. All the elements of an array are stored in memory cells for the reason that.
A. This way computer can keep track only the address of the first element and the addresses of other elements can be calculated.
B. The architecture of computer memory does not allow arrays to store other than serially.
C. Both of above.
D. None of above.
➢ **Ans: A. This way computer can keep track only the address of the first element and the addresses of other elements can be calculated.**

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24. The second name of two dimensional arrays is
A. Table arrays B. Serial arrays
C. Both of above D. All of above
➢ **Ans: C. Both of above**

25. What is the difference between linear array and a record?
A. An array is suitable for homogeneous data but hte data . items in a record may have different data type.
B. In a record, there may not be a natural ordering in opposed to linear array.
C. A record form a hierarchical structure but a lienear array does not.
D. All of above.
➢ **Ans: D. All of above.**

26. The "push" and "pop" is correlated to which of the given?
A. Array
B. lists
C. Stacks
D. None of above
➢ **Ans: C. Stacks**

27. Which of the following option is a data structure which is linear?
A. String B. List
C. Queue D. All of above
➢ **Ans: D. All of above**

28. The binary numbers A = 1100 and B = 1001 are applied to the inputs of a comparator. What will be the output levels?
A. A > B = 1, A < B = 0, A < B = 1
B. > B = 0, A < B = 1, A = B = 0
C. A > B = 1, A < B = 0, A = B = 0
D. A > B = 0, A < B = 1, A = B = 1
➢ **Ans: C. A > B = 1, A < B = 0,**

29. The ABEL notation equivalent to Boolean expression A+B is
A. A & B
B. A ! B
C. A # B
D. None of the above
➢ **Ans: C. A # B**

30. If a cache access requires one clock cycle and handling cache misses stalls theprocessor for an additional five cycles, which of the following cache hit ratescomes closest to achieve an average memory access of 2 cycles?
A. 75 B. 80
C. 83 D. 86
➢ **Ans: B. 80**

31. The PROM consists of a fixed non-programmable
A. NAND Gate array configured as a decoder.
B. OR Gate array configured as a decoder.
C. NOT Gate array configured as a decoder.
D. AND Gate array configured as a decoder.
➢ **Ans: D. AND Gate array configured as a decoder.**

32. With multiplexer as parallel to serial converter requires
A. A parallel to serial converter circuit connected to the multiplexer
B. A counter circuit connected to the multiplexer
C. A BCD to decimal decoder connected to the multiplexer
D. A 2-to-8 bit decoder connected to the multiplexer
➢ **Ans: A. A parallel to serial converter circuit connected to the multiplexer**

33. Two 2-input, 4-bit multiplexers 74X157 can be connected to apply
A. 4-input, 8-bit a multiplexer.
B. 4-input, 16-bit a multiplexer.
C. 2-input, 4-bit a multiplexer.
D. 2-input, 8-bit a multiplexer.
➢ **Ans: D. 2-input, 8-bit a multiplexer.**

34. Operating system provides the services of
A. I/O handling.
B. program execution
C. Communication
D. All of the above
➢ **Ans: D. All of the above**

35. While computer is turned on or restarted, a special type of absolute loader isexecuted; identify the name of loader?
A. Init boot loader
B. boot loader
C. Relating loader
D. Bootstrap loader
➢ **Ans: D. Bootstrap loader**

36. Which option is used in operating system to separate mechanism?
A. Two level implantation
B. Multilevel implantation
C. Single level implementation
D. Hierarchal implementation
➢ **Ans: A. Two level implantation**

37. Which is not included in the process state while executing single process?
A. Terminated B. running
C. Block D. Ready
➢ **Ans: C. Block**

38. Which of the following statement is true about non-preemptive scheduling?
A. A process switching from running state to the waiting state
B. A process switching from ready to running state
C. A process switching from waiting to ready state
D. A process switching from new to ready state
➢ **Ans: A. A process switching from running state to the waiting state**

39. What do databases and DBMSs directly support?
A. OLDP
B. OLTP
C. Databases
D. Operational databases
➢ **Ans: B. OLTP**

40. What file access method allows the user to directly access records organizedsequentially using an index of key fields?
A. Sequential access method
B. Indexed sequential access method
C. Direct access method
D. Relational access method
➢ **Ans: B. Indexed sequential access method**

41. Which of the following term describes each two-dimensional table or file in therelational model?
A. Database Management System
B. Relational database
C. Network database
D. None of the above
➢ **Ans: D. None of the above**

42. Which of the following statement is true about a data dictionary?

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A. It is a two-dimensional table used to store data within a relational database.
B. It is a multi-dimensional table used to store data within a relational database.
C. **It is storage area where data about data is stored**
D. It is a two-dimensional table used to store data within a database.

➢ **Ans: C. It is storage area where data about data is stored**

43. If there is a one-to-one relationship between entity A and B, then
A. There exists a functional dependency from the primary key in B to the primary key in A, i.e., PKB. PKA..
B. There exists a functional dependency from the primary key in A to the primary key in B, i.e., PKA. PKB..
C. **Both A and B**
D. None of the above

➢ **Ans: C. Both A and B**

44. The logical structure of information in a database is contained in the
A. Data manipulation system
B. Data administration subsystem
C. Data definition subsystem
D. Data dictionary

➢ **Ans: D. Data dictionary**

45. Which of the following statement is [illegible] user's desire for the defined capabilities into a working product.
B. The goal of product engineering is to check the DFD for the requirements.
C. The goal of product engineering is to translate the logical design to physical design.
D. None of the above

➢ **Ans: A. The goal of product engineering is to translate the customer's desire for a set of defined capabilities into a working product.**

46. The IEEE software maturity index is used to provide a measure of the
A. Maintainability of a software product based on its availability
B. Specification of the software according to user's requirement
C. Reliability of a software product following regression testing
D. Stability of a software product as it is modified during maintenance

➢ **Ans: D. Stability of a software product as it is modified during maintenance**

47. Requirements validation review is conducted by
A. Testing the system model
B. Have the customer look over the requirements
C. The software requirement team
D. Use a checklist of questions to examine each requirement

➢ **Ans: D. Use a checklist of questions to examine each requirement**

buildinginterface prototypes including
A. Black box testing
B. Software engineering tools
C. Input validation
D. None of the above

➢ **Ans: C. Input validation**

49. Which of the following is true about many of the tasks from the generic tasksets for analysis modelling and design?
A. Can be conducted in sequential way.
B. Can be conducted in parallel with one another.
C. Is the most difficult task of the system engineering?
D. None of the above.

➢ **Ans: B. Can be conducted in parallel with one another.**

50. The sharing of a medium and its link by two or more than two devices is called
A. Modulation
B. De-multiplexing
C. Line discipline
D. Multiplexing

➢ **Ans: D. Multiplexing**

51. Which layer of OSI model is used to cover the specifications of transmissionmedia?
A. Session Layer
B. network layer
C. Physical layer
D. Application layer

➢ **Ans: C. Physical layer**

52. Which of the following statement is true about microwave
A. Microwave transmission is omnidirectional
B. Microwave transmission is unidirectional
C. Microwave transmission is bidirectional
D. Microwave transmission is directional

➢ **Ans: B. Microwave transmission is unidirectional**

53. Which of the following error detection method uses one's complement?
A. Even parity check
B. Odd parity check
C. Checksum
D. Cyclic Redundancy Check

➢ **Ans: C. Checksum**

54. A technique which restrict the amount of data that the sender can send beforewaiting for acknowledgment.
A. Flow control
B. multiplexing
C. Data rate
D. Error control

➢ **Ans: A. Flow control**

55. Which of the IEEE specifications is used for wireless LAN which covers thephysical and data link layer of OSI reference model
A. IEEE 802.3
B. IEEE 802.11.4
C. IEEE 802.11
D. IEEE 802.3.5

➢ **Ans: C. IEEE 802.11**

56. Which of the following is not Ethernet unicast destination?
A. 44:AA:C1:23:45:32
B. 43:7B:6C:DE:10:00
C. 46:56:21:1A:DE:F4
D. 48:32:21:21:4D:34

➢ **Ans: B. 43:7B:6C:DE:10:00**

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Which of the following is an example of analog technique?
A. FDM B. WDM
C. ACM D. FCM
➢ **Ans: A. FDM**

58. Packet-switched networks can also be divided into
A. virtual-circuit networks and datagram networks
B. virtual-circuit networks and histogram networks
C. virtual-circuit networks
D. datagram networks
➢ **Ans: A. virtual-circuit networks and datagram networks**

59. A register which is used to keep track of address of the memory location?
A. Address Register
B. Data Register
C. Instruction Register
D. Program Counter
➢ **Ans: D. Program Counter**

60. A time sharing system involve
A. More than one processor
B. More than one program in memory
C. More than one memory in the system
D. All of above
➢ **Ans: B. More than one program in memory**

61. The address of the instruction following the CALL instructions stored in/onthe when a subroutine is called is
A. Stack pointer
B. adder

62. The ALU and control unit of microcomputers are combined on a single silicon chip, called?
A. Minichip
B. microprocessor
C. ALU
D. CU
➢ **Ans: B. Microprocessor**

63. The key feature of the PCI BUS is
A. Low cost connectivity.
B. Plug and Play capability.
C. Expansion of Bandwidth.
D. Both A. and C.
➢ **Ans: B. Plug and Play capability.**

64. The address space in ARM is _____.
A. 2^24 B. 2^64
C. 2^16 D. 2^32
➢ **Ans: D. 2^32**

65. The addressing mode where the EA of the operand is the contents of Rn is _____.
A. Pre-indexed mode
B. Pre-indexed with write back mode
C. Post-indexed mode
D. None of the above
➢ **Ans: C. Post-indexed mode**

66. The CPU is also called as _____.
A. Processor hub
B. ISP
C. Controller
D. All of the above
➢ **Ans: B. ISP**

67. If L1 and L2 are regular languages; then which of the following are also regularlanguage(s).
A. L1 + L2 B. 1L2
C. L1* D. All of above
➢ **Ans: D. All of above**

68. If L is a regular language then which of the following is true?
A. La is also a regular language.
B. Lb is also a regular language.
C. Lx is also a regular language.
D. Lc is also a regular language.
➢ **Ans: D. Lc is also a regular language.**

69. look at the following CFG and pick the correct option
S→ AB, A →BSB, B→ CC
C→ SS
A→ a|b
C→ b|bb
A. Abb is not the word of corresponding CFL.
B. One word can be accept from the corresponding CFL.
C. Abb is a word in the corresponding CFL.
D. None of the above
➢ **Ans: C. Abb is a word in the corresponding CFL.**

70. Which of the following is true about null able production?
A. A production is called null able production if it is of the form N → Λ.
B. A production is called null able production if it is of the form N → B.
C. A production is called null able production if it is of the form A → N.
D. A production is called null able production if it is of the form A → Λ.
➢ **Ans: A. A production is called null able production if it is of the form N → Λ.**

71. Identify the correct statement
A. The production of the form terminal → Λ is said to be null production.
B. The production of the form no terminal → Λ is said to be null production.
C. The production of the form no terminal → Λ is said to be reproducible production.
D. None of the above
➢ **Ans: B. The production of the form no terminal → Λ is said to be null production.**

72. The following grammar
$G = (N, T, P, S)$
$N = \{S, A, B, C, D, E\}$
$T = \{a, b, c\}$
$P: S \rightarrow aAB$
$AB \rightarrow CD$
$CD \rightarrow CE$
$C \rightarrow aC$
$C \rightarrow b$
$bE \rightarrow bc$ is
A ... is type 2

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C. is type 1 but not type 2
D. is type 0 but not type 1
➢ **Ans: C. is type 1 but not type 2**

73. Consider the following language $L = \{a^n b^n | n \geq 1\}$ then L is
A. CFL but not regular
B. CSL but not CFL
C. Regular
D. Type 0 language but not type 1
➢ **Ans: A. CFL but not regular**

74. Quick sort is
A. Stable & in place
B. Not stable but in place
C. Stable but not in place
D. Sometime stable & some times in place
➢ **Ans: B. Not stable but in place**

75. Fibonacci function fib(n) = fib(n-1) + fib(n -2) is an example of
A. Direct recursion
B. Indirect recursion
C. Linear recursion
D. None of the above
➢ **Ans: A. Direct recursion**

76. which of the following sort inserts each elements A (K) into proper positionin the previously sorted sub array A (1) ...A (K-1)
A. Insertion sort
B. Selection sort
C. Merge sort
D. None of the above
➢ **Ans: A. Insertion sort**

77. Let suppose a user want to check whether a given set of items is sorted or not, following
A. Bubble sort
B. Selection sort
C. Quick sort
D. Insertion sort
➢ **Ans: D. Insertion sort**

78. A binary search tree holds the values 1, 2, 3, 4, 5, 6, 7, 8. The tree is traversed inpre-order, identify the correct sequence output.
A. 5 3 1 2 4 7 8 6
B. 5 3 1 2 4 7 7 8
C. 5 3 1 2 4 7 8 7
D. 5 3 1 2 4 7 6 8
➢ **Ans: D. 5 3 1 2 4 7 6 8**

79. Heap (represented by an array) constructed from the list of numbers 30, 10, 80,60, 15, 55, and 17 is:
A. 60, 80, 55, 30, 10, 17, 15
B. 80, 55, 60, 15, 10, 30, 17
C. 80, 60, 36, 17, 55, 55, 10
D. None of the above
➢ **Ans: B. 80, 55, 60, 15, 10, 30, 17**

80. Which of the following searching method requires that all keys must exist ininternal memory?
A. Hashing functions
B. Forwarding search
C. Binary search
D. None of these
➢ **Ans: C. Binary search**

81. **What stage of the developing process has been explained as "the mapping offunction onto form"?**
A. Logical
B. Intelligent agent base
C. Heuristic
D. None of the above
➢ **Ans: C. Heuristic**

... developed very

A. 1970 at the University of California
B. 1971 at the University of Manchester
C. 1972 at the University of Marseilles
D. 1973 at the University of Frankfurt
➢ **Ans: C. 1972 at the University of Marseilles**

83. The reason of ambiguity may be
A. Syntactic ambiguity
B. Multiple word meanings
C. Unclear antecedents
D. All of the above
➢ **Ans: D. All of the above**

84. **A process which is repeated, assess, and polished is known as**
A. Interconnected
B. Iterative
C. Interpretive
D. None of the above
➢ **Ans: B. Iterative**

85. In Breadth First Search the node with the largest value of height will be at the
A. Maximum priority to be picked.
B. Minimum priority to be picked.
C. Intelligent agent
D. None of the above
➢ **Ans: A. Maximum priority to be picked.**

PADAGOGY MCQs = 10

1. Child development is marked by interrelated processes. Which one is not one of them?
(A) differentiation
(B) integration
(C) motivation

2. Generally students like those teachers who:
(A) dictate notes in the class
(B) reveal important Questions before examinations
(C) remove the difficulties of the subject
(D) are self-disciplined

3. The students learn most from those teachers who:
(A) are gentle
(B) express their ideas comprehensively and clearly
(C) are always ready for discussion
(D) works hard

4. The able teacher is one who:
(A) helps all the students in passing the examination
(B) inculcates the interest in the subject among students
(C) maintains peace in the class
(D) engages the students in their work

5. Through which action children learn fast?
(A) facial expression
(B) study
(C) write
(D) walk

6. The job of a school teacher is more attractive than in the past because of:
(A) higher social status
(B) higher pay
(C) more training institution
(D) greater job satisfaction

7. The students learn most from those teachers who:
(A) are gentle
(B) express their ideas

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(C) are always ready for discussion
(D) works hard

8. The able teacher is one who:
(A) helps all the students in passing the examination
(B) inculcates the interest in the subject among students
(C) maintains peace in the class
(D) engages the students in their work

9. If one child gives answers to all the questions at first in your class but disturbs the rest of the children and roams here and there in the class then what will you do?
(A) punish him
(B) tell him not to do like that
(C) complain the guardians that his child is breaking the discipline
(D) engage that child in more activities than rest of the children of the class so that he may learn new things

10. On which basis the ability of teachers can be judged?
(A) publication of the books
(B) period of the service
(C) to fulfill the needs of the students
(D) personality of the teacher

GENERAL KNOWLEDGE MCQs = 5

1. When the Nuclear scientist Dr. Abdul Qadeer Khan dissolved his Political Party Tehreek-i-Tahafuz-i- Pakistan?
(A) 27-Jan-2014
(B) 1-Jan-2014
(C) 5-Jan-2014
(D) 10-Jan-2014

2. Who visited Pakistan, agreed to deepen their defence cooperation and support each other's position on regional issues, including Syria and Afghanistan?
(A) Saudi Foreign Minister
(B) American Foreign Minister
(C) German Foreign Minister
(D) French Foreign Minister

3. The government issued a notification for appointment of _____ as foreign secretary.
(A) Aizaz Chaudhary
(B) Saleem Qureshi
(C) Chaudhry Kashif Khan
(D) Ahmad Zahoor

4. Attorney General _____ resigned from his post.
(A) Munir A Malik
(B) Irfan Qadir
(C) Aslam Shad
(D) Farhan Qureshi

5. Who took over as the chairman of national Assembly's Kashmir Committee?
(A) Molana Fazal ur Rehman
(B) Hamad Azam
(C) Qamar uz zaman Qaira
(D) Umair Anjum ch

Course Outline of Computer Science for Educators (SESE & SSE)

1	**Introduction to Computing and Programming Fundamentals** Computer and its applications Problem solving strategies: Algorithm, flow charts, pseudocode Algorithm development (Input/Output, conditional statements, iteration, tracing of algorithm) Data types Functions Arrays Records Files Testing programs
2	**Computer Networks** Internet: Network edge, network core, access networks, transmission media, network delays, Internet (TCP/IP) protocol stack, Internet service models Application layer: Principles, Web & HTTP, web caches, FTP, E-mail, DNS, P2P systems Transport layer: Services, UDP, TCP (Segment structure, RTT and timeout estimation, flow control, connection management, congestion control) Network layer: Principles, virtual-circuit and datagram networks, Internet Protocol (IP), IP addressing and subnetting, CIDR, NAT, DHCP, Link state routing, distance vector routing, hierarchical routing, RIP, OSPF, BGP, broadcast & multicast routing Data link layer: ARP, Ethernet, IEEE 802.11
3	**Operating Systems** Theory and implementation of process management Thread management Process synchronization Deadlock management Memory management File management
4	**Data Structures and Algorithms** Arrays Linked Lists Stacks Queues Recursion Sorting and searching algorithms Heaps Trees Graphs and traversals Minimum spanning tree algorithms Shortest path algorithms Hashing Algorithm complexity, Polynomial and intractable algorithms Divide and conquer Dynamic programming Greedy algorithms
	Theory of Automata and Formal Languages Regular expressions / Regular languages Finite automata (FA) Transition graphs (TGs) NFAs Kleene's theorem Transducers (automata with output) Pumping lemma and non-regular language grammars and PDA: context free grammars, derivations, derivation trees and ambiguity,

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	simplifying CFLs Normal form grammars and parsing Decidability Chomsky's hierarchy of grammars Turing Machines Theory: Turing machines, post machine, variations on TM, TM encoding, universal turing machine, context sensitive grammars, defining computers by TMs
5	**Object Oriented Analysis and Design** Key concepts of Object Orientation Identifying and capturing requirements for OO systems using Use Cases Assigning responsibilities to objects using operation contracts Modelling and designing dynamic system behavior through system sequence diagrams and interaction diagrams (sequence diagrams and communication diagrams) Representing software system using Class diagram Understanding software design patterns and creating better software architecture through Gang of Four Patterns
6	**Database Systems** Basic database concepts Entity relationship modelling Relational data model and algebra Structured Query Language (SQL) RDBMS: Database design, functional dependencies and normal forms Transaction processing and optimization concepts Concurrency control and recovery techniques Database security and authorization Physical database design: Storage and file structure, indexed files, b-trees, files with dense index, files with variable length records
7	**Object Oriented Paradigm** Classes, methods, objects and encapsulation Constructors and destructors Operator and function overloading Inheritance Polymorphism I/O and file processing Exception handling
8	**Digital Logic Design** Fundamental concepts of computer digital design Combinational and sequential circuit analysis and design Digital circuit design methods using random logic gates Adders, subtractors Multiplexers Encoders and decoders Registers Counters Programmable logic arrays
9	**Software Engineering** Introduction to computer-based system engineering Project management Software process models Requirements specifications Software prototyping Software design: architectural design, function-oriented design, user interface design Quality assurance Software configuration management

COMPUTER SCIENCE

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PROGRAMMING FUNDAMENTALS (MCQs)

1. Consider the following code
Intz, x=5,y=-10,a=4,b=2;
z = x++ - --y * b / a;
What number will z in the sample code above contain?
A. 5 B. 6
C. 10 D. 15
➢ **Ans: C. 10**

2. With every use of a memory allocation function, what function should be used to release allocated memory which is no longer needed?
A. Unalloc() B. Dropmem()
C. Dealloc() D. Free()
➢ **Ans: D. Free()**

3. void *ptr;
myStructmyArray[10];
ptr = myArray;
Which of the following is the right method to increment the variable "ptr"?
A. ptr = ptr + sizeof(myStruct)
B. ++(int*)ptr;
C. *ptr = ptr + sizeof(myArray);
D. ptr = ptr + sizeof(ptr);
➢ **Ans: A. ptr = ptr + sizeof(myStruct)**

4. What will print when the following code is executed?
char* myFunc (char *ptr)
{
ptr += 3;
return (ptr);
}
int main()
{
char *x, *y;
x = "HELLO";
y = myFunc (x);
printf("%s\n", y);
A. y = HELLO B. y = ELLO
C. y = LLO D. y = LO
➢ **Ans: D. y = LO**

5. struct node *nPtr, *sPtr; are a linked
for (nPtr=sPtr; nPtr; nPtr=nPtr->next)
{
free(nPtr);
}
The sample code above free memory from a linked list. Which of the choices below accurately describes how it will work?
A. It will work correctly since the for loop covers the partial list.
B. It may fail since each node "nPtr" is freed before its next address cannot be accessed.
C. In the for loop, the assignment "nPtr=nPtr->next" should be changed to "nPtr=n*Ptr.next
D. None of the above
➢ **Ans: D. None of the above**

6. What function will read a specified number of elements from a file?
A. fileread() B. getline()
C. readfile() D. fread()
➢ **Ans: D. fread()**

7. "My salary was increased by 15%!" Select the statement which will EXACTLY reproduce the line of text above.
A. printf("My salary was increased by 15%!\n");
B. printf("My salary was increased by 15'%'!\n");
C. printf("\"My salary was increased by 15%%!\"\n");
D. None of the above
➢ **Ans: C. printf("\"My salary was increased by**

8. What is a difference between a declaration and a definition of a variable?
A. Both can occur multiple times, but a declaration must occur first.
B. A declaration occurs once, but a definition may occur many times.
C. Both can occur multiple times, but a definition must occur first.
D. There is no difference between them.
➢ **Ans: B. A declaration occurs once, but a definition may occur many times.**

9. inttestarray [3][2][2] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12};
What value does testarray[2][1][0] in the sample code above contain?
A. 3 B. 5
C. 7 D. 11
➢ **Ans: D. 11**

10. int a=10,b;
b=a++ + ++a;
printf("%d,%d,%d,%d",b,a++,a,++a)
;
What will be the output when following code is carry out
A. 12,10,11,13 B. 22,10,11,13
C. 22,13,13,13 D. 12,11,11,11
➢ **Ans: C. 22,13,13,13**

11. shortint x; /* assume x is 16 bits in size */
What is the maximum number that can be printed using printf("%d\n", x), assuming that x is initialized as shown above?
A. 127 B. 128
C. 255 D. 32,767
➢ **Ans: D. 32,767**

12. Consider the following code
voidmyFunc (int x)
{
if (x > 0)
myFunc(--x);
printf("%d, ", x);
}
int main()
{
myFunc(5);
return 0;
}
What will the above sample code produce when executed?
A. 0, 0, 1, 2, 3, 4,
B. 1, 2, 3, 4, 5, 5,
C. 4, 3, 2, 1, 0, 0,
D. 0, 1, 2, 3, 4, 5,
➢ **Ans: A. 0, 0, 1, 2, 3, 4,**

13. 11 ^ 5
What does the operation shown above produce?
A. 12 B. 14
C. 15 D. 17
➢ **Ans: B. 14**

14. #define MAX_NUM 15 Referring to the sample above, what is MAX_NUM?
A. MAX_NUM is an integer variable.
B. MAX_NUM is a character constant.
C. MAX_NUM is a preprocessor macro
D. MAX_NUM is a constant variable.
➢ **Ans: C. MAX_NUM is a preprocessor macro**

15. Which one of the following will turn off buffering for stdout?
A. setbuf(stdout, FALSE,NULL);.
B. setvbufer(stdout, NULL);
C. setbuf(stdout, _IONBF,NULL);
D. None of the above

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6. What is a proper method of opening a file for writing as binary file?
   A. FILE *f = fwrite("test.bin", "bin");
   B. FILE *f = fopen("test_bin", "wbin");
   C. FILE *f = fopen("test_bin", "bw");
   D. None of the above
   ➢ **Ans: D. None of the above**

17. Which one of the following functions is the correct choice for moving blocks of binary data that are of arbitrary size and position in memory?
   A. memcpy() B. memmove()
   C. memset() D. strncpy()
   ➢ **Ans: B. memmove()**

18. int x = 2 * 3 + 4 * 5;
   What value will x contain in the sample code above?
   A. 22 B. 35
   C. 26 D. 34
   ➢ **Ans: C. 26**

19. int var1;
   If a variable has been declared with file scope, as above, can it safely be accessed globally from another file?
   A. Yes; it can be referenced through the static variable.
   B. No; it would need to have been initially declared using the global keyword.
   C. No; it would have to have been initially declared as a dynamic variable.
   D. Yes; it can be referenced through the extern variable.
   ➢ **Ans: B. No; it would need to have been initially declared using the global keyword.**

20. time_t t;
   Which one of the following statements will properly initialize the variable t with the current time from the sample above will execute?
   A. t = clock();
   B. time(&t);
   C. t = ctime(&);
   D. None of the above
   ➢ **Ans: A. t = clock();**

21. Which one of the following provides conceptual support for function calls?
   A. The data segment
   B. The system stack
   C. The code segment
   D. The text segment
   ➢ **Ans: B. The system stack**

22. C is which kind of language?
   A. Machine
   B. Procedural
   C. Object-oriented
   D. Assembly
   ➢ **Ans: B. Procedural**

23. Consider the following code and what will be printed when the sample code below is executed?
```
int x = 0;
for (x=1; x<4; x++);
printf("x=%d\n", x);
```
   A. x=0 B. x=1
   C. x=2 D. x=4
   ➢ **Ans: D. x=4**

24. Let see the following code and what value will x contain when the sample code below is executed?
```
int x = 3;
if( x == 2 );
x = 0;
if( x == 3 )
x++;
else x += 2;
```
   A. 1 B. 2
   C. 3 D. 4
   ➢ **Ans: B. 2**

25. Let consider the following code and what string does ptr point to in the sample below?
```
char *ptr;
charmyString[] = "abcdefg";
ptr = myString;
ptr += 5;
```
   A. cfg B. fg
   C. cdefg D. abfeg
   ➢ **Ans: B. fg**

26. Which one of the following will declare a pointer to an integer at address 0x200 in memory?
   A. *x = 0x200; B. int *x = &0x200;
   C. int *x = 0x200; D. int *x(&0x200);
   ➢ **Ans: A. *x = 0x200;**

27. Consider the following code and referring to the sample code below, what value will the variable counter have when completed?
```
x = 3, counter = 0;
while ((x-1))
{
++counter;
x--;
}
```
   A. 1 B. 2
   C. 4 D. 5
   ➢ **Ans: B. 2**

28. Char ** array [12][12][12];
   Consider array, defined above. Which one of the following definitions and initializations of p is valid?
   A. char ***** p = array[2];.
   B. char ** (* p) [12][12] = array;
   C. const char ** p [12] = array;
   D. char * (* p) [12][12] = array;
   ➢ **Ans: B. char ** (* p) [12][12] = array;**

29. Void (*signal(int sig, void (*handler) (int))) (int);
   Which one of the following definitions of sighandler_t allows the above declaration to be rewritten as follows:
   sighandler_t signal (int sig, sighandler_t handler);
   A. typedefsighandler_t void (*int) (int);
   B. typedef void *sighandler_t (int);
   C. typedef void (*sighandler_t) (int);
   D. #define sighandler_t void (*) (int)
   ➢ **Ans: C. typedef void (*sighandler_t) (int);**

30. Struct customer *ptr = malloc(sizeof(struct customer));
   Given the sample allocation for the pointer "ptr" found above, which one of the following statements is used to reallocate ptr to be an array of 10 elements?
   A. realloc(ptr, 10 * sizeof(struct customer));
   B. ptr += malloc(10 * sizeof(struct customer));
   C. ptr = realloc(ptr, 10 * sizeof(struct customer));
   D. realloc(ptr, 10 * sizeof(struct customer));
   ➢ **Ans: C. ptr = real loc(ptr, 10 * size of(struct customer));**

31. Which one of the following is a true statement about pointers?
   A. Pointer arithmetic is permitted on pointers of static type.
   B. A pointer of type void * can be used to directly modify an object of object type.
   C. Standard C mandates a minimum of two levels of indirection accessible through a pointer.
   D. None of the above
   ➢ Ans: D. None of the above

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Which one of the following functions returns the string representation from a pointer to a time_t value?
A. Limed
B. get time
C. string time
D. None of the above
➤ **Ans: D. None of the above**

33. consider the following code
shorttestarray[4][3] = { {1}, {2, 3}, {4, 5, 6} };
printf("%d\n", size of(testarray));
Assuming a short is two bytes long, what will be printed by the above code?
A. 6 B. 7
C. 12 D. 24
➤ **Ans: D. 24**

34. charbuf [] = "Hello world!"; char * buf = "Hello world!";
In terms of code generation, how do the two definitions of buf, both presented above, differ?
A. The first definition certainly allows the contents of buf to be safely modified at runtime; the second definition does not.
B. The first definition is not suitable for usage as an argument to a function call; the second definition is.
C. The first definition is not legal because it does not indicate the size of the array to be allocated; the second definition is legal.
D. They do not differ -- they are functionally equivalent.
➤ **Ans: D. They do not differ -- they are functionally equivalent.**

35. In a C expression, how is a logical
C. AND D. &&
➤ **Ans: D. &&**

36. How do printf()'s format specifiers %e and %f differ in their treatment of floating-point numbers?
A. %e always displays an argument of type double in engineering notation; %f always displays an argument of type double in decimalnotation.
B. %e expects a corresponding argument of type float; %f expects a corresponding argument of type float.
C. %e displays a double in engineering notation if the number is very small or very large. Otherwise, it behaves like %f and displays the number in hexadecimal notation.
D. None of the above.
➤ **Ans: A. %e always displays an argument of type double in engineering notation; %f always displays an argument of type double in decimal notation.**

37. Which one of the following standard C functions can be used to reset end-of-file and error conditions on an open stream?
A. clearerr() B. fseek()
C. ferror() D. feof()
➤ **Ans: D. feof()**

38. Which one of the following will read a character from the keyboard and will store it in the variable c?
A. c = getc();
B. getc(&c);
C. getchar(&c)
D. c = getchar();

39. Consider the following code and what is wrong with the below code (assuming the call to malloc does not fail)?
char ptr1[] = "Hello World";
char *ptr2 = malloc(5);
ptr2 = ptr1;
A. There will be a memory overwrite.
B. There will be a memory leak.
C. There will be a segmentation fault.
D. None of the above
➤ **Ans: D. None of the above**

40. Which one of the following C operators is right associative?
A. = B. ,
C. [] D. ^
➤ **Ans: C. []**

41. What does the "auto" specifier do?
A. It automatically initializes a variable to 0.
B. It indicates that a variable's memory will automatically be preserved
C. It automatically increments by one (1)the variable when used.
D. It automatically decrements a variable to by one.(1)
➤ **Ans: B. It indicates that a variable's memory will automatically be preserved**

42. How a file is included a system header file called sysheader.h in a C source file?
A. #include <sysheader.h>
B. #incl "sysheader.h"
C. #includefile<sysheader>
D. #include sysheader.h
➤ **Ans: A. #include**

43. Which one of the following printf() format specifiers indicates to print a double value in decimal notation, left aligned in a 30-character field, to four (4) digits of precision?
A. %-30.4e B. %4.30e
C. %-4.30f D. %-30.4f
➤ **Ans: D. %-30.4f**

44. Let considering the following code what will be printed when the sample code below is executed?
int x = 0;
for (; ;)
{
if (x++ == 4)
break;
continue;
}
printf("x=%d\n", x);
A. x=0 B. x=1
C. x=4 D. x=5
➤ **Ans: D. x=5**

45. According to the standard C specification, what are the respective minimum sizes (in bytes) of the following three data types: short; int; and long?
A. 1, 2, 2 B. 1, 2, 4
C. 1, 2, 8 D. 2, 2, 4
➤ **Ans: D. 2, 2, 4**

46. What will be output when the following code is executed
int y[4] = {6, 7, 8, 9};
int *ptr = y + 2;
printf("%d\n", ptr[1]); /*ptr+1 == ptr[1]*/
A. 6 B. 10
C. 9 D. 7

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47. How many bytes are allocated by the definition below?
char txt [20] = "Hello world!\0";
A. 11 bytes B. 12 bytes
C. 13 bytes D. 20 bytes
➢ **Ans: D. 20 bytes**

48. Which one of the following variable names is NOT valid?
A. go_cart B. go4it
C. 4season D. run4
➢ **Ans: C. 4season**

49 int a [8] = { 0, 1, 2, 3 };
The definition of a above explicitly initializes its first four elements. Which one of the following describes how the compiler treats the remaining four elements?
A. Standard C defines this particular behavior as implementation-dependent.
B. The remaining elements are initialized to zero (0).
C. It is illegal to initialize only a portion of the array.
D. As with an enum, the compiler assigns values to the remaining elements by counting up from the last explicitly initialized element. The final four elements will acquire the values 4, 5, 6, and 7, respectively.
➢ **Ans: B. The remaining elements are initialized to zero(0).**

50. Which one of the following is a true statement about pointers?
A. They are always 32-bit values.
B. For efficiency, pointer values are always stored in machine registers.
C. [illegible] pointers may be subtracted from each other.
D. None of the above
➢ **Ans: D. None of the above**

51. Which one of the following statements allocates enough space to hold an array of 10 integers that are initialized to 0?
A. int *ptr = (int *) malloc(10, sizeof(int));
B. int *ptr = (int *) calloc(10, sizeof(int));
C. int *ptr = (int *) malloc(10*sizeof(int));
D. None of the above
➢ **Ans: C. int *ptr = (int *) malloc(10*sizeof(int));**

52. What are two predefined FILE pointers in C?
A. stdout and stdin
B. console and error
C. stdip and stderror
D. None of the above
➢ **Ans: D. None of the above**

53. How is a variable accessed from another file?
A. The global variable is referenced via the extern specifier
B. The local variable is referenced via the global specifier.
C. The static variable is referenced via the local specifier.
D. The dynamic variable is referenced via the pointer specifier.
➢ **Ans: A. The global variable is referenced via the extern**

54. When applied to a variable, what does the unary "&" operator yield?
A. The variable's value
B. The variable's binary form
C. The variable's address
D. The variable's data
➢ **Ans: C. The variable's address**

55. Which one of the following is NOT a valid identifier?
A. __ident B. auto
C. bigNumber D. g42277
➢ **Ans: B. auto**

56. Global variables that are declared static
A. Are defined by Standard C
B. Internal to the current translation unit
C. Visible to all translation units
D. Allocated on the heap
➢ **Ans: D. Allocated on the heap**

57. Which one of the following is NOT a valid C identifier?
A. ___S B. 1___
C. ___1 D. S___
➢ **Ans: B. 1___**

58. According to Standard C, what is the type of an unsuffixed floating-point literal, such as 123.45?
A. Long double B. Unspecified
C. Float D. Long int
➢ **Ans: C. Float**

59. Which one of the following is true for identifiers that begin with an underscore?
A. They are generally treated equally by preprocessors and compilers from same identifiers.
B. They are not case-insensitive.
C. They are reserved for usage by standards libraries.
D. None of the above
➢ **Ans: D. None of the above**

60. Which one of the following is valid for opening a read-only ASCII file
A. fileOpen (filenm, "read");
B. Open (filenm, "r ");
C. fileOpen (filenm, "read")
D. fopen (filenm, "r");
➢ **Ans: D. fopen (filenm, "r");**

61. If there is a need to see output as soon as possible, what function will force the output from the buffer into the out0.put stream?
A. flush() B. output()
C. fflush() D. dump()
➢ **Ans: A. flush()**

62. What number is equivalent to -4e3?
A. -4000 B. -400
C. -40 D. .0004
➢ **Ans: A. -4000**

63. How does variable definition differ from variable declaration?
A. Definition allocates storage for a variable, but declaration only informs the compiler as to the variable's type.
B. Declaration allocates storage for a variable, but definition only informs the compiler as to the variable's type.
C. Variables may be defined many times, but may be declared only once.
D. Variable definition must precede variable declaration.
➢ **Ans: C. Variables may be defined many times, but may**

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64. c = getchar();
What is the proper declaration for the variable c in the code above?
A. char *c;
B. unsigned int c;
C. int c;
D. char c;
➤ **Ans: D. char c;**

65 A _____ can be edited by the user at runtime:
A. label. B. text box.
C. button. D. form.
➤ **Ans: B. text box.**

66 A VB control used to help keep related data fields together is the:
A. container B. group box
C. label D. radio button
➤ **Ans: B. group box**

67 To hide all the controls in a group box:
A. set the Enabled property of any control to False.
B. set the Enabled property of any control to True.
C. set the Visible property of the group box to False.
D. set the Visible property of any control to True.
➤ **Ans: C. set the Visible property of the group box to False.**

68 To disable all the controls in a group box:
A. set the Enabled property of any control to False.
B. set the Enabled property of the group box to False.
C. set the Visible property of the group box to True.
D. set the Disabled property of the group box to True.
➤ **Ans: B. set the Enabled property of the group box to**

69 The control you should use to allow the user to choose from a small list of mutually exclusive values is the:
A. check box. B. radio button.
C. combo box. D. text box.
➤ **Ans: B. radio button.**

70 To add Computer Science to a combo box named cboDepartments at runtime:
A. use the statement cboDepartments.Add("Computer Science").
B. use the statement cboDepartments.Items.Add("Computer Science").
C. use the statement cboDepartments.AddItems("Computer Science").
D. use the statement cboDepartments.Items.Add.Computer Science.
➤ **Ans: B. use the statement cboDepartments.Items.Add("Computer Science").**

71 To have the items in a list or combo display in ascending order, set the _____ to True:
A. Sorted method
B. Ascending property
C. Sorted property
D. Selected Index property
➤ **Ans: C. Sorted property**

72 When the text box is used for data entry, you should be prepared to write code for:
A. data validation.
B. data input.
C. grouping similar text boxes together.
D. giving the user a clue about what type of data to enter.
➤ **Ans: A. data validation.**

73 The property that determines the order in which a control receives focus is:
A. Tab Order.
B. Tab Sequence.
C. Tab Index.
D. Sort Order.
➤ **Ans: C. Tab Index.**

74 The event that occurs when the form is brought into memory and before the form is displayed is the:
A. Form Open event.
B. Form Load event.
C. Form Click event.
D. Form In Memory event.
➤ **Ans: B. Form Load event.**

75 The click event is most commonly associated with the:
A. text box. B. label.
C. form. D. button.
➤ **Ans: D. button.**

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OBJECT-ORIENTED PROGRAMMING

Object-Oriented Programming (OOP) is dissimilar from procedural programming languages. Everything in OOP is grouped as "objects" OOP, defined in the purest sense, and is implemented by sending messages to objects.

An Object

An object can be considered a "thing" that can perform a set of related activities. The set of activities that the object performs defines the object's behavior. For example, the hand can grip something or a Student (object) can give the name or address.

In pure OOP terms an object is an instance of a class.

Objects provide a number of benefits, including:

1. **Modularity:** The source code for an object can be written and maintained independently of the source code for other objects. Once created, an object can be easily passed around inside the system.
2. **Information-hiding:** By interacting only with an object's methods, the details of its internal implementation remain hidden from the outside world.
3. **Code re-use:** If an object already exists (perhaps written by another software developer), you can use that object in your program. This allows specialists to implement/test/debug complex, task-specific objects, which you can then trust to run in your own code.
4. **Plug ability and debugging.ease:** If a particular object turns out to be problematic, you can simply remove it from your application and plug in a different object as its replacement. This is analogous to fixing mechanical problems in the real world. If a bolt breaks, you replace it, not the entire machine.

Interface

An interface is a contract between a class and the outside world. When a class implements an interface, it promises to provide the behavior published by that interface. This section defines a simple interface and explains the necessary changes for any class that implements it.

Package

A package is a name space for organizing classes and interfaces in a logical manner. Placing your code into packages makes large software projects easier to manage. This section explains why this is useful, and introduces you to the Application Programming Interface (API) provided by the Java platform.

Class

A class is the blueprint from which individual objects are created.

Identify and design a Class

This is an art; each designer uses different techniques to identify classes. However according to **Object Oriented** Design Principles, there are five principles that you must follow when design a class.

- SRP - The Single Responsibility Principle –

A class should have one, and only one, reason to change.

OCP - The Open Closed Principle -

You should be able to extend a classes behavior, without modifying it.

LSP - The Liskov Substitution Principle-

Derived classes must be substitutable for their base classes.

DIP - The Dependency Inversion Principle-

Depend on abstractions, not on concretions.

ISP - The Interface Segregation Principle-

Make fine grained interfaces that are client specific.

Sequential Operation

In sequential operation an object will send message to another object of itself to execute the program. Control will not return to the original sending object until all other messages have been completed.

Method

Each message has code that linked with it. When an object obtains a message, code is executed. In other words, these messages decide an object's performance and the code determines how the object carries out each message. The code that is associated with each message is called a method. The message name is also called the method name due to its close association with the method.

Object's Data

Each object need to keep the information on how to perform its defined behavior. Some objects also contain variables that support their behavior. These variables are called instance variables. Only the instance method for an object can refer to and change the values stored in the instance variables. The instance methods for other objects cannot refer to this object's data. An object may only access another object's data by sending it messages.

Object-Oriented Problem Solving Approach

Object-oriented problem solving technique is very like to the way a human solves daily problems. It consists of identifying objects and how to use these objects in the correct sequence to solve the problem. In other words, object-oriented problem solving can consist of designing objects whose behavior solves a specific problem. A message to an object causes it to perform its operations and solve its part of the problem.

The object-oriented problem solving approach, in general, can be divided into four steps.

(1) Recognize the problem.
(2) Spot the objects needed for the solution.
(3) Recognize messages to be sent to the objects.
(4) Create a sequence of messages to the objects that solve the problem.

Object-Oriented Paradigm

A computer language is called object-oriented if it supports the four specific object properties called Inheritance, Data Abstraction, Encapsulation, Polymorphism

Inheritance

Inheritance allows a class to have the same behavior as another class and extend or tailor that behavior to provide special action for specific needs.

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Abstraction

Encapsulation is the inclusion within a program object of all the data. The object is said to "publish its interfaces." Other objects adhere to these interfaces to use the object without having to be concerned with how the object accomplishes it.

Polymorphism

Another benefit of separating implementation from behavior is polymorphism. Polymorphism allows two or more objects respond to the same message.

Operator Overloading

The operator overloading is a specific case of *polymorphisms* in which some or all of operators like +, - or == are treated as polymorphic functions and as such have different behaviors depending on the types of its arguments.

Method Overriding

Method overriding is a language feature that allows a subclass to override a specific implementation of a method that is already provided by one of its super-classes.
A subclass can give its own definition of methods but need to have the same signature as the method in its super-class. This means that when overriding a method the subclass's method has to have the same name and parameter list as the super-class's overridden method.

OBJECT ORIENTED PROGRAMMING (MCQs)

1. Virtual functions allow you to
   A. Create an array of type pointer-to-base class that can hold pointers to child classes.
   B. Create functions that can never be accessed by the other functions.
   C. Use the same function call to execute member functions of objects from different classes.
   D. Group objects of different classes so they can all be accessed by the same function code.
   ➢ **Ans: C. Use the same function call to execute member functions of objects from different classes.**

2. Consider the code below, class c1{ }; class c2 : public c1 { }; class c3 : public c2 { }; Then c2 is,
   A. Direct base class of c2
   B. Direct child class of c3
   C. Direct base class of c1
   D. Direct child class of c1
   ➢ **Ans: B. Direct child class of c3**

3. Which one of the following operators is used to access members of reference data types?
   A. -> operator B. & operator
   C. ++ operator D. operator
   ➢ **Ans: D. . operator**

4. Function overloading is done with respect of?
   A. A single class
   B. A derived class
   C. A base class

5. Child class can call constructor of its
   A. Direct base class
   B. Indirect base class
   C. Both direct and indirect base classes
   D. None of the above
   ➢ **Ans: C. Both direct and indirect base classes**

6. A template argument is preceded by the keyword
   A. Public B. Class
   C. Vector D. Private
   ➢ **Ans: C. Vector**

7. Which of the following causes run time binding?
   A. Declaring object of abstract class
   B. Declaring pointer of abstract class
   C. Declaring overridden methods as non-virtual
   D. None of the above
   ➢ **Ans: D. None of the above**

8. Which is the best approach if it is required to have more than one functions having exactly same functionality and implemented on different data types?
   A. Polymorphism
   B. Overloading
   C. Data hiding
   D. Encapsulation
   ➢ **Ans: B. Overloading**

9. Identify the correct way of declaring an object of user defined template class A for char type members?
   A. < char >obj;
   B. <char>A obj;
   C. A obj<char>;

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10. Which of the following is correct about copy constructor?
A. The user must define the operation of the constructor.
B. The user must define the operation of the dynamic constructor class.
C. The user must define the operation of the copy constructor.
D. The user must define the operation of the static constructor.
➢ **Ans: C. The user must define the operation of the copy constructor.**

11. Template functions use
A. Greater Memory than ordinary functions.
B. Lesser Memory than ordinary functions.
C. Equal Memory than ordinary functions.
D. None of the above
➢ **Ans: B. Lesser Memory than ordinary functions.**

12. The find () algorithm
A. Finds matching sequences of elements in predefined strings.
B. Finds a container that matches a specified container.
C. Takes integrators as its first two arguments.
D. None of the above
➢ **Ans: C. Takes iterators as its first two arguments.**

13. Compiler performs
A. Static type checking to diagnose type errors.
B. Dynamic type checking to diagnose type errors.
C. Bound type checking to diagnose type errors.
D. Unbound type checking to diagnose type errors.
➢ **Ans: A. Static type checking to diagnose type errors.**

14. Which of the following option is best indication about generic programming?
A. Reusability
B. Adaptability
C. Compatibility
D. None of the above
➢ **Ans: A. Reusability**

15. Vectors contain contiguous elements stored as
A. Data type B. Array
C. Static variable D. Dynamic variable
➢ **Ans: B. Array**

16. Let consider the following uninitialized vector as under
vector<int>evec;
After adding the statment,
evecpush_back(21);
what will happen?
A. The above statement will add an element to the start (the back) of evec and will initialize it with the value 21.
B. The above statement will delete an element to the center of evec and will reinitialize it with the value 21.
C. The above statement will delete an element to the end (the back) of evec and will reinitialize it with the value 21.
D. The above statement will add an element to the end (the back) of evec and initialize it with the value 21.
➢ **Ans: A. The above statement will add an element to the start (the back) of evec and will initialize it with the value 21.**

17. In a de-queue
A. Data can be quickly inserted or deleted at any arbitrary location.
B. Data can be inserted or deleted at any arbitrary location, but the process is relatively slow.
C. Data cannot be quickly inserted or deleted at either end.
D. Data can be inserted or deleted at either end, but the process is relatively slow.
➢ **Ans: D.Data can be inserted or deleted at either end, but the process is relatively slow.**

18. Identify the correct statement
A. User can use "this" pointer in the constructor in the body and even in the initialization list of any class if we are careful.
B. User can use "this" pointer in the constructor in the body of the function.
C. We can use "this" pointer in the constructor in the body and even in the initialization list of any class if we are careful.
D. None of these.
➢ **Ans: C. We can use "this" pointer in the constructor in the body and even in the initialization list of any class if we are careful.**

19. Default constructor is such constructor which has no
A. Temporary constructor B. Default parameter
C. Parameter
D. None of the above
➢ **Ans: C. Parameter**

20. Public methods of base class can
A. Directly be accessed in its derived class
B. Indirectly be accessed in its derived class
C. Simultaneously be accessed in its derived class
D. Cannot be access in derived class
➢ **Ans: A. Directly be accessed in its derived class**

21. The type which is used to declare a pointer is called its
A. Public type B. Private type
C. Default type D. Reference type
➢ **Ans: D. Reference type**

22. Which of the following members are somewhere between public and private members?
A. Protected members
B. Public as well as private members
C. Private members
D. Global members
➢ **Ans: A. Protected members**

23. Which of these are error handling techniques?
A. Abnormal Termination B. Graceful Termination
C. Return the illegal D. All of the above
➢ **Ans: D. All of the above**

24. Which of the following try block to catch the object thrown?
A. Throw block B. Object block
C. Catch block D. Try block
➢ **Ans: C. Catch block**

25. Graphical representation of the classes and objects is called object model that shows
A. Class Name only
B. Class Name and attributes
C. Relationships of the objects and classes
D. All of the above
➢ **Ans: D. All of the above**

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Which of the following programming approach uses functions as a key concept to perform action-oriented tasks?
A. Structured programming
B. Modular programming
C. Procedure-oriented programming
D. Object-oriented programming
➢ **Ans: C. Procedure-oriented programming**

27. Which one of the following OOP concepts enables reusability of components?
A. Inheritance
B. Encapsulation
C. Polymorphism
D. All of the above
➢ **Ans: A. Inheritance**

28. The concept of hierarchical classification is related to
A. Abstraction
B. Inheritance
C. Function overloading
D. None of the above
➢ **Ans: B. Inheritance**

29. Object-based programming languages do not support
A. Polymorphism
B. Dynamic binding
C. Encapsulation
D. All of the above
➢ **Ans: B. Dynamic binding**

30. Information hiding can be achieved through
A. Inheritance
B. Constructor class
C. [illegible]

31. A good model is that which
A. Loosely related to a real life problem.
B. Openly related to a real life problem.
C. Closely related to a real life problem.
D. None of the above
➢ **Ans: C. Closely related to a real life problem.**

32. Which of the following feature of OOP is used to derive a class from another?
A. Polymorphism
B. Overloading
C. Data binding
D. Inheritance
➢ **Ans: D. Inheritance**

33. Which of the following is a weak relationship between two objects?
A. Data hiding
B. Composition
C. Aggregation
D. None of the above
➢ **Ans: C. Aggregation**

34. Which one is a class association?
A. Multiple Association
B. Inheritance
C. Child association
D. Parent association
➢ **Ans: B. Inheritance**

35. Suppose there is an object of type Person, which of the following can be considered as one of its attributes
A. Name
B. Experience
C. Work()
D. None of the above

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36. Which one is not an object association?
A. Multiple association
B. Inheritance
C. Collection of objects
D. All of the above
➢ **Ans: D. All of the above**

37. By the use of encapsulation a user can obtained
A. Information hiding
B. Least interdependencies among classes
C. Implementation independence among modules
D. All of given options
➢ **Ans: Information hiding**

38. In constant member function the type of this pointer is
A. Constant pointer to constant object
B. Constant pointer to object
C. Constant pointer to class
D. Constant pointer to static object
➢ **Ans: Constant pointer to object**

39. What is best method to extract common behavior and attributes from the given classes and make a separate class of those common behaviors and attributes?
A. Generalization
B. Sub-typing
C. Specialization
D. Abstraction
➢ **Ans: A. Generalization**

40. The ability to derive a class from more than one classes is called
A. Single inheritance
B. Abstraction
C. Multiple inheritance
D. None of the above
➢ **Ans: Multiple inheritance**

41. If My Class has a destructor wh[illegible] the destructor named?
A. My Class B. ~MyClass
C. My~Class D. MyClass~
➢ **Ans: B. ~MyClass**

42. Identify correct statement about a valid class declaration?
A. Class abc{ -----}
B. Class abc();
C. Class abc{ -----};
D. None of the above
➢ **Ans: C. Class abc{ ----};**

43. With no using Deep copy constructor
A. System crash problem will occur.
B. Memory Leakage problem will occur.
C. Dangling pointer problem will occur.
D. All of the above.
➢ **Ans: All of the above.**

44. If only one behavior of a derived class is incompatible with base class, then it is called
A. Generalization
B. Specialization
C. Abstraction
D. Single inheritance
➢ **Ans: Specialization**

45. Which may not be an integral part of an object?
A. State
B. Behavior
C. Protected data members
D. All of the above
➢ Ans: All of the above

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46. A default catch block catches
A. All thrown objects
B. No thrown objects
C. Any thrown object that has not been caught by an earlier catch block
D. All thrown objects that have been caught by an earlier catch block
➢ **Ans: C.Any thrown object that has not been caught by an earlier catch block**

47. Format flags may be combined using
A. The bitwise OR operator (|)
B. The logical OR operator (||)
C. The bitwise AND operator (&)
D. None of the a above
➢ **Ans: A. The bitwise OR operator (|)**

48. The use of the break statement in a switch statement is
A. Optional
B. Compulsory
C. Not permitted
D. To check an error
➢ **Ans: A. Optional**

49. To expose a data member to the program, which section of a class is used to declare the data member?
A. Common B. Private
C. Public D. User
➢ **Ans: C. Public**

50. Which of the following are valid characters for a numeric literal constant?
A. A comma
B. dollar sign ($)
C. A percent sign (%)
D. None of the above
➢ **Ans: D. None of the above**

51. A function that changes the state of the cout object is called a(n)
A. Member B. Operator
C. Operand D. Manipulator
➢ **Ans: D. Manipulator**

52. Identify the correct statement
A. Interfaces cannot have static members.
B. Interfaces can have dynamic members.
C. Interface can use object classes.
D. None of the above
➢ **Ans: A. Interfaces cannot have static members.**

53. An object can be defined as
A. A combination of message and data.
B. A combination of data types.
C. A combination objects.
D. A combination of Array
➢ **Ans: A. A combination of message and data.**

54. A class can best defined as
A. An abstract representation of something with certain properties.
B. A concrete representation of something with certain properties.
C. An abstract representation of something with certain properties and abilities.
D. None of the above
➢ **Ans: C. An abstract representation of something with certain properties and abilities.**

55. What is the difference between assignment and initialization?
A. Assignment can be done as many times as desired whereas initialization can be done only once.
B. Assignment can be done when initialization can be done as many times as desired.
C. Assignment can be done only once whereas initialization can be done as many times as desired.
D. None of the above.
➢ **Ans: A. Assignment can be done as many times as desired whereas initialization can be done only once.**

56. What is an encapsulation?
A. An action or occurrence such as click
B. A package of one or more components together
C. A set of statements that performs specific task on static objects.
D. A reference type variable which cannot dereference.
➢ **Ans: B. A package of one or more components together**

57. Which of the following is correct about the new keyword?
A. Used to create objects on the heap and invoke constructors
B. Used to hide an inherited member from a base class member
C. A and B
D. None of the above
➢ **Ans: C. A and B**

58. Suppose class an implements interface I1. The class explicitly implements a member of I1. Which method is to use to access this member?
A. Through a class instance
B. Through an instance of interface
C. Through the object of that class
D. Through the this operator
➢ **Ans: B. Through an instance of interface**

59. Which of the following is true about abstract class
A. Abstract class cannot be inherited
B. Abstract class can be access by the member function
C. Abstract class can be access by static variable.
D. Abstract class can be inherited.
➢ **Ans: D. Abstract class can be inherited.**

60. Choose one of the following
A. Struct is encapsulation
B. Class is encapsulation
C. Functions is hiding the parameters.
D. None of the above
➢ **Ans: B. Class is encapsulation**

61. Which among the following is not true about interfaces?
A. Interface can have properties
B. Interface cannot have access modifiers
C. Interface can have fields
D. None of the above
➢ **Ans: C. Interface can have fields**

62. The Boolean expression A >= B is equivalent to which of the following expressions?
A. !(A > B)
B. (B >= A)!
C. !(A < B)
D. A <= B

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63. If a subclass has the same method identifier as a base class method then
A. A logical error message will occur.
B. A syntax error will occur.
C. The base class method will be used.
D. The subclass method will be used.
➢ **Ans: D. The subclass method will be used.**

64. Inheritance is the process of
A. Using classes in the established standard c++ library.
B. Using features from an existing class.
C. Combining data and the methods, which process the data, inside the same module.
D. Dividing a program into multiple related files for each class in the program.
➢ **Ans: B. Using features from an existing class.**

65. Which of the following is example of encapsulation
A. Steering wheel of the car
B. Truck
C. Color of the truck
D. Music system of the car
➢ **Ans: B. Truck**

66. Which of the following is similar to the floor plan of a house?
A. Physical design
B. Process-level design
C. Architectural design
D. Logical design
➢ **Ans: C. Architectural design**

67. Which of the following are not in composition in "Bus as a system"?
A. Bus and doors
B. Bus and music system
C. Bu and gears
D. Bu and gears
➢ **Ans: B. Bus and music system**

68. Access to private data or private methods is
A. Restricted to objects of the same class.
B. Restricted to methods of other classes.
C. Restricted to member of other class.
D. Restricted to the data types of the other class.
➢ **Ans: B. Restricted to methods of other classes.**

69. Another name of data in a class is
A. Objects
B. Fields
C. Access identifier
D. Instance
➢ **Ans: B. Fields**

70. Information hiding is the theory of
A. Declaring all significant data as public
B. Storing information in private data fields.
C. Storing information in public data fields.
D. Storing data in object classes.
➢ **Ans: B. Storing information in private data fields.**

71. Methods are best defined as
A. Action modules that contains private variables.
B. Class variables that store information.
C. Action modules that process data.
D. Class which contained public variable.
➢ **Ans: C. Action modules that process data.**

72. Class methods are usually used when
A. Multiple copies of the class needs to be loaded
B. Multiple copies or instances of a class are required.
C. Single copy is necessary to pass information to the methods.
D. Multiple static functions are used in a class.
➢ **Ans: B. Multiple copies or instances of a class are required.**

73. When is a constructor called?
A. Each time the constructor identifier is used in a program statement
B. During the declaration of a new object
C. During the instantiation of a class
D. At the time of program execution
➢ **Ans: C. During the instantiation of a class**

74. What is an overloaded constructor?
A. A constructor with too many program statements.
B. A second constructor with the same signature heading as the first constructor.
C. A constructor with a different identifier than the first constructor.
D. A second or other multiple constructors with a different signature than any other constructor.
➢ **Ans: D. A second or other multiple constructors with a**

75. Instantiation is the moment that
A. Memory is de-allocated for a specific object of a class.
B. Memory is allocated for a specific object, which is a member of a class.
C. A program which has static variables.
D. A memory is allocated for a specific object of a class.
➢ **Ans: D. A memory is allocated for a specific object of a class.**

76. Object Oriented Programming is characterizing by using
A. Encapsulation B. Inheritance
C. Polymorphism D. All of the above
➢ **Ans: D. All of the above**

77. An object is better defined as
A. It is a user-defined function.
B. It is combination of both data and functions of that class.
C. It is one instance of a more general data type.
D. It is a static member of the class.
➢ **Ans: C. It is one instance of a more general data type.**

78. The scope of an object is
A. Within that class in which it is defined.
B. Total number of data attributes used by an object.
C. Range of accessing member methods.
D. None of the above.

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An array is a defined as
A. Data structure with one, or more, elements of the different types.
B. Data structure with FIFO access type.
C. Data structure, which allows transfer between heap and stack.
D. Data structure with one or more elements of the same types.
➢ **Ans: D. Data structure with one or more elements of the same types.**

80. Object methods are typically used when
A. Multiple instance of the class are required.
B. Multiple copies of a class are required.
C. A single copy of the class is required to be loaded.
D. None of the above
➢ **Ans: C. A single copy of the class is required to be loaded.**

81. While simple data types are used as parameter passing then,
A. The current and old value of the simple data type's variable is copied.
B. The initial value of the simple data type's variable is copied.
C. The actual current value of the simple data type's variable is copied.
D. None of the above.
➢ **Ans: C. The actual current**

82. When objects are used for parameter passing then.
A. The current values of the data attributes of the object are copied.
B. The initial values of the object instantiation information are copied.
C. The memory reference where the object information is stored is copied.
D. A new object of the same class as the parameter object is instantiated.
➢ **Ans: A. The current values of the data attributes of the object are copied.**

83. A class is best defined as
A. It is a user-defined function.
B. It combines both data and the methods that act upon the data in the same module.
C. It is one instance of a more general data type.
D. In one instance of the static variable.
➢ **Ans: B. It combines both data and the methods that act upon the data in the same module.**

84. Which of the following shows correct syntax to create an object of the Piggy class?
A. Piggy new tom = new Piggy();
B. New Piggy = new tom();
C. Piggy tom = new Piggy();
D. Tom new = new Piggy;
➢ **Ans: C. Piggy tom = new Piggy();**

85. While using method overriding, which of the following statement is true?
A. Number of parameters determines which version of an overridden method is invoked.
B. The instance of the class determines which version of an overridden method is invoked.
C. The class determines which version of an overridden method is invoked.
D. The object reference determines which version of an overridden method is invoked.
➢ **Ans: C. The class determines which version of an overridden method is invoked.**

86. The dowhile loop is ideal for loop structures when we want it
A. Must repeat some process a fixed number of times.
B. Must execute some process at least one time.
C. Must check the loop condition before the loop body is executed.
D. Must check the loop condition after the loop body is executed.
➢ **Ans: B. Must execute some process at least one time.**

87. A class method call is necessary which
A. May be called with the method identifier when executing user defined data types.
B. May be called with the method identifier when executing user defined functions.
C. May be called with the method identifier only in certain conditions
D. Uses the class identifier only to access object identifier.
➢ **Ans: C. May be called with the method identifier only in certain conditions.**

88. Polymorphism minimizes the attempt required to expand an object system by
A. Coupling objects together more tightly
B. Enabling a number of different operations to share the same name
C. Enabling a number of operations to share the same data.
D. Eradicates the obstacle forced by encapsulation.
➢ **Ans: B. Enabling a number of different operations to share the same name**

89. Object Oriented Programming is best defined as
A. It makes programs more reliable.
B. It simulates real life.
C. It uses a lot of intimidating vocabulary, which is not as bad as it sounds.
D. None of the above
➢ **Ans: B. It simulates real life.**

90. What is anonymous class?
A. Class defined inside a method without a name
B. It is instantiated and declared in the different place and can have explicit constructors
C. It is declared with in the same class and can access in different fuctions.
D. None of the above

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91. What are the different creational patterns in OO design?
A. Factory pattern & Single ton pattern
B. Hiding class patterns
C. Inner class functions patterns
D. None of the above
➢ **Ans: A. Factory pattern & Single ton pattern**

92. Which of the following statement is true
A. Anonymous classes can have explicit constructors.
B. Anonymous classes cannot have explicit constructors.
C. Anonymous classes can be defined in other classes.
D. None of the above.
➢ **Ans: B. Anonymous classes cannot have explicit constructors.**

93. A class can have many methods with the same name, as long as the number of parameters is different is called as
A. Function Overloading
B. Function Invocating
C. Function Overriding
D. Function Labeling
➢ **Ans: A. Function Overloading**

94. What are the benefits of inheritance?
A. It permits code reusability. Reusability saves time in program development.
B. A void area in memory is returned so that you can populate it.
C. It permits the user to access the parent member function in child class.
D. None of the above
➢ **Ans: A. It permits code**

95. What is the difference between virtual functions and pure virtual functions?
A. A virtual function must have a definition in the class in which it is declared. A pure virtual function does not provide a definition.
B. A virtual function does not provide a definition. A pure virtual function must have a definition in the class in which it is declared.
C. Both are same.
D. None of the above
➢ **Ans: B. A virtual function must have a definition in the class in which it is declared. A pure virtual function does not provide a definition.**

96. The relationship between a teacher & a student is
A. Alliance
B. Association
C. Inheritance
D. None of the above
➢ **Ans: B. Association**

97. What is the difference between the terms fatal error and non–fatal error?
A. A fatal error causes a program to terminate temporally. A nonfatal error occurs when the syntax of the program is incorrect.
B. A fatal error immediately lets you know there is a problem with the program, whereas a nonfatal error can be subtle and possibly go undetected.
C. Both are same
D. None of the above
➢ **Ans: B. A fatal error immediately lets you know there is a problem with the program, whereas a nonfatal error can be subtle and**

98. Which of the following statement is incorrect about objects?
A. An object is an instance of a class
B. Objects can access both instance and static data
C. All classes extend the object class
D. Objects do not permit encapsulation
➢ **Ans: D. Objects do not permit encapsulation**

99. Which of the following statement best describes the polymorphism?
A. Polymorphism is the technique by which an object that is used to invoke a method can actually invoke different methods, depending on the nature of the control structure.
B. Polymorphism is the technique by which an object is used to invoke user defined functions at different times.
C. Polymorphism is the technique by which an object reference is used to refer to any object created from a class that is related to the reference type by inheritance.
D. None of the above.
➢ **Ans: C. Polymorphism is the technique by which an object reference is used to refer to any object created from a class that is related to the reference type by inheritance.**

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1 The parameters which are used to measure the efficiency of an algorithm are.
A. Processor and C.P.U,
B. complexity and integrity,
C. Time and space,
D. Data and space,
➤ **Ans: C. Time and space,**

2 In what terms the time factor when determining the efficiency of algorithm is measured?
A. Counting microseconds,
B. Counting the number of key operations,
C. Counting the kilo number of statements,
D. counting the megabytes of algorithm.
➤ **Ans: B. Counting the number of key operations,**

3 When determining the efficiency of algorithm the space factor is measured by.
A. Counting the maximum memory needed by the algorithm.
B. Counting the minimum memory.
C. Counting the average memory required by the algorithm.
D. Counting the maximum disk area needed by the algorithm.
➤ **Ans: A. counting the maximum memory needed by the algorithm.**

4 All of the following cases exist in complexity theory except
A. Best case B. worst case
C. None case D. Null case

5 In linear search algorithm the worst case occurs:
A. When item is in the middle of the array.
B. When item is not in the array.
C. When item is the last element in the array
D. When item is the last element in the array or is not there.
➤ **Ans: D. When item is the last element in the array or is not there.**

6 When the average case occurs in linear search algorithm?
A. Item is somewhere in the middle of the array
B. Item is not in the array
C. Item is the last element in the array.
D. Item is the last element in the array or is not there.
➤ **Ans: A. Item is somewhere in the middle of the array**

7 The complexity of the average case of an algorithm is also describes as
A. Much more complicated to analyze than that of worst case.
B. Simpler to analyze than that of worst case.
C. Sometimes more complicated. and some other times simpler.
D. All of the above.
➤ **Ans: A. Much more complicated to analyze than that of worst case.**

8 Which of the following is the complexity of linear search algorithm?
A. O(n) B. O(log 10)
C. $O(n^2)$ D. O(10 log n)
➤ **Ans: A. O(n)**

9 Which of the following is the complexity of binary search algorithm?
A. O(n) B. O(log)
C. $O(n^2)$ D. O(10 log n)
➤ **Ans: B. O(log)**

10 Which of the following is the complexity of bubble sort algorithm?
A. O(n) B. O(log 2)
C. $O(n^2)$ D. O(n log n)
➤ **Ans: C. $O(n^2)$**

11 Which of the following is the complexity of merge sort algorithm?
A. O(n) B. O(10log n)
C. O(n2) D. O(n log n)
➤ **Ans: D. O(n log n)**

12 The circuitous alter of the values of a variable in one module by another module is called
A. Internal change
B. Inter-module change
C. Side effect
D. External update
➤ **Ans: C. Side effect**

13 All of the following data structure are linear data structure except?
A. Arrays B. Linked lists
C. Both of above D. None of above
➤ **Ans: D. None of above**

14 Which of the following data structure is linear?
A. Tree B. Graph
C. Array D. All of above
➤ **Ans: C. Array**

15 The operatic n of processing each element in the list is also knownas.
A. Sorting B. Joining
C. Inserting D. Traversal
➤ **Ans: D. Traversal**

16 The location of the element with a given value is which of the following.
A. Traversal
B. Search
C. Sort and search
D. All of above
➤ **Ans: B. Search**

17 Why Arrays are best data structures?
A. For relatively permanent collections of data
B. For the size and the data in the structure are constantly changing
C. Not of above situation
D. None of above situation
➤ **Ans: A. For relatively permanent collections of data**

18 Linked lists are most suitable for
A. For relatively permanent collections of data
B. For the size and the data in the structure are constantly changing
C. Both of above situation
D. None of above situation
➤ **Ans: B. For the size and the data in the structure are constantly changing**

19 Each array declaration need not give information about.
A. Name of array
B. The data of array
C. The first data from the set to be stored
D. The index of the array
➤ **Ans: C. The**

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20 All the elements of an array are stored in memory cells for the reason that.
A. This way computer can keep track only the address of the first element and the addresses of other elements can be calculated.
B. The architecture of computer memory does not allow arrays to store other than serially.
C. Both of above.
D. None of above.
➢ **Ans: A. This way computer can keep track only the address of the first element and the addresses of other elements can be calculated.**

21 What does the memory address of the first element of an array is called.
A. Last address
B. Foundation address
C. First address
D. Basic address
➢ **Ans: B. Foundation address**

22 What is the formula to calculate thememory address of 5th element of an array?
A. LOC (Array [5] = Base (Array) + w (5-lower bound)
B. LOC (Array [5]) =Base (Array [5]) + (5-lower bound)
C. LOC (Array[5]) =Basic (Array [4]) + (5-Upper bound)
D. All of above
➢ **Ans: A. LOC (Array [5] = Base (Array) + w (5-lower**

23 The data structures are indexed structures as?
A. Linear arrays
B. Link lists
C. Both of above
D. None of above
➢ **Ans: A. Linear arrays**

24 All of the following are the required condition for binary search algorithm except?
A. The list must be stored.
B. There is the indirect access to the middle element in any sublist.
C. There must be mechanism to delete and/or insert elements in list.
D. All of above.
➢ **Ans: C. There must be mechanism to delete and/or insert elements in list.**

25 Which of the following is not a limitation of binary search algorithm?
A. Must use a sorted file.
B. Requirement of sorted array is expensive.
C. There must be a mechanism to access middle element. directly.
D. Binary search algorithm is not efficient when the data elements are more than
➢ **Ans: D. Binary search algorithm is not efficient when the data elements are more than 1000.**

26 The second name of two dimensional arrays is
A. Table arrays B. Serial arrays
C. Both of above D. All of above
➢ **Ans: C. Both of above**

27 A variable P is known as pointer if
A. P contains the address of an element in DATA
B. P points to the address of first element in array.
C. P can store only one memory addresses.
D. P contain the DATA and the address of DATA.
➢ **Ans: A. P contains the address of an element in DATA**

28 Which of the following option about data structure cannot store the non-homogeneous data elements?
A. Arrays
B. Records
C. Pointers
D. All of the above
➢ **Ans: A. Arrays**

29 Which of the following option about data structure stores the homogeneous data elements?
A. Array
B. Records
C. Pointer
D. All of the above
➢ **Ans: B. Records**

30 Each data item in a record can be a group item composed of sub-items is known as.
A. Elementary items
B. Atoms
C. Scalars
D. All of above
➢ **Ans: D. All of above**

31 What is the difference between linear array and a record?
A. An array is suitable for homogeneous data but hte data items in a record may have different data type.
B. In a record, there may not be a natural ordering in opposed to linear array.
C. A record form a hierarchical structure but a lienear array does not.
D. All of above.
➢ **Ans: D. All of above.**

32 All of the following statements are true accept?
A. Arrays are dense listed and static data.
B. Data elements in linked list need not be stored in adjecentspace in memory.
C. Pointers store the next data element of a list.
D. Linked lists are collection of the nodes that contain information part and next pointer.
➢ **Ans: C. Pointers store the next data element of a list.**

33 Binary search algorithm can be applied to all of the below except
A. Sorted linked list
B. Sorted binary trees
C. Sorted linear array
D. Pointer array
➢ **Ans: A. Sorted linked list**

34 When new data are to be inserted into an old existing data structure, but there is no space; this situation is known as.
A. Underflow B. overflow
C. Super flow D. Saturated
➢ **Ans: B. Overflow**

35 The condition when a linked list START=NULL is known as
A. Underflow B. overflow
C. Superflow D. Saturated
➢ **Ans: A. Underflow**

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36 Which of the given option is a two way list?
A. Grouped header list circular trailer list B.
C. Linked list above D. None of
➢ **Ans: D. None of above**

37 Which of the following option has no relation with stacks?
A. FIFO lists B. LIFO
C. Piles D. Push-down
➢ **Ans: A. FIFO lists**

38 The "push" and "pop" is correlated to which of the given?
A. Array B. lists
C. Stacks above D. None of
➢ **Ans: C. Stacks**

39 The elements which can be added or removed at either end but not in the middle, this type of data structure is called
A. Linked lists B. Array
C. Queues D. Deque
➢ **Ans: D. Deque**

40 In order to traverse a tree resulted E A C K F H D B G; the preorder traversal would return.
A. FAEKCDAHG FAEKCDHGB B.
C. EAFKHDCBG FEAKDCHBU D.
➢ **Ans: B. FAEKCDHGB**

41 Which type of data structure allows deleting data elements from front end?
A. Arrays B. Queues
C. Deques Search Tree(BST) D. Binary
➢ **Ans: B. Queues**

42 The data structure which allows deletions at both ends of the list but insertion at only one end is called.
A. Input-restricted deque B. Output-restricted deque
C. Prior queues D. All of above
➢ **Ans: A. Input-restricted deque**

43 Which of the given option is a data structure which is non-linear?
A. String B. Array
C. Stack above D. None of
➢ **Ans: D. None of above**

44 Which of the following option is a data structure which is linear?
A. String B. List
C. Queue D. All of above
➢ **Ans: D. All of above**

45 Which data structure is suitable to represent hierarchical relationship between elements?
A. Deque B. Array
C. Tree above D. None of
➢ **Ans: C. Tree**

46 A binary tree whose every node can have zero is known as:
A. Complex binary tree Binary search tree B.
C. Extended binary tree All of above D.
➢ **Ans: C. Extended binary tree**

47 The formula for the depth of a complete binary tree is
A. $D_n = n \log_2 10$ B. $D_n = n \log_2 n+1$
C. $D_n = \log_2 10$ D. $D_n = \log_2 n+1$
➢ **Ans: D. $D_n = \log_2 n+1$**

48 Any algebraic expression E which uses only binary operations in a 2-tree can be represented as
A. The variable in E will appear as external nodes and operations in internal nodes.
B. The operations in E will appear as external inter nodes and variables in internal nodes.
C. The variables in E will appear only in internal nodes.
D. All of above.
➢ **Ans: A. The variable in E will appear as external nodes and operations in internal nodes.**

49 A binary tree can simply be changed into q 2-tree by
A. Replacing each empty sub tree by a new internal internode.
B. Inserting an internal nodes for non-empty nodes.
C. Inserting an external nodes for non-empty node.
D. Replacing each empty sub tree by a new external node.
➢ **Ans: D. Replacing each empty sub tree by a new external node.**

50 When to change binary tree into extended binary tree, all the unique nodes in binary tree are.
A. Internal nodes on extended tree.
B. External nodes on extended tree.
C. Vanished on extended tree.
D. All of above.
➢ **Ans: A. Internal nodes on extended tree.**

51 What is the pre order traversal of binary tree whose post order is DEBFCA?
A. ABFCDA B. ADBBEC
C. ABDECF D. ABECEF
➢ **Ans: C. ABDECF**

52 Which of the given option is a sortingalgorithm of divide-and-conquer form?
A. Switch sort
B. Insertion sort
C. Quick sort
D. None of above
➢ **Ans: C. Quick sort**

53 A directly or indirectly algorithm also called.
A. Sub algorithm
B. Recursion
C. Reverse notation
D. Traversal algorithm
➢ **Ans: B. Recursion**

54 When in a binary tree, certain null entries are swaped by special pointers which point to nodes higher in the tree for efficiency; these special pointers are known as
A. Leaf B. Array
C. path D. Thread
➢ **Ans: D. Thread**

55 In order traversal of tree will give up a sorted listing of elements of tree in.
A. Binary tree
B. Binary search tree
C. Heap
D. All of above
➢ **Ans: B. Binary search tree**

56 Which of the following is related to a Heap tree?
A. Values in a node are less than every value in left sub tree and smaller than right sub tree
B. Values in a node are greater than every value in children of it
C. Both of above
D. None of above
➢ **Ans:B. Values in a node are greater than every value in children of it**

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..., v], Then u and v are known
A. Endpoints of v
B. Adjacent inter nodes
C. Neighbors
D. All of above
➤ **Ans: D. All of above**

58 A connected graph T without any cycles is also known as
A. A tree branch
B. Free tree
C. Leaf
D. All of above
➤ **Ans: D. All of above**

59 if e=(u, v) it means that
A. u is not adjacent to v
B. e begins at u and ends at v
C. u is processor and v is successor
D. both b and c
➤ **Ans: D. both b and c**

60 If every node u in G is adjacent to every other node v in G, then that graph is known as
A. Isolated graph
B. complete
C. Finite tree graph
D. Strongly connected
➤ **Ans: B. Complete**

61. Which data structure allows deleting data elements from front and inserting at rear?
A. Stacks
B. Queues
C. Deques
D. Binary search tree
➤ **Ans: B. Queues**

62. Identify the data structure which allows deletions at both ends of the list but insertion at only one end.
A. Input-restricted deque
B. Output-restricted deque
C. Priority queues
D. None of above
➤ **Ans: A. Input-restricted deque**

63. Which of the following data structure is non-linear type?
A. Strings
B. Lists
C. Stacks
D. None of above
➤ **Ans: D. None of above**

64. Which of the following data structure is linear type?
A. Strings B. Lists
C. Queues D. All of above
➤ **Ans: D. All of above**

65. To represent hierarchical relationship between elements, which data structure is suitable?
A. Deque B. Priority
C. Tree D. All of above
➤ **Ans: C. Tree**

66. A binary tree whose every node has either zero or two children is called
A. Complete binary tree
B. Binary search tree
C. Extended binary tree
D. None of above
➤ **Ans: C. Extended binary tree**

67. The depth of a complete binary tree is given by
A. $D_n = n \log_2 n$
B. $D_n = n \log_2 n+1$
C. $D_n = \log_2 n$
D. $D_n = \log_2 n+1$
➤ **Ans: D. $D_n = \log_2 n+1$**

68. When representing any algebraic expression E which uses only binary operations in a 2-tree,
A. the variable in E will appear as external nodes and operations in internal nodes
B. the operations in E will appear as external nodes and variables in internal nodes
C. the variables and operations in E will appear only in internal nodes
D. the variables and operations in E will appear only in external nodes
➤ **Ans: A. the variable in E will appear as external nodes and operations in internal nodes**

69. A binary tree can easily be converted into q 2-tree
A. by replacing each empty sub tree by a new internal node
B. by inserting an internal nodes for non-empty node
C. by inserting an external nodes for non-empty node
D. by replacing each empty sub tree by a new external node
➤ **Ans: D. by replacing each empty sub tree by a new external node**

70. When converting binary tree into extended binary tree, all the original nodes in binary tree are
A. internal nodes on extended tree
B. external nodes on extended tree
C. vanished on extended tree
D. None of above
➤ **Ans: A. internal nodes on extended tree**

71. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
A. ABFCDE B. ADBFEC
C. ABDECF D. ABDCEF
➤ **Ans: C. ABDECF**

72. Which of the following sorting algorithm is of divide-and-conquer type?
A. Bubble sort
B. Insertion sort
C. Quick sort
D. All of above
➤ **Ans: C. Quick sort**

73. An algorithm that calls itself directly or indirectly is known as
A. Sub algorithm
B. Recursion
C. Polish notation
D. Traversal algorithm
➤ **Ans: B. Recursion**

74. In a binary tree, certain null entries are replaced by special pointers which point to nodes higher in the tree for efficiency. These special pointers are called
A. Leaf
B. branch
C. path
D. thread
➤ **Ans: D. thread**

75. The in order traversal of tree will yield a sorted listing of elements of tree in
A. Binary trees
B. Binary search trees
C. Heaps
D. None of above
➤ **Ans: B. Binary search trees**

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1. Binary numbers can be used to represent
   A. Integers only
   B. Fractions only
   C. Floating points only
   D. Both fractions and integers.
   ➢ **Ans: D. Both fractions and integers.**

2. Program that translate a symbolic version of an instruction into the binary version is called
   A. Assembler
   B. interpreter
   C. Compiler
   D. Operating system
   ➢ **Ans: A. Assembler**

3. A micro program written as string of 0's and 1's is a called
   A. symbolic microinstruction
   B. binary instruction
   C. symbolic instructions
   D. binary microprogram
   ➢ **Ans: D. binary microprogram**

4. 2's complement of any binary number can be gained by
   A. adding 1's complement twice
   B. adding 1 to 1's complement
   C. Subtracting 1 from 1's complement.
   D. calculating 1's complement and inverting Most Significant Bit
   ➢ **Ans: B. adding 1 to 1's complement**

5. In the binary number ' 10011 ' the weight of the most significant digit is
   A. 2^4 B. 2^3
   C. 2^0 D. 2^1

6. The output of the expression F=A+B+C will be ------Logic when A=0, B=1, C=1 while symbol ' + ' here represents OR Gate.
   A. Undefined
   B. One
   C. Zero
   D. None of the above
   ➢ **Ans: B. One**

7. The binary numbers A = 1100 and B = 1001 are applied to the inputs of a comparator. What will be the output levels?
   A. A > B = 1, A < B = 0, A < B = 1 B. > B = 0, A < B = 1, A = B = 0
   C. A > B = 1, A < B = 0, A = B = 0
   D. A > B = 0, A < B = 1, A = B = 1
   ➢ **Ans: C. A > B = 1, A < B = 0, A = B = 0**

8. Floating point representation is used to store
   A. Boolean values
   B. ergative integers
   C. Real numbers
   D. Positive integers
   ➢ **Ans: C. Real numbers**

9. Which one of the following is incorrect about Boolean algebra?
   A. A = A'
   B. AA = A
   C. A + 1 = 1
   D. A + 0 = A
   ➢ **Ans: A. A = A'**

10. The OR gate performs which of the following function
    A. Boolean multiplication
    B. Boolean subtraction
    C. Boolean division
    D. Boolean addition
    ➢ Ans: D. Boolean addition

11. The Boolean expression AB'CD'is
    A. a sum term
    B. A product term
    C. a literal term
    D. a binomial term
    ➢ **Ans: B. a product term**

12. The Boolean expression X = AB + CD represents
    A. two ORs AND ed together
    B. A 4-input AND gate
    C. two ANDs OR ed together
    D. None of the above
    ➢ **Ans: C. two ANDs OR ed together**

13. ABEL is a short form for
    A. Advanced Broadband Enabled Longitude
    B. Advanced Boolean Equation Language
    C. Advances Binary Equal Language
    D. Advanced Boolean Expression Language
    ➢ **Ans: D. Advanced Boolean Expression Language**

14. The ABEL notation equivalent to Boolean expression A+B is
    A. A & B
    B. A ! B
    C. A # B
    D. None of the above
    ➢ **Ans: C. A # B**

15. A major benefit of direct mapping of a cache is its simplicity. The main disadvantage of this organization is that
    A. It does not allow concurrent access to the intended data and its tag
    B. It is more expensive than other types of cache group
    C. The cache hit ratio is degraded if two or more blocks used alternately map onto the same block frame in the cache
    D. Its access time is greater than that of other cache organizations
    ➢ **Ans: C. The cache hit ratio is degraded if two or more blocks used alternately map onto the same block frame in the cache**

16. A hypothetical microprocessor communicates with its memory and peripheral over an 8-bit data bus and a 16-bit address bus. It contains an 8-bit accumulator A and two 16-bit registers: program counter PC and index register X theopcode of each instruction is one byte (8 bits) long. Suppose that any internal processor time is negligible, and that the time to address memory and transfer one byte in either direction over the data bus equals unity (one memory cycle).
    The time taken to fetch and execute the 3-byte instruction "store A in some address indexed by X" is
    A. 3 B. 4
    C. 5 D. 6
    ➢ **Ans: B. 4**

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17. If a cache access requires one clock cycle and handling cache misses stalls the processor for an additional five cycles, which of the following cache hit rates comes closest to achieve an average memory access of 2 cycles?
A. 75 B. 80
C. 83 D. 86
➢ **Ans: B. 80**

18. NOR gate is shaped by linking
A. AND Gate and then NOT Gate
B. NOT Gate and then NOR Gate
C. AND Gate and then OR Gate
D. OR Gate and then NAND Gate
➢ **Ans: C. AND Gate and then OR Gate**

19. Which of the following statement is true?
A. Power use of TTL is higher than of CMOS
B. Power utilization of CMOS is higher than of TTL
C. Both TTL and CMOS have same power use
D. Power use of both CMOS and TTL depends on no. of gates used in the circuit
➢ **Ans: A. Power use of TTL is higher than of CMOS**

20. A logic circuit with an output X = A(Bar)BC+AB(Bar) consists of
A. two NAND gates, two OR gates, two inverters
B. three AND gates, two NOR gates, one inverter
C. two AND gates, one OR gate, two inverters
D. one AND gates, one OR gate
➢ **Ans: C. two AND gates, one [illegible] two inverters**

21. To implement the expression AB' CD+ ABC'D+ ABCD' it takes one OR gate and
A. three AND gates and three inverters
B. three AND gates and four inverters
C. three NAND gates
D. one NAND gate
➢ Ans:

22. Half-Adder logic circuit contains.
A. 4 XOR Gates B. 2 XOR Gates
C. 1 XOR Gates D. 6 XOR Gates
➢ **Ans: C. 1 XOR Gates**

23. The PROM consists of a fixed non-programmable
A. NAND Gate array configured as a decoder.
B. OR Gate array configured as a decoder.
C. NOT Gate array configured as a decoder.
D. AND Gate array configured as a decoder.
➢ **Ans: D. AND Gate array configured as a decoder.**

24. Tri-State Buffer is basically
A. AND gate B. OR gate
C. NOT gate D. XOR gate
➢ **Ans: C. NOT gate**

25. When the control line in tri-state buffer is high the buffer operates like a
A. AND gate B. OR gate
C. NAND gate D. None of the above
➢ **Ans: D. None of the above**

26. An S-R latch can be implementing by means of
A. AND, NOR
B. NAND, NOR
C. AND, XOR
D. NOT, XOR
➢ **Ans: B. NAND, NOR**

27. Which of the following statement is true about Karnaugh map
A. A Karnaugh map is totally different from a truth table because it presents even values while truth table presents all the possible values.
B. A Karnaugh map is similar to a truth table because it presents all the possible values of input values and the resulting output of each value.
C. A Karnaugh map is similar to a truth table because it presents all the possible values of input variables and the resulting output of each value.
D. A Karnaugh map is similar to a truth table because it presents all the possible input variables and the resulting output of all value.
➢ **Ans: C. A Karnaugh map is similar to a truth table because it presents all the possible values of input variables and the resulting output of each value.**

28. In a 4-variable K-map, a 2-variable product term is produced by
A. a 2-cell group of 1s
B. a 8-cell group of 1s
C. a 4-cell group of 1s
D. a 4-cell group of 0s
➢ **Ans: C. a 4-cell group of 1s**

29. The 3-variable Karnaugh Map (K-Map) has
A. 4 cells for min or max terms
B. 8 cells for min or max terms
C. 12 cells for min or max terms
D. 16 cells for min or max terms
➢ **Ans: B. 8 cells for min or max terms**

30. On a Karnaugh map, grouping the 0s produces
A. a POS expression
B. a SOP expression
C. a "don't care" condition
D. AND-OR logic
➢ **Ans: A. a POS expression**

31. A 5-variable karnaugh map has
A. 16 cells
B. 32 cells
C. 64 cells
D. None of the above
➢ **Ans: B. 32**

32. A particular Full Adder has
A. 3 inputs and 2 output
B. 3 inputs and 3 output
C. 2 inputs and 3 output
D. 2 inputs and 2 output
➢ **Ans: A. 3 inputs and 2 output**

33. Half-Adder Logic circuit contains
A. 2 XOR Gates.
B. 3 XOR Gates.
C. 1 XOR Gates.
D. 6 XOR Gates.
➢ **Ans: C. 1 XOR Gates.**

34. With multiplexer as parallel to serial converter requires
A. A parallel to serial converter circuit connected to the multiplexer
B. A counter circuit connected to the multiplexer
C. A BCD to decimal decoder connected to the multiplexer
D. A 2-to-8 bit decoder connected to the multiplexer
➢ **Ans: A. A parallel to serial converter circuit connected to the multiplexer**

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35. The values that go above the specified range cannot be correctly represented and are measured as
A. Buffer B. overwhelm
C. Overflow D. Sign value
➢ **Ans: C. Overflow**

36. Which of the following encoder is used as a keypad encoder?
A. 1-to-4 multiplexer
B. 4-to-16 encoder
C. BCD-to-Decimal
D. Decimal-to-BCD Priority
➢ **Ans: C. BCD-to-Decimal**

37. Demultiplexer can also be used as
A. Deselector B. decoder
C. Distributor D. Encoder
➢ **Ans: C. Distributor**

38. A BCD to 7-Segment decoder has
A. 3 inputs and 7 outputs
B. 2 inputs and 7 outputs
C. 4 inputs and 7 outputs
D. 7 inputs and 4 outputs
➢ **Ans: C. 4 inputs and 7 outputs**

39. For a 3-to-8 decoder how many 2-to-4 decoders will be required?
A. 4 B. 3
C. 5 D. 2
➢ **Ans: D. 2**

40. If '1110' is applied at the input of BCD-to-Decimal decoder which output pin will be make active?
A. 2nd
B. 4th
C. 3rd
D. None of the above
➢ **Ans: B. 4th**

41. 8-bit parallel data can be converted into serial data by using
A. 4-to-2 multiplexer
B. [illegible]
C. 8-to-1 multiplexer
D. 8-to-4 multiplexer
➢ **Ans: C. 8-to-1 multiplexer**

42. Two 2-input, 4-bit multiplexers 74X157 can be connected to apply
A. 4-input, 8-bit a multiplexer.
B. 4-input, 16-bit a multiplexer.
C. 2-input, 4-bit a multiplexer.
D. 2-input, 8-bit a multiplexer.
➢ **Ans: D. 2-input, 8-bit a multiplexer.**

43. Using multiplexer as parallel to serial converter requires
A. A parallel to serial converter circuit connected to the multiplexer
B. A counter circuit connected to the multiplexer
C. A parallel to serial converter circuit connected to the multiplexer
D. None of the above
➢ **Ans: C. A parallel to serial converter circuit connected to the multiplexer**

44. A demultiplexer has
A. Several input and one output
B. One input and one output
C. Several inputs and several outputs
D. One input and several outputs
➢ **Ans: D. One input and several outputs**

45. Demultiplexer contains
A. Single input and many outputs.
B. Single input and single output.
C. Many inputs and multiple outputs.
D. None of the above
➢ **Ans: A. Single input and many outputs.**

46. The key use of the Multiplexer is to
A. Pick data from multiple sources and to transfer it to a multiple destination
B. Pick data from single source and to transfer it to a multiple destinations
C. Pick data from single source and to transfer to single destination
D. Pick data from multiple sources and to transfer to single destination
➢ **Ans: D. Pick data from multiple sources and to transfer to single destination**

47. The binary numbers A = 1100 and B = 1001 are useful to the inputs of a comparator. Chose the correct option about the output levels?
A. A > B = 1, A < B = 0, A < B = 1
B. A > B = 0, A < B = 1, A = B > 0
C. A > B = 1, A < B = 0, A = B = 0
D. A > B = 0, A < B = 1, A = B < 1
➢ **Ans: C. A > B = 1, A < B = 0, A = B = 0**

48. Which gate is best used as a basic comparator?
A. NOR
B. OR
C. Exclusive-OR
D. AND
➢ **Ans: C. Exclusive-OR**

49. Which of the following option is correct?
A. Two 4-bit comparator circuits can be connected to form multiple 6-bit comparators.
B. Two 4-bit comparator circuits can be connected to form multiple 8-bit comparator
C. Two 4-bit comparator circuits can be connected to form single 12-bit comparator
D. Two 2-bit comparator circuits can be connected to form single 4-bit comparator
➢ **Ans: D. Two 2-bit comparator circuits can be connected to form single 4-bit comparator**

50. When the control line in tri-state buffer is high the buffer work similar to a
A. AND gate B. OR gate
C. NOT gate D. XOR gate
➢ **Ans: C. NOT gate**

51. A memory management method used to get better computer performance is
A. To pick memory chips based on price
B. To store up as much data as possible on disk
C. By means of the cache to store data that will most likely be desired soon
D. None of the above
➢ **Ans: C. By means of the cache to store data that will most likely be desired soon**

52. The instruction MOV CL, [BX][DI]+8 represents the which of the subsequent addressing mode?
A. Based relative
B. Based indexed
C. Base direct
D. Register indirect
➢ **Ans: B. Based indexed**

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3. While executing a program instructions must be transferred from memory to CPU. If data buss has 8 lines, at most one 8 bit byte can be transferred at a time. What number of memory access would be to move a 32 bit instruction from memory to the CPU?
   A. 3 B. 2
   C. 4 D. 5
   ➢ **Ans: C. 4**

54. Which of the following programming languages has an instruction set nearest to the machine language?
   A. Cobol
   B. Java
   C. Assembly Language
   D. C++
   ➢ **Ans: C. Assembly Language**

55. If CS= 24F6 and IP =634A, the physical address is
   A. 2BFCC B. 2B2BB
   C. 2B2AA D. 2BAFF
   ➢ **Ans: C. 2B2AA**

56. A computer that is advertised as having a 96k byte DRAM memory and a 2.1 Gigabyte hard drive has
   A. 96k bytes of cache, 96 K bytes of primary memory, and 2.1 Gigabytes of secondary memory
   B. 2.1 Gigabytes of primary memory and 96K bytes of secondary memory
   C. 96 K bytes of primary memory and 2.1 Gigabytes of secondary memory
   D. None of the above
   ➢ **Ans: C. 96 K bytes of primary memory and 2.1 Gigabytes of secondary memory**

57. Cache memory refers to
   A. fast memory that can be plugged into the mother board to expand main memory
   B. fast memory present on the processor chip that is used to store recently accessed data
   C. a reserved portion of main memory used to store data
   D. a special area of memory on the RAM chip that is used to save frequently used instructions
   ➢ **Ans: B. fast memory present on the processor chip that is used to store recently accessed data**

58. Which register is used to maintain track of address of the memory location where the next instruction is positioned?
   A. Address Register
   B. Data Register
   C. Instruction Counter
   D. Program Register
   ➢ **Ans: D. Program Register**

59. Pipelining scheme is called implement by
   A. instruction load
   B. instruction fetch
   C. instruction manipulation
   D. instruction transfer
   ➢ **Ans: B. instruction fetch**

60. Which of the following is true about stack?
   A. It is 8-bit register in the microprocessor
   B. Is a 8-bit memory address stored in the program counter
   C. It is a set of memory locations in R/WM engaged for storing information temporarily during the execution of computer

   D. It is a 16-bit memory address stored in the program counter
   ➢ **Ans: C. It is a set of memory locations in R/WM engaged for storing information temporarily during the execution of computer**

61. A stack pointer is
   A. A register that contains address of next instruction.
   B. A register that decodes and executes 16-bit arithmetic expression.
   C. 16-bit register in the microprocessor that indicate the beginning of the stack memory
   D. None of the above
   ➢ **Ans: C. 16-bit register in the microprocessor that indicate the beginning of the stack memory**

62. The branch logic that supply decision making capacity in the control unit is identified by
   A. Unconditional branch
   B. Unconditional transfer
   C. Conditional branch
   D. None of above
   ➢ **Ans: B. Unconditional transfer**

63. Interrupts which are commence by an instruction are called
   A. Instruction level interrupts
   B. External interrupts
   C. Process level interrupts
   D. Software interrupts
   ➢ **Ans: D. Software interrupts**

64. The general addressing scheme in use by a CP J is
   A. Internal
   B. External
   C. Indirect
   D. None of the above
   ➢ **Ans: C. Indirect**

65. While calling the subroutine, the address of the instruction is stored in
   A. Stack pointer
   B. Stack
   C. Instruction counter
   D. Instruction register
   ➢ **Ans: B. Stack**

66. A micro-program written as string of 0's and 1's is a
   A. Binary microprogram
   B. Binary instructions
   C. Symbolic instructions
   D. Sybolicmicroprogram
   ➢ **Ans: A. Binary microprogram**

67. Memory access in RISC architecture is limited to instructions
   A. CALL and EXIT
   B. PUSH and POP
   C. STA and LDA
   D. STORE and ADD
   ➢ **Ans: C. STA and LDA**

68. How many address lines are needed to address each memory locations in a 2048 x 4 memory chip?
   A. 10
   B. 11
   C. 8
   D. 12
   ➢ **Ans: B. 11**

69. Which of the following statement is true when the RET instruction at the end of subroutine is executed?
   A. The information where the stack is initializing is transferred to the stack pointer
   B. The memory address of the RET instruction is transferred to the instruction counter

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C. Two data bytes stored in the top two locations of the stack are transferred to the program counter
D. Two data bytes stored in the top two locations of the stack are transferred to the data register
➤ **Ans: C. Two data bytes stored in the top two locations of the stack are transferred to the program counter**

70. A microporgram is sequencer perform the operation
A. Fetch B. Write
C. Execute D. Store
➤ **Ans: C. Execute**

71. Interrupts which are begin by an I/O drive are
A. Internal
B. xternal
C. Software
D. All of the above
➤ **Ans: B. External**

72. Sum-of-Weights method is used
A. To convert from one number system to other
B. To convert from binary to octal system
C. To encode and decode data
D. To convert from parallel to serial system
➤ **Ans: A. To convert from one number system to other**

73. In ANSI/IEEE Standard 754 ' Mantissa ' is represented by
A. 16-bits B. 46-bits
C. 48-bits D. 23-bits
➤ **Ans: D. 23-bits**

74. Fan-out is specified in terms of
A. Unit load
B. voltage
C. Frequency
D. None of the above
➤ **Ans: A. Unit load**

75. The Power dissipation of
A. TTL series remain constant throughout their operations
B. TLT series devices remain constant throughout their operations
C. TTC series devices remain constant throughout their operations
D. None of the above
➤ **Ans: A. TTL series remain constant throughout their operations**

76 .The nickname for a die or integrated circuit
A. Chip
B. IC
C. Transistor
D. None of the above
➤ **Ans: A. Chip**

77. Which expression can be best for SOP?
A. A + B(C + D)(C+D)
B. A'B + AC' + AB'C
C. (A' + B + C)(A +C)
D. None of the above
➤ **Ans: B. A'B + AC' + AB'C**

78. High level Noise Margins (VNH) of CMOS 5 volt series circuits is approximately
A. 0.6 V B. 0.7 V
C. 0.5 V D. 0.9 V
➤ **Ans: D. 0.9 V**

79. Which of the following set of input selects the function performed by processor?
A. Micro instruction selectors
B. Opcode
C. Function select input
D. None of the above
➤ **Ans: C. Function select input**

80. GAL can be reprogrammed because it uses the
A. Transistor logic
B. TTL logic
C. E^2 CMOS logic
D. IC logic
➤ **Ans: C. E^2 CMOS logic**

81. GAL is a short form of
A. General access Logic
B. General Arithmetic Logic
C. Giant Array Logic
D. None of the above
➤ **Ans: C. Giant Array Logic**

82 .The GAL22V10 contains
A. 30 input B. 25 input
C. 20 input D. 10 input
➤ **Ans: D. 10 input**

83. A latch has
A. 5 stable states
B. 4 stable states
C. 2 stable states
D. 3 stable states
➤ **Ans: C. 2 stable states**

84 .An S-R latch can be put into practice by the use of
A. AND, XNOR
B. NAND, OR
C. NAND, NOR
D. AND, XOR
➤ **Ans: C. NAND, NOR**

85. Let suppose an active-HIGH S-R latch has a 0 on the S input and a 1 on the R input and then the R input set off to 0, the latch output will be
A. RESET B1
B. SET B1
C. SET to 0
D. Invalid
➤ **Ans: A. RESET B1**

86. Which of the following language is designed for embedded computer system?
A. Ada B. Java
C. COBOL D. C++
➤ **Ans: A. Ada**

87. Let suppose computer's memory is composed of 8K words of 32 bits each. How many bits are required for memory address?
A. 10 B. 13
C. 15 D. 16
➤ **Ans: B. 13**

88. Assume a computer's memory is composed of 4K words of 32 bits each. Calculate the total bits in memory?
A. 131200 B. 128700
C. 131072 D. 132380
➤ **Ans: C. 131072**

89. A computer's memory is composed of 8K words of 32 bits each. Calculate the bytes which are stored in memory.
A. 32K B. 320K
C. 24K D. 48K
➤ **Ans: A. 32K**

90. A computer's memory is composed of 8K words of 32 bits each. How many bits will be necessary for the memory address?
A. 20
B. 14
C. 15
D. None of the above
➤ **Ans: C. 15**

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91. Let suppose a bus has 16 data lines and requires 4 cycles of 250 sec each to transfer data. The bandwidth of this bus would be 2 Megabytes/sec. If the cycle time of the bus was reduced to 125 nsecs and the number of cycles required for transfer stayed the same what would the bandwidth of the bus?
A. 1 Megabyte/sec
B. Megabytes/sec
C. 8 Megabytes/sec
D. 2 Megabytes/sec
➢ **Ans: B. 4 Megabytes/sec**

92 .Floating point representation is used to store
A. Whole numbers
B. Constant integers
C. Real numbers
D. None of the above
➢ **Ans: C. Real numbers**

93. Binary numbers can be used to represent
A. Integers
B. ractions
C. floating point
D. Both A. and B.
➢ **Ans: D. Both A and B.**

94. Suppose a memory chip has 12 address pins and 4 data pins. What the number of locations that memory chip has
A. 2_{12}
B. 2_{36}
C. 2_{48}
D. 2^{12}
➢ **Ans: B. 2^{12}**

95. In a 8086/8088 Microprocessor, the unit responsible for receiving the instructions from memory and loading in the queue is.
A. Control unit
B. Pointer
C. Stack
D. Bus Interface Unit
➢ **Ans: D. Bus Interface Unit**

96. A time sharing system imply
A. More than one memory chip in the system
B. More than one program in memory
C. More than one memory in the system
D. Single processor in the system
➢ **Ans: B. More than one program in memory**

97. A computer program that converts an entire program into machine language at one time is called
A. Interpreter
B. Instruction translator
C. Compiler
D. None of the above
➢ **Ans: C. Compiler**

98. In immediate addressing the operand is located
A. CPU register
B. Instruction register
C. Program counter
D. Stack pointer
➢ **Ans: A. CPU register**

99. Microprocessor 8085 can address location up to
A. 32K B. 128K
C. 64K D. 1M
➢ **Ans: A. 32K**

100. Program that converts a symbolic version of an instruction into the binary version is called
A. Translator
B. Interpreter
C. Assembler
D. None of the above
➢ **Ans: C. Assembler**

OPERATING SYSTEM

An operating system is the set of programs that controls a computer. Some examples of operating systems are UNIX, MS-DOS, MS-Windows, Windows/NT, OS/2, MacOS®, VMS, MVS, and VM.

Kernel

The core of the operating system is the kernel, a control program that functions in privileged state, reacting to interrupts from external devices and to service requests and traps from processes. Generally, the kernel is a permanent resident of the computer. It creates and terminates processes and responds to their request for service.

Process Management

The operating system manages many kinds of activities ranging from user programs to system programs like printer spooler, name servers, file server etC. Each of these activities is encapsulated in a process. A process includes the complete execution context.
The five major activities of an operating system in regard to process management are as under:
- Creation and deletion of user and system processes.
- Suspension and resumption of processes.
- A mechanism for process synchronization.
- A mechanism for process communication.
- A mechanism for deadlock handling.

Main-Memory Management

Primary-Memory or Main-Memory is a large array of words or bytes. Each word or byte has its own address. Main-memory provides storage that can be access directly by the CPU. That is to say for a program to be executed, it must in the main memory.
The major activities of an operating in regard to memory-management are:
- Keep track of which part of memory are currently being used and by whom.
- Decide which process is loaded into memory when memory space becomes available.
- Allocate and de allocate memory space as needed.

File Management

A file is a collected of related information defined by its creator. Computer can store files on the disk , which provide long term storage A file systems normally organized into directories to ease their use. These directories may contain files and other directions.
The five main major activities of an operating system in regard to file management are
- The creation and deletion of files.
- The creation and deletion of directions.
- The support of primitives for manipulating files and directions.
- The mapping of files onto secondary storage.
- The backup of files on stable storage media.

I/O System Management

I/O subsystem hides the peculiarities of specific hardware devices from the user. Only the device driver knows the peculiarities of the specific device to which it is assigned.

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Process

The term "process" was can be defined as a program in Execution. Process is not the same as program. A process is more than a program code. A process is an 'active' entity as oppose to program which consider being a 'passive' entity.

Process Operations

Following are the important operation which can be performed on a process.

Process Creation

In general-purpose systems, some way is needed to create processes as needed during operation. There are four principal events led to processes creation.

System initialization.
Execution of a process Creation System calls by a running process.
A user request to create a new process.
Initialization of a batch job.

Process Termination

A process terminates when it finishes executing its last statement. Its resources are returned to the system, it is purged from any system lists or tables, and its process control block (PCB) is erased i.e., the PCB's memory space is returned to a free memory pool. The new process terminates the existing process, usually due to following reasons:

Normal Exist Most processes terminates because they have done their joB. This call is exist in UNIX.

Error Exist When process discovers a fatal error. For example, a user tries to compile a program that does not exist.

Fatal Error An error caused by process due to a bug in program for example, executing an illegal instruction, referring non-existing memory or dividing by zero.

Killed by another Process A process executes a system call telling the Operating Systems to terminate some other process. In UNIX, this call is killing. In some systems when a process kills all processes it created are killed as well.

Process States

A process goes through a series of discrete process states.

New State The process being created.
Terminated State The process has finished execution.
Blocked (waiting) State When a process blocks, it does so because logically it cannot continue, typically because it is waiting for input that is not yet available.
Running State A process is said to be running if it currently has the CPU that is, actually using the CPU at that particular instant.
Ready State A process is said to be ready if it use a CPU if one were available. It is run able but temporarily stopped to let another process run.

Process Control Block

A process in an operating system is represented by a data structure known as a process [illegible] descriptor. The PCB contains important information about

Threads

A thread is a single sequence stream within in a process. Because threads have some of the properties of processes, they are sometimes called lightweight processes. In a process, threads allow multiple executions of streams.

Processes Vs Threads

As we mentioned earlier that in many respect threads operate in the same way as that of processes. Some of the similarities and differences are:

User-Level Threads

User-level threads implement in user-level libraries, rather than via systems calls, so thread switching does not need to call operating system and to cause interrupt to the kernel. In fact, the kernel knows nothing about user-level threads and manages them as if they were single-threaded processes.

Kernel-Level Threads

In this method, the kernel knows about and manages the threads. No runtime system is needed in this case. Instead of thread table in each process, the kernel has a thread table that keeps track of all threads in the system. In addition, the kernel also maintains the traditional process table to keep track of processes. Operating Systems kernel provides system call to create and manage threads.

Context Switching

Threads are very inexpensive to create and destroy, and they are inexpensive to represent. For example, they require space to store, the PC, the SP, and the general-purpose registers, but they do not require space to share memory information, Information about open files of I/O devices in use, etC. With so little context, it is much faster to switch between threads. In other words, it is relatively easier for a context switch using threads.

CPU/Process Scheduling

The assignment of physical processors to processes allows processors to accomplish work. The problem of determining when processors should be assigned and to which processes is called processor scheduling or CPU scheduling.

Goals of Scheduling

Fairness

Fairness is important under all circumstances. A scheduler makes sure that each process gets its fair share of the CPU and no process can suffer indefinite postponement. Note that giving equivalent or equal time is not fair. Think of safety control and payroll at a nuclear plant.

Policy Enforcement

The scheduler has to make sure that system's policy is enforced. For example, if the local policy is safety then the safe'y control processes must be able to run whenever they want to, even if it means delay in payroll processes.

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Efficiency
Scheduler should keep the system (or in particular CPU) busy cent percent of the time when possible. If the CPU and all the Input/Output devices can be kept running all the time, more work gets done per second than if some components are idle.

Response Time
A scheduler should minimize the response time for interactive user.

Turnaround
A scheduler should minimize the time batch users must wait for an output.

Preemptive Vs No preemptive Scheduling
The Scheduling algorithms can be divided into two categories with respect to how they deal with clock interrupts.

No preemptive Scheduling
A scheduling discipline is nonpreemptive if, once a process has been given the CPU, the CPU cannot be taken away from that process.

Preemptive Scheduling
A scheduling discipline is pre-emptive if, once a process has been given the CPU can take away.

Semaphores
A semaphore is a protected variable whose value can be accessed and altered only by the operations P and V and initialization operation called 'Semaphoiinitislize'.

Necessary and Sufficient Deadlock Conditions
Coffman (1971) identified **four (4) conditions** that must hold simultaneously for there to be a deadlock.

1. Mutual Exclusion Condition
The resources involved are non-shareable.
Explanation: At least one resource (thread) must be held in a non-shareable mode, that is, only one process at a time claims exclusive control of the resource. If another process requests that resource, the requesting process must be delayed until the resource has been released.

2. Hold and Wait Condition
Requesting process hold already, resources while waiting for requested resources.
Explanation: There must exist a process that is holding a resource already allocated to it while waiting for additional resource that are currently being held by other processes.

3. No-Preemptive Condition
Resources already allocated to a process cannot be preempted.
Explanation: Resources cannot be removed from the processes are used to completion or released voluntarily by the process holding it.

4. Circular Wait Condition
The processes in the system form a circular list or chain where each process in the list is waiting for a resource held by the next process in the list.

Dealing with Deadlock Problem
In general, there are four strategies of dealing with deadlock problem:

1. The Ostrich Approach
Just ignore the deadlock problem altogether.

2. Deadlock Detection and Recovery
Detect deadlock and, when it occurs, take steps to recover.

3. Deadlock Avoidance
Avoid deadlock by careful resource scheduling.

4. Deadlock Prevention
Prevent deadlock by resource scheduling so as to negate at least one of the four conditions.

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OPERATING SYSTEM

1 Which statement is true regarding system programs and system calls?
A. System programs can be thought of as bundles of useful system calls.
B. System calls provide basic functionality to users so that users do not need to write their own programs to solve common problems.
C. System calls can be defined by the user
D. A and B
➤ **Ans: D. A and B**

2. Operating system provides the services of
A. I/O handling.
B. program execution
C. Communication
D. All of the above
➤ **Ans: D. All of the above**

3. Which of the following are advantages of the microkernel technique in system design?
A. Adding a new service does not require modifying the kernel B Program execution
B. It is more secure as more operations are done in user mode than in kernel mode
C. A, B and D
D. A simpler kernel design and functionality typically results in a more reliable operating system.
➤ **Ans: C. A, B and D**

4. How a system is designed which have a choice of operating systems to boot from? What bootstrap program is to need?
A. While boot-up, a special program (boot manager) will decide which operating system to boot.
B. The boot-strap loader will load the operating system selected at the start-up.
C. Kernel will see and load operating system to RAM.
D. None of the above
➤ **Ans: A. While boot-up, a special program (boot manager) will decide which operating system to boot.**

5 Which file keeps commands to execute automatically when Operating System is started
A. Command file
B. batch file
C. Autoexe C.bat
D. Config.sys file
➤ **Ans: C. Autoexe C.bat**

6. The operating system performs the functions (choose all options which apply)
A. Process management
B. processes management
C. I/O devices management
D. All of the above
➤ **Ans: D. All of the above**

7. While computer is turned on or restarted, a special type of absolute loader is executed; identify the name of loader?
A. Init boot loader
B. boot loader
C. Relating loader
D. Bootstrap loader
➤ **Ans: D. Bootstrap loader**

8. What should be the extension to execute files?
A. EXE
B. BAT
C. COM
D. All of the above
➤ **Ans: D. All of the above**

9. Which of the following is not the function of the Operating System?
A. Memory management
B. Disk management
C. process management
D. Virus Protection
➤ **Ans: D. Virus Protection**

10. In MSDOS, the primary hard disk drives have the drive letter.
A. F B. A
C. E D. C
➤ **Ans: D. C**

11. Which of the following Operating System doesn't support networking?
A. Windows XP
B. windows 3.1
C. Windows Server 2000
D. Windows NT
➤ **Ans: B. Windows 3.1**

12. Which of the following Operating System doesn't support long file names?
A. MS DOS
B. windows 2000
C. NOS Operating System
D. Windows XP
➤ **Ans: A. MS DOS**

13. Which statement is true about the function of an operating system?
A. Controls the scheduling jobs for execution
B. Performs scheduling jobs for execution
C. Manages computer's resources efficiently
D. All of the above
➤ **Ans: D. All of the above**

14. Operating system which has better for implementing capability as Client-Server architecture?
A. MS DOS
B. windows 3.1
C. Windows 95
D. Windows 2000
➤ **Ans: D. Windows 2000**

15. Which option is used in operating system to separate mechanism?
A. Two level implantation
B. Multilevel implantation
C. Single level implementation
D. Hierarchal implementation
➤ **Ans: A. Two level implantation**

16. One of the functions of operating system is to create virtual computer form
A. Physical computer
B. virtual memory
C. Virtual device
D. None of the above
➤ **Ans: A. Physical computer**

17. Which of the following statement is true about multiprogramming computer?
A. Execution of task is faster
B. Execute more tasks in the same time slots
C. Are multithreaded
D. Are program dependent
➤ **Ans: B. Execute more tasks in the same time slots**

18. Which of the following is not true about the system call?
A. Process control information
B. maintenance
C. Disk scheduling
D. Device management
➤ **Ans: B. Maintenance**

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19. Occurrence of an event is normally signaled by an?
A. Kernel B. Init program
C. Interrupt D. I/O devices
➢ **Ans: C. Interrupt**

20. **Program which is in execution is called**
A. Job B. Scheduling
C. File D. Process
➢ **Ans: D. Process**

21. Which is not included in the process state while executing single process?
A. Terminated B. running
C. Block D. Ready
➢ **Ans: C. Block**

22. Process control block contains the information like
A. Process state
B. CPU registers
C. I/O state information
D. All of the above
➢ **Ans: D. All of the above**

23. Selection of the process from job pool and to load it in to memory is done by
A. CPU scheduler
B. Long-term scheduler
C. Scheduler
D. None of the above
➢ **Ans: B. Long-term scheduler**

24. Which of the following is true about the inter process communication model?
A. Shared memory
B. message passing
C. A and B
D. A only
➢ **Ans: C. A and B**

25. Endpoint of communication is called
A. Program
B. process
C. Socket
D. Block process
➢ **Ans: C. Socket**

26. Which of the following statement is true about non-preemptive scheduling?
A. A process switching from running state to the waiting state
B. A process switching from ready to running state
C. A process switching from waiting to ready state
D. A process switching from new to ready state
➢ **Ans: A. A process switching from running state to the waiting state**

27. Round-Robin scheduling algorithm technique is designed for
A. Time-sharing systems
B. parallel processing
C. Client computer
D. None of these
➢ **Ans: A. Time-sharing systems**

28. Time which is taken by dispatcher to stop a process and start another running process is called?
A. Delay
B. dispatch latency
C. Execution time
D. Turnaround time
➢ **Ans: B. Dispatch latency**

29. The basic unit of CPU utilization is called?
A. Process
B. program
C. Thread
D. None of the above
➢ **Ans: C. Thread**

30. Round robin scheduling is the preemptive version of?
A. Shortest job first
B. shortest remaining
C. First in First out
D. Priority scheduling
➢ **Ans: C. First in First out**

31. A page fault occurs when
A. Page is in the memory
B. Process is in the halt state
C. Process is in the waiting state
D. Page is not in the memory
➢ **Ans: D. Page is not in the memory**

32. Suppose A and B be two semaphores initialized to 1, where P0 and P1 processes the following statements waitA.;waitB.; ---; signalA.;signalB. and waitA.; waitB.;---;signalA.;signalB.; respectively. The above situation is about
A. Halt state
B. Interrupt service routine
C. Deadlock state
D. Interrupt
➢ **Ans: C. Deadlock state**

33. Which statement is correct about a shell?
A. Shell is hardware component
B. Shell is part in assembler
C. Shell is command interpreter
D. Shell is used in memory management
➢ **Ans: C. Shell is command interpreter**

34. Routines are kept on disk in a re-locatable load format. Main program is loaded into memory & is executed. This is which type of loading?
A. Static loading
B. dynamic loading
C. Dynamic linking
D. Static linking
➢ **Ans: C. Dynamic linking**

35. Which of the following statement is true about block state
A. Processes that are running is found
B. Processes waiting for the processor are found
C. Processes which is ready are found
D. Processes waiting for I/O are found
➢ **Ans: D. Processes waiting for I/O are found**

36. Which statement is true about tree structured file directory system?
A. FDS storage and retrieval of file names is easy
B. FDS contains debated unnecessary feature
C. FDS has no importance when millions of files are kept in database
D. None of the above
➢ **Ans: A. FDS storage and retrieval of file names is easy**

37. Banker's algorithm is mainly used in which of the situation?
A. Deadlock detection in operating systems
B. Deadlock prevention in operating systems
C. Deadlocked recovery
D. All of above
➢ **Ans: B. Deadlock prevention in operating systems**

38. Memory from 1K - 640K is called?
A. Main Memory
B. physical Memory
C. Virtual Memory
D. Conventional Memory
➢ **Ans: D. Conventional Memory**

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39. Which option is correct about a high level abstraction over Semaphore?
A. Fixed memory
B. message passing
C. Monitor
D. Mutual exclusion
➢ **Ans: C. Monitor**

40. Which of the following statement is true about a thread?
A. It is lightweight process in which context switching is high
B. It is used to speed up efficiency of the computer
C. It is a lightweight process where the context switching is low
D. None of the above
➢ **Ans: C. It is a lightweight process where the context switching is low**

41. Operating System mostly uses which of the following directory implantation?
A. Single level directory structure
B. Multi-level directory structure
C. Tree level directory structure
D. Binary directory structure
➢ **Ans: C. Tree level directory structure**

42. Illusion of extremely large main memory is called
A. Large main memory
B. Large secondary memory
C. Virtual memory
D. Physical memory
➢ **Ans: C. Virtual memory**

43. The process related to process control device management that is requested by high level language is called
A. Interpreter B. compilers
C. System Call D. Paging
➢ **Ans: C. System Call**

44. If the Disk head is located initially at 32, find the number of disk moves required with FCFS if the disk queue of I/O blocks requests are 98,37,14,124,65,67.
A. 445 B. 786
C. 333 D. 321
➢ **Ans: D. 321**

45. Which of the following statement is true about Multiprogramming systems?
A. Easier to develop than single programming systems
B. Execute each job faster
C. Execute more jobs in the same time
D. Are used only on large main frame computers
➢ **Ans: C. Execute more jobs in the same time**

46. while switching process to another Process needs to save state of the old process and to load new one' state is called?
A. Process initiating
B. context Switch
C. Interrupt handling
D. None of the above
➢ **Ans: B. Context Switch**

47. First in first out scheduling algorithm is called
A. Preemptive Scheduling B. Non Preemptive Scheduling
C. Deadline Scheduling D. Fair share scheduling
➢ **Ans: B. Non Preemptive Scheduling**

48. PCB is abbreviation of
A. Program Control branch
B. process Communication Block
C. Process Control Block
D. None of the above
➢ **Ans: C. Process Control Block**

49. Technique which brings a page into memory only when it is required is called
A. External Segmentation
B. internal Fragmentation
C. Demand Paging
D. Page Replacement
➢ **Ans: C. Demand Paging**

50. Which of the following statement is true about critical region?
A. It is a piece of code which only one process executes at a time
B. It is a region in which deadlock occurs
C. It is a piece of code which only a finite number of processes execute
D. It is place where process's state change to deadlock
➢ **Ans: A. It is a piece of code which only one process executes at a time**

51. Which is not true about the state of the process?
A. Waiting state
B. running state
C. Ready state
D. Privileged state
➢ **Ans: D. Privileged state**

52. The solution to Critical Section Problem is
A. Mutual Exclusion, Progress and Bounded waiting
B. Process bound waiting
C. Mutual exclusion
D. None of the above
➢ **Ans: A. Mutual Exclusion, Progress and Bounded waiting**

53. Which of the following technique is used to keep CPU and the I/O devices busy?
A. Time-sharing
B. multithreading
C. Non-preemptive scheduling
D. Multiprogramming
➢ Ans: D. Multiprogramming

54. Thrashing is effected by
A. Program structure
B. process size
C. Primary storage size
D. Secondary storage size
➢ **Ans: A. Program structure**

55. Process's state after facing an I/O instruction is called
A. Ready
B. Blocked/Waiting
C. Idle
D. terminated
➢ **Ans: B. Blocked/Waiting**

56. Which of the following option is most suitable file extension for the Backup copy of another file?
A. TXT B. COM
C. BAK D. DAT
➢ **Ans: C. .BAK**

57. The number of processes completed per unit time is known as
A. Output B. throughput
C. Result D. Capacity
➢ **Ans: B. Throughput**

58. The primary purpose of an operating system is.....
A. To make the most efficient use of the computer hardware
B. To allow people to use the computer
C. To keep systems programmers employed
D. To make computers easier to use
➢ **Ans: A. To make the most efficient use of the computer hardware**

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59. Which of the following statement is true about Swapping?
A. It works best with many small partitions of the program
B. It allows many programs to use memory simultaneously
C. **It allows each program in turn to use the memory**
D. It does not work with overlaying
➢ **Ans: B. It allows many programs to use memory simultaneously**

60. Where a user find user.dat?
A. C:\windows\win 32
B. C:\windows
C. C:\s\system\system32
D. C:\system\win32
➢ **Ans: B. C:\windows**

61. Machine level instruction's part, which tells the processor what to be done is called?
A. Operation code
B. ddress
C. Locator
D. Flip-Flop
➢ **Ans: A. Operation code**

62. Which of the following statement is true about associative memory?
A. It is address of that data is generated by the CPU.
B. It is address of the data which is provided by users.
C. There is no need for an address i.e. the data is used as an address.
D. The data are accessed sequentially.
➢ **Ans: C. There is no need for an address i.e. the data is**

63. To avoid the race condition, the number of processes that may be simultaneously inside their critical section is
A. 8 B. 1
C. 15 D. 20
➢ **Ans: B. 1**

64. A system program that combines the separately compiled modules of a program into a form suitable for execution
A. Assembler B. Linking loader
C. Compiler D. Load and go
➢ **Ans: B. Linking loader**

65. Which of the following statement is true about a process?
A. Program of high level language
B. Program of low level language
C. Program in execution
D. Program in secondary memory
➢ **Ans: C. Program in execution**

66. Which of the following statement is true about Addressing structure?
A. It defines the technique of determining effective operand addresses
B. It is variations in the use of fundamental addressing structures
C. It performs indicated operations on two fast registers of the machine
D. None of the above
➢ **Ans: A. It defines the technique of determining effective operand addresses**

67. Which of the following is true about The Memory Buffer Register (MBR)?
A. It is a hardware memory device that shows location of the current instruction being executed.
B. It is a group of IC's that fetched the instructions from memory.
C. It contains the address of the memory location that is to be read from or stored into.
D. It contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write".
➢ **Ans: D. It contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write".**

68. The method of allowing processes that are logically runnable but temporarily suspended is called
A. Preemptive scheduling
B. Non preemptive scheduling
C. Shortest job first
D. First come first served
➢ **Ans: A. Preemptive scheduling**

69. Which of the following statement is true about Storage-to-Storage instructions?
A. It has operands in the main store.
B. It performs an operation on a register operand and an operand.
C. It performs indicated operations on two fast registers of the machine.
D. None of the above
➢ **Ans: A. It has operands in the main store.**

70. Least recently used algorithm is used to
A. pages out pages that have been used recently
B. pages out pages that have not been used recently
C. pages out pages that have been least used recently
D. pages out the first page in a given area
➢ **Ans: C. pages out pages that have been least used recently**

71. Software that merges the records from two files into one is called?
A. System software
B. utility program
C. Networking software
D. Application system
➢ **Ans: B. Utility program**

72. Which statement is true about fork?
A. It is the dispatching of a task
B. It is the creation of a new job
C. It is the creation of a new process
D. It increases the priority of a task
➢ **Ans: C. It is the creation of a new process**

73. Thrashing is best explained as
A. It is a consequence of virtual memory systems
B. It can always be controlled by swapping
C. It will always occurs on super computers
D. It can be caused by poor paging algorithms
➢ **Ans: D. It can be caused by poor paging algorithms**

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74. Supervisor state is best defined as
A. A state which is never used
B. A state which is entered by programs when they enter the processor
C. A program which is required to perform any I/O
D. It is only allowed to the operating system
➢ **Ans: D. It is only allowed to the operating system**

75. Computer cannot boot without the
A. Compaction involves moving all occupied areas of storage to one end or other of main storage.
B. Compaction does not involve relocation of programs.
C. Compaction is also known as garbage collection.
D. The system must stop everything while it performs the compaction.
➢ **Ans: B. Compaction does not involve relocation of programs.**

76. Which of the following statement is true about inter-process communication?
A. It is required for all processes which are in waiting state.
B. It is usually done via hard disk controller.
C. It is never necessary for the process.
D. It allows processes to synchronize activity.
➢ **Ans: D. It allows processes to**

77. Which of the following functions is performed by the loader?
A. Allocate space in memory for the programs and resolve symbolic references between object decks.
B. It adjust all address dependent locations.
C. It physically place the machine instructions and data into memory.
D. **All of the above**
➢ **Ans: D. All of the above.**

78. Which of the following statement is true about memory?
A. It is a device that performs a sequence of operations.
B. It is the device where information is stored
C. it is a sequence of instructions
D. It is typically characterized by interactive processing and time-slicing of the
➢ **Ans: B. It is the device where information is stored** CPU's time to **allow quick response to each user.**

79. Which of the following rules out the use of GO TO?
A. Flowchart
B. DFD-DIAGRAMS
C. Nassi-Shneiderman diagram
D. None of the above
➢ **Ans: C. Nassi-Shneiderman diagram**

80. A system program that sets up an executable program in main memory ready for execution is
A. assembler B. Linker
C. loader D. compiler
➢ **Ans: C. loader**

81. Difference between a multiprocessor system and a multiprogramming system is that in a multiprocessor system:
A. Main storage is shared by many programs.
B. Input is accepted in batches of many jobs.
C. Processor time is shared among several processes.
D. Many processors may be active simultaneously.
➢ **Ans: D. Many processors may be active simultaneously.**

82. A user process can be blocked only if it is
A. In the ready state
B. In the running state.
C. In the blocked/waiting state.
D. Waiting for a resource.
➢ **Ans: A. In the ready state**

83. A wait operation on a semaphore should not occur within a critical section controlled by that semaphore because
A. A deadlock will occur.
B. A semaphore is not a shared variable.
C. Another process may then enter the critical section violating the mutual exclusion constraint.
D. A signal on a semaphore is always given from outside the critical section.
➢ **Ans: A. A deadlock will occur.**

84. Which of the following statements is false?
A. I/O-bound processes should be given priority in scheduling over CPU-bound processes to ensure good turnaround time.
B. Users can exploit a multilevel feedback-scheduling policy by breaking a long job into several small jobs.
C. The processor scheduler normally classifies a process as being a CPU-bound process if it uses most of the previous time slice allocated to it.
D. The round-robin-scheduling policy allocates a time slice to a process depending on the number of time slices it has already used.
➢ **Ans: D. The round-robin-scheduling policy allocates a time slice to a process depending on the number of time slices it has already used.**

85. It is advantageous for the page size to be large because:
A. Less unreferenced data will be loaded into memory.
B. Virtual addresses will be smaller.
C. Page tables will be smaller.
D. Large programs can be run.
➢ **Ans: C. Page tables will be smaller.**

86. Which of the following statement is true about Disk scheduling?
A. Allocates disk space to users in a fair manner.
B. Validates the file control information which is stored in the file.
C. Examined pending disk requests to determine the most efficient way to service the requests.
D. Reorganizing disk requests to maximize seek time
➢ **Ans: C. Examined pending disk requests to determine the most efficient way to service the requests.**

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87. Which of the following is not contained in the directory entry of a file?
A. Creation date of file.
B. Access control list of users.
C. A count of the number of free blocks in the disk.
D. Filename and its extension.
➢ **Ans: C. A count of the number of free blocks in the disk.**

88. Which of the following is an example of a spooled device?
A. A line printer used to print the output of a number of jobs.
B. The terminal used to enter the input data for a Fortran Program being executed.
C. The secondary memory device in a virtual memory system.
D. The swapping area on a disk used by the swapper.
➢ **Ans: A. A line printer used to print the output of a number of jobs.**

89. Which of the following components of an operating system maintains the directory system?
A. Device drivers
B. File manager
C. Memory manager
D. None of the above
➢ **Ans: B. File manager**

90. Which of the following components of an operating system handles the details associated with particular peripheral equipment?
A. Device drivers
B. File manager
C. Memory manager
D. None of the above
➢ **Ans: A. Device drivers**

91. Which of the following components of an operating system is not part of the kernel?
A. Shell
B. File manager
C. Scheduler
D. None of the above
➢ **Ans: A. Shell**

92. Multitasking in a computer with only one CPU is accomplished by a technique called
A. Bootstrapping
B. Batch processing
C. Multiprogramming
D. None of the above
➢ **Ans: C. Multiprogramming**

93. Execution of an operating system is initiated by a program called the
A. Window manager
B. Scheduler
C. Bootstrap
D. None of the above
➢ **Ans: C. Bootstrap**

94. The end of a time slice is indicted by the occurrence of a signal called
A. An interrupt
B. A semaphore
C. A login
D. None of the above
➢ **Ans: A. An interrupt**

95. A section of a program that should be executed by at most one process at a time is called a
A. Utility
B. Critical region
C. Privileged instruction
D. None of the above
➢ **Ans: B. Critical region**

96 Which of the following is not involved in a context switch?
A. Interrupt
B. Process table
C. Dispatcher
D. Shell
➢ **Ans: D. Shell**

DATABASE

A **database** is a collection of data organized in a particular way. Databases can be of many types such as Flat File Databases, Relational Databases, and Distributed Databases etc. A database is a collection of data. That may sound overly simplistic but it pretty much sums up what any database is. A database could be as simple as a text file with a list of names. Or it could be as complex as a large, relational database management system, complete with in-built tools to help you maintain the data.

What a DBMS?

MySQL and mSQL are database management systems or DBMS. These software packages are used to manipulate a database. All DBMSs use their own implementation of SQL. It may be a subset or a superset of the instructions provided by SQL 92. MySQL, due to its simplicity uses a subset of SQL 92.

What's a RDBMS?

A relational database uses the concept of linked two-dimensional tables which comprise of rows and columns. A user can draw relationships between multiple tables and present the output as a table again. A user of a relational database need not understand the representation of data in order to retrieve it. Relational programming is non-procedural.

What's Database Normalization?

Normalization is the process where a database is designed in a way that removes redundancies, and increases the clarity in organizing data in a database.
Normalization of a database helps in modifying the design at later times and helps in being prepared if a change is required in the database design. Normalization raises the efficiency of the data base in terms of management, data storage and scalability.
Now Normalization of a Database is achieved by following a set of rules called 'forms' in creating the database.

These rules are 5 in number (with one extra one stuck in-between 3&4) and they are:
1st Normal Form or 1NF:
Each Column Type is Unique.
2nd Normal Form or 2NF:
The entity under consideration should already be in the 1NF and all attributes within the entity should depend solely on the entity's unique identifier.

3rd Normal Form or 3NF:

The entity should already be in the 2NF and no column entry should be dependent on any other entry (value) other than the key for the table. If such an entity exists, move it outside into a new table.
Now if these 3NF are achieved, the database is considered normalized.But there are three more 'extended' NF for the elitist.
These are:

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BCNF (Boyce & Codd):
The database should be in 3NF and all tables can have only one primary key.

4NF:
Tables cannot have multi-valued dependencies on a Primary Key.

5NF:
There should be no cyclic dependencies in a composite key.

Active database
An active database is a database that includes an event-driven architecture which can respond to conditions both inside and outside the database. Possible uses include security monitoring, alerting, statistics gathering and authorization.

Cloud database
A Cloud database is a database that relies on cloud technology .Both the database and most of its DBMS reside remotely, "in the cloud," while its applications are both developed by programmers and later maintained and utilized by (application's) end-users through a Web browser and Open APIs. More and more such database products are emerging, both of new vendors and by virtually all established database vendors.

Data warehouse
Data warehouses archive data from operational databases and often from external sources such as market research firms. The warehouse becomes the central source of data for use by managers and other end-users who may not have access to operational data..Operations in a data warehouse are typically concerned with bulk data manipulation, and as such, it is unusual and inefficient to target individual rows for update, insert or delete. Bulk native loaders for input data and bulk SQL passes for aggregation are the norm.

Distributed database
The definition of a distributed database is broad, and may be utilized in different meanings. In general it typically refers to a modular DBMS architecture that allows distinct DBMS instances to cooperate as a single DBMS over processes, computers, and sites, while managing a single database distributed itself over multiple computers, and different sites.

Embedded database
An embedded database system is a DBMS which is tightly integrated with application software that requires access to stored data in a way that the DBMS is "hidden" from the application's end-user and requires little or no ongoing maintenance. It is actually a broad technology category that includes DBMSs with differing properties and target markets. The term "embedded database" can be confusing because only a small subset of embedded database products is used in real-time embedded system.

End-user database
These databases consist of data developed by individual end-users. Examples of these are collections of documents, spreadsheets, presentations, multimedia, and other files. Several products exist to support such databases.

Functional requirements
Certain general functional requirements need to be met in conjunction with a database. They describe what is needed to be defined in a database for any specific application.

Data modeling and Data definition languages
The database needs to be based on a data model that is sufficiently rich to describe in the database all the needed respective application's aspects. A data definition language exists to describe the databases within the data model. Such language is typically data model specific.

Data manipulation languages and Query languages
A database data model needs support by a sufficiently rich data manipulation language to allow all database manipulations and information generation as needed by the respective application. Such language is typically data model specific.

Setting database security types and levels
The DB needs built-in security means to protect its content (and users) from dangers of unauthorized users. Protection is also provided from types of unintentional breach. Security types and levels should be defined by the database owners.

Data models
A data model is an abstract structure that provides the means to effectively describe specific data structures needed to model an application. As such a data model needs sufficient expressive power to capture the needed aspects of applications.

Early data models
These models were popular in the 1960s, 1970s, but nowadays can be found primarily in old legacy system .They are characterized primarily by being navigational with strong connections between their logical and physical representations, and deficiencies in data independence.

Hierarchical model
In the Hierarchical model different record types are embedded in a predefined hierarchical structure. This model has been supported primarily by the IBM IMS DBMS, one of the earliest DBMSs. Various limitations of the model have been compensated at later IMS versions by additional logical hierarchies imposed on the base physical hierarchy.

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NETWORK MODEL

In this model a hierarchical relationship between two record types is established via the set construct. A set consists of circular , linked listswhere one record type, the set owner or parent, appears once in each circle, and a second record type, the subordinate or child, may appear multiple times in each circle.

Inverted file model

An inverted file or inverted index of a first file, by a field in this file, is a second file in which this field is the key. A record in the second file includes a key and pointers to records in the first file where the inversion field has the value of the key.

Database architecture

Database architecture may be viewed, to some extent, as an extension of datamodeling. It is used to conveniently answer requirements of different end-users from a same database, as well as for other benefits.

- **External View**
  The external View defines how each end-user type understands the organization of its respective relevant data in the database, i.e., the different needed end-user views. A single database can have any number of views at the external level.
- **Conceptual level**
  Conceptual View unifies the various external views into a coherent whole, global view. It provides the common-denominator of all the external views. It comprises all the end-user needed generic data, i.e., all the data from which any view may be derived/computeD.It is provided in the simplest possible way of such generic data, and comprises the back-bone of the database. It is out of the scope of the various database end-users, and serves database application developers and defined by database administrators that build the database.
- **Internal View**
  Internal View or Physical view is as a matter of fact part of the database implementation inside a DBMS. It is concerned with cost, performance, scalability and other operational matters.
  It deals with storage layout of the conceptual level, provides supporting storage-structures to enhance performance, and occasionally stores data of individual views, computed from generic data, if performance justification exists for such redundancy. It balances all the external views' performance requirements, possibly conflicting, in attempt to optimize the overall database usage by all its end-uses according to the database goals and priorities.

DBMS components

DBMS architecture specifies its components and their interfaces. DBMS architecture is distinct from database architecture. The following are major DBMS components:

- **DBMS external interfaces**
  They are the means to communicate with the DBMS to perform all the operations ...d for the DBMS. These can be operations on a database, or operations to operate

Direct database operations
Defining data types, assigning security levels, updating data, querying the database, etc.

Operations related to DBMS operation and management
Backup and restore, database recovery, security monitoring, database storage allocation and database layout configuration monitoring, performance monitoring and tuning, etc.

- **Database language engines**
  Most operations upon databases are performed through expression in Database languages. Languages exist for data definition, data manipulation and queries , as well as for specifying various aspects of security, and more. Language expressions are fed into a DBMS through proper interfaces. A language engine processes the language expressions to extract the intended database operations from the expression in a way that they can be executed by the DBMS.
- **Query Optimizer**
  Performs query optimization on every query to choose for it the most efficient query plan to be executed to compute the query result.
- **Database Engine**
  Performs the received database operations on the database objects, typically at their higher-level representation.
- **Storage Engine**
  Translates the operations to low-level operations on the storage bits. In some references the Storage engine is viewed as part of the Database engine.
- **Transaction Engine**
  It is used for correctness and reliability purposes most DBMS internal operations are performed encapsulated in transactions.
  Transactions can also be specified externally to the DBMS to encapsulate a group of operations. The transaction engine tracks all the transactions and manages their execution according to the transaction rules
- **DBMS management and operation component**
  Comprises many components that deal with all the DBMS management and operational aspects like performance monitoring and tuning, backup and restore, recovery from failure, security management and monitoring, database storage allocation and database storage layout monitoring.

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DATABASE

1. Which of the following tools is used to help an organization build and use business intelligence?
   A. Data warehouse
   B. Data-mining tools
   C. Database management systems
   D. All of the above
   ➤ **Ans: D. All of the above**

2. What do databases and DBMSs directly support?
   A. OLDP
   B. OLTP
   C. Databases
   D. Operational databases
   ➤ **Ans: B. OLTP**

3. Which of the following statement is inaccurate with reference to a database?
   A. A collection of information
   B. Organized by logical structure
   C. Accessed by physical structure
   D. None of the above
   ➤ **Ans: C. Accessed by physical structure**

4. A base table with reference to database is a
   A. Mathematical table
   B. Table with logical indexing
   C. Table that physically exists in the database
   D. Index table
   ➤ **Ans: C. Table that physically exists in the database**

5. How can you start a database transaction in the database?
   A. By asking a Transaction object to your Connection, and calling the method begin()on it.
   B. By asking a Transaction object to your Connection, and setting the auto Commit property of the Transaction to false.
   C. By calling the method begin Transaction() on the Connection object.
   D. By setting the auto Commit property of the Connection to false, and execute a statement in the database.
   ➤ **Ans: D. By setting the auto Commit property of the Connection to false, and execute a statement in the database.**

6. How a user can execute a stored procedure in the database?
   A. Call method execute() on a Callable Statement object.
   B. Call method execute Procedure on call() on a Statement object
   C. Call method executeondenamd() on a Stored Procedure object.
   D. Call method run() on a Procedure Command object.
   ➤ **Ans: A. Call method execute() on a Callable Statement object.**

7. Which of the following cannot be enforced in the DBMS or application programs?
   A. Processing rights
   B. Security
   C. Processing responsibilities
   D. Cursors
   ➤ **Ans: C. Processing responsibilities**

8. The highest level in the hierarchy of data organization is called
   A. Data bank B. Data base
   C. Data file D. Data record
   ➤ **Ans: B. Data base**

9. What file access method allows the user to directly access records organized sequentially using an index of key fields?
   A. Sequential access method
   B. Indexed sequential access method
   C. Direct access method
   D. Relational access method
   ➤ **Ans: B. Indexed sequential access method**

10. Data integrity controls may include
    A. Default values, null value control, de-normalization
    B. Default values, hashing, referential integrity
    C. Range control, hashing, de-normalization
    D. Range control, referential integrity, default values
    ➤ **Ans: D. Range control, referential integrity, default values**

11. Which of the following is the basic object of ER model; which is a thing in real world?
    A. Relation B. Domain
    C. Attribute D. Entity
    ➤ **Ans: D. Entity**

12. Attributes that are not divisible are called
    A. Composite attribute
    B. Atomic attribute
    C. Complex attribute
    D. Structured attribute
    ➤ **Ans: B. Atomic attribute**

13. An entity type without a key attribute is called
    A. Null entity type
    B. Weak entity type
    C. Strong entity type
    D. Single entity type
    ➤ **Ans: B. Weak entity type**

14. Which of the following option best specifies the maximum number of relationship instances that an entity can participate?
    A. Range B. Domain
    C. Cardinality D. Ceiling
    ➤ **Ans: C. Cardinality**

15. The attribute Name of CUSTOMER entity is a
    A. Key attribute
    B. Derived attribute
    C. Composite attribute
    D. Multivalve attribute
    ➤ **Ans: C. Composite attribute**

16. The multivalve attributes are represented in ER-diagrams by
    A. Ovals B. Rectangles
    C. Double ovals D. Diamonds
    ➤ **Ans: C. Double ovals**

17. The relationship in which an entity type participates more than once is a called
    A. Recursive attribute
    B. Iterative attribute
    C. Enumerated attribute
    D. Implied attribute
    ➤ **Ans: A. Recursive attribute**

18. A multivalve attribute can have
    A. Lower and upper bounds
    B. Lower bounds
    C. Upper bounds
    D. None of the above
    ➤ **Ans: A. Lower and upper bounds**

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19. The attribute Name of DEPENDENT entity (company database) is a
A. Primary key
B. Candidate key
C. Partial key
D. Super key
➢ **Ans: C. Partial key**

20. A weak entity type always has a
A. Partial participation constraint with respect to its identifying relationships.
B. Total participation constraint with respect to its identifying relationships.
C. Overlap participation constraint with respect to its identifying relationships.
D. Disjoint participation constraint with respect to its identifying relationships.
➢ **Ans: B. Total participation constraint with respect to its identifying relationships.**

21. The relational database environment has all of the following components except
A. Users
B. Separate files
C. Database
D. Query languages
➢ **Ans: A. Users**

22. A top-to-bottom relationship among the items in a database is established by a
A. Hierarchical schema
B. Network schema
C. Relational schema
D. Logical schema
➢ **Ans: A. Hierarchical schema**

23. Which of the following is not an example of relational database?
A. dBase IV
B. 4th Dimension
C. FoxPro
D. Reflex
➢ **Ans: D. Reflex**

24. Which of the following statement is not true about a relational database model which?
A. Uses a series of logical related multi-dimensional files to store information in the form of a database.
B. Uses a series of physically related two-dimensional tables to accesses information in the form of a table.
C. Uses a series of physically related two-dimensional tables or files to store information in the form of a database.
D. None of the above.
➢ **Ans: C. Uses a series of physically related two-dimensional tables or files to store information in the form of a database.**

25. Which of the following uses a series of logically related two-dimensional tables to store information in database?
A. Database Management System
B. Relational Database
C. Data warehouse
D. Data molding schema
➢ **Ans: B. Relational Database**

26. Which of the following term describes each two-dimensional table or file in the relational model?
A. Database Management System
B. Relational database
C. Network database
D. None of the above
➢ **Ans: D. None of the above**

27. What are the two parts that compose a relational database model?
A. Information and physical structure of information
B. Inventory and physical structure of information
C. Information and logical structure of information
D. Inventory and physical structure of information
➢ **Ans: C. Information and logical structure of information**

28. Which of the following statement is true regarding SQL
A. Structured query language (SQL) is a standardized first - generation query language.
B. Structured query language (SQL) is a standardized third-generation query language found in most DBMSs.
C. Structured query language (SQL) is a standardized language which is used to perform different operation on the database.
D. None of the above.
➢ **Ans: C. Structured query language (SQL) is a standardized language which is used to perform different operation on the database.**

29. What of the following software performs the same functions as SQL?
A. DBMS
B. QBE
C. Crystal report generator
D. MS database recorder
➢ **Ans: B. QBE**

30. Which of the following data-mining tool is similar to QBE tools, SQL, and report generators in the typical database environment?
A. Intelligent agents
B. Query-and-reporting tools
C. Multidimensional analysis tools
D. Report generator
➢ **Ans: B. Query-and-reporting tools**

31. What is embedded SQL?
A. A subset of SQL for Macintosh system
B. An SQL compiler built by Microsoft
C. SQL statements used in a program written in some other programming language, usually prefixed by some symbols recognizable by preprocessor
D. SQL written for embedded systems, used in a program written in some other programming language
➢ **Ans: C. statements used in a program written in some other programming language, usually prefixed by some symbols recognizable by preprocessor**

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32. Which of the following statement is true about ANSI SQL?
A. Serializable isolation level will allow phantom reads and easy access.
B. Serializeableisolation level will not allow phantom reads, dirty reads, and no repeatable reads.
C. Serializeable isolation level will allow phantom reads
D. Serializeableisolation level will not allow dirty reads, and no repeatable reads.
➢ **Ans: B. Serializeableisolation level will not allow phantom reads, dirty reads, and no repeatable reads.**

33. The term relation often describes each
A. Two-dimensional table or file in the relational model.
B. Two-dimensional network model in the database management system.
C. Multi-dimensional table or file in the relational model.
D. Two-dimensional functions in the relational model.
➢ **Ans: A. Two-dimensional table or file in the relational model.**

34. Which of the following statement is true about a data dictionary?
A. It is a two-dimensional table used to store data within a relational database.
B. It is a multi-dimensional table used to store data within a relational database.
C. It is storage area where data about data is stored
D. It is a two-dimensional table used to store data within a database.
➢ **Ans: C. It is storage area where data about data is stored**

35. Which statements about JDBC are true?
A. JDBC is an API to connect to relational-, object- and XML data sources
B. JDBC stands for Java DataBase control
C. JDBC is an API to access relational databases, spreadsheets and flat files
D. JDBC is an API to bridge the object-relational mismatch between OO programs and relational Databases
➢ **Ans: C. JDBC is an API to access relational databases, spreadsheets and flat files**

36. Which of the following statement is true about Query-by-example (QBE) tools?
A. These tools help the user to graphically design.
B. These tools are for the purpose of system analysis.
C. These tools are not for the software design.
D. These tools are used of alpha testing.
➢ **Ans: A. These tools help the user to graphically design.**

37. Which of the following statement is true
A. A DBMS, or Database Marketing System, is a database designed to take marketing decision.
B. MDBMS is a database designed to support the marketing function within a business.
C. Database about Marketing System, is a database designed to support the marketing function within a business.
D. None of the above.
➢ **Ans: C. Database about Marketing System, is a database designed to support the marketing function within a business.**

38. Which data manipulation tool allows you to graphically design the answer to a question?
A. Crystal Report generator
B. Query-by-example tool
C. Structured query language
D. Query optimizer tools
➢ **Ans: B. Query-by-example tool**

39. Integrity constraints prevent from?
A. Poor database design
B. Lack of database security
C. Poor data quality
D. Database integrity
➢ **Ans: C. Poor data quality**

40. Which of the following is graphically design to answer a question?
A. Crystal Report generator
B. query-by-example tool
C. Structured query language
D. Query optimizer tools
➢ **Ans: B. Query-by-example tool**

41. Which statement is true about DBA?
A. The DBA is responsible for managing changes to the database structure, but is rarely involved in the original design of the structure
B. The DBA is responsible for managing changes to the database structure.
C. The DBA is rarely involved in the original design of the structure
D. **None of the above**
➢ **Ans: D. None of the above**

42. Which of the following is true about making changes to the database structure?
A. The DBA need not get input from users on the issue because it is a technical decision.
B. Formal policies and procedures for requesting a change are not used because they are too limiting.
C. Documentation of when the change was made, how it was made, and why it was made must be created.
D. None of the above
➢ **Ans: C. Documentation of when the change was made, how it was made, and why it was made must be created.**

43. If there is a one-to-one relationship between entity A and B, then
A. There exists a functional dependency from the primary key in B to the primary key in A, i.e., PKB. PKA..
B. There exists a functional dependency from the primary key in A to the primary key in B, i.e., PKA. PKB..
C. Both A and B
D. None of the above
➢ **Ans: C. Both A and B**

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44. If there is a one-to-many relationship from entity A to B (A is on one-side, and B is on many-side), then
A. There exists a functional dependency from the primary key in B to the primary key in A, i.e., PKB. PKA..
B. There exists a functional dependency from the primary key in A to the primary key in B, i.e., PKA. PKB..
C. Both A and B
D. Neither A nor B
➤ **Ans: A. There exists a functional dependency from the primary key in B to the primary key in A, i.e., PKB. PKA..**

45. If there is a many-to-many relationship between entity A and B, then
A. There exists a functional dependency from the primary key in B to the primary key in A, i.e., PKB. PKA..
B. There exists a functional dependency from the primary key in A to the primary key in B, i.e., PKA. PKB..
C. Both A and B
D. Neither A nor B
➤ **Ans: D. Neither A nor B**

46. If a database table is in the first normal form, it is also
A. The non-first normal form.
B. The second normal form.
C. The third normal form.
D. The Boyce-Codd normal form.
➤ **Ans: B. The second normal**

47. If a database table is in Boyce-Codd normal form, it is also in
A. The first normal form.
B. The second normal form.
C. The third normal form.
D. All of the above
➤ **Ans: D. All of the above**

48. If a database table is in the third normal form, it is also in
A. The fifth normal form
B. The second normal form.
C. The Boyce-Codd normal form
D. None of the above
➤ **Ans: B. The second normal form.**

49. The higher normalized database schema implies
A. More decomposed database tables.
B. More join operations when data from these decomposed tables are combined.
C. Slower processing for queries involved the joining these decomposed tables.
D. All of the above
➤ **Ans: D. All of the above**

50. A multidimensional representation of information is referred to as a
A. Database
B. Hypercube warehouse
C. Hypercube
D. Multidimensional data storage unit
➤ **Ans: C. Hypercube**

51. A logical collection of information gathered from many different operational databases and used to create business intelligence is a
A. Database
B. data dictionary
C. Data warehouse
D. None of the above
➤ **Ans: C. Data warehouse**

52. The logical structure of information in a database is contained in the
A. Data manipulation system
B. Data administration subsystem
C. Data definition subsystem
D. Data dictionary
➤ **Ans: D. Data dictionary**

53. Which of the following permit users to examine the impact of structural changes to a database?
A. Data definition subsystem
B. Data manipulation subsystem
C. Change management facilities
D. Application generation subsystem
➤ **Ans: C. Change management facilities**

54. Which of the following maintain Data quality when multiple users attempt to access and modify the same data at the same time?
A. Data quality subsystem
B. concurrency control facilities
C. Reorganization facilities
D. None of the above
➤ **Ans: B. Concurrency control facilities**

55. Which portion of the database managemen' system is used to develop user interfaces?
A. Data definition subsystem
B. Data manipulation subsystem
C. Data warehouse
D. Application generation subsystem
➤ **Ans: D. Application generation subsystem**

56. The DBMS focuses on physical tasks so that the user can focus on what?
A. Logical information needs
B. Logical tasks
C. Physical thought
D. All of the above
➤ **Ans: A. Logical information needs**

57. A database actually consists of what two parts?
A. Information and tables
B. Tables and structure
C. Information and logical structure of information
D. Physical structure of information and tables
➤ **Ans: C. Information and logical structure of information**

58. Which of the following is the manipulation of information to support decision making?
A. Online transaction processing
B. Logical database
C. Online data warehouse
D. Online analytical processing
➤ **Ans: D. Online analytical processing**

59. Which of the following data-mining tools applies various mathematical models to information within a data warehouse to obtain information?
A. Query-and-reporting tools
B. Query optimizer
C. Multidimensional analysis tools
D. Statistical tools
➤ **Ans: D. Statistical tools**

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60. Which of the following function is performed by the database administrator?
A. Plans for information resources
B. Oversees the development of information resources
C. Defines the database structures
D. Monitors information resources
➤ **Ans: C. Defines the database structures**

61. Which of the following function is performed by the data administrator?
A. Defining database structures
B. Monitors information resources
C. Develops security procedures
D. Develops database documentation
➤ **Ans: B. Monitors information resources**

62. The data administration function performs all of the following, except
A. Plans for information resources
B. Oversees the development of information resources
C. Defining and organizing database structures
D. Monitors information resources
➤ **Ans: C. Defining and organizing database structures**

63. Who is the person responsible for the more technical and operational aspects of managing the information contained in organizational databases?
A. Chief information officer
B. Data administrator
C. Database administrator
D. None of the above
➤ **Ans: C. Database administrator**

64. Which of the following data-mining tool uses slice-and-dice techniques that allow you to view multidimensional information from different perspectives?
A. Structure query language
B. Query-and-reporting tools
C. Multidimensional analysis tools
D. None of the above
➤ **Ans: C. Multidimensional analysis tools**

65. Which of the following DBMS subsystem manages the overall database environment?
A. Concurrency control facilities
B. Reorganization facilities
C. Query optimization facilities
D. None of the above
➤ **Ans: D. None of the above**

66. The tools which are included in an application generation subsystem facility?
A. Creating visually appealing data entry screens
B. Interfaces to commonly used programming languages
C. Creating easy-to-use data entry screens
D. All of the above
➤ **Ans: D. All of the above**

67. Which of the following statements represents a DBMS engine?
A. It is the most important component of a DBMS
B. Accepts logical requests from other DBMS subsystems
C. Accesses databases and data dictionaries
D. All of the above
➤ **Ans: D. All of the above**

68. Which DBMS component contains facilities to help you to develop transaction-intensive applications?
A. DBMS engine
B. Data definition subsystem
C. Data manipulation subsystem
D. None of the above
➤ **Ans: D. None of the above**

69. Which of the following cannot be created without foreign keys?
A. Logical ties among various files
B. Physical ties among various files
C. Logical ties among various fields
D. Physical ties among various fields
➤ **Ans: A. Logical ties among various files**

70. Which of the following uses a series of logically related two-dimensional tables or files to store information in the form of a database?
A. Database
B. Relational database
C. Data warehouse
D. Database management system
➤ **Ans: B. Relational database**

71. What is embedded SQL?
A. A subset of SQL for Macintosh system
B. An SQL compiler built by Microsoft
C. SQL statements used in a program written in some other programming language, usually prefixed by some symbols recognizable by preprocessor
D. SQL written for embedded systems, used in a program written in some other programming language
➤ **Ans: C. SQL statements used in a program written in some other programming language, usually prefixed by some symbols recognizable by preprocessor**

72. Which of the following keywords is NOT included in most data retrieval statements?
A. SELECT B. AS
C. FROM D. WHERE
➤ **Ans: B. AS**

73. Which of the following is true about making changes to the database structure?
A. The DBA need not get input from users on the issue because it is a technical decision.
B. Formal policies and procedures to request a change are not used because they are too limiting.
C. Documentation of when the change was made, how it was made, and why it was made must be created.
D. Changes do not produce unexpected results because the DBA will have investigated
➤ **Ans: C. Documentation of when the change was made, how it was made, and why it was made must be created.**

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74. Measures that are taken to prevent one user's work from inappropriately influencing another user's work are called:
A. Concurrency control.
B. Checkpoint.
C. Database recovery.
D. Database logging.
➢ **Ans: A. Concurrency control.**

75. A series of actions to be taken on the database such that either all actions are completed successfully, or none of them can be completed, is known as a(n):
A. Checkpoint.
B. Crystal reports
C. Transaction processing system
D. Transaction.
➢ **Ans: D. Transaction.**

76. One remedy for the inconsistencies caused by concurrent processing is called
A. Concurrency
B. Check pointing
C. Rollback
D. Resource locking
➢ **Ans: D. Resource locking**

77. **Which of the following statement is false about locks?**
A. Locks with large granularity are easier for the DBMS to administer.
B. Locks with small granularity cause more conflicts.
C. Locks with large granularity produce fewer details for the DBMS to track.
D. Locks may have a table-level granularity.
➢ **Ans: B. Locks with small granularity cause more conflicts.**

78. Ensuring that all rows impacted by the actions of a transaction are protected from changes until the entire transaction is completed is called:
A. Statement level consistency.
B. Optimistic locking.
C. Transaction level consistency.
D. Durable transactions.
➢ **Ans: C. Transaction level consistency.**

79. Which of the following cannot be enforced in the DBMS or application programs?
A. Processing rights
B. Security
C. Processing responsibilities
D. Transaction isolation
➢ **Ans: C. Processing responsibilities**

80. Recovering a database via reprocessing involves
A. **Restoring the database from the save and reprocessing all the transactions since the save.**
B. Restoring the database from the save and reapplying all the changes made by transactions since the save.

C. Undoing the changes made by erroneous or partially processed transactions, and restarting the valid transactions that were in process at the time of the failure.
D. Synchronizing the database and the transaction log by check pointing.
➢ **Ans: A. Restoring the database from the save and reprocessing all the transactions since the save.**

81. Which type of data repository is composed of metadata that is created automatically as the system components are created?
A. Passive repository
B. Dynamic repository
C. Active repository
D. Automatic repository
➢ **Ans: C. Active repository**

82. Which of the following would not be contained in a transaction log?
A. Before-images
B. Type of operation
C. Pointers
D. Permissions
➢ Ans: D. Permissions

83. Which of the following is not true of DBMS security features?
A. Users may be assigned to one or more roles.
B. A role may be assigned to only one user.
C. Both users and roles can have many permissions.
D. Objects have many permissions.
➢ **Ans: B. A role may be assigned to only one user.**

84. Recovering a database via rollback involves:
A. Restoring the database from the save and reprocessing all the transactions since the save.
B. Restoring the database from the save and reapplying all the changes made by transactions since the save.
C. Undoing the changes made by erroneous or partially processed transactions, and restarting the valid transactions that were in process at the time of the failure.
D. Re-creating the database by re-entering all of the data from the beginning and, then reprocessing all of the transactions.
➢ **Ans: C. Undoing the changes made by erroneous or partially processed transactions and restarting the valid transactions that were in process at the time of the failure.**

85. Which of the following is allowed by "Repeatable Read Isolation?"
A. No repeatable reads
B. Dirty reads
C. Phantom reads
D. None of the above
➢ **Ans: C. Phantom reads**

86. If there is a one-to-many relationship from entity A to B (A is on one-side, and B is on many-side), then
A. There exists a functional dependency from the primary key in B to the primary key in A, i.e., PKB. A..

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B. There exists a functional dependency from the primary key in A to the primary key in B, i.e., PKA. PKB.
C. There exists a functional dependency from the primary key in A to the primary key in B, i.e., PKB. A.
D. None of the above
➤ **Ans: A. There exists a functional dependency from the primary key in B to the primary key in A, i.e., PKB. A.**

87. The higher normalized database schema implies
A. More decomposed database tables.
B. More join operations when data from these decomposed tables are combined.
C. Slower processing for queries involved the joining these decomposed tables.
D. All of the above
➤ **Ans: D. All of the above**

SOFTWARE ENGINEERING

Software engineering (SE) is concerned with developing and maintaining software systems that behave reliably and efficiently, are affordable to develop and maintain, and satisfy all the requirements that customers have defined for them.

Software Engineering is the systematic approach to the development, operation and maintenance of software. Software Engineering is concerned with development and maintenance of software products.

Goal of Software Engineering

The primary goal of software engineering is to provide the quality of software with low cost. Software Engineering involves project planning, project management, systematic analysis, design, validations and maintenance activities.

Component

A Component is a tested, special purpose software unit which is reusable, adaptable, portable and interoperable. In software terms, components are also called **component ware (CM)**.

Framework

Framework is the combination of components that can be plugged into an application.

Software interface

A Software interface is the program that makes it possible for components to interact and interoperate with each other. Eg. JAVA BEANS, DCOM etc.

Software Entities

Software Entities are the processes, requirements, products and resources of a software engineering landscape.

Engineering approach

An Engineering approach to software engineering is to produce system on time and within budget.

Software Development problems

1) Conceptual problem. 2) Representation problem.

Vanilla Framework helps to bridge gap between a high level solution, to a problem and its implementation in software.

Software Requirement Specification (SRS):

This is a blueprint for the complete design of a software product.

Quality Factors: The following are quality factors

Correctness, reliability, maintainability, testability, efficiency, integrity, usability, portability, interoperability, reusability.

Reusability Criterion: The following are some important reusability criteriA.

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Self-Descriptive:
This is with natural language.

Modularity:
Modularity means change in one component has minimal impact on other.

Portability:
Portability means transfer of software from one system to other.

Platform Independence:
Platform Independence means it can execute on any type of platform.

Incremental Approach:
Incremental approach to software development has been formulated by watts Humphrey.

Clean Room Engineering:
Clean room Engineering is used to control the quality of incrementally developed software product and to certify the fitness of software products for usage at time of delivery.

CAPABILITY MATURITY MODEL (CMM):
CMM describes software process management maturity relative to five levels i.e., Initial, Repeatable, Defined, Managed, Optimizing In the Initial level there is a lack of planning and the development of a clear-cut guide that software development teams can follow. Few details of a software process have been defined at this level. Good results are considered miraculous.

KPA (Key Process Areas)
In the Second level i.e., the CMM Repeatable Process is characterized by a commitment to discipline in carrying out a software development project.

Key Process Areas (KPA) achieved by:
Requirements management, software project planning, software project tracking and oversight, software subcontract management, software quality assurance, software configuration management.

CMM Defined Process
CMM Defined Process is to guide the structuring and evaluation of a software project and is achieved by Organizational process focus and definition, training program, software product engineering, intergroup coordination, peer reviews.

CMM Managed Process
CMM Managed Process is for data gathering and analysis and managing software quality [illegible] achieved by Quantitative process management, Software quality management.

CMM Optimizing Process
CMM Optimizing Process is associated with defect prevention, automation of the software process wherever possible, and methods for improving software quality and team productivity and shortening development time.

Validation
Validation occurs whenever a system component is evaluated to ensure that it satisfies system requirements.

Verification
Verification consists in checking whether the product of a particular phase satisfies the conditions imposed at that phase.

Software Evolution
This is characterized by genotypes and phenotypes.
A **genotype** provides information about a member of a population.
A **phenotype** characterizes the behavior of a population member.
Evolution pattern = where || why || what || when || how || by-whom.

Software Life-Cycle:
This is the period of time beginning with a concept for a software product and ending whenever the software is no longer available for use. The Software life-cycle typically includes the following: Requirements, Analysis, and Design, construction, testing (Validation), installation, operation, maintenance, and retirement. Several models (spiral, waterfall etC.) have been proposed to describe this process.

Software Life-Cycle Model
Software Life-Cycle Model represents the activities, their inputs and outputs and their interactions during the life-cycle.

Software Life-Cycle Models:
A discipline whose aim is the production of quality software, delivered on time, within budget, and satisfying users' needs. Designing and developing high-quality software. Application of computer science techniques to a variety of problems.

CASE tool
CASE stands for Computer Aided Software Engineering; it can be used to mean any computer-based tool for software planning, development, and evolution. What is a Function Point ?Function points and feature points are methods of estimating the "amount of functionality" required for a program, and are thus used to estimate project completion time. The basic idea involves counting inputs, outputs, and other features of a description of functionality.

Spiral Model
Idea in spiral model is evolutionary development, using the waterfall model for each step; it's intended to help manage risks. Don't define in detail the entire system at first. The

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developers should only define the highest priority features. Define and implement those, then get feedback from users/customers (such feedback distinguishes "evolutionary" from "incremental" development). With this knowledge, they should then go back to define and implement more features in smaller chunks.

Spec Mark

SPEC mark refers to the results of the first suite What is Hungarian Notation? A naming convention for C code What is SEI Maturity Model?

First step in improving the existing situation is to get management buy-in and management action to clean up the software management processes.

Second step (Integration) is to get everyone working together as a team.

Third step (Measurements) is to establish objective ways of understanding status and predict where things are going in your process.

Software BUG

A Fault, Failure, Mistake is called software bug.

Clean Room

Clean room' is a software process based on mathematical verification of components and statistical system-level testing.

Testing:

All the modules that have been developed before are integrated or put together in this phase, and tested as a complete system. A system is tested for online response, volume of transactions, stress, recovery from failure, and usability.

The following are the two major groups of testing

- Black Box testing
- Glass box testing

Black Box testing:

Functional or black box testing is an approach to testing where the tests are derived from the program or component specification. The system is a black box whose behavior can only be determined by studying its inputs and the related outputs.

Challenge in the black box

The challenge in the black box testing is to cause failures in the module by designing test causes that, with an appropriate input and controlled externally conditions, can produce an output that will clearly indicate a module failure

Manual Testing:

Time Consuming, Low Reliability, Human Resources, Inconsistent.

Automated Testing:

Speed, Repeatability, Reusability, Reliability, Programming Capabilities.

Unit testing

The unit test is white box oriented and the steps can be conducted in parallel for multiple components.

1. The module Interface is tested to ensure that information properly flows into and out of the program unit under test.
2. The local data structure is examined to ensure that data stored temporarily maintains its integrity during all steps in an algorithm's execution.
3. Boundary conditions are tested to ensure that the module operates properly at boundaries established to limit and restrict processing
4. All the statements are executed at least once and error handling paths are tested

Integration testing:

Integration testing is a systematic technique for constructing the program structure.

Top down Integration Testing

Top down integration testing with the main routine and one or two immediate subordinate routines in the system structure it is good to have modules are integrated as they are developed, top level interfaces are tested first.

Bottom up Integration Testing:

Bottom up integration testing is the traditional strategy used to integrate the components of a software system into a functioning whole.

Regressive testing:

Retesting the already test modules and adding new modules .Regressive testing is an important strategy for reducing side effects. System Level Testing

Performance testing:

Performance testing is designed to test the run time performance of software or hardware.

Recovery testing:

Recovery testing is a system test forces the software to fail in a variety of ways and verifies that recovery is properly performed .if recovery is automatic, re initialization, check pointing, data recovery and restart are evaluated for correctness.

Security Testing:

Security testing attempts to verify that protection mechanisms built into a system will in fact, protect it from improper penetration.

Acceptance testing

When customer software is built for one customer, a series of acceptance tests are conducted to enable the customer to validate all requirements. Conducted by the end user rather than software engineers, an acceptance test can range from an informal test drive to a planned and systematically executed series of tests.

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GUI checkpoints

GUI checkpoints check information about GUI objects. For example, you can check that a button is enabled or see which item is selected in a list.

Database checkpoints

Database checkpoints check the data content in a database.

Text checkpoints

Text checkpoints read text in GUI objects and in bitmaps, and enable you to check their contents.

Bitmap checkpoints

Bitmap checkpoints compare a "snapshot" of a window or an area in your application to an image captured in an earlier version.

Software Production Process

Software Production Process is the process of building, delivering and evolving the software system from the inception of an idea all the way to the delivery and final retirement of the system is called a software production process.

Spiral ModelConception:

SDLC starts with the conception phase. This phase is triggered by a competitor, a problem or an opportunity

- The problem perceived
- The goal to be achieved
- The benefits from the solution
- The scope of the project

Initiation:

The Software engineers work with users to carry out a macro level study of the users requirements. The software engineers define the various alternatives possible and the cost-benefit justification of these alternatives.

Analysis:

The software Engineers carry out a detailed study of the user's requirement. They the narrate at the proposed system to be built .The model of this system is to be used to freeze all requirements before the next phase begins.

Design:

In this phase the functional specifications are used for translating the model into a design of the desired system like data flow diagrams, decisions tables, databases etc.

Construction:

[illegible] delivered to the customer as the

Implementation:

Implementation means converting a new system design into operation .This involves creating computer compatible files, training the operating staff, installing hardware and any other requirements.

Prototyping Process:

The basic idea of prototyping model is instead of fixing requirements before design and coding can begin, a prototype is built to understand the requirements. The prototype is built with the know requirements by this the user can be know how the system works

RAD Model

Rapid Application development is high speed adaption of the linear sequential model in which rapid development is achieved by using component based construction, business model and data modeling etc.

Incremental Model

Incremental model delivers software in small but usable pieces called increments. In general each increment builds on those that have already been delivereD. In this analysis, design, coding and testing are done for every model.
How can u measure the quality of your project some SDLC models.

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SOFTWARE ENGINEERING (MCQs)

1. Which of the following statement is true about system engineering?
   A. Modern system engineering practices simulation of reactive systems is no longer necessary.
   B. System engineering practices is systematic approach of system development life cycle.
   C. System engineering practices simulation of proactive systems is no longer necessary.
   D. None of the above.
   ➢ **Ans: A. Modern system engineering practices simulation of reactive systems is no longer necessary.**

2. The system engineering process usually begins from the following phase
   A. Requirement phase
   B. domain view phase
   C. Component base view phase
   D. World view phase
   ➢ **Ans: D. World view phase**

3. Software engineer should consider which of the following factors to construct a system model?
   A. Human resource
   B. budget
   C. Constraints
   D. Schedule
   ➢ **Ans: C. Constraints**

4. In business process engineering, which of the three architectures are
   C. Applications, data, technology infrastructure
   D. Communications, organizational, financial infrastructure
   ➢ **Ans: C. Applications, data, technology infrastructure**

5. Which of the following elements of business processing engineering is the responsibilities of the software engineer for successful system modelling?
   A. Physical system design
   B. Logical system design
   C. Construction and integration
   D. Information strategy planning
   ➢ **Ans: C. Construction and integration**

6. Which of the following statement is true about user's desire for the product specification?
   A. The goal of product engineering is to translate the customer's desire for a set of defined capabilities into a working product.
   B. The goal of product engineering is to check the DFD for the requirements.
   C. The goal of product engineering is to translate the logical design to physical design.
   D. None of the above

7. Purpose of decision table is to
   A. Document all process sequences.
   B. Guide the development of the project specifications
   C. Use only when building a requirement phase
   D. Use when a complex set of conditions appears in a component
   ➢ **Ans: D. Use when a complex set of conditions appears in a component**

8. Which of the following option is near to project management?
   A. Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project.
   B. Project management is to control the budget of any specific project.
   C. Project management is the application of knowledge, skills, tools, and techniques to control the scope and time of the project.
   D. Project management is to divide the project in to small modules.
   ➢ **Ans: A. Project management is the application of knowledge, skills, tools, and techniques to project**

9. Which of the following option is best for the project management tools?
   A. Gantt chart
   B. Network diagram
   C. Primavera Project Manager
   D. All of the above
   ➢ **Ans: D. All of the above**

10. Which of the formal methods model of software development makes use of mathematical methods to?
    A. Define the specification for computer-based systems.
    B. Develop defect free computer-based systems.
    C. Verify the correctness of computer-based systems.
    D. All of the above.
    ➢ **Ans: D. All of the above.**

11. Which of the following option is true about quality standards for computer software?
    A. ISO 9001 quality standards for computer software.
    B. ISO 9126 quality standards for computer software.
    C. ISO 9001:9002 quality standards for computer software.
    D. ISO 13000 quality standards for computer software.
    ➢ **Ans: B. ISO 9126 quality standards for computer software.**

12. Which of the following statements are true about technical product measurements during software development?

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B. Provides software engineers with an objective mechanism for assessing software quality.
C. It is responsibility of project manager.
D. All of the above.
➢ **Ans: B. Provides software engineers with an objective mechanism for assessing software quality.**

13. Which of the following statement is true about the Goal/Question/Metric (GQM) paradigm?
A. It was developed as a technique for assigning blame for software failures.
B. It is the software quality assurance plan model.
C. It is compulsory while software testing.
D. None of the above
➢ **Ans: D. None of the above**

14. An attributes for a software product metric is that it should be
A. Easy to compute
B. qualitative approach
C. Flexible during cost analysis
D. Quantitative approach
➢ **Ans: A. Easy to compute**

15. The IEEE software maturity index is used to provide a measure of the
A. Maintainability of a software product based on its availability
B. Specification of the software according to user's requirement
C. Reliability of a software product following regression
D. Stability of a software product as it is modified during maintenance
➢ **Ans: D. Stability of a software product as it is modified during maintenance**

16. Which of the following statement is true about maintenance plan?
A. Predicts the maintenance requirements of the system, maintenance costs and effort required.
B. Predicts the testing of the system, maintenance costs and effort required.
C. Predicts the maintenance requirements of the system.
D. None of the above.
➢ **Ans: A. Predicts the maintenance requirements of the system, maintenance costs and effort required.**

17. The review and approved document about System Requirement Specification's is called
A. Delivery document
B. Baseline document
C. Checklist
D. Software specification requirement
➢ **Ans: B. Baseline document**

18. Which of the following is reasonable approach when requirements are well defined?
A. The linear sequential model
B. Spiral model
C. V Process Model
D. Rapid Application Development model
➢ **Ans: A. The linear sequential model**

19. Incremental model of software development is applied when
A. Requirements are well defined.
B. Working core product is required quickly.
C. The best approach to use for projects with large development teams.
D. A RAD model that is not used for commercial products.
➢ **Ans: B. Working core product is required quickly.**

20. Which software development model easily accommodate product requirements changes
A. XP: extreme Programming
B. Evolutionary software process models
C. V Process Model
D. Spiral model
➢ **Ans: B. Evolutionary software process models**

21. Which of the following is a useful approach when a user is unable to define requirements clearly?
A. XP: extreme Programming
B. The prototyping model of software development
C. Spiral model D-V Process Model
D. None of these
➢ **Ans: B. The prototyping model of software development**

22. In the Unified Process model
A. Requirements are determined iteratively and may span more than one phase of the process.
B. Requirements are determined just once.
C. Requirements are determined by the customer and can't be changed..
D. Requirements are determined iteratively by the project manager.
➢ **Ans: A. Requirements are determined iteratively and may span more than one phase of the process.**

23. How agile processes are created to manage unpredictability?
A. Requirements gathering must be conducted very carefully.
B. Cost analysis must be conducted before planning takes place.
C. Software increments must be delivered in short time periods.
D. Software processes must adapt to changes just once.
➢ **Ans: C. Software increments must be delivered in short time periods.**

24. What are the activities for the Adaptive Software Development (ASD) process model?
A. Software testing, design, requirement gathering.
B. Alpha testing, black box testing, implementation.
C. Adaptive cycle planning, iterative development, requirements gathering.
D. Speculation, collaboration, learning.
➢ **Ans: D. Speculation, collaboration, learning.**

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25. Requirements elicitation are difficult due to the
A. Cost
B. Scope
C. Time
D. Requirement gathering team
➢ **Ans: B. Scope**

26. The result of the requirements engineering elaboration task is an analysis model that defines which of the following problem domain(s)?
A. Information
B. functional
C. Behavioural
D. All of the above
➢ **Ans: D. All of the above**

27. Requirements validation review is conducted by
A. Testing the system model
B. Have the customer look over the requirements
C. The software requirement team
D. Use a checklist of questions to examine each requirement
➢ **Ans: D. Use a checklist of questions to examine each requirement**

28. Which of the following statement is best definition about the job of requirement engineer is to?
A. Categorize all stakeholder information so that decision makers to choose an internally consistent set of requirements.
B. Analyse the software test plan document.
C. Check the software requirement plan specification.
D. None of the above
➢ **Ans: A. Categorize all stakeholder information so that decision makers to choose an internally consistent set of requirements.**

29. Which is not included requirement classifications used in Quality Function Deployment (QFD)?
A. Fix
B. variable
C. Mandatory
D. None of the above
➢ **Ans: C. Mandatory**

30. To determine the architectural style that best fits the proposed system, requirements engineering is used to uncover
A. Algorithmic complexity
B. characteristics and constraints
C. Requirement specification
D. Testing patterns
➢ **Ans: B. Characteristics and constraints**

31. In the process of system modelling, systems that interact with the target system are represented as
A. Tree-level systems
B. expert systems
C. Super ordinate systems
D. High level systems
➢ **Ans: C. Super ordinate systems**

32. Which of the following subject areas is not defined as part of the Software Engineering Code of Ethics?
A. Product B. management
C. Client D. Modelling
➢ **Ans: D. Modelling**

33. Agile Modelling (AM) provides guidance during which of these software tasks?
A. Analysis phase
B. requirement phase
C. Coding phase
D. Testing phase
➢ **Ans: A. Analysis phase**

34. Which of the following statement is true about operational software prototype?
A. It is the best representation of system.
B. Is shows the complete flow of the system.
C. It is documentation specification of the product.
D. None of the above
➢ **Ans: A. It is the best representation of system.**

35. User interface development systems provide some mechanisms for building interface prototypes including
A. Black box testing
B. Software engineering tools
C. Input validation
D. None of the above
➢ **Ans: C. Input validation**

36. The component-based development model is
A. Only appropriate for computer hardware design.
B. Not able to support the development of reusable components.
C. Works best when object technologies are not available for support.
D. None of the above
➢ **Ans: B. Not able to support the development of reusable components.**

37. Which of the following option is best fit for the Extreme Programming (XP) process model?
A. System exploration, requirement, coding, testing
B. Maintenance, analysis, design, coding
C. Maintenance, analysis, system exploration, testing
D. Planning, design, coding, testing
➢ **Ans: D. Planning, design, coding, testing**

38. Which of the following statement is true about internal and external quality of the design?
A. The customer can directly observe difference between the above two.
B. The customer can give option to change the design of the product.
C. The customer can indirectly observe the internal and external quality of the design
D. None of the above
➢ **Ans: A. The customer can directly observe difference between the above two.**

39. Software engineer has the obligations about business processing engineering?
A. Requirement analysis
B. Business system design
C. Human resource planning
D. Information strategy planning
➢ **Ans: B. Business system design**

40. Which of the following sentences is true?
A. In white box testing, test cases are derived from the system specification.
B. Usually all the paths of a control flow graph are covered by the test cases leading to 100 % path coverage.

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C. Cyclamate Complexity (CC) of a flow graph is defined by the formula:
$CC = |Edges| - |Nodes| + 2$
D. None of the above
➢ **Ans: C. Cyclamate Complexity (CC) of a flow graph is defined by the formula:CC = | Edges | - | Nodes | + 2**

41. What areas are considered in the design model?
A. Architecture
B. process
C. Prototype
D. None of the above
➢ **Ans: A. Architecture**

42. Which of the following is not one of Hooker's core principles of software engineering practice?
A. Design should be as simple as possible.
B. Software system is used to value its users.
C. Pareto principle (20% of a product requires 80% of the effort)
D. Remember that you produce others will consume
➢ **Ans: C. Pareto principle (20% of a product requires 80% of the effort)**

43. Which of the following is true about many of the tasks from the generic task sets for analysis modelling and design?
A. Can be conducted in sequential way.
B. Can be conducted in parallel with one another.
C. Is the most difficult task of the system engineering?
D. None of the above.
➢ **Ans: B. Can be conducted in parallel with one another.**

44. Which of the following statement is not true?
A. Attributes can define for a class before the design has been completed.
B. Functions can be defined for a class until design has been completed.
C. Attributes cannot be defined for a class until design has been completed.
D. None of these
➢ **Ans: C.Attributes cannot be defined for a class until design has been completed.**

45. What is not included in area of design model?
A. Architecture
B. Data
C. Interfaces
D. Project scope
➢ **Ans: D. Project scope**

46. UML notations that are used to define hardware and software elements of a system
A. Dataflow diagram diagrams
B. Object diagrams
C. Deployment diagrams
D. Entity relationship diagrams
➢ **Ans: C. Deployment diagrams**

47. Which of the following is used as UML diagram to create system analysis model?
A. Function diagram B. Class diagram
C. Dataflow diagram D. Object diagram
➢ **Ans: B. Class diagram**

48. UML activity diagrams represent?
A. Structural elements of analysis model elements
B. Object-based elements of analysis model elements
C. Entity- based elements of analysis model elements
D. Scenario-based elements of analysis model elements
➢ **Ans: D. Scenario-based elements of analysis model elements**

49. Which of the following statement is true about the object constraint language (OCL) complements UML by
A. Allowing a software engineer to use a formal grammar to construct unambiguous statements about design model elements.
B. Creating good design of the product.
C. Enforcing the software engineer to implements constraints about the users.
D. None of the above.
➢ **Ans: A. Allowing a software engineer to use a formal grammar to construct unambiguous statements about design model elements.**

50. Which of the following option is true about user hierarchies are used to replace?
A. UML user representations for WebApps having small numbers of user categories.
B. UML user representations for WebApps having small number of user functions.
C. UML user representations for WebApps having large numbers of user categories.
D. UML user representations for WebApps having large numbers of user functions.
➢ **Ans: C. UML user representations for WebApps having large numbers of user categories.**

51. Which of each of the following is not an activity of the project planning process?
A. Draw up project schedule
B. Establish project constraints
C. Review project progress
D. Product reviews
➢ **Ans: D. Product reviews**

52. UML deployment diagrams can be used to create
A. The development model for a complex system
B. The configuration model for a normal system
C. The configuration model for a complex system
D. None of these
➢ **Ans: C. The configuration model for a complex system**

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53. Object-oriented domain analysis is concerned
A. With the requirement and analysis phase of the system development life cycle.
B. With the identification of reusable classes within an application domain.
C. With the specification of reusable classes within an application domain.
D. B and C
➢ **Ans: D. B and C**

54. Requirements Specification, Planning, Test case Design, Execution, Bug Reporting & Maintenance phase are included in the
A. SDLC B. STLC
C. SQLC D. BLC
➢ **Ans: B. STLC**

55. Which option is true for design patterns?
A. These are not applicable to the design of object-oriented software.
B. These are applicable to the design of object-oriented software.
C. These are modern patterns which are not included in object-oriented design.
D. None of the above.
➢ **Ans: A. These are not applicable to the design of object-oriented software.**

56. In Object-oriented software engineering a component contains
A. Attributes of class
B. Operations on class
C. Instance of class
D. A set of collaborating classes
➢ **Ans: D. A set of collaborating classes**

57. Object-oriented analysis techniques are used to
A. Identify and refine user task objects and actions.
B. Identify the user requirement
C. Identify the testing pattern of the software
D. None of the above.
➢ **Ans: A. Identify and refine user task objects and actions.**

58. Object-oriented systems uses
A. Graph base testing
B. Alpha testing
C. Beta testing
D. White box testing
➢ **Ans: A. Graph base testing**

59. Which of the following is measurable characteristic of object-oriented design?
A. Completeness B. Efficiency
C. Reliably D. Durability
➢ **Ans: A. Completeness**

60. Which of the following does not justify the need for a software engineering discipline?
A. Deliver software on time with desired quality.
B. Overcome a crisis situation in software development.
C. Enforce tight control on the software development process in order to meet deadlines.
D. Enforce a code of ethics on software developers.
➢ **Ans: D. Enforce a code of ethics on software developers.**

61. Which of the following sentences is / are correct with respect to object oriented design?
A. Object oriented design does not facilitate information hiding and encapsulation.
B. Object oriented design separates operations from data values.
C. A sub class inherits all the attributes of the super class.
D. Java is a pure object oriented language which supports multiple inheritances.
➢ **Ans: C. A sub class inherits all the attributes of the super class.**

62. Which of the following does not justify the need for a software engineering discipline?
A. Deliver software on time with desired quality.
B. Overcome a crisis situation in software development.
C. Enforce tight control on the software development process in order to meet deadlines.
D. Enforce a code of ethics on software developers.
➢ **Ans: D. Enforce a code of ethics on software developers.**

63. Which of the following tasks are used in the set for construction?
A. Test a software component
B. Create a user interface
C. Unit test the component
D. Assess the duration to build a system
➢ **Ans: C. Unit test the component**

64. The system model template contains
A. Classes
B. functions
C. User interface
D. None of the above
➢ **Ans: C. User interface**

65. Which of the following model is near to user interface design along with all supporting information?
A. Implementation model
B. prototype model
C. System model
D. Data model
➢ **Ans: A. Implementation model**

66. Which tasks are normally associated with the user interface design processes?
A. Cost estimation
B. interface construction
C. Budget validation
D. None of the above
➢ **Ans: B. Interface construction**

67. One famous technique to define user interface objects and actions is to
A. Conduct a grammatical parse of the user scenario.
B. Conduct the surveys regarding the user interface design.
C. Prepare software analysis report.
D. None of the above.
➢ **Ans: A. Conduct a grammatical parse of the user scenario.**

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68. Which of the following is incorrect about reverse engineering?
A. Re engineering often precedes reverse engineering.
B. Reverse engineering supports program maintenance.
C. Reverse engineering is concerned with analysing the software with a view of understanding its design.
D. None of the above
➢ **Ans: A. Re engineering often precedes reverse engineering.**

69. Which of the following sentences is / are not true with regard to user interface design?
A. First generation interfaces are command line interfaces where users have to remember and
B. Type commands to interact with the computer.
C. Graphical User Interfaces (GUIs) are the most famous interface category today.
D. Casual users of an interface have a good understanding of the functionality and the
➢ **Ans: C. Graphical User Interfaces (GUIs) are the most famous interface category today.**

70. The profile model of user interface design defines different user categories considering their capabilities, experience and objectives. What are those categories in the increasing order of expertise?
A. Amateur, Intermediate, Advance.
B. Casual, Expert, Novice.
C. Casual, Novice, Expert.
D. Novice, Casual, Expert.
➢ **Ans: D. Novice, Casual, Expert.**

71. To check whether the system is producing right product according to the specification of customer requirements, it is static process of
A. Validation
B. Quality Assurance
C. Verification
D. Quality Control
➢ **Ans: B. Quality Assurance**

72. To check whether the system is producing right product according to the specification of customer requirements, it is dynamic process of
A. Validation
B. Quality Assurance
C. Verification
D. Quality Control
➢ **Ans: A. Validation**

73. Which of the following statement is true about cost of quality?
A. Cost of quality = Prevention Cost + Appraisal cost + Failure cost
B. Cost of quality = Prevention Cost +Failure cost
C. Cost of quality = Prevention Cost - Appraisal cost + Failure cost
D. Cost of quality = Prevention Cost + Appraisal cost -Failure cost
➢ **Ans: A. Cost of quality = Prevention Cost + Appraisal cost + Failure cost**

74. It measures the quality of processes used to create a quality product.
A. Validation
B. Verification
C. Quality Assurance
D. Quality Control
➢ **Ans: C. Quality Assurance**

75. The significant of software design can be summarized in a single word
A. Reliability B. security
C. Efficiency D. Quality
➢ **Ans: D. Quality**

76. The scale which is used to assess the quality of an architectural design should be based on
A. System accessibility
B. system requirement
C. System implantation
D. None of the above
➢ **Ans: C. System implantation**

77. Which of the following statement is true?
A. Quantitative techniques for measuring the quality of proposed architectural designs not available.
B. Qualitative techniques for measuring the quality of proposed architectural designs are readily available.
C. Quantitative methods for measuring the quality of proposed architectural designs are readily available.
D. None of the above.
➢ **Ans: B. Qualitative techniques for measuring the quality of proposed architectural designs are readily available.**

78. in software quality assurance work
A. There is no difference between software verification and software validation.
B. There is a significant difference between software verification and software validation.
C. Project manager is not concerned with the quality of the product.
D. None of the above
➢ **Ans: B. There is a significant difference between software verification and software validation.**

79. Which of the following characteristics should not be used to assess the quality of a Web App?
A. Aesthetics
B. Moral values
C. Durability
D. Fairness
➢ **Ans: A. Aesthetics**

80. Which of the following does not justify the need for a software engineering discipline?
A. Deliver software on time with desired quality.
B. Overcome a crisis situation in software development.
C. Enforce tight control on the software development process in order to meet deadlines.
D. Enforce a code of ethics on software developers.
➢ **Ans: D. Enforce a code of ethics on software developers.**

81. What are the most important software quality attribute the system should have?
A. Reliability B. robustness
C. Correctness D.

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82. What is / are the correct statement(s) with respect to software quality?
   A. The Capability Maturity Model (CMM) is a scheme which does not classify a software development organization according to its capability.
   B. The quality management process starts after the design stage of the software development process.
   C. A quality plan sets out the desired product qualities and how they are assessed.
   D. Quality assurance and quality control are not activities of the quality management process.
   ➢ **Ans: C. A quality plan sets out the desired product qualities and how they are assessed.**

83. Which of the following is a software quality metric?
   A. Reliability
   B. climatic complexity
   C. Reusability
   D. None of the above
   ➢ **Ans: B. Cyclomatic complexity**

84. Which of the following is internal software quality attribute?
   A. Program size
   B. usability
   C. Reliability
   D. Durability
   ➢ **Ans: A. Program size**

85. The process that deals with the technical and management issues of software development called as?
   A. Requirement gathering Process
   B. esting Process
   D. None of the above
   ➢ **Ans: C. Software Process**

86. System engineering process starts with
   A. Narrow view
   B. process view
   C. World view
   D. Local view
   ➢ **Ans: C. World view**

87. In Business process engineering which architectures is necessary to be judge
   A. Applications, data, technology infrastructure
   B. Organization, program, process
   C. Network, database, algorithm
   D. Testing, requirements, operating system
   ➢ **Ans: A. Applications, data, technology infrastructure**

88. Which of the following statement is false
   A. Software design is process that may be applied with modification to any software project.
   B. Software design is static process which is applied to the software specification phase.
   C. Software design is an iterative generic process that may be applied without modification to any software project.
   D. Software design is dynamic process which is applicable during to the requirement phase.
   ➢ **Ans: C. Software design is an iterative generic process that may be applied without modification to any software**

89. Which of the following strategic issues need to be addressed in a successful software testing process?
   A. Conduct formal technical reviews prior to testing
   B. Specify physical design in a quantifiable manner
   C. Use dependent test teams
   D. None of the above
   ➢ **Ans: A. Conduct formal technical reviews prior to testing**

90. Which process model best describes Web Engineering?
   A. Linear model
   B. spiral model
   C. RAD model
   D. All of the above
   ➢ **Ans: A. Linear model**

91. Which of the following statement is true about Configuration Management Plan?
   A. It describes the Configuration Management specification.
   B. It describes the Configuration Management certification procedure.
   C. It describes the Configuration Management procedures and structures to be used.
   D. None of the above
   ➢ **Ans: C. It describes the Configuration Management procedures and structures to be used.**

92. . Standards and procedures for managing changes in an evolving software product is called?
   A. Process Management
   B. Change Management
   C. Configuration Management
   D. Product Management
   ➢ **Ans: C. Configuration Management**

93. The software process
   A. Is the general set of activities undertaken to develop a software product.
   B. Includes project management activities such as planning and scheduling.
   C. Includes configuration management activities as part of it.
   D. Is concerned with engineering high quality defect free software.
   ➢ **Ans: A. Is the general set of activities undertaken to develop a software product.**

94. Configuration management is the process concerned with managing an evolving software product. Which of the following are items managed in this process?
   A. Program code, user manuals, version information, and company policy
   B. Specifications, design, program code, user manuals
   C. Test data, version information, company policy, user manuals
   D. Version information, specifications, design, marketing information
   ➢ **Ans: B. Specifications, design, program code, user**

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95. Which of the following is not a characteristic common to all design methods?
A. Configuration management
B. Functional component
C. Notation quality assessment
D. Guidelines refinement heuristics
➢ **Ans: A. Configuration management**

96. What is the definition of term Software?
A. A set of computer application
B. A mathematical modal
C. Set of computer programs probably associated document disturbed with the operation of data processing is called a software
D. All of above
➢ **Ans: C. Set of computer programs probably associated document disturbed with the operation of data processing is called a software**

97. Which of the following is not the feature of software?
A. Software does not wear out
B. Software is intelligent
C. Software is artificial
D. Software is always exact
➢ **Ans: D. Software is always exact**

98. All of the following are related to a product matrix except?
A. Productivity
B. Size
C. Reliability
D. Functionality
➢ **Ans:**

100. All of the following are process metric except?
A. Productivity
B. Quality
C. Functionality
D. Efficiency
➢ **Ans: C. Functionality**

101. Efforts is calculated in terms of?
A. Persons
B. Person - Months
C. Rupees
D. Months
➢ **Ans: B. Person - Months**

102. Infrastructure software is enclosed in which of following?
A. Generic Products
B. Customized Products
C. Both a and b
D. All of the above
➢ **Ans: A. Generic Products**

103. Software development management is needy upon?
A. users B. Products
C. Process D. All of above
➢ **Ans: D. All of above**

104. Which factor is most crucial in the development of software?
A. People B. Process
C. management D. Process
➢ **Ans: A. People**

105. Milestones are used for what purpose?
A. Know the position of the development
B. Know the cost of the project
C. Know the user expectations
D. None of the above
➢ **Ans: B. Know the cost of the project**

106. The word module in the design phase of a software is known as?
A. Procedures
B. Functions
C. Sub programs
D. All of the above
➢ **Ans: D. All of the above**

107. The model Spiral was developed by?
A. Bev. Littlewood
B. R. Pressman
C. Berry Bohem
D. Bisili
➢ **Ans: C. Berry Bohem**

108. For students small projects which model is used?
A. Spiral Model
B. Quick/ Fix model
C. Waterfall Model
D. Prototype Model
➢ **Ans: C. Waterfall Model**

109. Which of the following is not a software life cycle(SLC) model?
A. Spiral Model
B. Capability maturity Model
C. Waterfall Model
D. Quick and fix Model
➢ **Ans: B. Capability maturity Model**

110. Project risk aspect is measured in?
A. Waterfall Model
B. Prototyping Model
C. Spiral Model
D. Quick and fix model
➢ **Ans: C. Spiral Model**

111. SDLC is the abbreviation of?
A. Software design life cycle
B. System development life cycle
C. System design life cycle
D. None of above
➢ **Ans: B. System development life cycle**

112. Build and Fix model consists of?
A. 1 Phases B. 2 Phases
C. 3 Phases D. 4 Phases
➢ **Ans: B. 2 Phases**

113. SRS is short for?
A. Software requirement system
B. Software requirement specification
C. System requirement specification
D. All of Above
➢ **Ans: B. Software requirement specification**

114. The model Waterfall is not appropriate for?
A. Accommodating change
B. Small Projects
C. Complex and large Projects
D. All of Above
➢ **Ans: A. Accommodating change**

115. What does RAD means?
A. Relative Application Development
B. Ready Application Development
C. Rapid Application Development
D. Repeated Application Development
➢ **Ans: C. Rapid Application Development**

116. RAD Model was projected by?
A. Motorola
B. IBM
C. Microsoft
D. Cisco Technologies
➢ **Ans: B. IBM**

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117. The purpose of Software engineering is to develop?
A. Reliable Software
B. Consistent and cost effective Software
C. Cost Effective Software
D. All Of Above
➢ **Ans: B. Consistent and cost effective Software**

118. An excellent specification must be
A. Functional
B. Unmistakable
C. Clearly Specific
D. All of Above
➢ **Ans: D. All of Above**

119. Which of the following design phase tool?
A. Information Hiding
B. Abstraction
C. Refinement
D. All of Above
➢ **Ans: D. All of Above**

120. Information hiding (to hide from user), explains?
A. That are irrelevant to him
B. That may be maliciously handled by him
C. That are not relevant to him
D. That are confidential
➢ **Ans: B. That may be maliciously handled by him**

121. Which of the following statement is not correct?
A. An object is possible to belong to two classes
B. Objects inherit the properties of class
C. Classes are defined based on the attributes
D. Classes are for all time different
➢ **Ans: A. An object is possible to belong to two classes**

122. Design phase consists of?
A. Data, architectural, interface and procedural design
B. Data, architectural and procedural design only
C. Architectural and interface design only
D. Data and architectural design only
➢ **Ans: A. Data, architectural, interface and procedural design**

123. To write a program in FORTRAN language and rewrite the 1% code in assembly, if the project requires 13 working days, the team must consists of?
A. 8 programmers
B. 13 programmers
C. 1000 programmers
D. 100/13 programmers
➢ **Ans: A. 8 programmers**

124. If 99% of a program is written in FORTRAN language and the left over 1% in assembly language, the percentage raise in the programming time in contrast to writing the whole program in FORTRAN language and rewriting the 1% in assembly language is?
A. 100 B. 5
C. 1 D. 80
➢ **Ans: B. 5**

125. If whole program is written in FORTRAN programming language, the percentage raise in the program execution time, as compared to writing the whole program in FORTRAN language and rewriting the 1% in assembly language is?
A. 0.99 B. 84
C. 0.8 D. 90
➢ **Ans: C. 0.8**

126. If 99% portion of a program is written in FORTRAN programming language and the remaining 1%portion of the program in assembly language the percentage raise in the execution time, compared to writing the 1% portion of program in assembly language is
A. 0 B. 0.12
C. 10 D. 0.99
➢ **Ans: A. 0**

127. **A software testing technique ie White box testing is also known?**
A. Basic path testing
B. Glass box testing
C. Graph Testing
D. Dataflow
➢ **Ans: B. Glass box testing**

128. **Black box testing is also known as?**
A. Glass box testing
B. Behavioral Testing
C. Loop Testing
D. Graph Based Testing
➢ **Ans: B. Behavioral Testing**

129. Which of the below option is a type software testing?
A. Stress Testing
B. Recovery Testing
C. Security Testing
D. All of the above
➢ **Ans: D. All of the above**

130. The purpose of software testing is?
A. Debugging
B. To gain modularity
C. To expose errors
D. To investigate system
➢ **Ans: C. To expose errors**

131. Which of the following is a black box testing method?
A. Basic path testing
B. Boundary value analysis
C. Code path analysis
D. All of above
➢ **Ans: B. Boundary value analysis**

132. Structured programming codes consist of?
A. Alteration
B. Sequencing
C. Iteration
D. All the above
➢ **Ans: D. All the above**

133. Which of the following is the significant characteristic of coding?
A. Readability B. Productivity
C. Efficiency D. Brevity
➢ **Ans: A. Readability**

134. Data structure suitable for which of the following application?
A. Architectural design
B. Sequential design
C. Data design
D. Interface design
➢ **Ans: C. Data design**

135. To design a software in object oriented design, objects must have?
A. Attributes only
B. Operations and names and names only
C. Attributes, name and operations
D. All of above
➢ **Ans: C. Attributes, name and operations**

136. Who was the first who proposed the function oriented metrics?
A. Albrecht B. John
C. Jouls D. Basili
➢ **Ans: A. Albrecht**

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137. Suppose that we have a source code with 10 operators which include 6 different operators, and 6 operand including 2 different operands. The program volume will be?
A. 48 B. 1120
C. 20 D. 100
➢ **Ans: A. 48**

138. In the system terminologies, the term organization means?
A. Manner in which each component functions with additional components
B. Refers to the holism of system
C. Implies structure and order
D. Some parts of the computer depends on one another
➢ **Ans: C. Implies structure and order**

139. What is the meaning of the term integration in system concept?
A. The manner in which each component functions with other components of the system
B. Implies structure only
C. Means that parts of computer system depends on one another
D. Refers to the holism of systems
➢ **Ans: D. Refers to the holism of systems**

140. Project pointer helps a software project manager to
A. Evaluate the position of an current project
B. Follow potential risks
C. Expose problem areas
D. All of above
➢ **Ans: D. All of above**

141. When object oriented programming has been proficient, the Class tests for it includes?
A. Fault indicating testing
B. Random testing
C. Partition testing
D. All of above
➢ **Ans: D. All of above**

142. which of the following developed a set of software quality factors that has been given the short form FURPS?
A. Rambaugh
B. Hewlett - Packard
C. Booch
D. Jacobson
➢ **Ans: B. Hewlett - Packard**

143. What do we follow in system design?
A. Parallel hardware and software design
B. Hardware design after software
C. Software design after hardware
D. None of above
➢ **Ans: A. Parallel hardware and software design**

143. The file having all procedures, rules and regulations that usually direct an organization is
A. Personal bank
B. Administration manual
C. Organizing manual
D. Procedure data
➢ **Ans: C. Organizing manual**

144. A turnkey package consists of?
A. Training B. Software
C. Hardware D. All of above
➢ **Ans: D. All of above**

145. Term related to detailed design is
A. ASPEC B. Code SPEC
C. PSPEC D. MINI SPEC
➢ **Ans: D. MINI SPEC**

146. The data flow diagram in functional decomposition is
A. is ignored
B. is divided according to the logical closeness of the actigram
C. is partitioned according to the closeness of the datagram items
D. Both A and C
➢ **Ans: B. is divided according to the logical closeness of the actigram**

147. In phase 1 of the system development life cycle which of the following is done?
A. Reviewing policies only
B. Using questionnaires and surveys
C. carrying Interviews
D. All of above
➢ **Ans: D. All of above**

148. What is another name of graphic representation of an information system?
A. Data flow diagram
B. Flow chart
C. Pictogram
D. All of above
➢ **Ans: A. Data flow diagram**

149. During data entry the system to avoid errors in transcription analyst should?
A. Provide batch totals
B. Provide for a check digit
C. Provide for a hash totals
D. All of above
➢ **Ans: D. All of above**

150. RAD is not suitable when?
A. ast finding already done
B. Technical risks are high
C. Testing is needed
D. All of above
➢ **Ans: B. Technical risks are high**

151. A quantitative determine of the degree to which a system or process possess a given characteristic?
A. Measure B. Gain
C. Metric D. All of these
➢ **Ans: C. Metric**

152. Which of the following model remains functioning in anticipation of the software is withdrawn? Answer is not bolded
A. Spiral B. Waterfall
C. Incremental D. All of these
➢ **Ans: (-)**

153. Which of the following risk includes in risk analysis of spiral model?
A. Technical
B. Management
C. Both a and b
D. Data is insufficient
➢ **Ans: C. Both a and b**

154. RAD is a linear sequential software development process model. True or false?
A. True B. False
➢ **Ans: A. True b**

155 .In the system terms, the term integration refers to the holism of system. True or false?
A. True B. False
➢ Ans: A. T

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WHAT IS A COMPUTER NETWORK?

Networking is the practice of linking two or more then two computers or devices with each other. The connectivity can be wired or wireless. A computer network can be categorized in different ways, depends open the geographical area as mentioned below.

1. Two computers Server or Client workstation.
2. Networking Interface Card's (NIC)/LAN card.
3. Connection Media; may be wired or wireless.
4. Network Operating system software, such as Microsoft Windows 2000 or Linux.

Types of Networks:

LANs (Local Area Networks)

A network is any set of autonomous computers that communicate with one another over a shared network medium. LANs are networks typically limited to a geographic area, such as a single building or a university campus.

WANs (Wide Area Networks)

Wide area networking combines multiple LANs that are geographically separate. This is accomplished by connecting the different LANs using services such as dedicated leased phone lines, dial-up phone lines (both synchronous and asynchronous), satellite links, and data packet carrier services.

Internet

The Internet is a system of connected networks that are worldwide in capacity and make possible data communication services such as remote login, file transfer, E-mail and World Wide WeB.

Intranet

An intranet is a private network make use of Internet-type tools, but accessible only within that organization. For large organizations, an intranet provides an easy right of entry mode to corporate information for employees.

MANs (Metropolitan area Networks)

Metropolitan area Networks (MAN) is a computer network usually spanning within a city. A MAN provides efficient connections to a WAN.

VPN (Virtual Private Network)

VPN uses a system known as tunneling to transport data steadily on the Internet to a [illegible] workplace network. There are two ways to create a

VPN connection, by dialing an Internet Service Provider (ISP), or connecting directly to Internet.

Types of LAN Technology

Ethernet

Ethernet is the most accepted physical layer LAN technology which can transmit data at a rate up to 10 Megabits per second (10 Mbps). Ethernet is popular because it strikes a good balance between speed, cost and ease of installation. The Institute for Electrical and Electronic Engineers developed an Ethernet standard known as IEEE Standard 802.3.

Fast Ethernet

The Fast Ethernet standard (IEEE 802.3u) has been well-known for Ethernet networks that require higher broadcast speeds. This standard raises the Ethernet speed limit from 10 Mbps to 100 Mbps with only minimal changes to the existing cable structure. Fast Ethernet provides faster throughput for video, multimedia, graphics, Internet surfing and stronger error detection and correction.

Gigabit Ethernet

Gigabit Ethernet was designed to meet the requirements for faster communication networks with applications such as multimedia and Voice over IP (VoIP). It is also known as "**gigabit-Ethernet-over-copper**" or 1000Base-T, GigE is a description of Ethernet that runs at speeds 10 times faster than 100Base-T.

10 Gigabit Ethernet

10 Gigabit Ethernet is the fastest and most recent of the Ethernet standards. IEEE 802.3ae defines a version of Ethernet with a nominal rate of 10Gbits/s that makes it 10 times faster than Gigabit Ethernet.

Asynchronous Transfer Mode (ATM)

ATM is a cell-based fast-packet communication method that can carry data-transfer rates from sub-T1 speeds to 10 Gbps. ATM achieves its high speeds in part by transmitting data in fixed-size cells and dispensing with error-correction protocols. ATM can be integrated into an existing network as needed without having to update the entire network.

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Power over Ethernet (PoE)

PoE is a solution in which an electrical current is run to networking hardware over the Ethernet Category 5 cable or higher. This solution does not require an extra AC power cord at the product location. This reduces the amount of cable needed as well as eliminates the difficulties and cost of installing extra outlets.

Protocols

A network protocol defines rules and conventions for communication between network devices. Protocols for computer networking all generally use packet switching techniques to send and receive messages in the form of *packets*.

Introduction to TCP/IP Networks

TCP/IP-based networks play an increasingly important role in computer networks. Perhaps one reason for their appeal is that they are based on an open specification that is not controlled by any vendor.

What Is TCP/IP?

TCP stands for Transmission Control Protocol and IP stands for Internet Protocol. The term TCP/IP is not restricted just to these two protocols, however. often, the term TCP/IP is used to pass on to a group of protocols connected to the TCP and IP protocols such as the User Datagram Protocol (UDP), File Transfer Protocol (FTP), Terminal Emulation Protocol (TELNET), and so on.

Network Media

Network media can be classified as wired media and wireless mediA.
In the network commonly used wired media is coaxial cable, fiber optic and Twisted pair cable.

Coaxial cable

Coaxial cabling is the primary type of cabling used by the cable television industry and is also widely used for computer networks such as Ethernet Although more expensive than standard telephone wire, it is much less susceptible to interference and can carry much more data.

Fiber Optic Cable

As we all know fiber optics are pretty darn cool and not cheap. This cable is smaller and can carry a vast amount of information fast and over long distances.

Twisted Pair Cables

Shielded Twisted-Pair (STP) cabling is used commonly in the computer networks. I It has an impedance of 150 ohms, has a maximum length of 90 meters, and is used first and foremost in networking environments with a high amount of EMI due to motors, air conditioners, power lines, or other noisy electrical components. STP cabling is the default type of cabling for IBM Token Ring networks.

Unshielded Twisted Pair (UTP)

This is the most popular form of cables in the network and the cheapest form that you can go with. The UTP has four pairs of wires and all inside plastic sheathing. The biggest reason that we call it Twisted Pair is to protect the wires from interference from themselves. Each wire is only protected with a thin plastic sheath.

Ethernet Cabling

10Base2

10Base2 is measured the thin Ethernet, thinnet, and thinwire which uses light coaxial cable to create a 10 Mbps network. The cable segments in this network can't be over 185 meters in length. These cables connect with the BNC connector.

10Base5

This is well thought-out a thicknet and is used with coaxial cable arrangement such as the BNC connector. The good side to the coaxial cable is the high-speed transfer and cable segments can be up to 500 meters between nodes/workstations.

10BaseT

The "T" stands for twisted as in UTP (Unshielded Twisted Pair) and uses this for 10Mbps of transfer. The down side to this is you can only have cable lengths of 100 meters between nodes/workstations.

100Base T

It is considered Fast Ethernet uses STP (Shielded Twisted Pair) reaching data transfer of 100Mbps. This system is a little more expensive but still remains popular as the 10BaseT and cheaper than most other type networks.

10BaseF

A type of standard for implementing Ethernet networks. 10BaseF is different from other 10-Mbps Ethernet technologies because it uses fiber-optic cabling instead of copper UTP cabling 10BaseF is based on the 802.3 specifications of Project 802 developed by the IEEE.

Network Topologies

What is a Network topology?
A network topology is the Physical arrangement of nodes and cable links in a LAN

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Star Topology: In this topology each node has a dedicated set of wires connecting it to a central network hub/Switch. Since all traffic passes through the hub, the hub/Switch becomes a central point for isolating network problems and sharing.

Ring Topology: In this topology a logically closed loop is created. Data packets travel in a single direction around the ring from one network device to the next. Each network device acts as a repeater, meaning it regenerates the signal

Bus Topology: In this topology, each node (computer, server, peripheral etc. attaches directly to a common cable. This topology most often serves as the backbone for a network. In some instances, such as in classrooms or labs, a bus will connect small workgroups

Collisions

Ethernet is a shared media, so there are rules for sending packets of data to avoid conflicts and protect data integrity. It is possible that two nodes at different locations attempt to send data at the same time. When both PCs are transferring a packet to the network at the same time, a collision will result.

Network Interface Cards/ LAN Card

Network Interface Cards, commonly referred to as NIC, is used to connect a PC to a network. The NIC provides a physical connection between the networking cable and the computer's internal bus. NICs come in three basic varieties: 8-bit, 16-bit, and 32-bit. The larger the number of bits that can be transferred to the NIC, the faster the NIC can transfer data to the network cable.

Switch:

Switch is a computer networking device that connects segments. The term commonly refers to a multi-port network Bridge that processes and routes data at the data link layer. Switches that additionally process data at the network layer and above are often referred to as Layer 3 switches

Bridges:

Bridges connect different networks types (such as Ethernet and Fast Ethernet) or networks of the same type. Bridges map the Ethernet addresses of the nodes residing on each network segment and allow only necessary traffic to pass through the bridge.

Routers:

Routers filter out network traffic by specific protocol rather than by packet address. Routers also divide networks logically instead of physically. In complex networks, overall efficiency is improved by using routers.

IP Addressing:

An IP address is a unique identifier for a node or host connection on an IP network. An IP address is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 separated by decimal points.

Example:

172.16.0.4

Address Classes:

Different classes of IP addresses are as under:
Class A addresses begin with 0xxx, or 1 to 126 decimal.
Class B addresses begin with 10xx, or 128 to 191 decimal.
Class C addresses begin with 110x, or 192 to 223 decimal.
Class D addresses begin with 1110, or 224 to 239 decimal.
Class E addresses begin with 1111, or 240 to 254 decimal.

IPconfig

ipconfig is a command line utility available on all versions of Microsoft Windows starting with Windows NT. ipconfig is designed to be run from the Windows command prompt. This utility allows you to get the IP address information of a Windows computer. It also allows some control over active TCP/IP connections. ipconfig is an alternative to the older 'winipcfg' utility

Traceroute

Traceroute on Unix and Linux (or tracert in the Microsoft world) attempts to trace the current network path to a destination. Here is an example of a traceroute run to

OSI Reference Model:

Layer 7: Application Layer

This layer chains the application and end-user processes. Within this layer, user solitude is measured and communication partners, service and constraints are all identified. File transfers, email, Telnet and FTP applications are examples of this layer services.

Layer 6: Presentation Layer

Information is translated back and forth between application and network formats. This translation transforms the information into data the application layer and network recognize regardless of encryption and formatting.

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Layer 5: Session Layer

In this layer connections between applications are made, managed and terminated as needed to allow for data exchanges between applications at each end of a dialogue.

Layer 4: Transport Layer

Complete data transfer is make sure as information is transported clearly between systems in this layer. The transport layer also guarantees appropriate flow control and end-to-end error recovery.

Layer 3: Network Layer

Using switching and routing technologies, this layer is in charge to create virtual circuits to transmit information from node to node. Other functions include routing, forwarding, addressing, internetworking, error and congestion control, and packet sequencing.

Layer 2: Data Link Layer

Information in data packets are encoded and decoded into bits within this layer. Errors from the physical layer flow control and frame synchronization are corrected here utilizing transmission protocol knowledge and management. This layer consists of two sub layers: the Media Access Control (MAC) layer and the Logical Link Control (LLC) layer.

Layer 1: Physical Layer

This layer enables hardware to send and receive data over a carrier such as cabling, a card or other physical means. It conveys the bit stream through the network at the electrical and mechanical level. Fast Ethernet, RS232, and ATM are all protocols with physical layer components.

COMMUNICATION& NETWORK (MCQs)

1. The sharing of a medium and its link by two or more than two devices is called
   A. Modulation
   B. De-multiplexing
   C. Line discipline
   D. Multiplexing
   ➢ **Ans: D. Multiplexing**

2. Data can be defined as
   A. Analog
   B. digital
   C. A & B
   D. None of the above
   ➢ **Ans: C. A & B**

4. The telephone network, which is also known as the plain old telephone system (POTS), was
   A. Digital communication system
   B. Analog communication system
   C. 3rd generation communication network
   D. 1st generation communication network
   ➢ **Ans: B. Analog communication system**

5. The modern telephone network has the feature of
   A. Digital technology
   B. Analog technology
   C. Digital as well as analog technology
   D. None of the above
   ➢ **Ans:**

6. Telephone operators provide two types of analog services
   A. Switched; circuit
   B. Out-of-band; in-band
   C. Switched; leased
   D. None of the above
   ➢ **Ans: C. Switched; leased**

7. Transmission impairment in which the signal loses strength due to the resistance of the transmission medium.
   A. Attenuation
   B. Distortion
   C. White Noise
   D. Impulse noise
   ➢ **Ans: A. Attenuation**

8. Transmission impairment in which the signal loses strength due to the propagation speeds of the frequency of a signal is called
   A. Attenuation
   B. Distortion
   C. Noise
   D. Decibel
   ➢ **Ans: B. Distortion**

9. Transmission impairment in which crosstalk corrupts a signal is called.
   A. Attenuation
   B. distortion
   C. Noise
   D. Data loss
   ➢ **Ans: C. Noise**

10. Transmission media can be classified as
    A. Fixed or unfixed
    B. Guided or unguided
    C. Determinate or indeterminate
    D. Metallic or nonmetallic
    ➢ **Ans: B. Guided or unguided**

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11. Which layer of OSI model is used to cover the specifications of transmission media?
A. Session Layer
B. network layer
C. Physical layer
D. Application layer
➢ **Ans: C. Physical layer**

12. Which of the following cable is made of an inner copper core and has a second conducting outer sheath?
A. Twisted-pair cable
B. coaxial cable
C. Fiber-optic cable
D. Shielded twisted-pair cable
➢ **Ans: B. Coaxial cable**

13. Which of the following technique is used in fiber optic cable to transfer data?
A. Light
B. radio
C. Infrared
D. Very low-frequency
➢ **Ans: A. Light**

14. In an optical fiber, the inner core is _____ the cladding.
A. Denser than
B. thicker than
C. Less thicker than
D. More denser than
➢ **Ans: A. Denser than**

15. When a beam of light travels through media of two different densities, if the angle of incidence is greater than the critical angle, it is called
A. Refraction
C. Noise
D. Multiplexing
➢ **Ans: B. Reflection**

16. Short-range communications among different devices is done by
A. Satellite system
B. Radio waves
C. Infrared waves
D. Microwave
➢ **Ans: C. Infrared waves**

17. Which of the following statement is true about microwave
A. Microwave transmission is omnidirectional
B. Microwave transmission is unidirectional
C. Microwave transmission is bidirectional
D. Microwave transmission is directional
➢ **Ans: B. Microwave transmission is unidirectional**

18. Which of the following statement is true?
A. Radio waves are used to transfer data in cellular phone and wireless LAN network.
B. Micro waves are used to transfer data in cellular phone and wireless LAN network.
C. Infrared waves are used to transfer data in cellular phone and wireless LAN network.
D. Satellite systems are used to transfer data in cellular phone and wireless LAN network.
➢ **Ans: B. Microwave transmission is unidirectional**

19. Manchester encoding scheme is use in
A. Standard Ethernet
B. Wireless LAN
C. Mobile communication
D. Wired and wireless communication
➢ **Ans: A. Standard Ethernet**

20. Which of the following encoding schemes are used by 100 Base-TX
A. 4B/5B; Manchester
B. 4B/5B; MLT-3
C. Differential Manchester; NRZ
D. 8B/10B; NRZ
➢ **Ans: B. 4B/5B; MLT-3**

21. 1000Base-SX, 1000Base-LX, and 1000Base-CX use _____ block coding and _____ line coding.
A. Manchester; NRZ
B. 8B/10B; NRZ
C. 4B/5B; NRZ-I
D. 8B/10B; NRZ
➢ **Ans: B. 8B/10B; NRZ**

22. Asynchronous transmission may be defined as
A. Communication where the receiver clock must be in exact synchronism with that of the transmitter.
B. Communication where the receiver clock must be in approximate synchronism with that of the transmitter
C. Communication where receiver will operate satisfactorily, even if its clock frequency is appreciably different to that of the transmitter
D. None of the above
➢ **Ans: B. Communication where the receiver clock must be in approximate synchronism with that of the transmitter**

23. Synchronous transmission may be defined as:
A. Ensure that the line remains unbalanced.
B. Communication where the receiver clock must be in exact synchronism with that of the transmitter.
C. Communication where the receiver clock must be in approximate synchronism with that of the transmitter
D. Communication where receiver will operate satisfactorily, even if its clock frequency is appreciably different to that of the transmitter
➢ **Ans: D. Communication where receiver will operate satisfactorily, even if its clock frequency is appreciably different to that of the transmitter**

24. Manchester encoding is principally designed to
A. Have more than one symbol per bit period
B. Ensure that the line remains

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C. Ensure that a transition occurs in the centre of each bit period.
D. Increase the bandwidth of a signal transmitted on the medium bandwidth of a signal transmitted on the medium

➤ **Ans: C. Ensure that a transition occurs in the centre of each bit period.**

25. Which of the following is an application layer service?
A. Remote log-in
B. File transfer and access
C. Mail service
D. All the above
➤ **Ans: D. All the above**

26. When data packet moves from the lower to the upper layers, headers are
A. Added
B. Removed
C. Encapsulated
D. None of the above
➤ **Ans: B. Removed**

27. Which of the following statement is true about Go-back-N error control mechanism?
A. A transmitter may send up to N packets before it receives an acknowledgment.
B. A transmitter may send just error message packet.
C. A transmitter may never send any packet
D. A receiver will discard all packets and will not send acknowledgment.
➤ **Ans: A. A transmitter may send up to N packets before it receives an acknowledgment.**

28. Which of the following error detection method uses one's complement?
A. Even parity check
B. Odd parity check
C. Checksum
D. Cyclic Redundancy Check
➤ **Ans: C. Checksum**

29. Coding schemes can be categorize in to the following
A. Block coding; modulo-2 operation
B. Linear; Nonlinear
C. Block; Convolution
D. Linear block coding
➤ **Ans: C. Block; Convolution**

30. The correction of errors up to 5 errors in all cases, the minimum Hamming distance in a block code must be
A. 7 B. 6
C. 10 D. 11
➤ **Ans: D. 11**

31. Which of the following technique is used for flow control?
A. Hamming code
B. Stop-N-Wait
C. Go-Back-N ARQ
D. Selective-Repeat ARQ
➤ **Ans: B. Stop-N-Wait**

32. TCP use which of the following technique for the flow control?
A. Fixed window size
B. Variable packet size technique
C. Sliding window
D. Parity check
➤ **Ans: C. Sliding window**

33. Which of the following protocol uses flow control?
A. FTP B. TFTP
C. IP D. UDP
➤ **Ans: B. TFTP**

34. A technique which restrict the amount of data that the sender can send before waiting for acknowledgment.
A. Flow control
B. multiplexing
C. Data rate
D. Error control
➤ **Ans: A. Flow control**

35. Which of the following two techniques are common for flow control
A. Feedback-based flow control
B. Rate-based flow control
C. Forward flow control
D. A and B
➤ **Ans: D. A and B**

36. Which of the following term is used to define a (PDU) that is like to HDLC up to some extent?
A. Logical link control
B. Media access control
C. Logic link unit
D. Data unit
➤ **Ans: A. Logical link control**

37. Which of the following statement is true about point to point protocol
A. Point to Point protocol helps communication between 2 computers over a cross-over cable.
B. Point to Point protocol helps communication between 2 computers over a serial cable.
C. Point to Point protocol helps in error detection and error correction.
D. Point to Point protocol helps tin flow control.
➤ **Ans: B. Point to Point protocol helps communication between 2 computers over a serial cable.**

38. Which of the following is a three-way hand-shaking authentication protocol using point to point protocol which keeps the password secret?
A. Link control protocol
B. Challenge Handshake Authentication Protocol
C. Transmission control protocol
D. Password authentication protocol
➤ **Ans: B. Challenge Handshake Authentication Protocol**

39. A standalone program that has been modified to work on a LAN by including concurrency controls is called
A. LAN intrinsic software
B. LAN data software
C. Shareware software
D. LAN sharing software
➤ **Ans: A. LAN intrinsic software**

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40. Which of the IEEE specifications is used for wireless LAN which covers the physical and data link layer of OSI reference model
A. IEEE 802.3
B. IEEE 802.11.4
C. IEEE 802.11
D. IEEE 802.3.5
➤ **Ans: C. IEEE 802.11**

41. The IEEE 802.11 standard for wireless LANs defines the following two services
A. BSS and MSC
B. ESS and AAA
C. BSS and ESS
D. AAA and ECC
➤ **Ans: C. BSS and ESS**

42. Which of the following architecture uses CSMA/CD access method?
A. ARC net
B. Ethernet
C. Wide Area Network
D. Wireless Mesh Network
➤ **Ans: B. Ethernet**

43. Ethernet uses a physical address of Network Interface Card has length of
A. 32-bit B. 128 bit
C. 6-bit D. 6-byte
➤ **Ans: D. 6-byte**

44. What is the hexadecimal equivalent of the Ethernet address 01011010 01110001 01010101 01111000 10100011 00000011?
A. 5B:89:AB:13:55:FA
B. 5B:80:AA:98:BA:09
C. 3A:08:6A:28:88:9F
D. None of the above
➤ **Ans: D. None of the above**

45. Which of the following is Ethernet Multicast address then this is a _____ address?
A. 07:01:05:03:05:05,
B. 07:01:02:03:04:05,
C. 04:07:02:03:04:05,
D. 07:01:04:06:04:05,
➤ **Ans: B. 07:01:02:03:04:05,**

46. If Ethernet destination address is 08:07:06:05:44:33; then it is called
A. Multicast address
B. nicest address
C. Broadcast address
D. Logical address
➤ **Ans: B. Unicast address**

47. Which of the following is not Ethernet unicast destination?
A. 44:AA:C1:23:45:32
B. 43:7B:6C:DE:10:00
C. 46:56:21:1A:DE:F4
D. 48:32:21:21:4D:34
➤ **Ans: B. 43:7B:6C:DE:10:00**

48. **Which of the following is used as LAN protocol widely?**
A. CSMA/CD
B. logical link control
C. Ethernet
D. Point to point protocol
➤ **Ans: C. Ethernet**

49. Which of the following technique is used by the IEEE 802.3 Standard for CSMA/CD as the access method for first-generation 10-Mbps Ethernet?
A. p-persistent
B. 1-persistent
C. q-persistent
D. None of the above
➤ **Ans: B. 1-persistent**

50. Which of the following layer of Ethernet consists of the LLC sub layer and the MAC sub layer?
A. Physical layer
B. Data link layer
C. Transport layer
D. Session layer
➤ **Ans: B. Data link layer**

51. The maximum frame length for 10-Mbps Ethernet is
A. 1500 bytes B. 1518 bytes
C. 1510 bytes D. 1520 bytes
➤ **Ans: B. 1518 bytes**

52. FDDI is an example of
A. Ring Network
B. Star Network
C. Mesh Network
D. Bus based Network
➤ **Ans: A. Ring Network**

53. Which of the following multiplexing technique is used to transmit analog signals?
A. Time Division Multiplexing
B. Frequency Division Multiplexing
C. Code Division Multiplexing
D. None of the above
➤ **Ans: B. Frequency Division Multiplexing**

54. Which of the following multiplexing technique is used to transmit digital signals?
A. Time Division Multiplexing
B. Frequency Division Multiplexing
C. Code Division Multiplexing
D. Wave Division Multiplexing
➤ **Ans: A. Time Division Multiplexing**

55. In synchronous TDM, for n signal sources of the same data rate, each frame contains
A. N+n slots B. N slots
C. n-1 slots D. n-2 slots
➤ **Ans: B. N slots**

56. Time Division Multiplexing technique guarantees that the transmission rate of the multiplexed path is normally
A. Lesser than the sum of the transmission rates of the signal sources.
B. Greater than the sum of the transmission rates of the signal sources.
C. Not equal to the sum of the transmission rates of the signal sources.
D. Equal to the sum of the transmission rates of the signal sources.
➤ **Ans: B. Greater than the sum of the transmission rates of the signal sources.**

57. Which of the following can be achieved by using multiplexing?
A. Privacy
B. efficiency
C. Anti-jamming
D. All of the above
➤ **Ans: B. Efficiency**

58. Which of the following is an example of analog technique?
A. FDM B. WDM
C. ACM D. FCM
➤ **Ans: A. FDM**

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59. Which of the following technique is designed to use the high bandwidth capability of fiber-optic cable?
A. OFDM B. STDM
C. WDM D. FDM
➤ **Ans: C. WDM**

60. Which of the following multiplexing technique each input connection has an allotment in the output even if it is not sending datA.
A. Statistical Multiplexing
B. Synchronous Multiplexing
C. Isochronous Multiplexing
D. None of the above
➤ **Ans: B. Synchronous Multiplexing**

61. The most flexibility in how devices are wired together is provided by
A. T-switched networks
B. Star networks
C. Ring networks
D. Wide Area Networks
➤ **Ans: A. T-switched networks**

62. X.25 is an example of
A. Circuit Switched Network
B. Packet Switched Network
C. Wireless Sensor Network
D. Personal Area Network
➤ **Ans: B. Packet Switched Network**

63. A network that provides a constant bandwidth for the complete duration of a message transfer is called
A. Circuit switched network
B. Cell switched network
C. Packet switched network
D. A and B
➤ **Ans: A. Circuit switched network**

64. Packet-switched networks can also be divided into
A. virtual-circuit networks and datagram networks
B. virtual-circuit networks and histogram networks
C. virtual-circuit networks
D. datagram networks
➤ **Ans: A. virtual-circuit networks and datagram networks**

65. Which of the following network is made of a set of switches connected by physical links?
A. Line-switched network
B. Datagram network
C. Circuit-switched network
D. Packet-switched network
➤ **Ans: C. Circuit-switched network**

66. Circuit switching takes place at
A. Data link layer
B. physical layer
C. Transport layer
D. None of the above
➤ **Ans: B. Physical layer**

67. Which of the following switching technique is used to allocate the resources on demand?
A. Packet switching
B. Datagram switching
C. Circuit switching
D. Line switching
➤ **Ans: B. Datagram switching**

68. Which of the following network is a cross between a circuit-switched network and a datagram network?
A. Datagram switched network
B. Packet-switched
C. Virtual-circuit network
D. Line-switched network
➤ **Ans: C. Virtual-circuit network**

69. Packet switch network contains.
A. 4 type of components
B. 2 type of components
C. 6 type of components
D. 8 type of components
➤ **Ans: A. 4 type of components**

70. Switch uses a routing table in datagram network that is based on?
A. Source address
B. logical address
C. Destination address
D. Physical address
➤ **Ans: C. Destination address**

71. IP address of a destination is given in the routing table in the following forwarding scheme
A. Source-specific
B. destination-specific
C. Host-specific
D. None of the above
➤ **Ans: D. None of the above**

72. Which of the following protocol provides full transport layer services to applications?
A. ICMP B. TCP
C. ARP D. RARP
➤ **Ans: B. TCP**

73. How many bits are used as po address in TCP/ IP?
A. 8 B. 16
C. 32 D. 48
➤ **Ans: B. 16**

74. User datagram packets are encapsulated in?
A. Ethernet frame
B. IP datagram
C. TCP segment
D. None of the above
➤ **Ans: C. TCP segment**

75. TCP is a an example of
A. Connection-less protocol
B. Stream-oriented protocol
C. Message-oriented protocol
D. Line-oriented protocol
➤ **Ans: B. Stream-oriented protocol**

76. TCP uses the buffer because
A. The sending and the receiving processes may not write or read data at the same speed.
B. The sending and the receiving processes have same speed to transfer the data.
C. The sending and the receiving processes contains the complex datA.
D. The sending and the receiving processes may not write or read data at low speed.
➤ **Ans:**

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77. TCP uses number scheme to transfer data in each connection. These number starts from
A. 0
B. T1
C. Randomly generated number
D. None of the above
➤ **Ans: C. Randomly generated number**

78. TCP assigns a sequence number to each segment which is the number of the?
A. Last byte carried in that segment.
B. First byte carried in that segment.
C. Middle byte carried in that segment.
D. Second last byte carried in that segment.
➤ **Ans: B. First byte carried in that segment.**

79. Which of the following statement is true about TCP segments?
A. Checksum is optional in the TCP segments.
B. Checksum is mandatory in the TCP segments.
C. Checksum is added at the application layer.
D. None of the above
➤ **Ans: B. Checksum is mandatory in the TCP segments.**

80. Which of the following statement is true about UDP?
A. User datagram protocol allows computer applications
B. User datagram protocol allows computer applications to send messages as datagram packets from source to destination.
C. User datagram protocol allows network layer to send messages as datagram packets from source to destination.
D. User datagram protocol allows application layer to send messages as datagram packets from source to destination.
➤ **Ans: B. User datagram protocol allows computer applications to send messages as datagram packets from source to destination.**

81. Which of the following layer is used to send data for UDP to sending computer?
A. Data link layer
B. Application layer
C. Transport layer
D. None of the above
➤ **Ans: B. Application layer**

82. UDP performs the
A. Process-to-node communication
B. Process to process communication
C. Node to node delivery
D. Source to destination communication
➤ **Ans: B. Process to process**

83. Which of the following attach is dangerous security issue while TCP establishes the connection
A. DDOS attack
B. SYN flooding
C. PING flooding
D. DOS attack
➤ **Ans: B. SYN flooding**

84. Hash function is mostly used to secure the data transmission hash function must have
A. Two-wayness
B. One-wayness
C. Multi-wayness
D. None of the above
➤ **Ans: B. One-wayness**

85. Hash function creates the digest which is normally called
A. Modification detection code
B. Message detection code
C. Modification protection code
D. None of the above
➤ **Ans: A. Modification detection code**

86. Which of the following is 802.11 data link-level security protocol?
A. SAP B. BEP
C. POP D. LDAP
➤ **Ans: B. WEP**

87. Challenge-response authentication can be achieved by the?
A. Symmetric-key ciphers
B. Asymmetric-key ciphers
C. Keyed-hash functions
D. All of the above
➤ **Ans: D. All of the above**

88. Digital signature provide the following feature
A. Password authentication
B. Non repudiation
C. Data recovery
D. Password recovery
➤ **Ans: B. No repudiation**

89. Which of the following criteria guarantees to find two messages that hash to the same digest?
A. Symmetric- key
B. Weak-collision-resistance
C. Strong-collision-resistance
D. Asymmetric- key
➤ **Ans: C. Strong-collision-resistance**

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COMPUTER ARCHITECTURE AND ORGANIZATION

1 A computer adds and compares data in
A. keyboard
B. monitor
C. CPU chi
D. Memory chip
➤ **Ans: C. CPU chi**

2 A register which is used to keep track of address of the memory location?
A. Address Register
B. Data Register
C. Instruction Register
D. Program Counter
➤ **Ans: D. Program Counter**

3 A microcomputer system have?
A. Memory
B. microprocessor
C. Peripheral equipment
D. All of above
➤ **Ans: D. All of above**

4 Which of the following function is not performed by CPU?
A. Data display
B. logic operation
C. Arithmetic operation
D. To execute instructions
➤ **Ans: A. Data display**

5 Pipelining is also known as
A. Instruction execution
B. instruction prefetch
C. Program decoding
D. Instruction manipulation
➤ **Ans: B. Instruction prefetch**

6 Which of the following is a stack?
A. An 80-bit register in the memory
B. A 16-bit register in the
C. A set of memory locations in R/WM reserved for storing information
D. A 16-bit memory address stored in microprocessor
➤ **Ans: C. A set of memory locations in R/WM reserved for storing information**

7 A stack pointer performs
A. Indicate the beginning of the stack memory.
B. A register that decodes and executes 16-bit arithmetic expression.
C. A memory location where a subroutine address is stored.
D. A register in which flag bits are stored
➤ **Ans: A. Indicate the beginning of the stack memory.**

8 The decision making capabilities provided by branch logic in the control unit is called
A. Controller transfer
B. procedural transfer
C. Unconditional transfer
D. All of above
➤ **Ans: C. Unconditional transfer**

9 An Interrupt which is started by an instruction is called
A. Internal B. output
C. Hardware D. Software
➤ **Ans: D. Software**

10 A time sharing system involve
A. More than one processor
B. More than one program in memory
C. More than one memory in the system
D. All of above
➤ **Ans: B. More than one**

11 All computers processors must have
A. ALU
B. memory unit
C. Control unit
D. All of above
➤ **Ans: D. All of above**

12 What is the function of control units of CPU?
A. To transfer data
B. To store data
C. To perform logic operations
D. To decode program instruction
➤ **Ans: D. To decode program instruction**

13 What does dedicated computer mean?
A. Which is used by one person at a time
B. Which is assigned to one and only one task
C. Which does one kind of function
D. Which is meant for application software
➤ **Ans: B. Which is assigned to one and only one task**

14 CPU employs which type of technique most commonly?
A. immediate
B. direct
C. Register
D. All of the above
➤ **Ans: D. All of the above**

15 Pipeline performs
A. Fetch instruction
B. decode instruction
C. Fetch operand
D. All of above
➤ **Ans: D. All of above**

16 The code used in present day computing was developed by IBM corporation is?
A. ASCII
B. Hoffman Code
C. NRZ code
D. EBCDIC code
➤ **Ans: D. EBCDIC code**

17 The address of the instruction following the CALL instructions stored in/on the when a subroutine is called is
A. Stack pointer
B. adder
C. Program counter
D. Stack
➤ **Ans: D. Stack**

18 A string of 0's and 1's micro program is called
A. Symbolic macroinstruction
B. Bit microinstruction
C. Symbolic mini micro program
D. Binary micro program
➤ **Ans: D. Binary micro program**

19 Interrupts which are initiated by an instruction are which of the following
A. Internal B. external
C. Hardware D. Input
➤ **Ans: B. External**

20 RISC architecture in memory access is limited to instructions
A. CALL and CLEAR
B. USH and POP
C. STA and LDA
D. MOV and JMP
➤ **Ans: C. STA and LDA**

21 A group of 8 bits is known as
A. Byte B. File
C. Record

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22 A data Hierarchy (ascending order) is
A. bit - bytes - fields - record - file - database
B. bit - bytes - memory - field - file - database
C. bytes - bit- field - record - document - database
D. bytes -bit - record - field - file – database
➤ **Ans: A. bit - bytes - fields - record - file - database**

23 The number of address lines are required to address memory locations in a 2048 x 4 memory chip is?
A. 100 B. 11
C. 80 D. 120
➤ **Ans: B. 11**

24 A program that translates a whole program into machine language is called a/an
A. Interpreter
B. pointer
C. Compiler
D. Commander
➤ **Ans: C. Compiler**

25 Where does an operand is placed in immediate addressing?
A. In the CPU register
B. After OP code in the instruction
C. In hard disk
D. In stack
➤ **Ans: B. After OP code in the instruction**

26 MP 8085 can address how many locations?
A. 132K
B. 128K
C. 640K
D. 11M
➤ **Ans: B. 128K**

27 The ALU and control unit of microcomputers are combined on a single silicon chip, called?
A. Minichip
B. microprocessor
C. ALU
D. CU
➤ **Ans: B. Microprocessor**

28 What happens when the RET instruction at the end of subroutine is performed?
A. The information where the stack is initialized is transferred to the stack counter
B. The memory address of the RET instruction is transferred to the counter
C. Two data bytes stored in the top two locations of the stack are transferred to the program counter
D. Four data bytes stored in the top two locations of the stack are transferred to the stack pointer
➤ **Ans: A. The information where the stack is initialized is transferred to the stack counter**

29 What does a micro program (is sequencer) perform the operation?
A. Read
B. Write
C. Execute
D. Read and Execute
➤ **Ans: D. Read and Execute**

30 Which of the following interrupts are initiated by an I/O drive?
A. Internal
B. external
C. Software
D. None of above
➤ **Ans: B. External**

31. The PCI follows a set of standards primarily used in _____ PC's.
A. Intel B. Motorola
C. IBM D. SUN
➤ **Ans: C. IBM**

32. The _____ is the BUS used in Macintosh PC's.
A. NuBUS
B. EISA
C. PCI
D. None of the above
➤ **Ans: A. NuBUS**

33. The key feature of the PCI BUS is
A. Low cost connectivity.
B. Plug and Play capability.
C. Expansion of Bandwidth.
D. Both A. and C.
➤ **Ans: B. Plug and Play capability.**

34. PCI stands for
A. Peripheral Component Interconnect.
B. Peripheral Computer Internet.
C. Processor Computer Interconnect.
D. Processor Cable Interconnect.
➤ **Ans: A. Peripheral Component Interconnect.**

35. The PCI BUS supports _____ address space/s.
A. I/O
B. Memory
C. Configuration
D. All of the above
➤ **Ans: D. All of the above**

36. _____ address space gives the PCI its plug and play capability.
A. Configuration
B. I/O
C. Memory
D. All of the above
➤ **Ans: A. Configuration**

37. _____ provides a seperate physical connection to the memory.
A. PCI BUS
B. PCI interface
C. PCI bridge
D. Switch circuit
➤ **Ans: C. PCI bridge**

38. A common measure of performance is
A. Price/performance ratio.
B. Performance/price ratio.
C. Operation/price ratio.
D. None of the above.
➤ **Ans: A. Price/performance ratio.**

39. The master is also called as _____ in PCI terminology.
A. Initiator B. Commander
C. Chief D. Starter
➤ **Ans: A. Initiator**

40. Signals whose names end in _____ are asserted in the low voltage state.
A. $ B. #
C. * D. !
➤ **Ans: B. #**

41. ARM stands for _____.
A. Advanced Rate Machines
B. Advanced RISC Machines
C. Artificial Running Machines
D. Aviary Running Machines
➤ **Ans: B. Advanced RISC Machines**

42. The main importance of ARM micro-processors is providing operation with,
A. Low cost and low power consumption
B. Higher degree of multi-tasking
C. Lower error or glitches
D. Efficient memory management
➤ **Ans: A. Low cost and low power consumption**

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43. ARM processors where basically designed for _____.
A. Main frame systems
B. Distributed systems
C. Mobile systems
D. Super computers
➢ **Ans: C. Mobile systems**

44. An effective to introduce parallelism in memory access is by _____.
A. Memory interleaving
B. TLB
C. Pages
D. Frames
➢ **Ans: A. Memory interleaving**

45. The address space in ARM is _____.
A. 2^24 B. 2^64
C. 2^16 D. 2^32
➢ **Ans: D. 2^32**

46. The address system supported by ARM systems is/are _____.
A. Little Endian
B. Big Endian
C. X-Little Endian
D. Both a and b
➢ **Ans: D. Both a and b**

47. Memory can be accessed in ARM systems by _____ instructions.
i) Store
ii) MOVE
iii) Load
iv) arithmetic
v) logical
A. i,ii,iii B. i,iii
C. i,iv,v D. iii,iv,v
➢ **Ans: B. i,iii**

48. RISC stands for _____.
A. Restricted Instruction Sequencing Computer
B. Restricted Instruction Sequential Computer
C. Reduced Instruction Set Computer
D. Reduced Induction Set Computer
➢ **Ans: C. Reduced Instruction Set Computer**

49. In ARM, PC is implemented using _____.
A. Caches
B. Heaps
C. General purpose register
D. Stack
➢ **Ans: C. General purpose register**

50. The additional duplicate register used in ARM machines are called as _____.
A. Copied-registers
B. Banked registers
C. EXtra registers
D. Extential registers
➢ **Ans: B. Banked registers**

51. The banked registers are used for _____.
A. Switching between supervisor and interrupt mode
B. Extended storing
C. Same as other general purpose registers
D. Both a and c
➢ **Ans: A. Switching between supervisor and interrupt mode**

52. Each instruction in ARM machines is encoded into ____ Word.
A. 2 byte B. 3 byte
C. 4 byte D. 8 byte
➢ **Ans: C. 4 byte**

53. Two processors A and B have clock frequencies of 700 Mhz and 900 Mhz respectively. Suppose A can execute an instruction with an average

of 3 steps and B can execute with an average of 5 steps.For the execution of the same instruction which processor is faster
A. A
B. B
C. Both take the same time
D. Insufficient information
➢ **Ans: A. A**

54. The addressing mode where the EA of the operand is the contents of Rn is _____.
A. Pre-indexed mode
B. Pre-indexed with write back mode
C. Post-indexed mode
D. None of the above
➢ **Ans: C. Post-indexed mode**

55. The effective address of the instruction written in Post-indexed mode, MOVE[Rn]+Rm is _____.
A. EA = [Rn]
B. EA = [Rn + Rm]
C. EA = [Rn] + Rm
D. EA = [Rm] + Rn
➢ **Ans: A. EA = [Rn]**

56. The throughput of a super scalar processor is _____.
A. less than 1 B. 1
C. More than 1 D. Not Known
➢ **Ans: C. More than 1**

57. When the processor executes multiple instructions at a time it is said to use _____.
A. single issue
B. Multiplicity
C. Visualization
D. Multiple issue
➢ **Ans: D. Multiple issue**

58. The _____ plays a very vital role in case of super scalar processors.
A. Compilers
B. Motherboard
C. Memory
D. Peripherals
➢ **Ans: A. Compilers**

59. If an exception is raised and the succeeding instructions are executed completly, then the processor is said to have _____.
A. Exception handling
B. Imprecise exceptions
C. Error correction
D. None of the above
➢ **Ans: B. Imprecise exceptions**

60. The CPU is also called as _____.
A. Processor hub
B. ISP
C. Controller
D. All of the above
➢ **Ans: B. ISP**

61. In super-scalar processors, _____ mode of execution is used.
A. In-order
B. Post order
C. Out of order
D. None of the mentioned
➢ **Ans: C. Out of order**

62. Since it uses the out of order mode of execution, the results are stored in _____.
A. Buffers
B. Special memory locations
C. Temporary registers
D. TLB
➢ **Ans: C. Temporary registers**

63. The step where in the results stored in the temporary register is transfered into the permanent register is called as

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A. Final step
B. Committment step
C. Last step
D. Inception step
➢ **Ans: B. Committment step**

64. A special unit used govern the out of order execution of the instructions is called as _____.
A. Commitment unit
B. Temporal unit
C. Monitor
D. supervisory unit
➢ **Ans: A. Commitment unit**

65. The commitment unit uses a queue called _____.
A. Record buffer
B. Commitment buffer
C. Storage buffer
D. None of the above
➢ **Ans: A. Record buffer**

66. _____ have been developed specifically for pipelined systems.
A. Utility softwares
B. Speed up utilities
C. Optimizing compilers
D. None of the mentioned
➢ **Ans: C. Optimizing compilers**

67. The pipelining process is also called as _____.
A. Superscalar operation
B. Assembly line operation
C. Von neumann cycle
D. None of the mentioned
➢ **Ans: B. Assembly line operation**

68. The fetch and execution cycles are interleaved with the help of _____.
A. Modification in processor architecture
B. Clock
C. Special unit
D. Control unit
➢ **Ans: B. Clock**

69. Each stage in pipelining should be completed within _____ cycle.
A. 1 B. 2
C. 3 D. 4
➢ **Ans: A. 1**

60. The key factor/s in commercial success of a computer is/are _____.
A. Performance
B. Cost
C. Speed
D. Both a and b
➢ **Ans: D. Both a and b**

61. If a unit completes its task before the allotted time period, then
A. It'll perform some other task in the remaining time
B. Its time gets reallocated to different task
C. It'll remain idle for the remaining time
D. None of the mentioned
➢ **Ans: C. It'll remain idle for the remaining time**

62. To increase the speed of memory access in pipelining, we make use of _____.
A. Special memory locations
B. Special purpose registers
C. Cache
D. Buffers
➢ **Ans: C. Cache**

63. The periods of time when the unit is idle is called as _____.
A. Stalls
B. Bubbles
C. Hazards
D. Both a and b
➢ **Ans: D. Both a and b**

AUTOMATA THEORY

The word automaton itself, closely related to the word "automation", denotes automatic processes carrying out the production of specific processes. Automata theory deals with the logic of computation with respect to simple machines, referred to as automata. Through automata, computer scientists are able to understand how machines compute functions and solve problems and more importantly, what it means for a function to be defined as computable or for a question to be described as decidable.

Abstract models of machines

Automatons are abstract models of machines that perform computations on an input by moving through a series of states or configurations. At each state of the computation, a transition function determines the next configuration on the basis of a finite portion of the present configuration. As a result, once the computation reaches an accepting configuration, it accepts that input. The most general and powerful automata is the Turing machine.

Objective of automata theory

The major objective of automata theory is to develop methods by which computer scientists can describe and analyze the dynamic behavior of discrete systems, in which signals are sampled periodically. The behavior of these discrete systems is determined by the way that the system is constructed from storage and combinational elements. Characteristics of such machines include:

- **Inputs:** assumed to be sequences of symbols selected from a finite set I of input signals. Namely, set I is the set $\{x_1, x_2, x_3 \ldots x_k\}$ where k is the number of inputs.
- **Outputs:** sequences of symbols selected from a finite set Z. Namely, set Z is the set $\{y_1, y_2, y_3 \ldots y_m\}$ where m is the number of outputs.
- **States:** finite set Q, whose definition depends on the type of automaton.

There are four major families of automaton:

- Finite-state machine
- Pushdown automata
- Linear-bounded automata
- Turing machine

Lambda Calculus

A computation consists of an initial lambda expression plus a finite sequence of lambda terms, each deduced from the preceding term by one application of Beta reduction.

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Combinatory logic

Combinatory logic is a concept which has many similarities to λ-calculus, but also important differences exist. Combinatory logic was developed with great ambitions: understanding the nature of paradoxes, making foundations of mathematics more economic (conceptually), eliminating the notion of variables.

Markov algorithm

Markov algorithm a string rewriting system that uses grammar -like rules to operate on strings of symbols.

Register machine

Register machineis a theoretically interesting idealization of a computer. There are several variants. In most of them, each register can hold a natural number, and the instructions are simple, e.g. only defragmentation and incrimination exist. The lack of the infinite external store can be understood by replacing its role with Gödel numbering techniques.

Deterministic finite automaton (DFA)

DFA is also known as **deterministic finite state machine**. It is a finite state machine that accepts/rejects finite strings of symbols and only produces a unique computation (or run) of the automaton for each input string. Deterministic' refers to the uniqueness of the computation.

A DFA is defined as an abstract mathematical concept, but due to the deterministic nature of a DFA, it is implementable in hardware and software for solving various specific problems.

Implementing of DFA

A software state machine that decides whether or not online user-input such as phone numbers and email addresses are valid can be modeled as a DFA.

Hardware is the digital logic circuitry that controls whether an automatic door is open or closed, using input from motion sensors or pressure pads to decide whether or not to perform a state transition.

DFAs recognize exactly the set of regular languages which are, among other things, useful for doing analysis and pattern matching. A DFA can be used in either an accepting mode to verify that an input string is indeed part of the language it represents, or a generating mode to create a list of all the strings in the language.

Nondeterministic finite automaton (NFA)

Nondeterministic finite automaton (NFA) or nondeterministic finite state machine is finite state machine where from each state and a given input symbol the automaton may jump into several possible next states. This distinguishes it from the Deterministic Finite Automate (DFA), where the next possible state is uniquely determined.

Although the DFA and NFA have distinct definitions, a NFA can be translated to equivalent DFA using power construction, i.e., the constructed DFA and the NFA recognize the same formal language. Both types of automata recognize only regular languages.

Regular expression

In computing, a **regular expression** provides a concise and flexible means for "matching" (specifying and recognizing) strings of text, such as particular characters, words, or patterns of characters. Abbreviations for "regular expression" include "regex" and "regexp".

The concept of regular expressions was first popularized by utilities provided by Unix distributions, in particular the editor ed and the filter grep A regular expression is written in a formal language that can be interpreted by a regular expression processor, which is a program that either serves as a parser generator or examines text and identifies parts that match the provided specifications.

Decision Properties of Regular Languages

Given a representation, e.g., RE, FA, of a regular Language L, what can we tell about L?

- Is the language described empty?
- Is a particular string 'w' in the described language?
- Do two descriptions of a language actually describe the same language?

This question is often called "equivalence" of languages.

Closure Properties for Regular Languages

What is closure?

Recall that a set S is closed under an operation X if the output of X is in S whenever the inputs were in S. So, for example, saying that the regular languages are "closed under union" means that if P and Rare regular languages, then so is the union of P and R.

Closure properties

Regular languages are closed under a wide variety of operations.

Union and intersection

Pick DFAs recognizing the two languages and use the cross-product construction to build a DFA recognizing their union or intersection.

Set complement

Pick a DFA recognizing the language, then swap the accept/non-accept markings on its states.

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String reversal

Pick an NFA recognizing the language. Create a new final state, with epsilon transitions to it from all the old final states. Then swap the final and start states and reverse all the transition arrows.

Set difference

Re-write set difference using a combination of intersection and set complement

Concatenation and Star

Pick an NFA recognizing the language and modify it.

Homomorphism

A homomorphism is a function from strings to strings. What makes it a homomorphism is that its output on a multi-character string is just the concatenation of its outputs on each individual character in the string. Or, equivalently, $h(xy) = h(x)h(y)$ for any strings x and y. If S is a set of strings, then h(S) is $\{w : w = h(x)$ for some x in S$\}$.

To show that regular languages are closed under homomorphism, choose an arbitrary regular language L and a homomorphism h. It can be represented using a regular expression R. But then h(R) is a regular expression representing h(L). So h(L) must also be regular.

Context-free Language

Context-free language is a language generated by some context-free grammar. The set of all context-free languages is identical to the set of languages accepted by push down automate.

Context-free grammars

Context-free grammars are important in linguistics for describing the structure of sentences and words in natural language and in computer science for describing the structure of programming languages and other formal languages.

Parse Tree

A **concrete syntax tree** or **parse tree** or **parsing tree** is an ordered, rooted tree that represents the syntactic structure of strings according to some formal languages.

Parse trees are usually constructed according to one of two competing relations, either in terms of the constituency relation of **constituency grammars** or in terms of the dependency relation of dependency grammars.

Parse trees are distinct from abstract syntax tree in that their structure and elements more concretely reflect the syntax of the input language. Parse trees may be generated for sentences in natural grammar, as well as during processing of

Pushdown Automata

Push down automata is a finite automate with an additional stack of symbols; its transitions can take the top symbol on the stack and depend on its value, and they can add new top symbols to the stack.

Deterministic pushdown automaton

A **deterministic pushdown automaton** is effectively a particular type of pushdown automata, namely one that has at most one transition for the same combination of input symbol, state, and top stack symbol.

The term " pushdown" refers to the fact that the stack can be regarded as being "pushed down" like a tray dispenser at a cafeteria, since the operations never work on elements other than the top element.

Stack Automata

A stack automata, by contrast, does allow operations on other elements, and stack automata can recognize a strictly larger set of languages than pushdown automata.

Deterministic Context-free Language

A deterministic Context-free Language is a language recognized by some deterministic pushdown automaton. Not all context-free languages are deterministic.

Pumping lemma for context-free languages

The pumping lemma for context-free languages, also known as the Bar-Hillel lemma, is a lemma that gives a property shared by all context-free languages.

Turing machine

A **Turing machine** is a device that manipulates symbols on a strip of tape according to a table of rules. Despite its simplicity, a Turing machine can be adapted to simulate the logic of any computer algorithm, and is particularly useful in explaining the functions of a CPU inside a computer.

The "Turing" machine was described by Alan Turing in 1936, who called it an "*automatic machine*". The Turing machine is not intended as a practical computing technology, but rather as a hypothetical device representing a computing machine. Turing machines help computer scientists understand the limits of mechanical computation.

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THEORY OF AUTOMATA

1. Which of the following statement is true about RE (Regular Expression)?
   A. Any language that can be expressed by a RE is said to be regular language.
   B. Any language that can be expressed by a RE is said to be formal language.
   C. Any language that can be expressed by a RE is said to be finite language.
   D. None of the above.
   ➢ **Ans: D. None of the above.**

2. If L1 and L2 are regular languages; then which of the following are also regular language(s).
   A. L1 + L2 B. 1L2
   C. L1* D. All of above
   ➢ **Ans: D. All of above**

3. Which of the following statement is true?
   A. Let l be a language defined over an alphabet Σl, then the language of strings, defined over Σ, not belonging to L, is called finite language, denoted by Lf or l'.
   B. Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, belonging to L, is called inverse of the language L, denoted by Li or l'.
   C. Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, not belonging to L, is called Complement of the language L, denoted by Lc or L'.
   D. None of the above.
   ➢ **Ans: C. Let L be a language defined over an alphabet Σ, then the language of strings, defined over Σ, not belonging to L, is called Complement of the language L, denoted by Lc or L'.**

4. To describe the complement of a language, it is compulsory to describe the
   A. Alphabet of that language over which the language is defined.
   B. Regular Expression of that language over which the language is defined.
   C. Word of that language over which the language is defined.
   D. Letter of that language over which the language is defined.
   ➢ **Ans: A. Alphabet of that language over which the language is defined.**

5. Which of the following statement is false?
   A. For a certain language L, the complement of Lc is the given language L i.e. (Lc)c = Lc
   B. Suppose a Language L, the complement of Li is the given language L i.e. (Li)i = Li
   C. L is a language, the complement of Lc is the given language L i.e. (Lc)c = Lc
   D. **All of the above**
   ➢ **Ans: D. All of the above**

6. If L is a regular language then which of the following is true?
   A. La is also a regular language.
   B. Lb is also a regular language.
   C. Lx is also a regular language.
   D. Lc is also a regular language.
   ➢ **Ans: D. Lc is also a regular language.**

7. While converting each of the final states of F to non-final states and old non-final states of F to final states, FA thus obtained will reject every string belonging to L and will accept every string, defined over Σ, not belonging to L is called
   A. Transition Graph of L
   B. Regular expression of L
   C. Complement of L
   D. Finite Automata of L
   ➢ **Ans: C. Complement of L**

8. Which of the following statement is true
   A. If L1 and L2 are regular languages, then these cannot be expressed by the corresponding FAs.
   B. If L1 and L2 are regular languages, then L3 can be expressed by the corresponding FAs.
   C. If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.
   D. None of the above.
   ➢ **Ans: C. If L1 and L2 are regular languages, then these can be expressed by the corresponding FAs.**

9. L= language of words containing even number of a's. Regular Expression is?
   A. (a+b)*aa(a+b)*
   B. (b+ab*a)*
   C. a+bb*aab*a
   D. (a+b)*ab(a+b)*
   ➢ **Ans: B. (b+ab*a)***

10. The regular expression defining the language L1 U L2 can be obtained, converting and reducing the previous ---------- into a ---------- as after eliminating states.
    A. GTG, TG B. FA, GTG
    C. FA, TG D. TG, RE
    ➢ **Ans: B. FA, GTG**

11. look at the following CFG and pick the correct option
    S→ AB, A →BSB, B→ CC
    C→ SS
    A→ a/b
    C→ b/bb
    A. Abb is not the word of corresponding CFL.
    B. One word can be accept from the corresponding CFL.
    C. Abb is a word in the corresponding CFL.
    D. None of the above
    ➢ **Ans: C. Abb is a word in the corresponding CFL.**

12. Which of the following language is example of non-regular language?
    A. PALINDROME and PRIME
    B. PALINDROME and EVEN-EVEN
    C. EVEN-EVEN and FACTORIZAION
    D. FACTORIAL and UNDER ROOT
    ➢ **Ans: A. PALINDROME and PRIME**

13. The word formal in the formal languages means?
    A. Symbols used have well defined meaning.
    B. Only the form of the string of symbols is significant.
    C. These words are unnecessary.
    D. None of the above.
    ➢ **Ans: A. Symbols used have well defined meaning.**

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14. Which of the following statement is true about pumping lemma?
A. Languages are proved to be regular or non-regular using pumping lemma.
B. Languages are proved to be only regular using pumping lemma.
C. Languages are proved to be only non-regular using pumping lemma
D. None of the above.
➢ **Ans: A. Languages are proved to be regular or non-regular using pumping lemma.**

15. Which of the following is infinite language?
A. EQUAL-EQUAL
B. EVEN-EVEN
C. PALINDROME
D. FACTORIAL
➢ **Ans: C. PALINDROME**

16. MyhillNerode theorem is consisting of the followings,
A. L partitions Σ* into distinct classes.
B. If L is regular then, L generates finite number of classes.
C. If L generates finite number of classes then L is regular.
D. All of above
➢ **Ans: D. All of above**

17. The language Q is said to be quotient of two regular languages P and R, denoted by--- if PQ=R then.
A. R=Q/P B. Q=R/P
C. Q=P/R D. P=R/QP
➢ **Ans: B. Q=R/P**

18. If two languages R and Q are given, then the prefixes of Q in R denoted by
A. Pref(R in Q). B. P(R in Q).
C. Pref(Q in R). D. P (Q in R).
➢ **Ans: C. Pref(Q in R).**

19. Let suppose Q = {aa, abaaabb, bbaaaaa, bbbbbbbbb} and R = {b, bbbb, bbbaaa, bbbaaaaa} then which of the following option is true about Pref (Q in R) = ?
A. {b,bba,bbaaa}
B. {b,bbba,bbbaaa}
C. {ab,bba,bbba}
D. {b,bba,bbba}
➢ **Ans: B. {b,bbba,bbbaaa}**

20. If R is regular language and Q is any language, then Pref (Q in R) is called
A. Non-regular language
B. Equal language
C. Regular language
D. None of the above
➢ **Ans: C. Regular language**

21. "CFG" is abbreviation of
A. Context Free Graph
B. context Free Grammar
C. Context Finite Graph
D. Context Finite Grammar
➢ **Ans: B. Context Free Grammar**

22. Which of the following states are called halt states?
A. Accept and read
B. accept and reject
C. Accept and write
D. Halt and fixed
➢ **Ans: B. Accept and reject**

23. The part of an FA, where the input string is placed before it is run, is called?
A. Input State B. input Tape
C. Input string D. Input graph
➢ **Ans: B. Input Tape**

24. CNF is abbreviation of
A. Context Normal Form
B. complete Normal Form
C. Chomsky Normal Form
D. Compared Normal Form
➢ **Ans: C. Chomsky Normal Form**

25. Which of the following is true about null able production?
A. A production is called null able production if it is of the form N → Λ.
B. A production is called null able production if it is of the form N → B.
C. A production is called null able production if it is of the form A → N.
D. A production is called null able production if it is of the form A → Λ.
➢ **Ans: A. A production is called null able production if it is of the form N → Λ.**

26. The language which if generated by that CFG is called regular language if
A. No terminal → semi word
B. terminals → word
C. Semi word→ terminal
D. None of the above
➢ **Ans: C. Semi word→ terminal**

27. S → aXb|bXaX → aX|bX|Λ The given CFG generates the language in English
A. Beginning and ending in different letters
B. Beginning and ending in same letter
C. Even-even language
D. Odd- odd language
➢ **Ans: A. Beginning and ending in different letters**

28. Σ = {a,b} Productions S→XaaXX→aXX→bX X→Λ , this grammar defines the language that can be expressed by
A. (a+b)*a(a+b)
B. (a+b)*aa(a+b)*aaa
C. (a+b)*aa(a+b)*
D. (a+b)*aaba+bb)*
➢ **Ans: C. (a+b)*aa(a+b)***

29. The grammatical rules are often called
A. Semantics
B. terminals'
C. Productions
D. Non-terminals
➢ **Ans: C. Productions**

30. The symbols that can't be replaced by anything are called ----------
A. Productions B. terminals'
C. Terminals D. syntax
➢ **Ans: B. Terminals**

31. For language L defined over {a, b}, then L partitions {a, b}* into
A. Infinite classes
B. Finite classes
C. Distinct classes
D. Non-distinct classes
➢ **Ans: C. Distinct classes**

32. The symbols that must be replaced by other things are called
A. Productions symbols
B. terminals' symbols
C. Non-terminals symbols
D. CGA symbols
➢ **Ans: C. Non-terminals symbols**

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on a path
A. One character can be pushed and many characters can be popped
B. One character can be pushed and any no. of characters can be popped
C. Any No. of characters can be pushed and one character can be popped
D. Any No. of characters can be pushed and any no. of characters can be popped
➢ **Ans: C. Any No. of characters can be pushed and one character can be popped**

34. The symbols that can't be replaced by anything are called
A. Productions
B. terminals'
C. Non-terminals
D. None of the above
➢ **Ans: B. Terminals**

35. Grammatical rules which do not involve the meaning of words are called
A. Semantics
B. Syntactic
C. Both A and B
D. None of the above
➢ **Ans: B. Syntactic**

36. Grammatical rules which involve the meaning of words are called
A. syntax
B. production
C. Semantics
D. All of the above
➢ **Ans: C. Semantics**

37. In pumping lemma theorem (x y^n z) the range of n is
A. n=0, 1, 2, 3, 4.....
B. n= 0,-2,-3,-4,-5.....
C. n=1, 2, 3, 4.....
D. n=.....-3,-2,-1, 1, 2, 3, 4.....
➢ **Ans: (-)**

out going edges from
A. START or READ
B. POP or REJECT
C. READ or POP
D. PUSH or POP
➢ **Ans: C. READ or POP**

39. Which of the following is true statement?
A. A PDA is non-deterministic, if there are more than one REJECT states in PDA
B. A PDA is never non-deterministic
C. Like TG, A PDA can also be non-deterministic
D. A PDA is non-deterministic, if there are more than one PUSH or POP states
➢ **Ans: C. Like TG, A PDA can also be non-deterministic**

40. Identify the correct statement about state of FA
A. A problem occurs while deciding about state of FA that should be marked or not when the language Q is infinite.
B. No problem while deciding about state of FA that should be marked or not when the language Q is infinite.
C. A problem occurs while deciding about state of FA that should be marked or not when the language P is infinite.
D. A problem occurs while deciding about state of FA that should be marked or not when the language R is infinite.
➢ **Ans: A. A problem occurs while deciding about state of FA that should be marked or not when the language Q is infinite.**

A. Decision making
B. ecision problem
C. Decision procedure
D. None of the above
➢ **Ans: C. Decision procedure**

42. Which of the following problem can be called decidable problem(s)?
A. The two regular expressions define the different language.
B. The two FAs are equivalent.
C. Both A. and B.
D. The two FAs are non-equivalent.
➢ **Ans: B. The two FAs are equivalent.**

43. To judge about a certain FA accepts any words, it is required to check the path from
A. Final to initial
B. Final to final
C. Initial to final
D. Initial to initial
➢ **Ans: C. Initial to final**

44. Grammatical rules which involve the meaning of words are called
A. Semantics
B. Syntax
C. Production words
D. Terminal
➢ **Ans: A. Semantics**

45. Identify the wrong statement
A. The language that can be expressed by any expression is called a regular language.
B. The language that can be expressed by any regular expression is called a Non regular language.
D. The language that can be expressed by any regular expression is called a CFL.
➢ **Ans: B. The language that can be expressed by any regular expression is called a Non regular language.**

46. a^nb^n generate the
A. Regular language
B. Finite language
C. Non regular languages
D. CFL
➢ **Ans: C. Non regular languages**

47. Identify the correct statement regarding two strings x and y, defined over Σ, are run over an FA accepting the language L, then
A. x and y are said to belong to the different class if they end in the same state, no matter that state is final or not.
B. x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.
C. x and y are said to belong to the same class if they end in the different state, no matter that state is final or not.
D. x and y are said to belong to the different class if they end in the different state.
➢ **Ans: B. x and y are said to belong to the same class if they end in the same state, no matter that state is final or not.**

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48. Identify the correct statement
   A. The production of the form terminal → Λ is said to be null production.
   B. The production of the form no terminal → Λ is said to be null production.
   C. The production of the form no terminal → Λ is said to be reproducible production.
   D. None of the above
   ➢ **Ans: B. The production of the form no terminal → Λ is said to be null production.**

49. Which of the following statement is true about a production is called null able production?
   A. If it is of the form Λ → N
   B. If it is of the form N → N
   C. If it is of the form N → Λ
   D. If it is of the form Λ → Λ
   ➢ **Ans: C. If it is of the form N → Λ**

50. If L1 and L2 are regular languages then which statement is incorrect?
   A. L1+L2 are always regular language
   B. 1*L2 are always regular
   C. (L1/L2 is always regular)
   D. None of the above
   ➢ **Ans: C. (L1/L2 is always regular)**

51. If a TG has more than one start states, the
   A. Eliminate the old start state
   B. Initiate the new start state
   C. Replace the old start state with final state
   D. Replace the old final state with new start state
   ➢ **Ans: B. Initiate the new start state**

52. While finding RE corresponding to TG, we connect the new start state to the old start state by the transition labeled by
   A. Production string
   B. Null string
   C. Null able string
   D. None of the above
   ➢ **Ans: D. None of the above**

53. Which of the following statement is NOT true about TG?
   A. There may exist more than one paths for certain string.
   B. There may exist no path for certain string.
   C. There may be no final state.
   D. There exists exact one path for certain string.
   ➢ **Ans: D. There exists exact one path for certain string.**

54. Kleene's theorem states
   A. Finite automate is more powerful than pushdown automata.
   B. All representations of a context free language are equivalent.
   C. Finite automate is less powerful than pushdown automata.
   D. None of the above.
   ➢ **Ans: C. Finite automate is less powerful than pushdown automata.**

55. A language accepted by an FA is also accepted by
   A. TG only B. GTG only
   C. RE only D. All of the above
   ➢ **Ans: D. All of the above**

56. If r1 = (aa + bb) and r2 = (a + b) then the language (aa + bb)(a + b) will be generated by
   A. (r1 + r2) B. (r2)(r1)
   C. (r1)* D. (r1)(r2)
   ➢ **Ans: D. (r1)(r2)**

57. The following grammar
   $G = (N, T, P, S)$
   $N = \{S, A, B\}$
   $T = \{a, b, c\}$
   $P: S \rightarrow aSa$
   $S \rightarrow aAa$
   $A \rightarrow bB$
   $B \rightarrow bB$
   $B \rightarrow c$ is
   A. is type 3
   B. Is type 2 but not type 3
   C. is type 1 but not type 2
   D. None of the above
   ➢ **Ans: A. is type 3**

58. The following grammar
   $G = (N, T, P, S)$
   $N = \{S, A, B, C, D, E\}$
   $T = \{a, b, c\}$
   $P: S \rightarrow aAB$
   $A \rightarrow CD$
   B
   $C \rightarrow CE$
   D
   $C \rightarrow aC$
   $C \rightarrow b$
   $bE \rightarrow bc$ is
   A. is type 3
   B. Is type 2 but not type 3
   C. is type 1 but not type 2
   D. is type 0 but not type 1
   ➢ **Ans: C. is type 1 but not type 2**

59. The following grammar
   $G = (N, T, P, S)$
   $N = \{S, A, B, C\}$
   $T = \{a, b, c\}$
   $P: S \rightarrow aS$
   $A \rightarrow bB$
   $B \rightarrow cC$
   $C \rightarrow a$ is
   A. is type 3 B. Is type 2 but not type 3
   C. is type 1 but not type 2 D. is type 0 but not type 1
   ➢ **Ans: A. is type 3**

60. The following grammar
   $G = (N, T, P, S)$
   $N = \{S, A, B, C, D, E\}$
   $T = (a, b, c\}$
   $P: S \rightarrow ABCD$
   $BCD \rightarrow DE$
   $D \rightarrow aD$
   $D \rightarrow a$
   $E \rightarrow bE$
   $E \rightarrow c$ is
   A. is type 3 B. Is type 2 but not type 3
   C. is type 1 but not type 2 D. is type 0 but not type 1
   ➢ **Ans: D. is type 0 but not type 1**

61. Consider the following CFG
   S → aB S → bA
   B → b A → a
   B → bS A → aS
   B → aBB A → bAA
   Consider the following derivation

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$S \Rightarrow aB$
$\Rightarrow aaBB$
$\Rightarrow aaBb$
$\Rightarrow aabSb$
$\Rightarrow aabbAb$
$\Rightarrow aabbab$

This derivation is
A. A leftmost derivation
B. A rightmost derivation
C. Both leftmost and rightmost derivation
D. Neither leftmost nor rightmost derivation
➤ **Ans: D. Neither leftmost nor rightmost derivation**

62. Consider the following language $L = \{a^n b^n c^n d^m | n \geq 1\}$ then L is
A. CFL but not regular
B. CSL but not CFL
C. Regular expressing
D. Type 0 language but not type 3
➤ **Ans: B. CSL but not CFL**

63. Consider the following language $L = \{a^n b^n | n \geq 1\}$ then L is
A. CFL but not regular
B. CSL but not CFL
C. Regular
D. Type 0 language but not type 1
➤ **Ans: A. CFL but not regular**

64. Consider the following language $L = \{a^n b^m c^p d^q | n, m, p, q \geq 1\}$ L is
A. CFL but not regular
B. CSL but not CFL
C. Regular language
D. None of the above
➤ **Ans: C. Regular language**

65. The following CFG is in
$S \rightarrow AB$
$B \rightarrow CD$
$B \rightarrow AD$
$B \rightarrow b$
$D \rightarrow AD$
$D \rightarrow d$
$A \rightarrow a$
$C \rightarrow a$
A. Chomsky normal form
B. Weak Chomsky normal form
C. Strong Chomsky normal form
D. None of the above
➤ **Ans: C. Strong Chomsky normal form**

66. The following CFG is in
$S \rightarrow aBB$
$B \rightarrow bAA$
$A \rightarrow a$
$B \rightarrow b$
A. Chomsky normal form
B. Weak Chomsky normal
C. Strong Chomsky normal form
D. Greibach normal form
➤ **Ans: D. Greibach normal form**

67. Which of the following CF language is inherently ambiguous?
A. $\{a^n b^n c^m d^m | n, m \geq 1\}$
B. $\{a^n b^m c^p d^q | n = p \text{ or } m = q, n, m, p, q \geq 1\}$
C. $\{a^n b^m c^p d^q | n \neq m \wedge p \neq q\}$
D. $\{a^n b^m c^p d^q | n \neq m \vee p \neq q\}$
➤ **Ans: B.** $\{a^n b^m c^p d^q | n = p \text{ or } m = q, n, m, p, q \geq 1\}$

68. Which string is not accepted by the following FSA?
A. 00111 B. 01010
C. 00110 D. 11010
➤ **Ans: A. 00111**

69. Which string is accepted by the following FSA?
A. 00111 B. 01011
C. 01101 D. 0101
➤ **Ans: B. 11011**

70. Can a DFSA simulate a NFSA
A. No
B. Yes
C. Sometimes
D. Depends on NFA
➤ **Ans: B. Yes**

71. Which of the following is true for an arbitrary language L?
A. L* L+
B. L* = L+ ? {?}
C. L* = L+
D. L* = L+ ? {?}
➤ **Ans: B. L* = L+ ? {?}**

72. The concept of FSA is much used in this part of the compiler
A. Lexical analysis
B. logical expression
C. Code generation
D. Code optimization
➤ **Ans: A. Lexical analysis**

73. Which part of the compiler uses concept of grammer?
A. Lexical analysis
B. Parser
C. Code compiler
D. None of the above
➤ **Ans: B. Parser**

74. (a + b)(cd)*(a + b) denotes the following set
A. $\{a(cd)^n b | n \geq 1\} \cup \{a(bc)^n c | n \geq 1\}$
B. $\{a(cd)^n a | n \geq 1\} \cup \{b(cd)^n b | n \geq 1\} \cup \{b(bc)^n b | n \geq 0\}$
C. $\{a(cd)^n a | n \geq 0\} \cup \{a(cd)^n b | n \geq 0\} \cup \{b(cd)^n a | n \geq 0\} \cup \{b(cd)^n b | n \geq 0\}$
D. None of the above
➤ **Ans: C.** $\{a(cd)^* a | n \geq 0\} \cup \{a(cd)^* b | n \geq 0\} \cup \{b(cd)^* a | n \geq 0\} \cup \{b(cd)^* b | n \geq 0\}$

75. baa*c denotes the set
A. $\{a^n b^m c^p | n, m, p \geq 1\}$
B. $\{aab^n c | n \geq 0\}$
C. $\{ba^n c | n \geq 1\} 0$
D. None of the above
➤ **Ans: C.** $\{ba^n c | n \geq 1\} 0$

76. The set of all strings over the alphabet? = {a, b} (including ?) is exressed by
A. (a + b)+(a+b)*
B. (a + b)*
C. a+b+
D. None of the above
➤ **Ans: B. (a + b)***

77. Palindromes can't be recognized by any FSA because
A. FSA cannot remember arbitrarily large amount of information
B. FSA cannot deterministically fix the midpoint
C. Even if the mid point is known an FSA cannot find whether the second half of the string matches the first half
D. All of the above
➤ **Ans: D. All of the above**

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Algorithms are especially important to computers because computers are really general purpose machines for solving problems. But in order for a computer to be useful, we must give it a problem to solve and a technique for solving the problem. Through the use of algorithms, we can make computers "intelligent" by programming them with various algorithms to solve problems.

An **algorithm** is a well-ordered collection of unambiguous and effectively computable operations that when executed produces a result and halts in a finite amount of time

Five important characteristics of algorithms.

1. Algorithms are well-ordered.
2. Algorithms have unambiguous operations.
3. Algorithms have effectively computable operations.
4. Algorithms produce a result.
5. Algorithms halt in a finite amount of time.

Algorithms are well-ordered

Since an algorithm is a collection of operations or instructions, we must know the correct order in which to execute the instructions. If the order is unclear, we may perform the wrong instruction or we may be uncertain which instruction should be performed next. A computer can only execute an algorithm if it knows the exact order of steps to perform.

Algorithms have unambiguous operations

Each operation in an algorithm must be sufficiently clear so that it does not need to be simplified. Basic operations used for writing algorithms are known as primitive operations or primitives. When an algorithm is written in computer primitives, then the algorithm is unambiguous and the computer can execute it.

Algorithms have effectively computable operations

Each operation in an algorithm must be doable, that is, the operation must be something that is possible to do. For computers, many mathematical operations such as division by zero or finding the square root of a negative number are also impossible. These operations are not effectively computable so they cannot be used in writing algorithms.

Algorithms produce a result

Algorithm is a set of instructions for solving a problem. Unless an algorithm produces some result, we can never be certain whether our solution is correct. Only algorithms which produce results can be verified as either right or wrong.

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complete their execution in a finite amount of time .While our algorithm seems to be pretty clear, we have two problems. First, the algorithm must have an infinite number of steps because there are an infinite number of integers greater than one. Second, the algorithm will run forever trying to count to infinity. These problems violate our definition that an algorithm must halt in a finite amount of time. Every algorithm must reach some operation that tells it to stop.

Greedy algorithms

Greedy algorithms are simple and straightforward. They are shortsighted in their approach in the sense that they take decisions on the basis of information at hand without worrying about the effect these decisions may have in the future. They are easy to invent, easy to implement and most of the time quite efficient. Many problems cannot be solved correctly by greedy approach. Greedy algorithms are used to solve optimization problems.

Greedy Approach

Greedy Algorithm works by making the decision that seems most promising at any moment; it never reconsiders this decision, whatever situation may arise later.

Characteristics of Problems solved by Greedy Algorithms

To construct the solution in an optimal way. Algorithm maintains two sets. One contains chosen items and the other contains rejected items.

The greedy algorithm consists of four (4) functions.

1. A function that checks whether chosen set of items provide a solution.
2. A function that checks the feasibility of a set.
3. The selection function tells which of the candidates is the most promising.
4. An objective function, which does not appear explicitly, gives the value of a solution.

Huffman code

Huffman code is a technique for compressing data. Huffman's greedy algorithm looks at the occurrence of each character and it as a binary string in an optimal way.

Kruskal's Algorithm

In kruskal's algorithm the selection function chooses edges in increasing order of length without worrying too much about their connection to previously chosen edges, except that never to form a cycle.

Prim's Algorithm

This algorithm was first proposed by Jarnik, but typically attributed to Prim. It starts from an arbitrary vertex (root) and at each stage, add a new branch (edge) to the tree

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already constructed; the algorithm halts when all the vertices in the graph have been reached. This strategy is greedy in the sense that at each step the partial spanning tree is augmented with an edge that is the smallest among all possible adjacent edges.

Dijkstra's Algorithm (Shortest Path)

Consider a directed graph G = (V, E).

Problem Determine the length of the shortest path from the source to each of the other nodes of the graph. This problem can be solved by a greedy algorithm often called Dijkstra's algorithm. The algorithm maintains two sets of vertices, S and C. At every stage the set S contains those vertices that have already been selected and set C contains all the other vertices. Hence we have the invariant property V=S U C. When algorithm starts Delta contains only the source vertex and when the algorithm halts, Delta contains all the vertices of the graph and problem is solved. At each step algorithm choose the vertex in C whose distance to the source is least and add it to S.

Divide-and-Conquer Algorithm

Divide-and-conquer is a top-down technique for designing algorithms that consists of dividing the problem into smaller sub problems hoping that the solutions of the sub problems are easier to find and then composing the partial solutions into the solution of the original problem.

Little more formally, divide-and-conquer paradigm consists of following major phases:

Breaking the problem into several sub-problems that are similar to the original problem but smaller in size,

Solve the sub-problem recursively (successively and independently), and then

Combine these solutions to sub problems to create a solution to the original problem.

Dynamic Programming Algorithms

Dynamic programming is a fancy name for using divide-and-conquer technique with a table. As compared to divide-and-conquer, dynamic programming is more powerful and subtle design technique. Let me repeat, it is not a specific algorithm, but it is a meta-technique (like divide-and-conquer). Dynamic programming is a stage-wise search method suitable for optimization problems whose solutions may be viewed as the result of a sequence of decisions. The most attractive property of this strategy is that during the search for a solution it avoids full enumeration by pruning early partial decision solutions that cannot possibly lead to optimal solution.

Dynamic Programming Advantages

Dynamic programming takes advantage of the duplication and arranges to solve each sub problem only once, saving the solution (in table or in

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place) for later use. The dynamic programming is among the most powerful for designing algorithms for optimization problem. This is true for two reasons.

Firstly, dynamic programming solutions are based on few common elements.

Secondly, dynamic programming problems are typical optimization problems i.e., find the minimum or maximum cost solution, subject to various constraints.

In other words, this technique used for optimization problems:

Find a solution to the problem with the optimal value.

Then perform minimization or maximization.

Basic elements that characterize a dynamic programming algorithm:

Substructure

Decompose the given problem into smaller (and hopefully simpler) sub problems. Express the solution of the original problem in terms of solutions for smaller problems. Note that unlike divide-and-conquer problems, it is not usually sufficient to consider one decomposition, but many different ones.

Table-Structure

After solving the sub problems, store the answers (results) to the sub problems in a table. This is done because (typically) sub problem solutions are reused many times, and we do not want to repeatedly solve the same problem over and over again.

Bottom-up Computation

Using table (or something), combine solutions of smaller sub problems to solve larger sub problems, and eventually arrive at a solution to the complete problem.

Breadth-First Search Traversal Algorithm

Breadth-first search is a way to find all the vertices reachable from the given source vertex, *s*. Like depth first search, BFS traverse a connected component of a given graph and defines a spanning tree. Intuitively, the basic idea of the breath-first search is this: send a wave out from source *s*. The wave hits all vertices 1 edge from *s*. From there, the wave hits all vertices 2 edges from *s*. Etc. We use FIFO queue Q to maintain the wave front: *v* is in Q if and only if wave has hit *v* but has not come out of *v* yet.

Depth-First Search

Depth-first search is a systematic way to find all the vertices reachable from a source vertex, s. historically, depth-first was first stated formally hundreds of years ago as a method for traversing mazes. Like breadth-first search, DFS traverse a connected component of a given graph and defines a spanning tree. The basic idea of depth-first search is this: It methodically explores every edge. We start over from different vertices as necessary.

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Bubble Sort

Bubble Sort is an elementary sorting algorithm. It works by repeatedly exchanging adjacent elements, if necessary. When no exchanges are required, the file is sorted.

Insertion Sort

If the first few objects are already sorted, an unsorted object can be inserted in the sorted set in proper place. This is called insertion sort. An algorithm considers the elements one at a time, inserting each in its suitable place among those already considered. Insertion sort is an example of an **incremental** algorithm; it builds the sorted sequence one number at a time.

Selection Sort

This type of sorting is called "Selection Sort" because it works by repeatedly element. It works as follows: first find the smallest in the array and exchange it with the element in the first position, then find the second smallest element and exchange it with the element in the second position, and continue in this way until the entire array is sorted.

Shell Sort

This algorithm is a simple extension of Insertion sort. Its speed comes from the fact that it exchanges elements that are far apart (the insertion sort exchanges only adjacent elements).The idea of the Shell sort is to rearrange the file to give it the property that taking every h^{th} element (starting anywhere) yields a sorted file. Such a file is said to be h-sorted.

Heap Sort

The binary heap data structures are an array that can be viewed as a complete binary tree. Each node of the binary tree corresponds to an element of the array. The array is completely filled on all levels except possibly lowest.

Merge Sort

Merge sort is based on the **divide-and-conquer** paradigm. Its worst-case running time has a lower order of growth than insertion sort. Since we are dealing with sub problems, we state each sub problem as sorting a sub array $A[p .. r]$. Initially, $p = 1$ and $r = n$, but these values change as we recurs through sub problems.

Quick Sort

Quick sort is an algorithm of choice in many situations because it is not difficult to implement, it is a good "general purpose" sort and it consumes relatively fewer resources during execution.

Good points

It is in-place since it uses only a small auxiliary stack.
It requires only $n \log (n)$ time to sort n items.
It has an extremely short inner loop
This algorithm has been subjected to a thorough mathematical analysis, a

Bad Points

It is recursive. Especially if recursion is not available, the implementation is extremely complicated.
It requires quadratic (*i.e.*, n^2) time in the worst-case.
It is fragile i.e., a simple mistake in the implementation can go unnoticed and cause it to perform badly.

Counting Sort

The basic idea of counting sort is to determine, for each input elements x, the number of elements less than x. This information can be used to place directly into its correct position. In the code for Counting sort, we are given array $A[1 \ldots n]$ of length n. We required two more arrays, the array $B[1 \ldots n]$ holds the sorted output and the array $c[1 \ldots k]$ provides temporary working storage.

Bucket Sort

Bucket sort runs in linear time on the average. It assumes that the input is generated by a random process that distributes elements uniformly over the interval [0, 1).The idea of Bucket sort is to divide the interval [0, 1) into n equal-sized subintervals, or buckets, and then distribute the n input numbers into the buckets. Since the inputs are uniformly distributed over (0, 1), we don't expect many numbers to fall into each bucket. To produce the output, simply sort the numbers in each bucket and then go through the bucket in order, listing the elements in each.

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ALGORITHMS

1. Memorization is best described in the following statement?
   A. To store previous results for future use
   B. To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later
   C. To make the process accurate
   D. None of the above
   ➤ **Ans: B. To avoid this unnecessary repetitions by writing down the results of recursive calls and looking them up again if we need them later**

2. Which of the following is best option about faster sorting algorithm
   A. O (n log n) B. On^2
   C. O (nuke) D. On^3
   ➤ **Ans: C. O (nuke)**

3. Quick sort is
   A. Stable & in place
   B. Not stable but in place
   C. Stable but not in place
   D. Sometime stable & some times in place
   ➤ **Ans: B. Not stable but in place**

4. One example of in place but not stable algorithm is
   A. Merger Sort B. Merge sort
   C. Quick Sort D. Binary Sort
   ➤ **Ans: C. Quick Sort**

5. In Quick Sort Constants hidden in T (n log n) are
   A. Large
   B. defined by users
   C. Not defined
   D. Small
   ➤ **Ans: D. Small**

6. Continuation sort is appropriate to sort the elements in range 1 to k
   A. K is larger than range
   B. K is un-defined
   C. K is small
   D. None of the above
   ➤ **Ans: C. K is small**

7. Which of the following statement is correct for stable sorting algorithm?
   A. If duplicate elements remain in the same relative position after sorting
   B. One array is used midrange
   C. More than one arrays are required
   D. Duplicating elements not handled
   ➤ **Ans: A. If duplicate elements remain in the same relative position after sorting**

8. An in place sorting algorithm is one that uses
   A. Two dimensional arrays for storage
   B. More than one array arrays for storage
   C. No additional array for storage
   D. None of the above arrays for storage
   ➤ **Ans: C. No additional array for storage**

9. Continuing sort has time complexity of?
   A. O(n) B. O(n+k)
   C. O(nlogn) D. O(k)
   ➤ **Ans: A. O(n)**

10. Sending a copy of data to a program module is called by
    A. Passing a value
    B. Passing parameters
    C. Recursion
    D. Passing a reference

11. Stack cannot be used to
    A. Evaluate an arithmetic expression in postfix form
    B. Implement recursion
    C. Convert a given arithmetic expression in infix form
    D. Allocate resources by the operating system
    ➤ **Ans: D. Allocate resources by the operating system**

12. Stack is useful to implement
    A. Bubble sort
    B. Breadth first search
    C. Recursion
    D. Quick sort
    ➤ **Ans: C. Recursion**

13. Queue can be used to implement
    A. Bubble sort
    B. Quick sort
    C. Recursion
    D. Depth first search
    ➤ **Ans: D. Depth first search**

14. Tail recursion can be best defined as
    A. Occurs when the recursive call is the last statement executed in a recursive procedure or function
    B. Is a path that includes a recursive call to the routine, to solve a smaller version of the original problem
    C. Is a structure that keeps track of the activation records at run time, in order to preserve the values of parameters, return addresses, registers, and so on
    D. Refers to the point in the compile/execution cycle when variable names are associated with addresses in memory
    ➤ **Ans: A. Occurs when the recursive call is the last statement executed in a**

15. Fibonacci function fib(n) = fib(n-1) + fib(n -2) is an example of
    A. Direct recursion
    B. Indirect recursion
    C. Linear recursion
    D. None of the above
    ➤ **Ans: A. Direct recursion**

16. The recurrence relation that arises in relation with the complexity of binary search is
    A. T(n) = T(n/2) + k, where k is a constant
    B. T(n) = 2T(n/2) + k, where k is a constant
    C. T(n) = T(n/2) + log(n)D. T(n) = T(n/2) + n17
    D. T(n)= T(n/2)+log(n)D.T(n)
    ➤ **Ans: A. T(n) = T(n/2) + k, where k is a constant**

17. Which of the following is not a programming control structure?
    A. Repetition B. Selection
    C. Sequence D. Sorting
    ➤ **Ans: C. Sequence**

18. Link list is not suitable data structures for which one of the following problems
    A. Binary search
    B. Radix sort
    C. Polynomial
    D. Insertion sort
    ➤ **Ans: A. Binary search**

19. Identify name the sort for which time is not proportional to n2
    A. Bubble sort
    B. quick sort
    C. Insertion sort
    D. None of the above
    ➤ **Ans: A. Bubble sort**

20. Which of the following sorting algorithm does not use divide and conquer methodology?
    A. Merge sort
    B. Quick sort

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21. Identify the sorting algorithm in which array to be sorted is partitioned again & again in such a way that all elements less than or equal to partitioning element appear before it and those which are greater appear after it
A. Insertion sort
B. quick sort
C. Selection sort
D. Bubble sort
➢ **Ans: B. Quick sort**

22. which of the following sort inserts each elements A (K) into proper position in the previously sorted sub array A (1) ...A (K-1)
A. Insertion sort
B. Selection sort
C. Merge sort
D. None of the above
➢ **Ans: A. Insertion sort**

23. Which of the following sort finds location LOC of smallest element in A (K), ..., A (N) and then interchange A (LOC) with A(K) for K = 1, ..., N - 1.
A. Merge sort
B. Quick sort
C. Heap sort
D. None of these
➢ **Ans: D. None of these**

24. File is divided into sub files which are to be independently sorted and then merged is called.
A. Quick sort
B. Heap sort
C. Bubble sort
D. None of these
➢ **Ans: D. None of these**

25. Merge sort uses
A. Divide and conquer strategy
B. Backtracking strategy
C. Forwarding Search approach
D. Greedy approach
➢ **Ans: A. Divide and conquer**

26 A sorting method is called stable when.
A. It uses forward tracking algorithm
B. It uses greedy approach
C. It maintains the relative order of occurrences of non-distinct elements
D. It takes O (n) log n time
➢ **Ans: C. It maintains the relative order of occurrences of non-distinct elements**

27. Assume a user arrange the n numbers sorted in an array in such a way that all negative values occur before all positive ones. Minimum number of exchanges required in the worst case is
A. n – 1
B. n(n+1)
C. (n + 1)
D. None of the above
➢ **Ans: A. n – 1**

28. Sorting is not helpful to
A. Report generation
B. Minimize the storage needed
C. Respond the queries easily
D. None of the above
➢ **Ans: B. Minimize the storage needed**

29. Byte string is made of
A. Array of bits
B. Array of Bytes
C. Array of characters
D. None of the above
➢ **Ans: B. Array of Bytes**

30. The way a card game player arranges his cards as he picks them up one by one, is an example of
A. Quick sort
B. Selection sort
C. Insertion sort
D. Internal sort

31. Let suppose a user want to check whether a given set of items is sorted or not. Which of the following sorting methods will be the most well organized if it is already in sorted order?
A. Bubble sort
B. Selection sort
C. Quick sort
D. Insertion sort
➢ **Ans: D. Insertion sort**

32. A machine wants a minimum of 100 sec to sort 1000 names by quick sort. The minimum time needed to sort 100 names will be approximately?
A. 10.2 sec B. 7.7 sec
C. 6.7 sec D. 11.2 sec
➢ **Ans: C. 6.7 sec**

33. Which of the following algorithm design technique is used in the quick sort algorithm?
A. Dynamic programming
B. Divide and conquer
C. Static programming
D. Greedy method
➢ **Ans: B. Divide and conquer**

34. Which of the following abstract data types can be used to represent a many to many relation?
A. Tree B. Plex
C. Heap D. Queue
➢ **Ans: B. Plex**

35. Which of the following is necessary for converting an infix expression to the postfix form well?
A. A binary tree
B. An operand stack
C. An operator stack

36. Which data structure is mostly used in a no recursive implementation of a recursive algorithm?
A. Link list B. Stack
C. Heap D. Trees
➢ **Ans: B. Stack**

37. A Game tree is an example of
A. A special type of binary tree
B. A special type of mary tree
C. A special type of binary search tree
D. A special type of heap
➢ **Ans: B. A special type of mary tree**

38. Which of the following steps is performed first for in order traversal of a binary tree?
A. Traversal of the left sub tree in in-order
B. Traversal of the right sub tree in post order
C. Traversal of the left sub tree in post order.
D. Traversal of the right sub tree in in-order
➢ **Ans: A. Traversal of the left sub tree in in-order**

39. The preorder traversal of a binary tree begins with
A. Processing of the root node
B. Traversal of the right sub-tree in preorder
C. Traversal of the left sub-tree in post-order
D. None of the above.
➢ **Ans: A. Processing of the root node**

40. If a binary tree is threaded for an in-order traversal order, a NULL right link of any node is replaced by the address of its
A. Root B. Predecessor

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41. A binary search tree holds the values 1, 2, 3, 4, 5, 6, 7, 8. The tree is traversed in pre-order, identify the correct sequence output.
A. 5 3 1 2 4 7 8 6
B. 5 3 1 2 4 7 7 8
C. 5 3 1 2 4 7 8 7
D. 5 3 1 2 4 7 6 8
➢ **Ans: D. 5 3 1 2 4 7 6 8**

42. How many dissimilar binary search trees can be made from three nodes which hold the key values 1, 2 and 3?
A. 20 B. 15
C. 30 D. 10
➢ **Ans: B. 15**

43. The procedure of accessing data stored in a tape is like to manipulating data on a
A. Stack B. Link list
C. Queue D. Heap
➢ **Ans: C. Queue**

44. A dynamic data structure where a user can search for desired records in 0 (log n) time is:
A. Stack
B. Binary search tree
C. Circularly linked list
D. Doubly linked list
➢ **Ans: B. Binary search tree**

45. which of the following require not be a binary tree?
A. Search tree B. Heap
C. AVL-Tree D. B-Tree
➢ **Ans: D. B-Tree**

46. Which of the following sort finds location LOC of smallest element in A (K), ..., A (N) and then interchange A (LOC) with A(K) for K = 1, ..., N - 1.
A. Shuffle sort
B. Quick sort
C. Heap sort
D. None of these

47. Heap (represented by an array) constructed from the list of numbers 30, 10, 80, 60, 15, 55, and 17 is:
A. 60, 80, 55, 30, 10, 17, 15
B. 80, 55, 60, 15, 10, 30, 17
C. 80, 60, 36, 17, 55, 55, 10
D. None of the above
➢ **Ans: B. 80, 55, 60, 15, 10, 30, 17**

48. What is the maximum number of nodes in a heap with 8 leaf nodes?
A. 15 B. 16
C. 17 D. 31
➢ **Ans: A. 15**

49. Macro expansion of C is an example of
A. String matching and manipulation
B. Application of hashing for a practical program
C. String operation which does not require string matching
D. None of these
➢ **Ans: A. String matching and manipulation**

50. Which of the following searching method requires that all keys must exist in internal memory?
A. Hashing functions
B. Forwarding search
C. Binary search
D. None of these
➢ **Ans: C. Binary search**

51. Which of the following is an example of a hash function?
A. Quick sort
B. Close addressing
C. Open addressing
D. Folding
➢ **Ans: D. Folding**

52. Benefit of chained hash table over the open addressing scheme is
A. Worst case complexity of search operations is less.
B. Space used is less
C. Deletion is easier
D. Best case complexity of search operations is high
➢ **Ans: B. Space used is less**

53. A hash function f defined as f (key) = key mod 7, with linear probing, is used to insert the keys 37, 38, 72, 48, 98, 11, 56, into a table indexed from 0 to 6. What will be the location of key II?
A. 3 B. 4
C. 5 D. 6
➢ **Ans: C. 5**

54 The average search time of hashing, with linear probing will be less if the load factor
A. Is far less than one
B. Equals one
C. Is far greater than one
D. None of the above
➢ **Ans: A. Is far less than one**

55. A hash table can store a maximum of 10 records. At present there are records in locations 1, 3, 4, 7, 8, 9, 10.The chance of a new record going into location 2, with a hash function resolve crash by linear probing is
A. 0.3 B. 0.1
C. 0.6 D. 0.4
➢ **Ans: C. 0.6**

56. Let suppose a hashing function that resolves collision by quadratic probing. Assume the address space is indexed from 1 to 8. Which of the following locations will never be probed if a collision occurs at position4?
A. 4 B. 5
C. 8 D. 2
➢ **Ans: D. 2**

57. A hash table has space for 100 records. What is the probability of collision before the table is 10% full?
A. 0.45 B. 0.50
C. 0.30 D. 0.34
➢ **Ans: A. 0.45**

58. A hash function randomly distributes records one by one in a space that can hold x number of records. The chance that the mth record is the first record to result in collision is
A. (x-1) (x-2)...(x-(m-2))(m-l) / xm-l
B. (x-1) (x-2)... (x-(m-l))(m-l) / xm-l
C. (x-1) (x-2)... (x-(m-2))(m-l) / xm
D. (x-1) (x-2)... (x-(m-l))(m-l) / xm
➢ **Ans: A. (x-1) (x-2)...(x-(m-2))(m-l) / xm-l**

59. If the hashing function is the remainder on division, then clustering is more likely to occur if the storage space is divided into 40 sectors rather than 41. This result shows
A. More likely to be false
B. More likely to be true
C. Is always false
D. None of the above
➢ **Ans: B. More likely to be true**

60. Recursion is equivalent to
A. Greedy paradigm
B. Divide and Conquer paradigm
C. Both A and B.
D. None of the above
➢ **Ans: B. Divide and Conquer paradigm.**

61. Dynamic memory allocation use
A. Calloc B. Malloc
C. Free D. All of these
➢ **Ans: D. All of these**

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62. Dynamic memory allocation is used for
A. Dynamic allocation
B. Space management
C. Time management
D. Static allocation
➢ **Ans: B. Space management**

63. The link list implementation of sparse matrices is superior to the generalized dope vector method because it is
A. Conceptually easier
B. Completely static
C. Partially dynamic
D. Efficient if the sparse matrix is a band matrix
➢ **Ans: A. Conceptually easier**

64. A dynamic data structure where a user can search for desired records in 0 (log n) time is:
A. Stack
B. Binary search tree
C. Circularly linked list
D. Doubly link list
➢ **Ans: B. Binary search tree**

65. Which of the following statements is false?
A. Optimal binary search tree construction can be performed efficiently using dynamic programming.
B. Breadth first search cannot be used to find component of a graph.
C. Give the prefix and postfix walks over 3 binary trees, the binary tree cannot be uniquely constructed.
D. Depth first search can be used to find connected components of a graph.
➢ **Ans: B. Breadth first search cannot be used to find component of a graph.**

66. Let suppose an undirected un-weighted graph G. Let a breadth first traversal be done starting from a node r. Let d (r, u) and d (r, v) be the lengths of shortest paths from r to u and v respectively in G. If u is visited before v during the breadth first traversal, which of the following statement is correct?
A. $d(r, v) < d(r, u)$
B. $d(r, u) > d(v, r)$
C. $d(r, u) \leq d(r, v)$
D. None of these
➢ **Ans: C. $d(r, u) \leq d(r, v)$**

67. A appropriate structure for breadth-first and depth-first traversal of graphs is
A. Adjacency matrix
B. Edge listing
C. Adjacency list
D. None of the above
➢ **Ans: C. Adjacency list**

68. In which case adjacency list representation of graph is not useful
A. When number of edges is less than vertices
B. When number of vertices is less than edges
C. In breadth-first traversal
D. None of the above
➢ **Ans: C. In breadth-first traversal**

69. Graph structure is available in
A. C
B. C++
C. Pascal
D. None of the above
➢ **Ans: D. None of the above**

70. Assume that an undirected graph G is represented by an adjacency matrix A. Let B denote the matrix A x Ax A x A x A. Which of the following is true if an element B (i,j) is non. Zero?
A. Vertex j can be reached from vertex i in exactly 5 steps.
B. Vertex i can be reached from vertex j in exactly 5 steps.
C. Vertex j cannot be reached from vertex i.
D. Vertex i cannot be reached from vertex j.
➢ **Ans: B. Vertex i can be reached from vertex j in exactly 5 steps.**

71. The number of distinct simple graphs with up to 3 nodes is
A. 15 B. 10
C. 7 D. 9
➢ **Ans: A. 15**

72. Let G be a graph with 100 vertices numbered 1 to 100. Two vertices i and j are adjacent if $|i - j| = 8$ or $|i - j| = 12$. The number of connected components in G is
A. 8 B. 4
C. 12 D. 2524
➢ **Ans: A. 8**

73. Polynomials in memory may be maintained through
A. Link list with header node
B. Multi-dimensional array
C. Circularly link list
D. Array
➢ **Ans: A. Link list with header node.**

74. Representing the polynomial in memory using link list requires each node having
A. Two fields
B. More than four fields
C. Four fields
D. Three fields
➢ **Ans: D. Three fields**

75. A polynomial p(x) is such that p (0) = 5, p(1) = 4, p(2) = 9 and p(3) = 20. The minimum degree it can have is'
A. 1 C. 3
B. 2 D. 4
➢ **Ans: C. 3**

76. Adjacency matrix of a diagraph is:
A. Identity matrix
B. Symmetric Matrix
C. Asymmetric Matrix
D. None of these
➢ **Ans: D. None of these**

77. Which of the following is not true for adjacency matrix of a graph?
A. It is a symmetric matrix
B. It is a bit matrix
C. Diagonal has all zeroes
D. All of the above
➢ **Ans: D. All of the above**

78. While concatenating two strings of size m and n, the resultant string will be of size?
A. greater then m + n
B. less than m + n
C. m + n *mn
D. max(m, n)
➢ **Ans: B. less than m + n**

79. To locate an instance of a String of length l, in another string of length m, the Kunth – Morrues – Prattalgorithm's time is proportional to (at worst case)
A. m + l B. m -2
C. l+m D. m * l
➢ **Ans: A. m + l**

80. Which of the following string operation is not available in C?
A. Concatenation
B. Pattern Matching
C. Reversing the string
D. None of the above
➢ **Ans: C. Reversing the string**

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ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) can be define as "the study and design of intelligent agents" where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success. AI is also defined as the science and engineering of making intelligent machines."

Artificial Intelligence (AI) is the area of computer science focusing on creating machines that can engage on behaviors that humans consider intelligent.

Neural Networks

A neural network is an interconnected group of nodes, akin to the vast network of neurons in the human brains.

Hierarchical temporal memory

Hierarchical temporal memory is an approach that models some of the structural and algorithmic properties of the neocortex.

What is Intelligence?

Human behaviour can be intelligent .Mainstream thinking in psychology regards human intelligence not as a single ability or cognitive process but rather as an array of separate components.

Research in AI has focused primarily on the following mechanism of intelligence: Learning, reasoning, problem-solving, perception, and language-understanding.

Learning

Learning is distinguished into a number of different forms. The simplest is learning by trial-and-error. For example, a simple program for solving mate-in-one chess problems might try out moves at random until one is found that achieves mate. The program remembers the successful move and next time the computer is given the same problem it is able to produce the answer straight away. The simple memorizing of individual items solutions to problems, words of vocabulary, etc. is known as rote learning.

Generalization

Rote learning is relatively easy to implement on a computer. More challenging is the problem of implementing what is called generalization. Learning that engages generalization leaves the learner able to perform better in situations not previously encountered. Sophisticated modern techniques enable programs to generalize complex rules from data.

Reasoning

To reason is to draw inferences appropriate to the situation in hand. Inferences are classified as either deductive or inductive. There has been considerable success in programming computers to draw inferences, especially deductive inferences. However, a program cannot be said to reason simply in virtue of being able to draw inferences. Reasoning involves drawing inferences that are relevant to the task or situation in hand. One of the hardest problems confronting AI is that of giving computers the ability to distinguish the relevant from the irrelevant.

Problem-solving

Problems have the general form: given such-and-such data, find x. A huge variety of types of problem is addressed in AI. Some examples are: finding winning moves in board games; identifying people from their photographs; and planning series of movements that enable a robot to carry out a given task.

Problem-solving methods divide into:

Special-purpose

A special-purpose method is tailor-made for a particular problem, and often exploits very specific features of the situation in which the problem is embedded. A general-purpose method is applicable to a wide range of different problems:

General-purpose

One general-purpose technique used in AI is means-end analysis, which involves the step-by-step reduction of the difference between the current state and the goal state. The program selects actions from a list of means which in the case of, say, a simple robot, might consist of pickup, putdown, move forward, move back, move left, and move right until the current state is transformed into the goal state.

Perception

In perception the environment is scanned by means of various sense-organs, real or artificial, and processes internal to the perceiver analyse the scene into objects and their features and relationships. Analysis is complex by the fact that one and the same object may present many different appearances on different occasions, depending on the angle from which it is viewed, whether or not parts of it are projecting shadows, and so forth.

Language-understanding

A language is a system of signs having meaning by convention. Traffic signs, for example, form a mini-language, it being a matter of convention that, for

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example, the hazard-ahead sign means hazard ahead. This meaning-by-convention that is distinctive of language is very different from what is called natural meaning, exemplified in statements like 'Those clouds mean rain' and 'The fall in pressure means the valve is malfunctioning'.

An important characteristic of full-fledged human languages, such as English, which distinguishes them from, e.g. bird calls and systems of traffic signs, is their productivity. A productive language is one that is rich enough to enable an unlimited number of different sentences to be formulated within it.

It is relatively easy to write computer programs that are able, in severely restricted contexts, to respond in English, seemingly fluently, to questions and statements. What, then, is involved in genuine understanding, if a computer that uses language indistinguishably from a native human speaker does not necessarily understand? There is no universally agreed answer to this difficult question. According to one theory, whether or not one understands depends not only upon one's behaviour but also upon one's history: in order to be said to understand one must have learned the language and have been trained to take one's place in the linguistic community by means of interaction with other language-users.

Automatic Programming:
The task of describing what a program should do and having the AI system 'write' the program.

Bayesian Networks:
A technique of structuring and inference with probabilistic information.

Natural Language Processing (NLP):
Processing and (perhaps) understanding human ("natural") language.

Knowledge Engineering/Representation:
Turning what we know about a particular domain into a form in which a computer can understand it.

Planning:
Given a set of actions, a goal state, and a present state, decides which actions must be taken so that the present state is turned into the goal state.

Constraint Satisfaction:
Solving NP-complete problems, using a variety of techniques.

Machine Learning:
Programs that learn from experience.

Visual Pattern Recognition:
The ability to reproduce the human sense of sight on a machine.

Speech Recognition:
Conversion of speech into text.

Search:
The finding of a path from a start state to a goal state.

Neural Networks (NN):
The study of programs that function in a manner similar to how animal brains do.

LISP:
For many years, AI was done as research in universities and laboratories, thus fast prototyping was favored over fast execution. This is one reason why AI has favored high-level languages such as Lisp. This tradition means that current AI Lisp programmers can draw on many resources from the community. Features of the language that are good for AI programming include:

- **Garbage collection**
- **Dynamic typing**
- **Functions as data**
- **Uniform syntax**
- **Interactive environment**
- **Extensibility**

PROLOG:
This language wins 'cool idea' competition. It wasn't until the 70s that people began to become conscious that a set of logical statements plus a general theorem prover could make up a program. Prolog combines the high-level and tradition advantages of Lisp with a built-in unifier, which is particularly useful in AI. Prolog seems to be good for problems in which logic is intimately involved, or whose solutions have a succinct logical characterization.

Machine Learning:
A field of AI concerned with programs that learn. It includes Reinforcement Learning and Neural Networks among many other fields.

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Mini Max:
An algorithm for game playing in games with perfect information.

Modus Ponens:
An inference rule that says: if you know x and you know that 'If x is true then y is true' then you can conclude y.

Nonlinear Planning:
A planning paradigm which does not enforce a total (linear) ordering on the components of a plan.

Partial Order Planner:
A planner that only orders steps that need to be ordered and leaves unordered any steps that can be done in any order.

Planning:
A field of AI concerned with systems that construct sequences of actions to achieve goals in real-world-like environments.

Problem Space (also State Space):
The formulation of an AI problem into states and operators. There is usually a start state and a goal state. The problem space is searched to find a solution.

Search:
The finding of a path from a start state to a goal state.

Unification:
The process of finding a substitution (an assignment of constants and variables to variables) that makes two logical statements look the same.

The process of ... uses measureable inputs and produces output that can be used to make decisions about the real world.

Verification:
The process of confirming that an implemented model works as intended.

Fuzzy expert systems are the most common use of fuzzy logic. They are used in several wide-ranging fields, including:

- Linear and Nonlinear Control
- Pattern Recognition
- Financial Systems
- Operation Research
- Data Analysis

Logical AI:
What a program knows about the world in general the facts of the specific situation in which it must act, and its goals are all represented by sentences of some mathematical logical language. The program decides what to do by inferring that certain actions are appropriate for achieving its goals.

Search:
AI programs often examine large numbers of possibilities, e.g. moves in a chess game or inferences by a theorem proving program. Discoveries are continually made about how to do this more efficiently in various domains.

Pattern recognition:
When a program makes observations of some kind, it is often programmed to compare what it sees with a pattern. For example, a vision program may try to match a pattern of eyes and a nose in a scene in order to find a face. More complex patterns, e.g. in a natural language text, in a chess position, or in the history of some event are also studied. These more complex patterns require quite different methods than do the simple patterns that have been studied the most.

Representation:
Facts about the world have to be represented in some way. Usually languages of mathematical logic are used.

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Common sense knowledge and reasoning:

This is the area in which AI is farthest from human-level, in spite of the fact that it has been an active research. While there has been considerable progress, e.g. in developing systems of non-monotonic reasoning and theories of action, yet more new ideas are needed.

Learning from experience:

The approaches to AI based on connectionism and neural nets specialize in that. There is also learning of laws expressed in logic. Programs can only learn what facts or behaviors their formalisms can represent, and unfortunately learning systems are almost all based on very limited abilities to represent information.

Planning:

Planning programs start with general facts about the world (especially facts about the effects of actions), facts about the particular situation and a statement of a goal. From these, they generate a strategy for achieving the goal. In the most common cases, the strategy is just a sequence of actions.

Epistemology:

This is a study of the kinds of knowledge that are required for solving problems in the world.

Ontology:

Ontology is the study of the kinds of things that exist. In AI, the programs and sentences deal with various kinds of objects, and we study what these kinds are and what their basic properties are.

Heuristics:

A heuristic is a way of trying to discover something or an idea imbedded in a program. The term is used variously in AI. Heuristic functions are used in some approaches to search to measure how far a node in a search tree seems to be from a goal.

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Genetic programming:

Genetic programming is a technique for getting programs to solve a task by mating random Lisp programs and selecting fittest in millions of enerations.

Genetic Programming:

One of the central challenges of computer science is to get a computer to do what needs to be done, without telling it how to do it. Genetic programming addresses this challenge by providing a method for automatically creating a working computer program from a high-level problem statement of the problem.

Genetic programming achieves this goal of automatic programming by genetically breeding a population of computer programs using the principles of Darwinian natural selection and biologically inspired operations. Genetic programming is a domain-independent method that genetically breeds a population of computer programs to solve a problem.

Preparatory Steps of Genetic Programming:

The human user communicates the high-level statement of the problem to the genetic programming system by performing certain well-defined preparatory steps.

The five major steps for the basic version of genetic programming need the human user to state:

(1) The set of terminals for each branch of the to-be-evolved program,
(2) The set of primitive functions for each branch of the to-be-evolved program,
(3) The fitness measure.
(4) Certain parameters for controlling the run.
(5) The termination criterion and method for designating the result of the run.

Execution Steps of Genetic Programming:

Genetic programming typically starts with a population of randomly generated computer programs composed of the available programmatic ingredients. Genetic programming iteratively transforms a population of computer programs into a new generation of the population by applying analogs of naturally occurring genetic operations. These operations are applied to individual(s) selected from the population. The individuals are probabilistically selected to

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The execution steps of genetic are as follows:

(1) Randomly create an initial population (generation 0) of individual computer programs composed of the available functions and terminals.

(2) Iteratively perform the following sub-steps on the population until the termination criterion is satisfied:

A. Execute each program in the population and ascertain its fitness using the problem's fitness measure.

B. Select one or two individual program(s) from the population with a probability based on fitness to participate in the genetic operations in C..

C. Create new individual program(s) for the population by applying the following genetic operations with specified probabilities:

(i) **Reproduction:** Copy the selected individual program to the new population.

(ii) **Crossover:** Create new offspring program(s) for the new population by recombining randomly chosen parts from two selected programs.

(iii) **Mutation:** Create one new offspring program for the new population by randomly mutating a randomly chosen part of one selected program.

(iv) **Architecture-altering operations:** Choose an architecture-altering operation from the available repertoire of such operations and create one new offspring program for the new population by applying the chosen architecture-altering operation to one selected program.

(3) After the termination criterion is satisfied, the single best program in the population produced during the run is harvested and designated as the result of the run. If the run is successful, the result may be a solution to the problem.

1. Which of the following term is used to explain the hypercritical part of problem solving?
   A. Logical
   B. Intelligent agent base
   C. Heuristic
   D. None of the above
   ➤ **Ans: C. Heuristic**

2. What stage of the developing process has been explained as "the mapping of function onto form"?
   A. Logical
   B. Intelligent agent base
   C. Heuristic
   D. None of the above
   ➤ **Ans: C. Heuristic**

3. Which kind of planning consists of successive demonstration of different levels of a plan?
   A. Hierarchical planning
   B. Non-hierarchical planning
   C. Initial planning
   D. None of the above
   ➤ **Ans: A. Hierarchical planning**

4. What was at first called the "simulation game" by its creator?
   A. Imitation game
   B. Vision control game
   C. The Turing Test
   D. None of the above
   ➤ **Ans: C. The Turing Test**

5. Decision support programs are planned to assist managers to build
   A. Financial plan decision
   B. Secretarial control decision
   C. Business decisions
   D. All of the above
   ➤ **Ans: C. Business decisions**

6. Mamdani's method was among the
   A. Control systems
   B. Expert systems
   C. Decision support systems
   D. Management information system
   ➤ **Ans: A. Control systems**

7. To program a robot by physically moving it through the route you want it to follow is called
   A. Dynamic path control
   B. Static-path control
   C. Continuous-path control
   D. Pick-and-place control
   ➤ **Ans: C. Continuous-path control**

8. To invoke the LISP system, a user must enter
   A. AI
   B. LISP
   C. CLSI
   D. None of the above
   ➤ **Ans: B. LISP**

9. DEC advertises that it helped to create "the world's first expert system routinely used in an industrial environment," called
   A. PDP-11 B. Rl
   C. CDP-81 D. SEGNOM
   ➤ **Ans: B. Rl**

10. Arlier to the invention of time sharing, the common method of computer access was
    A. Remote login access
    B. Batch processing
    C. Single user system
    D. All of the above
    ➤ **Ans: B. Batch processing**

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11. Alain Colmerauer developed very first AI programming language. It was developed in
A. 1970 at the University of California
B. 1971 at the University of Manchester
C. 1972 at the University of Marseilles
D. 1973 at the University of Frankfurt
➢ **Ans: C. 1972 at the University of Marseilles**

12. Seymour Papert of the MIT AI lab shaped a programming atmosphere for children called
A. BASIC B. LOGO
C. MYCIN D. FORTRAN
➢ **Ans: B. LOGO**

13. The Strategic Computing Program is a project of the
A. Bell laboratory
B. International Business Machine
C. Defense Advance Research Project Agency
D. National Science Foundation
➢ **Ans: C. Defense Advance Research Project Agency**

14. The original LISP machines produced by both LMI and Symbolic were based on research performed at
A. University of Bonn
B. MIT
C. Stanford University
D. University of California
➢ **Ans: B. MIT**

15. In LISP, the addition 3 + 2 is entered as
A. 3 + 2 B. 3 add 2
C. 3 + 2 = D. (+ 3 2)
➢ **Ans: D. (+ 3 2)**

16. Weak Artificial Intelligence can be defined as
A. The personification of human intellectual ability within a computer.
B. A set of computer programs which generate output that would be measured to reflect intelligence if it were generated by humans.
C. The study of mental faculties through the use of mental models implemented on a computer.
D. The study of the intelligent agent by which a compute r display result.
➢ **Ans: C. The study of mental faculties through the use of mental models implemented on a computer.**

17. In LISP, the function assigns the symbol x to y is defined as follows?
A. (setq y= x)
B. (set y = 'x')
C. (setq x = 'y')
D. (setq y 'x')
➢ **Ans: D. (setq y 'x')**

18. In LISP, the function returns t if <object> is a CONS cell and nil otherwise
A. (cons <object>)
B. (consp<object>)
C. (eq<object>)
D. None of the above
➢ **Ans: B. (consp<object>)**

19. In a rule-based system, procedural domain knowledge is in the shape of
A. Production rules
B. Inference rule
C. Meta-rules
D. None of the above
➢ **Ans: A. Production rules**

20. If a robot can alter its own route in rejoinder to external conditions, it is considered as
A. Intelligent robot
B. External robot
C. Mobile robot
D. Static robot
➢ **Ans: A. Intelligent robot**

21. One of the leading American robotics centers is the Robotics Institute is located at
A. CMU
B. University of Hawaii
C. University of Washington
D. University of California
➢ **Ans: A. CMU**

22. In LISP, the function returns the first element of a list is
A. Set B. Car
C. First D. Second
➢ **Ans: B. Car**

23. Nils Nilsson led a team at SRI who produced a mobile robot
A. Robotics B. Turing
C. Shakey D. Simon
➢ **Ans: C. Shakey**

24. An AI technique that permit computers to understand associations and relationships between objects and events is called
A. Heuristic processing
B. Cognitive science
C. Relative symbolism
D. Pattern matching
➢ **Ans: D. Pattern matching**

25. The new organization established to implement the Fifth Generation Project is called:
A. ICOT (Institute for New Generation Computer Technology)
B. ISO(International Organization for Standardization)
C. ITU (International Telecommunication Union)
D. SCP (Strategic Computing Program)
➢ **Ans: A. ICOT (Institute for New Generation Computer Technology)**

26. The field that look into the technicalities of human intelligence is called
A. Social science
B. Cognitive science
C. Human computer interaction
D. None of the above
➢ **Ans: B. Cognitive science**

27. A problem is first connected to its planned solution during the
A. Initial state
B. Formalization state
C. Connection state
D. Identification state
➢ **Ans: B. Formalization state**

28. Identify name of the computer program which simulates the thought procedure of human beings?
A. Human logic
B. Expert reason
C. Expert system
D. Expert solution
➢ **Ans: C. Expert system**

29. Identify name of the computer program that contains the distill knowledge of an expert?
A. Data base management system

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B. Management information System
C. Expert system
D. Artificial intelligence
➢ **Ans: C. Expert system**

30. Claude Shannon explain the operation of electronic switching circuits with a system of mathematical logic
A. LISP
B. Algebra
C. Boolean algebra
D. Natural language processing
➢ **Ans: C. Boolean algebra**

31. A computer program that have expertise in a particular domain is called an
A. Intelligent agent
B. Automatic processor
C. Expert system
D. Operational symbolize
➢ **Ans: C. Expert system**

32. The reason of ambiguity may be
A. Syntactic ambiguity
B. Multiple word meanings
C. Unclear antecedents
D. All of the above
➢ **Ans: D. All of the above**

33. Which of the following organization offers the LISP machine considered to be "the most powerful symbolic processor available"?
A. Microsoft B. Symbolics
C. Xerox D. IBM
➢ **Ans: B. Symbolics**

34. Identify the essential event in the history of Artificial Intelligence.
A. 1949, Donald O, The organization of Behavior.
B. 1950, Computing Machinery and Intelligence.
C. 1956, Dartmouth University Conference Organized by John McCarthy
D. 1961, Computer and Computer Sense.
➢ **Ans: C. 1956, Dartmouth University Conference Organized by John McCarthy**

35. Natural language processing is divided into the two categories
A. Symbolic and narrative
B. Boolean algebra and decision making
C. Numerical and heuristic
D. Understanding and generation
➢ **Ans: D. Understanding and generation**

36. High-resolution, bit-mapped display are helpful to show
A. Clearer characters
B. Graphics
C. More characters
D. All of the above
➢ **Ans: D. All of the above**

37. A bidirectional feedback loop links computer modeling with
A. Artificial science
B. Heuristic processing
C. Human intelligence
D. Cognitive science
➢ **Ans: D. Cognitive science**

38. Identify the abilities which human being perform better than computers?
A. Recognizing relative importance
B. Finding similarities
C. Resolving ambiguity
D. All of the above
➢ **Ans: D. All of the above**