

1. The memory address of the first element of an array is called
 A. floor address B. foundation address C. first address **D. base address**

2. The memory address of fifth element of an array can be calculated by the formula
A. $LOC(Array[5]) = Base(Array) + w(5 - \text{lower bound})$, where w is the number of words per memory cell for the array
 B. $LOC(Array[5]) = Base(Array[5]) + (5 - \text{lower bound})$, where w is the number of words per memory cell for the array
 C. $LOC(Array[5]) = Base(Array[4]) + (5 - \text{Upper bound})$, where w is the number of words per memory cell for the array
 D. None of above

3. Which of the following data structures are indexed structures?
A. linear arrays B. linked lists C. both of above D. none of above

4. Which of the following is not the required condition for binary search algorithm?
 A. The list must be sorted
 B. there should be the direct access to the middle element in any sublist
C. There must be mechanism to delete and/or insert elements in list
 D. none of above

5. Which of the following is not a limitation of binary search algorithm?
 A. must use a sorted array
 B. requirement of sorted array is expensive when a lot of insertion and deletions are needed
 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 1000.

6. Two dimensional arrays are also called_____.
 A. tables arrays B. matrix arrays **C. both of above** D. none of above

7. A variable P is called pointer if
A. P contains the address of an element in DATA.
 B. P points to the address of first element in DATA
 C. P can store only memory addresses
 D. P contain the DATA and the address of DATA

8. Which of the following data structure can't store the non-homogeneous data elements?
A. Arrays B. Records C. Pointers D. None

9. Which of the following data structure store the homogeneous data elements?
 A. Arrays **B. Records** C. Pointers D. None

10. Each data item in a record may be a group item composed of sub-items; those items which are in decomposable are called
 A. elementary items B. atoms C. scalars **D. all of above**

11. The difference between linear array and a record is
 A. An array is suitable for homogeneous data but the 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 linear array does not
D. All of above

12. Which of the following statement is false?
 A. Arrays are dense lists and static data structure
 B. data elements in linked list need not be stored in adjacent space 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

13. Binary search algorithm can not be applied to

A. sorted linked list B. sorted binary trees C. sorted linear array D. pointer array

14. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called

A. underflow **B. overflow** C. houseful D. saturated

15. The situation when in a linked list $START=NULL$ is

A. underflow B. overflow C. houseful D. saturated

16. Which of the following is two way list?

A. grounded header list B. circular header list

C. linked list with header and trailer nodes **D. none of above**

17. Which of the following name does not relate to stacks?

A. FIFO lists B. LIFO list C. Piles D. Push-down lists

18. The term "push" and "pop" is related to the

A. array B. lists **C. stacks** D. all of above

19. A data structure where elements can be added or removed at either end but not in the middle

A. Linked lists B. Stacks C. Queues **D. Deque**

20. When in order traversing a tree resulted E A C K F H D B G; the preorder traversal would return

A. FAEKADBHG **B. FAEKCDHGB** C. EAFKHDCBG D. FEAKDCHBG

21. Which data structure allows deleting data elements from front and inserting at rear?

A. Stacks **B. Queues** C. Deques D. Binary search tree

22. 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

23. Which of the following data structure is non-linear type?

A. Strings B. Lists C. Stacks **D. None of above**

24. Which of the following data structure is linear type?

A. Strings B. Lists C. Queues **D. All of above**

25. To represent hierarchical relationship between elements, which data structure is suitable?

A. Deque B. Priority **C. Tree** D. All of above

26. 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

27. 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. $D_n = \log_2 n + 1$**

28. 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

29. A binary tree can easily be converted into a 2-tree
- by replacing each empty sub tree by a new internal node
 - by inserting an internal nodes for non-empty node
 - by inserting an external nodes for non-empty node
 - by replacing each empty sub tree by a new external node**
30. When converting binary tree into extended binary tree, all the original nodes in binary tree are
- internal nodes on extended tree**
 - external nodes on extended tree
 - vanished on extended tree
 - None of above
31. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
- ABFCDE
 - ADBFEC
 - ABDECF**
 - ABDCEF
32. Which of the following sorting algorithm is of divide-and-conquer type?
- Bubble sort
 - Insertion sort
 - Quick sort**
 - All of above
33. An algorithm that calls itself directly or indirectly is known as
- Sub algorithm
 - Recursion**
 - Polish notation
 - Traversal algorithm
34. 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
- Leaf
 - branch
 - path
 - thread**
35. The in order traversal of tree will yield a sorted listing of elements of tree in
- Binary trees
 - Binary search trees**
 - Heaps
 - None of above
36. In a Heap tree
- Values in a node is greater than every value in left sub tree and smaller than right sub tree
 - Values in a node is greater than every value in children of it**
 - Both of above conditions applies
 - None of above conditions applies
37. In a graph if $e=[u, v]$, Then u and v are called
- endpoints of e
 - adjacent nodes
 - neighbors
 - all of above**
38. A connected graph T without any cycles is called
- a tree graph
 - free tree
 - a tree
 - All of above**
39. In a graph if $e=(u, v)$ means
- u is adjacent to v but v is not adjacent to u
 - e begins at u and ends at v
 - u is processor and v is successor
 - both B and C**
40. If every node u in G is adjacent to every other node v in G, A graph is said to be
- isolated
 - complete**
 - finite
 - strongly connected
41. Two main measures for the efficiency of an algorithm are
- Processor and memory
 - Complexity and capacity
 - Time and space**
 - Data and space
42. The time factor when determining the efficiency of algorithm is measured by
- Counting microseconds
 - Counting the number of key operations**
 - Counting the number of statements
 - Counting the kilobytes of algorithm

43. The space factor when determining the efficiency of algorithm is measured by
A. Counting the maximum memory needed by the algorithm
B. Counting the minimum memory needed by the algorithm
C. Counting the average memory needed by the algorithm
D. Counting the maximum disk space needed by the algorithm
44. Which of the following case does not exist in complexity theory
A. Best case B. Worst case C. Average case **D. Null case**
45. The Worst case occur in linear search algorithm when
A. Item is somewhere in the middle of the array
B. Item is not in the array at all
C. Item is the last element in the array
D. Item is the last element in the array or is not there at all
46. The Average case occur in linear search algorithm
A. When item is somewhere in the middle of the array
B. When item is not in the array at all
C. When item is the last element in the array
D. When item is the last element in the array or is not there at all
47. The complexity of the average case of an algorithm is
A. Much more complicated to analyze than that of worst case
B. Much more simpler to analyze than that of worst case
C. Sometimes more complicated and some other times simpler than that of worst case
D. None or above
48. The complexity of linear search algorithm is
A. $O(n)$ B. $O(\log n)$ C. $O(n^2)$ D. $O(n \log n)$
49. The complexity of Binary search algorithm is
A. $O(n)$ **B. $O(\log)$** C. $O(n^2)$ D. $O(n \log n)$
50. The complexity of Bubble sort algorithm is
A. $O(n)$ B. $O(\log n)$ **C. $O(n^2)$** D. $O(n \log n)$
51. The complexity of merge sort algorithm is
A. $O(n)$ B. $O(\log n)$ C. $O(n^2)$ **D. $O(n \log n)$**
52. The indirect change 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. side-module update
53. Which of the following data structure is not linear data structure?
A. Arrays B. Linked lists C. Both of above **D. None of above**
54. On which principle does stack work?
A. FIFO B. FILO C. LILO D. Both A and C
55. The operation of processing each element in the list is known as
A. Sorting B. Merging C. Inserting **D. Traversal**
56. Finding the location of the element with a given value is:
A B C D

57. Arrays are best data structures

A. for relatively permanent collections of data

B. for the size of the structure and the data in the structure are constantly changing

C. for both of above situation

D. for none of above situation

58. Linked lists are best suited

A. for relatively permanent collections of data

B. for the size of the structure and the data in the structure are constantly changing

C. for both of above situation

D. for none of above situation

59. Each array declaration need not give, implicitly or explicitly, the information about

A. the name of array

B. the data type of array

C. the first data from the set to be stored

D. the index set of the array

60. The elements of an array are stored successively in memory cells because

A. by 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

61. Value of the first linked list index is _____

A. One **B. Zero** C. -1 D. None of these

62. A linked list index is ____ that represents the position of a node in a linked list.

A. An Integer B. A variable C. A character D. A Boolean

63. Why is the constructor of the QueueLinkedList class empty?

A. because initialization of data members of the LinkedList class is performed by the constructor of the LinkedList class.

B. because initialization of data members of the LinkedList class is performed by the destructor of the LinkedList class.

C. because initialization of data members of the QueueLinkedList class is performed by the constructor of the LinkedList class.

D. because initialization of data members of the QueueLinkedList class is performed by the destructor of the LinkedList class

64. _____ form of access is used to add and remove nodes from a queue

A. LIFO, Last In First Out **B. FIFO , First In First Out**

C. Both A and B D. None of these

65. _____ form of access is used to add and remove nodes from a stack

A. LIFO B. FIFO C. Both A and B D. None of these

66. New nodes are added to the _____ of the queue.

A. front **B. back** C. middle D. Both A and B

67. A _____ is a data structure that organizes data similar to a line in the supermarket, where the first one in line is the first one out.

A. queue linked list B. stacks linked list C. both of them D. neither of them

68. In an array queue, data is stored in an _____ element.
 A. Node B. linked list **C. array** D. constructor
69. The pop() member function determines if the stack is empty by calling the _____ member function
 A. removeback() **B. isEmpty()** C. removedfront() D. hasNext()
70. What happens when you push a new node onto a stack?
A. the new node is placed at the front of the linked list.
 B. the new node is placed at the back of the linked list.
 C. the new node is placed at the middle of the linked list.
 D. No Changes happens
71. _____ Memory is Volatile.
 A. main B. Random Access **C. Both A and B** D. Virtual
72. An _____ data type is a keyword of a programming language that specifies the amount of memory needed to store data and the kind of data that will be stored in that memory location
A. abstract B. int C. vector D. None of these
73. Which of the following abstract data types are NOT used by Integer Abstract Data type group?
 A. Short B. Int **C. float** D. long
74. The hash String() member function is called by other member functions of the Hashtable class whenever a function needs to convert a _____
 A. a hash number key to a key **B. key to a hash number key**
 C. a key to an Index D. None of these
75. An application iterates the hashtable by calling the _____ and _____ member functions
 A. hasNext() and hasDelete() **B. hasNext() and getNextKey()**
 C. Both A and B D. None of these
76. Data members of the Hashtable class stored in the private access specifier
A. private access specifier B. Public access specifier
 C. common access specifier D. None of these
77. _____ is the common programming technique used for hashing in all hashing functions
 A. Cloning **B. Bit Shifting** C. Hash mapping D. Listing
78. If the depth of a tree is 3 levels, then what is the Size of the Tree?
 A. 4 B. 2 **C. 8** D. 6
79. DeleteNode() function requires the _____ of the data element of the node that is being removed
 A. reference **B. value** C. declaration D. variable