

1. Computer Engineering

10.03.2019 FN 9.30-11.30 AM

1. A model which is used to understand the design of a data structure to indicate an implementation-independent view of the data structure is:
 - (a) Linear data type
 - (b) Non- linear data type
 - (c) Abstract data type
 - (d) Primitive data type

2. Which one of the following search algorithms cannot be applied to a sorted linked list?
 - (a) Sequential search algorithm
 - (b) Iterative search algorithm
 - (c) Recursive search algorithm
 - (d) Binary search algorithm

3. In a queue an element can be added arbitrarily and from which only either the smallest or largest element can be removed, the type of the queue is:
 - (a) Circular queue
 - (b) Priority queue
 - (c) Deques
 - (d) Ordinary queue

4. Postfix notation is also known as:
 - (a) Reverse polish notation
 - (b) Polish notation
 - (c) Infix notation
 - (d) Reverse notation

5. Which one of the following structure is *not* used for storing strings?
 - (a) Fixed-length- structures
 - (b) Variable-length- structure with fixed maximums
 - (c) Variable-length- structure with fixed minimums
 - (d) Linked- structures

6. What is the throughput, if Bus clock is 8.33 MHz , 32 bit-data wide (parallel), synchronous mode?
 - (a) 269 MBps
 - (b) 267 MBps
 - (c) 33 MBps
 - (d) 31 MBps

7. Few addressing modes, fixed instruction size and use more registers for separate memory operations are the features of:
 - (a) *CISC*
 - (b) *RISC*
 - (c) *RAID*
 - (d) *DMA*

8. A block set-associative cache consists of a total of 64 *blocks* divided into *four-block* sets. The main memory contains 4096 *blocks*, each consisting of 128 *words*. The number of bits in main memory address will be:
- (a) 17 *bits*
 - (b) 18 *bits*
 - (c) 19 *bits*
 - (d) 20 *bits*
9. If the average page-fault service time of 20 *ms*, a *MAT* of 80 *ns* and the probability of a page fault is 10 %. An effective access time will be:
- (a) 2,000,672 *ns*
 - (b) 2,000,072 *ns*
 - (c) 2,000,036 *ns*
 - (d) 2,000,006 *ns*
10. For a bus frequency of 100 *MHz* and with data being transferred at 64 *bits* at a time. The *DDR SDRAM* gives a transfer rate of:
- (a) 800 *MB/S*
 - (b) 1600 *MB/S*
 - (c) 3200 *MB/S*
 - (d) 6400 *MB/S*

11. A computer company wants to hire 25 programmers to handle systems programming jobs and 40 programmers for applications programming. Of those hired, 10 will be expected to perform jobs of both types, the number of programmers hired must be:
- (a) 40
 - (b) 45
 - (c) 50
 - (d) 55
12. A Hamming code can correct all combinations of k or fewer errors if and only if the minimum distance between any two code words is at least:
- (a) $k + 1$
 - (b) $k - 1$
 - (c) $2k + 1$
 - (d) $2k - 1$
13. If the time is now 4 o'clock, the time 101 hours from now will be:
- (a) 8 o'clock
 - (b) 9 o'clock
 - (c) 10 o'clock
 - (d) 11 o'clock

14. A statement that can be either true or false, depending on the truth values of its propositional variables is called:
- (a) Contradiction
 - (b) Tautology
 - (c) Absurdity
 - (d) Contingency
15. Which one of the following algorithms is designed by Ford and Fulkerson?
- (a) The labeling algorithm
 - (b) The matching algorithm
 - (c) The line drawing algorithm
 - (d) The edge detection algorithm
16. In Object-Oriented Programming using C++, static variable is also known as:
- (a) Object variable
 - (b) Class variable
 - (c) Stored variable
 - (d) Global variable

17. Which one of the following types of class is *not* used to create objects?
- (a) Anonymous class
 - (b) Nested class
 - (c) Base class
 - (d) Abstract class
18. The function call **A.max()** will set the pointer *this* to the:
- (a) Contents of the object *A*
 - (b) Address of the object *A*
 - (c) Address of the function *max*
 - (d) Address of the first argument of function *max*
19. A class which can inherit the attributes of two or more classes is called:
- (a) Hierarchical Inheritance
 - (b) Multilevel Inheritance
 - (c) Multiple Inheritance
 - (d) Hybrid Inheritance
20. Which one of the following statements is true with respect to Virtual Functions?
- (a) These cannot be static members
 - (b) They cannot be friend of another class
 - (c) They cannot be accessed by using object pointers
 - (d) One can have virtual constructors, but cannot have virtual destructors

21. In a depth-first search of an undirected graph G , every edge of G is:
- (a) Either a tree edge or a back edge
 - (b) Either a forward edge or a cross edge
 - (c) Either a left edge or a right edge
 - (d) Either a front edge or a parallel edge
22. The time required to perform a sequence of data structure operations is averaged over all the operations performed is called:
- (a) Average case analysis
 - (b) Amortized analysis
 - (c) Performance analysis
 - (d) Best case analysis
23. Which algorithm solves the single-source shortest-paths problem in the general case in which edge weights may be negative?
- (a) Dijkstra algorithm
 - (b) Bellman-Ford algorithm
 - (c) Ford-Fulkerson algorithm
 - (d) Prim algorithm

24. Which of the following statements are correct regarding asymptotic notation?

1. O -notation provides an asymptotic upper bound on a function
2. Ω - notation provides an asymptotic lower bound on a function
3. θ - notation provides an asymptotic lower bound on a function

- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

25. What is the asymptotic bound for the following recurrence using master theorem method?

$$T(n) = 9T\left(\frac{n}{3}\right) + n$$

- (a) $T(n) = \Theta(n)$
- (b) $T(n) = \Theta(n^2)$
- (c) $T(n) = \Theta(n \lg n)$
- (d) $T(n) = \Theta(\lg n)$

26. The primary determinant in selecting activities in each iteration of the spiral model of software development is:

- (a) Cost
- (b) Iteration size
- (c) Constraints
- (d) Risk

27. Which one of the following testing is essentially a set of path test performed to examine the many different paths through the modules?
- (a) Integration testing
 - (b) Unit testing
 - (c) Function testing
 - (d) System testing
28. An approach which is very simple in its philosophy where basically all the modules are constructed and tested independently of each other and when they are finished, they are all put together at same time is:
- (a) Top-Down strategy
 - (b) Bottom-Up strategy
 - (c) Big-Bang strategy
 - (d) Breadth-First strategy
29. Capability maturity model in software engineering is a technique which is used to improve the:
- (a) Testing
 - (b) Understanding of the software
 - (c) Software process
 - (d) Prototype model

30. A model which enables the developer to apply the prototyping at any stage in evolution of the product and which addresses the risks associated with software development is:
- (a) Spiral model
 - (b) Prototype model
 - (c) Water fall model
 - (d) V-shape model
31. The performance of the network is often evaluated by which of the following two networking metrics?
- (a) Speedup and accuracy
 - (b) Throughput and delay
 - (c) Speedup and delay
 - (d) Throughput and accuracy
32. A sine wave is offset $\frac{1}{6}$ cycle with respect to time 0. Its phase will be nearly:
- (a) 1.05 *rad*
 - (b) 0.79 *rad*
 - (c) 0.52 *rad*
 - (d) 0.26 *rad*

33. If a periodic signal is decomposed into 5 sine waves with frequencies of 100 Hz, 300 Hz, 500 Hz, 700 Hz and 900 Hz, its bandwidth will be:
- (a) 800 Hz
 - (b) 700 Hz
 - (c) 600 Hz
 - (d) 500 Hz
34. A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. The throughput of this network will be:
- (a) 2 Mbps
 - (b) 4 Mbps
 - (c) 6 Mbps
 - (d) 8 Mbps
35. Assume the distance between the sender and the receiver is 12,000 km, the bandwidth of the network is 1 Mbps and that light travels at 2.4×10^8 m/s. The propagation time and the transmission time to transmit 5-MB message (an image), will be respectively:
- (a) 40 ms and 30 s
 - (b) 50 ms and 30 s
 - (c) 40 ms and 40 s
 - (d) 50 ms and 40 s

36. What is *MTTF* in redundancy for data storage in disks?
- (a) Middle-time-training-failure
 - (b) Mean-time-to-failure
 - (c) Mean-time-training-failure
 - (d) Middle-training -to-failure
37. The advantage of using *DBMS* is that it offers data independence which is achieved through:
- (a) Data abstraction
 - (b) Exceptional handling
 - (c) Data hiding
 - (d) Transaction
38. A weak entity can be identified only by considering some of its attributes in conjunction with the:
- (a) Total participation
 - (b) Primary key of another entity
 - (c) Independent entity
 - (d) All the attributes of the strong entity

39. Which of the following are the limitations for creating, using and managing decision-support system in a database management system?
1. Lack of analytical sophistication
 2. Database layout limitations
 3. Inability to handle or process large amounts of data
- (a) 1 and 2 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3
40. The method of accessing the data which uses the search key value transformation to support the efficient retrieval of data entries is known as:
- (a) Hash-based indexing
- (b) Sequential indexing
- (c) Random indexing
- (d) Direct indexing
41. A language L is accepted by some ϵ -NFA if and only if L is accepted by some:
- (a) NFA
- (b) DFA
- (c) FSM
- (d) PDA

42. If L is a context free language and R is a regular language, then $L \cap R$ is a:
- (a) Regular language
 - (b) Non-regular language
 - (c) Context sensible language
 - (d) Context free language
43. A finite automaton **cannot** be in more than one state at any one time is called:
- (a) *FSM*
 - (b) Deterministic Finite Automaton
 - (c) Non-deterministic Finite Automaton
 - (d) Regular language
44. If $A = (Q, \Sigma, \delta, q_0, F)$ is an *NFA*, the language of an *NFA* will be:
- (a) $L(A) = \{\omega \mid \hat{\delta}(q_0, \omega) \cap F \neq \emptyset\}$
 - (b) $L(A) = \{\omega \mid \hat{\delta}(q_0, \omega) \cap F = \emptyset\}$
 - (c) $L(A) = \{\omega \mid \hat{\delta}(q_0, \omega) \cup F = \emptyset\}$
 - (d) $L(A) = \{\omega \mid \hat{\delta}(q_0, \omega) \cup F \neq \emptyset\}$
45. Which one of the following languages are described by Finite Automata?
- (a) Regular language
 - (b) Content sensitive language
 - (c) Content-free language
 - (d) Recursive language

46. In order to describe an algorithm for searching an *AND-OR* graph, we need to exploit a value called:
- (a) Modality
 - (b) Mobility
 - (c) Futility
 - (d) Quality
47. Most commonly used language for Artificial Intelligence programming is:
- (a) *C*
 - (b) *C + +*
 - (c) *LISP*
 - (d) *PASCAL*
48. The process of writing programs that can themselves produce formal descriptions from informal ones is:
- (a) Optimization
 - (b) Feasibility
 - (c) Coding
 - (d) Operationalization
49. How well a model trained on the training set predicts the right output for new instances is called:
- (a) Specialization
 - (b) Generalization
 - (c) Modularization
 - (d) Optimization

50. In polynomial interpolation, given N points, we find the $(N - 1)$ th degree polynomial that is used to predict the output for any X which is outside of the range of X^t in the training set is called:
- (a) Extrapolation
 - (b) Interpolation
 - (c) Polynomial evaluation
 - (d) Friction
51. The ability to access the capabilities over the network through standard mechanisms that promote use by heterogeneous thin or thick client platform is:
- (a) On demand service
 - (b) Rapid elasticity
 - (c) Ubiquitous Network Access
 - (d) Location Independent Resource Pooling
52. A grouping of services or service components that have specific delivery commitments and roles identified with the customer is:
- (a) Service Level Agreements
 - (b) Service Level Management
 - (c) Service Level Management Objective
 - (d) Services Portfolio

53. The period of time within which systems, applications or functions must be recovered after an outage is:
- (a) Mean Time to Recover
 - (b) Recovery Time Objective
 - (c) Recovery Point Objective
 - (d) Mean Time Return Failure
54. The chargeback scheme where the *IT* costs are defined in measurable events, transactions and functions that are relevant to the business and outside the *IT* organization is:
- (a) Resource or usage based
 - (b) Allocation based
 - (c) Activity based costing
 - (d) Product or service based
55. The use of distributed computing facilities for application requiring large computing power over a long period of time is:
- (a) High-Performance Computing
 - (b) High-Throughput Computing
 - (c) Many Tasks Computing
 - (d) Distributed Computing

56. A small change in either the plaintext or the key producing a significant change in the ciphertext is called:
- (a) Feistel effect
 - (b) Claude Shannon effect
 - (c) Bit independence effect
 - (d) Avalanche effect
57. Finding an effective linear equation between plaintext, ciphertext and the key that holds with probability $p \neq 0.5$ is the objective of:
- (a) Differential Cryptanalysis
 - (b) Linear Cryptanalysis
 - (c) Brute-Force Attack
 - (d) Feistel Analysis
58. During the design of S -boxes used in various cryptographic algorithms, if for a 1-bit input change, at least π output bits change, then it satisfies:
- (a) Strict avalanche criterion
 - (b) Bit independence criterion
 - (c) Permutation criterion
 - (d) Guaranteed avalanche criterion

59. The block cipher mode of operation used for encryption of stream-oriented transmission over noisy channel is:
- (a) Electronic Codebook
 - (b) Output Feedback
 - (c) Cipher Feedback
 - (d) Cipher Block Chaining
60. A popular approach to generating a secure pseudorandom number is known as:
- (a) Pseudorandom Number Generator (*PRNG*)
 - (b) Linear Congruential Generator (*LCG*)
 - (c) True Random Number Generator (*TRNG*)
 - (d) Blum, Blum, Shub Generator (*BBS*)
61. The effective and well established technique to catch inconsistency in programs is called:
- (a) Type checking
 - (b) Error checking
 - (c) Type casting
 - (d) Bounds checking
62. The category of software maintenance which fixes errors in the original system design and implementation is:
- (a) Perfective maintenance
 - (b) Adaptive maintenance
 - (c) Corrective maintenance
 - (d) Software maintenance

63. Which one of the following techniques can be used for implementing different type of Virtual memory?
- (a) Segmentation
 - (b) Fragmentation
 - (c) Reassembly
 - (d) Reallocation
64. Which one of the following register is updated during instruction execution to point to the next instruction byte to be fetched?
- (a) Stack pointer
 - (b) Frame pointer
 - (c) Program counter
 - (d) Argument pointer
65. A policy that only allows a decision to be made when we execute the program is said to be:
- (a) Static policy
 - (b) Dynamic policy
 - (c) Constant policy
 - (d) Random policy

66. A general solution for the machine with many completely independent address spaces which can grow or shrink independently, without affecting each other?
- (a) Paging
 - (b) Segmentation
 - (c) Framing
 - (d) Spooling
67. The purpose of the system call *KILL* used in signal handling is to:
- (a) Send signal to another process
 - (b) Change set of blocked signals, then pause
 - (c) Examine set of blocked signals
 - (d) Clean up after signal handler
68. The most common technique used to reduce the disk accesses in a file system is known as:
- (a) Buffer cache
 - (b) Long-structured file system
 - (c) *LFS*-cleaner
 - (d) Write-through caches

69. If the time to transfer a block from the controller to memory over the bus is longer than the time to read a block from the disk, it may be necessary to read one block and then skip two or more blocks is called:
- (a) Spooling
 - (b) Interleaving
 - (c) Interlinking
 - (d) Data hiding
70. If the process size is s bytes and the page size is p bytes and assuming that each page entry requires e bytes, then the optimum page size is given by:
- (a) $p = \sqrt{2se}$
 - (b) $p = \frac{1}{2}\sqrt{2se}$
 - (c) $p = \sqrt{se}$
 - (d) $p = \sqrt{\frac{2s}{e}}$
71. Which one of the following supports basic OLAP operations, including slice-and-dice, drill-down, roll-up and pivoting?
- (a) Information processing
 - (b) Analytical processing
 - (c) Transaction processing
 - (d) Data mining

72. Which one of the following systems is customer-oriented and is used for transaction and query processing by Clerks, Clients and *IT* professionals?
- (a) *OLAP*
 - (b) *OLTP*
 - (c) *ROLAP*
 - (d) *HOLAP*
73. In the discretization technique, if the discretization process uses class information then it is:
- (a) Top-down discretization
 - (b) Bottom-up discretization
 - (c) Supervised discretization
 - (d) Un-supervised discretization
74. In which one of the following data transformations the low-level or primitive (raw) data are replaced by higher-level concepts through the use of concept hierarchies?
- (a) Smoothing
 - (b) Aggregation
 - (c) Normalization
 - (d) Generalization

75. The database which is partitioned across multiple disks and parallel processing occurs within a specific task that is performed concurrently on different processors against different sets of data, is:
- (a) Vertical parallelism
 - (b) Horizontal parallelism
 - (c) Inter-query parallelism
 - (d) Intra-query parallelism
76. In a distributed transaction processing system, a transaction should satisfy the properties of:
- (a) *RPC*
 - (b) *ACID*
 - (c) Nested transactions
 - (d) *MOM*(Message Oriented Middleware)
77. The distributed systems containing devices which are often characterized by small, battery-powered, mobile, adopt to contextual changes, encourage ad hoc composition and recognize sharing are called:
- (a) Distributed Computing Systems
 - (b) Cloud Computing Systems
 - (c) Distributed Information Systems
 - (d) Distributed Pervasive Systems

78. Which one of the following architectural styles of distributed systems is based on publish/subscribe systems?
- (a) Event-based architectures
 - (b) Object-based architectures
 - (c) Data-centered architectures
 - (d) Layered architectures
79. In a decentralized distributed system architecture where the tables of distributed relational databases, are split column-wise and distributed across multiple machines, is called:
- (a) Horizontal distribution
 - (b) Overlay distribution
 - (c) Three-tiered distribution
 - (d) Vertical distribution
80. In a distributed system, the interface suitable for development work in high-performance server clusters and can handle more advanced features of buffering and synchronization is:
- (a) *RPC* (Remote Procedure Call)
 - (b) Berkeley Socket Interface
 - (c) *XTI* (Open Transport Interface)
 - (d) *MPI* (Message-Passing Interface)

81. A distributed service that allows distributed processes to coordinate with each other through a shared hierarchical name space of data registers is known as:
- (a) Oozie
 - (b) Mahout
 - (c) ZooKeeper
 - (d) Sqoop
82. Which one of the following filters is a space-efficient probabilistic data structure used to test whether an element is a member of a set or not?
- (a) Flajolet filter
 - (b) *DGIM* filter
 - (c) Bloom filter
 - (d) High Pass filter
83. In Big Data Analysis, an algorithm for finding the frequent itemsets which is effort-intensive both with space and time is:
- (a) Page Rank algorithm
 - (b) Trust Rank algorithm
 - (c) Apriori algorithm
 - (d) *SON* algorithm

84. A process of discovering the natural grouping(s) of a set of patterns, points, or objects based on a distance measure on that space is known as:
- (a) Classifying
 - (b) Searching
 - (c) Matching
 - (d) Clustering
85. An algorithm that divides the entire file of baskets into segments small enough so that all frequent itemsets for the segment can be found in main memory is:
- (a) *PCY* algorithm
 - (b) The *SON* algorithm
 - (c) The Toivonen's algorithm
 - (d) The Randomized algorithm
86. Which one of the following is *not* a type of Contexts in Context-aware Computing?
- (a) Structural Context
 - (b) Mechanical Context
 - (c) Temporal Context
 - (d) User Context

87. Which one of the following is *not* a cellular Architectural approach?
- (a) Cell Splitting
 - (b) Cell Breathing
 - (c) Cell Sectoring
 - (d) Reuse partitioning
88. Which of the following are Radio propagation mechanisms?
- 1. Reflection and transmission
 - 2. Scattering
 - 3. Diffraction
- (a) 1 and 2 only
 - (b) 1, 2 and 3
 - (c) 1 and 3 only
 - (d) 2 and 3 only
89. Which one of the following layers is *not* an Open System Interconnection (*OSI*) layer?
- (a) Data link layer
 - (b) Transport layer
 - (c) Presentation layer
 - (d) Direction layer

90. If the transmitter and receiver in a *WLAN* operating at 2.4 GHz are separated by a distance of 50 m , and the power transmitted by the transmitter is 10 dBm . The received power considering free-space propagation and Omni-directional antennas at both ends will be nearly:
- (a) -72 dBm
 - (b) -64 dBm
 - (c) -56 dBm
 - (d) -52 dBm
91. A *NETCONF* client that provides a command line interface for interacting with the Netopeer-server is:
- (a) Netopeer-manager
 - (b) Netopeer-configurator
 - (c) Netopeer-cli
 - (d) Netopeer-server
92. A protocol which handles sending e-mail and routing e-mail between mail servers is:
- (a) Internet Protocol
 - (b) Transport control Protocol
 - (c) Simple mail transfer Protocol
 - (d) Server control Protocol

93. A language which is used to model configuration and state data manipulated by the *NETCONF* protocol is:
- (a) Data Manipulation Language
 - (b) YANG data modeling language
 - (c) Shell Script Language
 - (d) Data Definition Language
94. A networking architecture that separates the control plane from the data plane and centralizes the network controller is known as:
- (a) Software-Defined Networking
 - (b) Network-Function Virtualization
 - (c) Machine-to-Network
 - (d) Centralized Network Controller
95. A template that allows separation of the presentation of data from the actual data by using placeholders and associated logic is:
- (a) Django template
 - (b) *URL* template
 - (c) Xively cloud template
 - (d) Form template

96. The time taken by the header of a message to travel between two directly-connected nodes in the network is called:
- (a) Startup time
 - (b) Per-hop time
 - (c) Per-word transfer time
 - (d) Word-transfer time
97. Which one of the following decomposition techniques is used to decompose problems whose underlying computations correspond to a search of a space for solutions?
- (a) Recursive decomposition
 - (b) Data decomposition
 - (c) Exploratory decomposition
 - (d) Speculative decomposition
98. In which parallel computer, the same instruction is executed synchronously by all processing units?
- (a) *SISD*
 - (b) *SIMD*
 - (c) *MISD*
 - (d) *MIMD*

99. The ratio of time taken by single processor system and that taken by a parallel processing system is called:
- (a) Efficiency
 - (b) Speed up
 - (c) Throughput
 - (d) Turnaround time
100. The hardware technique that detects and resolves hazards is called:
- (a) Interlock
 - (b) Intralock
 - (c) Halt
 - (d) Inter unlock