

U.G. Department of Computer Applications

N.G.M College, Pollachi

17 UBC 309- DATA STRUCTURE AND ALGORITHMS

K1 & K2-Level Questions

Unit -I

1. A mathematical-model with a collection of operations defined on that model is called
A. Data Structure B. Abstract Data Type C. Primitive Data Type D. Algorithm
2. The extra key inserted at the end of the array is called a
A. End key. B. Stop key. C. Sentinel. D. Transposition.
3. The largest element of an array index is called its
A. lower bound. B. range. C. upper bound. D. All of these.
4. 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
5. 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
6. 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
7. Two dimensional arrays are also called
A. tables arrays B. matrix arrays C. both of the above D. none of the above
8. The smallest element of an array's index is called

A. Lower bound B. Upper bound C. Range D. Extraction

9. The memory address of the first element of an array is called

A. floor address B. base address C. foundation address D. first address

10. Which of the following data structure cannot store the no homogeneous data element.

a. Stack b. Array c. Record d. None

Unit -II

11. How is Data in a queue accessed

A. First in First out B. First in last out C. Last in First out D. None of these

12. The following data structure allows deleting data elements from front and inserting at rear

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

13. A data structure where elements can be added or removed at either end but not in the middle is referred as

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

14. Convert the infix to postfix for $A-(B+C)*(D/E)$

A. $ABC+DE/*-$ B. $ABC-DE/*-$ C. $ABC-DE*/*-$ D. None of the above

15. The data structure required to evaluate a postfix expression is

A. queue B. stack C. array D. linked-list

16. What data structure would you mostly likely see in a nonrecursive implementation of a recursive algorithm?

A. Stack B. Linked list C. Queue D. Trees

17. Minimum how many stacks are needed to implement a queue ?

A. Cannot be implemented B. 1 C. 2 D. 3

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

A. Array B. Lists C. stacks D. all of above

19. What Member function places a new node at the end of the linked list?

A. addNode B. append Node C. DisplayNode D. StructNode

20. In a circular linked list

A. components are all linked together in some sequential manner.

B. there is no beginning and no end.

- C. components are arranged hierarchically.
- D. forward and backward traversal within the list is permitted.

Unit -III

21. The worst case time complexity of AVL tree is better in comparison to binary search tree for
- A. Search and Insert Operations B. Search and Delete Operations
 - C. Insert and Delete Operations D. Search, Insert and Delete Operations
22. If a node in a BST has two children, then its inorder predecessor has
- A. no left child B. no right child C. two children D. no child
23. A full binary tree with n leaves contains
- A. n nodes. B. $(\log_2 n)$ nodes. C. $(2n-1)$ nodes. D. 2^n nodes.
24. The number of different directed trees with 3 nodes are
- A. 2 B. 4 C. 3 D. 5
25. A BST is traversed in the following order recursively: Right, root, left
The output sequence will be in
- A. Ascending order B. Descending order
 - C. Bitomic sequence D. No specific order
26. In a binary tree certain null entries are replaced by special pointers which point to nodes higher in tree for efficiency. These special pointers are called
- A. Leaf B. Branch C. Path D. Thread
27. 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
28. When converting binary tree into extended 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 the above
29. Which of these classes implement the Collection interface SortedMap. Select the one correct answers.
- A. HashMap B. Hashtable C. TreeMap D. HashSet
30. If we delete a node from a balanced binary tree, How can properties of balanced binary tree retain.

- A. By rotation the nodes.
- B. No Operation needed
- C. will be balanced after new node insetion
- D. None of the above

Unit -IV

31. An undirected graph G with n vertices and e edges is represented by adjacency list. What is the time required to generate all the connected components?

- A. $O(n)$ B. $O(e)$ C. $O(e+n)$ D. $O(e^2)$

32. A graph with n vertices will definitely have a parallel edge or self loop if the total number of edges are

- A. more than n B. more than $n+1$
C. more than $(n+1)/2$ D. more than $n(n-1)/2$

33. The maximum degree of any vertex in a simple graph with n vertices is

- A. $n-1$ B. $n+1$ C. $2n-1$ D. n

34. A graph with n vertices will definitely have a parallel edge or self loop if the total number of edges are

- A. greater than $n-1$ B. less than $n(n-1)$ C. greater than $n(n-1)/2$ D. less than $(n^2)/2$

35. An adjacency matrix representation of a graph cannot contain information of :

- A. nodes B. edges C. direction of edges D. parallel edges

36. In a graph if $e=(u, v)$ means

- A. e begins at u and ends at v B. u is processor and v is successor
C. both B and C are true D. none is true

- 37.If every node u in G is adjacent to every other node v in G , A graph is said to be

- A. Isolated B. Complete C. Finite D. Strongly connected

38. Which of the following statements for a simple graph is correct?

- Every path is a trail
- Every trail is a path
- Every trail is a path as well as every path is a trail
- None of the mentioned

39. Which of the following properties does a simple graph not hold?

- a) Must be unweighted
- b) Must be connected
- c) Must have no loops or multiple edges
- d) All of the mentioned

40. What is the maximum number of edges in a bipartite graph having 10 vertices?

- a) 24 b) 21 c) 25 d) 16

Unit -V

41. A sort which relatively passes through a list to exchange the first element with any element less than it and then repeats with a new first element is called

- A. insertion sort. B. selection sort. C. heap sort. D. quick sort.

42. Which of the following algorithmic paradigm is used in the merge sort?

- A. Dynamic Programming B. BackTracking
C. Greedy method D. Divide and Conquer

43. What is the worst case performance of Selection sort algorithm?

- A. $O(\log n)$ B. $O(n^* n)$ C. $O(n)$ D. $O(n \log n)$

44. What sorting algos have their best and worst case times equal ?

- A. heap and selection sort B. intersection sort & merge sort
C. merge sort and heap sort D. None of these

45. You have to sort a list L consisting of a sorted list followed by a few "random" elements. Which of the following sorting methods would be especially suitable for such a task?

- A. Bubble sort B. Selection sort C. Quick sort D. Insertion sort

46. The number of interchanges required to sort 5, 1, 6, 2 4 in ascending order using Bubble Sort is

- A. 6 B. 7 C. 5 D. 8

47. Quick sort is also known as

- A. merge sort B. heap sort C. bubble sort D. None of these

48. Which of the following sorting algorithms does not have a worst case running time of $O(n^2)$?

- A. Insertion sort B. Merge sort C. Quick sort D. Bubble sort

49. Mergesort makes two recursive calls. Which statement is true after these recursive calls finish, but before the merge step ?

- A. Elements in each half of the array are sorted amongst themselves.
B. Elements in the first half of the array are less than or equal to elements in the second half of the array.
C. None of these. D. The array elements form a heap.

50. The following sorting algorithm is of divide and conquer type

A. Bubble sort B. Insertion sort C. Quick sort D. None of the above

Answer Key

1. B	2.C	3. C	4.C	5.A	6.A	7.C	8.A	9.B	10.B
11.B	12.B	13.D	14.A	15. B	16.A	17. C	18..C	19.A	20.B
21.D	22.B	23.C	24.C	25.B	26.D	27.C	28.C	29.C	30.C
31.C	32. D	33.A	34.A	35.D	36.C	37.B	38.A	39.B	40.C
41.D	42. D	43.B	44.C	45. D	46.C	47.D	48.B	49.D	50.B

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K3-Level Questions

UNIT 1:

I. Answer the following questions

1. Analyze the steps to create a program?
2. Inspect the Sparse Matrix with suitable example?
3. Analyze the concept of Arrays and its representation.
4. Explain the Multiple stacks.

UNIT 2:

I. Answer the following questions

1. Examine the Strings
2. List out the types of Linked List and explain.
3. Analyze the steps in polynomial Addition.
4. Inspect the Dynamic Storage Management.

UNIT 3:

I. Answer the following questions

1. List out the Basic Terminologies of Tree in details.
2. Write a note on Representation of Binary Tree.
3. Inspect about Thread Binary tree with example.
4. Examine the Counting Binary Trees.

UNIT 4:

I. Answer the following questions

1. Examine about Graphs and its type.
2. List out the Terminology and its Representation.
3. Analyze the step in Shortest Path Method.
4. Inspect about Topological Sorts.

UNIT 5:

I. Answer the following questions

1. Compare the Internal and External Sorting.
2. Examine about Two-way Merge Sort.
3. Inspect about Sorting with Disks.
4. Inspect about Sorting with Tapes.

K4-Level Questions.

UNIT -1:

I.ANSWER THE FOLLOWING IN DETAIL:

1. Analyze the basic concept of Stack.
2. Explain about how to create a program.
3. Explain about Multiple stack and queues.
4. Explain about evaluation of Expression in detail.

UNIT -2:

I.ANSWER THE FOLLOWING IN DETAIL:

1. Describe about Linked list.
2. Write a brief description about Linked Stack and Queues.
3. Describe about Polynomial addition.
4. Give a brief description about Dynamic storage management

UNIT -3:

I.ANSWER THE FOLLOWING IN DETAIL:

1. Explain about Threaded Binary Trees.
2. Explain about Binary tree traversal.
3. Describe about Binary tree representation.
4. Explain Counting Binary trees.

Unit -4:

I.ANSWER THE FOLLOWING IN DETAIL:

1. Examine the Traversal Connected components and spanning trees.
2. Give a brief description about shortest path with diagram.
3. Illustrate the Topological shorts.

4. List out the graph, terminology and its representation

UNIT -5:

I.ANSWER THE FOLLOWING IN DETAIL:

1. Briefly describe about storage devices in external sorting.
2. Describe about quick sort with algorithm.
3. Describe sorting with Tapes.
4. Examine the Internal sorting with algorithm.