

PART-1 :

1. ----- 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 (ANS)
- C. Both a and b
- D. None of these

2. ----- form of access is used to add or remove nodes from a stack.

- A. LIFO (ANS)
- B. FIFO
- C. Both A and B
- D. None of these

3. New nodes are added to the ----- of the queue.

- A. Front (ANS)
- B. Back
- C. Middle
- D. Both A and B

4. A queue is a

- A. FIFO (ANS)
- B. LIFO
- C. FILO
- D. LOFI

5. The retrieval of items in a stack is operation.

- A. push
- B. pop (ANS)
- C. retrieval
- D. access

6. The term push and pop is related to

- A. Array
- B. Lists
- C. Stacks (ANS)
- D. Trees

7. Which is the pointer associated with the stack?

- A. FIRST
- B. FRONT
- C. TOP (ANS)
- D. REAR

8. The elements are removed from a stack in order.

- A. Reverse (ANS)
- B. Hierarchical

- C. Alternative
- D. Sequential

9. The insertion operation in the stack is called

- A. insert
- B. push (ANS)
- C. pop
- D. top

10. is the term used to insert an element into a stack.

- A. Push (ANS)
- B. Pull
- C. Pop
- D. Pump

11. Stack follows the strategy of

- A. LIFO (ANS)
- B. FIFO
- C. LRU
- D. RANDOM

12. is the term used to delete an element from the stack.

- A. Push
- B. Pull
- C. Pop (ANS)
- D. Pump

13. Deletion operation is done using in a queue.

- A. front (ANS)
- B. rear
- C. top
- D. list

14. Where does the object is created?

- A. Class (ANS)
- B. Constructor
- C. Destructors
- D. Attributes

15. How to access the object in the class?

- A. Ternary operator
- B. Scope resolution operator
- C. Dot operator or direct member access operator (ANS)
- D. None of the above

16. When struct is used instead of the keyword class means, what will happen in the program?

- A. Access is public by default (ANS)

- B. Access is private by default
- C. Access is protected by default
- D. None of the mentioned

17. Constructor is executed when

- A. An object goes out of scope.
- B. A class is declared
- C. An object is created (ANS)
- D. An object is used

18. Which of the following keywords is used to control access to a class member?

- A. Default
- B. Break
- C. Public (ANS)
- D. Asm

19. A member function can always access the data in

- A. the class of which it is member (ANS)
- B. the object of which it is a member
- C. the public part of its class
- D. the private part of its class

20. Which of the following cannot be passed to a function in C++?

- A. Constant
- B. Structure
- C. Array
- D. Header file (ANS)

21. Which of the following is the correct syntax to print the message in C++ language?

- A. `cout <<"Hello world!";` (ANS)
- B. `Cout << Hello world!;`
- C. `Out <<"Hello world!;`
- D. None of the mentioned

22. Which of the following is the original creator of the C++ language?

- A. Dennis Ritchie
- B. Ken Thompson
- C. Bjarne Stroustrup (ANS)
- D. Brian Kernighan

23. Which of the following is the correct definition of sorting?

- A. Sorting is a type of process in which the data or information is ordered into a specific order. Example increasing orders, decreasing. (ANS)
- B. Sorting information or data only in increasing order.
- C. Sorting is a type of process in which data elements are modified or manipulated.
- D. None of the mentioned

24. Which of the following statements is correct about the class?

- A. An object is an instance of its class (ANS)
- B. A class is an instance of its object
- C. An object is the instance of the data type of that class
- D. None of the mentioned

25. What does your class can hold?

- A. data
- B. functions
- C. both data & functions (ANS)
- D. none of the mentioned

26. In C++, a function which invokes itself repeatedly until some condition is satisfied is called

- A. Normal function
- B. Inline function
- C. Recursive function (ANS)
- D. None of the mentioned

27. By default members of a class is

- A. Private (ANS)
- B. Public
- C. Protected
- D. Friendly

28. Which of the following statements is true in C++

- A. Structure cannot have a member function
- B. Structure cannot have private members
- C. Default access specifier is public (ANS)
- D. All of the mentioned

29. In C++ a pointer variable stores

- A. Value of another variable
- B. Address of pointer variable
- C. Address of another variable (ANS)
- D. Value of another pointer variable

30. A function normally can return

- A. Single value (ANS)
- B. Multiple values
- C. Depends on coder
- D. None of the mentioned

31. Which of the following best describes the useful criterion for comparing the efficiency of algorithms?

- A. Time
- B. Memory
- C. Both of these (ANS)
- D. None of the mentioned

32. How is time complexity measured?

- A. By counting the number of statements in an algorithm
- B. By counting the number of primitive operations performed by the algorithm on a given input size (ANS)
- C. By counting the size of data input to the algorithm
- D. None of the mentioned

33. Average case time complexity of quicksort?

- A. $O(n)$
- B. $O(n \log n)$ (ANS)
- C. $O(n^2)$
- D. $O(n^3)$

34. Worst case time complexity of quicksort?

- A. $O(n)$
- B. $O(n \log n)$
- C. $O(n^2)$ (ANS)
- D. $O(n^3)$

35. Time complexity of binary search?

- A. $O(1)$
- B. $O(\log n)$ (ANS)
- C. $O((\log n) \times (\log n))$
- D. $O(n)$

36. Two main measures for the efficiency of an algorithm are

- A. Processor and memory
- B. Complexity and capacity
- C. Time and space (ANS)
- D. Data and space

37. The time factor when determining the efficiency of an algorithm is measured by

- A. Counting microseconds
- B. Counting the number of key operations (ANS)
- C. Counting the number of statements
- D. Counting the kilobytes of algorithm

38. The space factor when determining the efficiency of an algorithm is measured by

- A. Counting the maximum memory needed by the algorithm (ANS)
- 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

39. Which of the following case does not exist in complexity theory

- A. Best case
- B. Worst case
- C. Average case

D. Null case (ANS)

40. The concept of order Big O is important because

- A. It can be used to decide the best algorithm that solves a given problem
- B. It determines the maximum size of a problem that can be solved in a given amount of time
- C. None of the mentioned
- D. Both of the mentioned (ANS)

41. What is the advantage of a recursive approach than an iterative approach?

- A. Consumes less memory
- B. Less code and easy to implement (ANS)
- C. Consumes more memory
- D. More code has to be written

42. What is the worst case complexity of binary search using recursion?

- A. $O(n \log n)$
- B. $O(\log n)$ (ANS)
- C. $O(n)$
- D. $O(n \times n)$

43. What is the average case time complexity of binary search using recursion?

- A. $O(n \log n)$
- B. $O(\log n)$ (ANS)
- C. $O(n)$
- D. $O(n \times n)$

44. Which of the following is not an application of binary search?

- A. To find the lower/upper bound in an ordered sequence
- B. Union of intervals
- C. Debugging
- D. To search in unordered list (ANS)

45. Binary Search can be categorized into which of the following?

- A. Brute Force technique
- B. Divide and conquer (ANS)
- C. Greedy algorithm
- D. Dynamic programming

PART-2 :

1. Which of the following best describes the useful criterion for comparing the efficiency of algorithms?

- A. Time
- B. Memory

- C. Both of these (ANS)
- D. None of the mentioned

2. How is time complexity measured?

- A. By counting the number of statements in an algorithm
- B. By counting the number of primitive operations performed by the algorithm on a given input size (ANS)
- C. By counting the size of data input to the algorithm
- D. None of the mentioned

3. Which of the following does NOT belong to the family of notations?

- A. Big Oh
- B. Big Omega
- C. Big Theta
- D. Big Lamda (ANS)

4. Average case time complexity of quicksort?

- A. $O(n)$
- B. $O(n \log n)$ (ANS)
- C. $O(n \times n)$
- D. $O(n \times n \times n)$

5. Worst case time complexity of quicksort?

- A. $O(n)$
- B. $O(n \log n)$
- C. $O(n \times n)$ (ANS)
- D. $O(n \times n \times n)$

6. Time complexity of binary search?

- A. $O(1)$
- B. $O(\log n)$ (ANS)
- C. $O((\log n) \times (\log n))$
- D. $O(n)$

7. Two main measures for the efficiency of an algorithm are

- A. Processor and memory
- B. Complexity and capacity
- C. Time and space (ANS)
- D. Data and space

8. The time factor when determining the efficiency of an algorithm is measured by

- A. Counting microseconds
- B. Counting the number of key operations (ANS)
- C. Counting the number of statements
- D. Counting the kilobytes of algorithm

9. The space factor when determining the efficiency of an algorithm is measured by

- A. Counting the maximum memory needed by the algorithm (ANS)

- 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

10. Which of the following case does not exist in complexity theory

- A. Best case
- B. Worst case
- C. Average case
- D. Null case (ANS)

11. 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 of the mentioned

12. The concept of order Big O is important because

- A. It can be used to decide the best algorithm that solves a given problem
- B. It determines the maximum size of a problem that can be solved in a given amount of time
- C. None of the mentioned
- D. Both of the mentioned

13. What is the advantage of recursive approach than an iterative approach?

- A. Consumes less memory
- B. Less code and easy to implement (ANS)
- C. Consumes more memory
- D. More code has to be written

14. Given an input arr = {2,5,7,99,899}, key = 899, What is the level of recursion?

- A. 5
- B. 2
- C. 3 (ANS)
- D. 4

15. Given an array arr = {45,77,89,90,94,99,100} and key = 99, what are the mid values(corresponding array elements) in the first and second levels of recursion?

- A. 90 and 99 (ANS)
- B. 90 and 94
- C. 89 and 99
- D. 89 and 94

16. What is the worst case complexity of binary search using recursion?

- A. $O(n \log n)$
- B. $O(\log n)$ (ANS)
- C. $O(n)$
- D. $O(n \times n)$

20. Given an array $arr = \{5, 6, 77, 88, 99\}$ and $key = 88$, How many iterations are done until the element is found?

- A. 1
- B. 3
- C. 4
- D. 2 (ANS)

21. Given an array $arr = \{45, 77, 89, 90, 94, 99, 100\}$ and $key = 100$, What are the mid values (corresponding array elements) generated in the first and second iterations?

- A. 90 and 99 (ANS)
- B. 90 and 100
- C. 89 and 94
- D. 94 and 99

22. What is the time complexity of binary search with iteration?

- A. $O(n \log n)$
- B. $O(\log n)$ (ANS)
- C. $O(n)$
- D. $O(n \times n)$

23. The average number of key comparisons done in a successful sequential search in a list of length n is

- A. $\log n$
- B. $n - 1/2$
- C. $n/2$
- D. $(n+1)/2$ (ANS)

24. Suppose there are 11 items in sorted order in an array. How many searches are required on the average, if binary search is employed and all searches are successful in finding the item?

- A. 2.81
- B. 3.46
- C. 3.00 (ANS)
- D. 3.33

25. Suppose that we have numbers between 1 and 1000 in a binary search tree and we want to search for the number 365, which of the following sequences could not be the sequence of nodes examined?

- A. 4, 254, 403, 400, 332, 346, 399, 365
- B. 926, 222, 913, 246, 900, 260, 364, 365
- C. 927, 204, 913, 242, 914, 247, 365 (ANS)
- D. 928, 224, 923, 248, 916, 356, 401, 365

26. The worst-case occurs 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 item is not there at all (ANS)

27. The complexity of the sorting algorithm measures the as a function of the number n of items to be sorted.

A. average time

B running time (ANS)

C. average-case complexity

D. case-complexity

28. 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 more than 1500. (ANS)

29. The Average case occurs in the linear search algorithm is

A. when the item is somewhere in the middle of the array (ANS)

B. when the item is not the array at all

C. when the item is the last element in the array

D. Item is the last element in the array or item is not there at all

30. Complexity of linear search algorithm is

A. $O(n)$ (ANS)

B. $O(\log n)$

C. $O(n \times n)$

D. $O(n \log n)$

31. The complexity of bubble sort algorithm is

A. $O(n)$

B. $O(\log n)$

C. $O(n \times n)$ (ANS)

D. $O(n \log n)$

32. The complexity of merge sort algorithm is

A. $O(n)$

B. $O(\log n)$

C. $O(n \times n)$

D. $O(n \log n)$ (ANS)

33. Which of the following sorting algorithm is of divide and conquer type?

A. Bubblesort

B. Insertionsort

C. Mergesort (ANS)

D. Selection sort

34. Which of the following is not the required condition for a binary search algorithm?

A. The list must be sorted

B. There should be direct access to the middle element in any sublist

- C. There must be a mechanism to delete and/or insert elements in the list. (ANS)
- D. Number values should only be present

35. Partition and exchange sort is

- A. quick sort (ANS)
- B. selection sort
- C. bubble sort
- D. None of the mentioned

PART 3

1. In the worst case, the number of comparisons needed to search a singly linked list of length n for a given element is

- A. $\log_2 n$
- B. $n/2$
- C. $\log_2 n - 1$
- D. n (ANS)

2. Which of the following points is true about Linked List data structure when it is compared with array

- A. All of the mentioned (ANS)
- B. It is easy to insert and delete elements in Linked List
- C. Random access is not allowed in a typical implementation of Linked Lists
- D. The size of the array has to be pre-decided, linked lists can change their size any time.

3. What are the time complexities of finding 8th element from beginning and 8th element from end in a singly linked list of n number of nodes and n greater than 8.

- A $O(1)$ and $O(n)$ (ANS)
- B. $O(1)$ and $O(1)$
- C. $O(n)$ and $O(1)$
- D. $O(n)$ and $O(n)$

4. You are given pointers to first and last nodes of a singly linked list, which of the following operations are dependent on the length of the linked list?

- A. Delete the first element
- B. Insert a new element as a first element
- C Delete the last element of the list (ANS)
- D. Add a new element at the end of the list

5. In a singly linked list, let P be the pointer to an intermediate node x in the list. What is the time complexity to delete the node x from the list?

- A. $O(n)$
- B. $O(\log_2 n)$
- C. $O(\log n)$
- D. $O(1)$ (ANS)

6. The time required to search an element in a linked list of length n is
- A. $O(\log n)$
 - B. $O(n)$ (ANS)
 - C. $O(1)$
 - D. $O(n \times n)$
7. The minimum number of fields with each node of doubly linked list is
- A. 1
 - B. 2
 - C. 3 (ANS)
 - D. 4
8. Consider a singly linked list of the form where F is a pointer to the first element in the linked list and L is the pointer to the last element in the list. The time of which of the following operations depends on the length of the list?
- A. Delete the last element of the list (ANS)
 - B. Delete the first element of the list
 - C. Add an element after the last element of the list
 - D. Interchange the first two elements of the list
9. What is the worst case time complexity of inserting n elements into an empty linked list, if the linked list needs to be maintained in sorted order?
- A. $O(n)$
 - B. $O(n \log n)$
 - C. $O(n \times n)$ (ANS)
 - D. $O(1)$
10. In linked list each node contain minimum of two fields. One field is data field to store the data second field is?
- A. Pointer to character
 - B. Pointer to integer
 - C. Pointer to node (ANS)
 - D. Node to pointer
11. What would be the asymptotic time complexity to insert an element at the second position in the linked list?
- A. $O(1)$ (ANS)
 - B. $O(n)$
 - C. $O(n \times n)$
 - D. None of the mentioned
12. In doubly linked lists, traversal can be performed?
- A. Only in forward direction
 - B. Only in reverse direction
 - C. In both directions (ANS)
 - D. None of the mentioned
13. A variant of the linked list in which none of the node contains NULL pointer is?

- A. Singly linked list
- B. Doubly linked list
- C. Circular linked list (ANS)
- D. None of the mentioned

14. Collection of homogenous elements is

- A. array (ANS)
- B. lists
- C. node
- D. none of the mentioned

15. Which data structure is mainly used for implementing the recursive algorithm?

- A. Queue
- B. Stack (ANS)
- C. Binary tree
- D. Linked list

16. Which of the following is the infix expression?

- A. $A+B*C$ (ANS)
- B. $+A*BC$
- C. $ABC+*$
- D. None of the mentioned

17. Which of the following is the prefix form of $A+B*C$?

- A. $A+(BC*)$
- B. $+AB*C$
- C. $ABC+*$
- D. $+A*BC$ (ANS)

18. If the elements '1', '2', '3' and '4' are added in a stack, so what would be the order for the removal?

- A. 1234
- B. 2134
- C. 4321 (ANS)
- D. None of the mentioned

19. The value of postfix expression $(9,5,-9,2,/,*)$ is

- A. 18 (ANS)
- B. 12
- C. 11
- D. 8

20. The value of postfix expression $(5,7,3,+,*,8,2,/, -)$ is

- A. 59
- B. 62
- C. 46 (ANS)
- D. 45

21. The value of postfix expression (8,5,3,-,/2,1,5,+,*,+) is

A. 14

B. 12

C. 16 (ANS)

D. 18

