Shivaji University, Kolhapur

Question Bank for Mar 2022 (Summer) Examination

Subject Code: 83942 **Subject Name**: Data Structures

Common subject Code (if any)

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Descriptive Questions

1. What is a Data Structure?
2. What is the difference between File storage and Data Structure?
3. Describe the types of Data Structures?
4. What is a Linear Data Structure?
5. What is the difference between Linear and Non-Linear Data Structures? Explain with example
6. List the applications of Data Structure.
7. Define terms Time Complexity and Space Complexity.
8. Explain time space trade-off
9. Explain various time complexity notations.
10. Write a note on Searching and Sorting
11. What are the importance of searching and sorting algorithms?
12. Name the different types of searching techniques with example
13. Write an algorithm for linear search technique
14. Compare Linear search and Binary search
15. Write an algorithm for binary search technique
16. Explain different searching algorithms for the input: 22, 34,15, 17, 69,40,30,47.64
17. Explain bubble sort with example
18. Compare bubble sort and quick sort with example
19. Demonstrate selection sort and insertion sort for the input 2,1,3,7,4,5,9,8,6
20. What are stacks? Explain with example
21. What are queues? Explain with example
22. Write operations on stack with example
23. Write operations on queue with example
24. Write short note on Priority queue
25. Write a note Linked representation stack
26. Write algorithms for push and pop operations

27. Write algorithm for enqueue and dequeue operations
28. What are circular queues? Explain the advantages of Circular queues over linear queues
29. What are the applications of Stacks
30. Convert the given equation infix to postfix and prefix
    (X+Y/Z*(P+Q)*R)
    (A+B(C*D)+E/F-G)
31. What is singly linked list? What are the operations on singly linked list.
32. List types of linked list with example
33. What is doubly linked lists?
34. Explain operations on doubly linked list.
35. State the algorithm to insert node in doubly linked list at the given position.
36. Explain inserting a node in singly linked list in all possible positions.
37. Write algorithm to delete first node from doubly lined list
38. What are Tree data structures?
39. State different types of trees in data structure
40. List the types of trees and its advantages
41. What is binary tree? Explain with example
42. What is binary search tree? Explain with example
43. State the difference between binary and binary search tree.
44. Explain types of traversing in tree data structures
45. Demonstrate Pre-order traversal with example
46. Demonstrate Post-order traversal with example.
47. Construct binary tree for the data
    In-order: M, A, E, H, K,F,N,S,R,T,Z,X,W,Q
    Post-order: M, A, E, H, K,F,N,S,R,T,Z,X,W,Q
48. Explain In-order traversal with example
49. Construct binary tree for the given input 60,30,90,45,95,85,25,19,24,27,80,99,45
50. Construct Binary search tree for the input M, N, P, R, S, Q, A, C, B, T, J, L
51. What are AVL Trees? List the advantages over BST
52. Construct complete binary search tree for the data
    50,80,40,30,20,35,45,78,90,47,86,42,56,77,89
53. Explain threaded Binary Tree with example
54. Explain B-Tree and B+ Tree with example
55. Explain the term Heap, what are the operation on Heap
56. Explain Heap sort with example.
57. What are graphs? Explain types of graphs
58. What are Forests?

59. Difference between graph and forest
60. What is the basic concept of graph.
61. Explain the storage representation of Graph
62. Explain the term BFS and DFS with example
63. What is sparse matrix? Explain representation of sparse matrix.

Multiple choice Questions

1. Which of this best describes an array?
   a. Data structure that shows a hierarchical behavior
   b. Container of objects of similar types
   c. Arrays are immutable once initialized
   d. Array is not a data structure

2. Syntax to initialize an array in C?
   a. int arr[3] = (1,2,3);
   b. int arr(3) = {1,2,3};
   c. **int arr[3] = {1,2,3};**
   d. int arr(3) = (1,2,3);

3. What are the advantages of arrays?
   a. Objects of mixed data types can be stored
   b. Elements in an array cannot be sorted
   c. Index of first element of an array is 1
   d. Easier to store elements of same data type

4. Assuming int is of 4bytes, what is the size of int arr[15];?
   a. 15
   b. 19
   c. 11
   d. **60**

5. Elements in an array are accessed _____
   a. **Randomly**
   b. Sequentially
   c. Exponentially
   d. Logarithmically

6. Which if the following is non-linear Data Structure
   a. Stacks
   b. List

c. Strings
d. Trees

7. The time complexity of binary search is
   a. O(log n)
   b. O^2(log n)
   c. Log(n)
   d. None of the above

8. The time complexity of quick sort is
   a. O(n)
   b. O(n2)
   c. O(n log n)
   d. O(log n)

9. Which of the following data structure is more appropriate to represent a heap?
   a. Two-dimensional array
   b. Doubly linked list
   c. Linear Array
   d. Linked list
10. …… is not the component of data structure.
    a. Operations
    b. Storage Structures
    c. Algorithms
    d. None of the Above
11. ……. Is a pile in which items are added at one end and removed from the other.
    a. Stack
    b. Queue
    c. List
    d. None of the above
12. …… is very useful in situation when data have to stored and then retrieved in reverse order.
    a. Stack
    b. Queue
    c. List
    d. Link list
13. Which data structure allows deleting data elements from and inserting at rear?
    a. Stacks
    b. Queues
    c. Dequeues
    d. Binary search tree
14. Which of the following is non-liner data structure?
    a. Stacks
    b. List
    c. Strings
    d. Trees
15. To represent hierarchical relationship between elements, Which data structure is suitable?

a. Dequeue
b. Priority
c. Tree
d. Graph

16. A directed graph is …….. if there is a path from each vertex to every other vertex in the digraph.
    a. Weakly connected
    b. Strongly Connected
    c. Tightly Connected
    d. Linearly Connected
17. The number of comparisons done by sequential search is ……
    a. (N/2)+1
    b. (N+1)/2
    c. (N-1)/2
    d. (N+2)/2
18. In ……, search start at the beginning of the list and check every element in the list.
    a. Linear search
    b. Binary search
    c. Hash Search
    d. Binary Tree search
19. Which of the following is not the internal sort?
    a. Insertion Sort
    b. Bubble Sort
    c. Merge Sort
    d. Heap Sort
20. A graph is said to be …… if the vertices can be split into two sets V1 and V2 such there are no edges between two vertices of V1 or two vertices of V2.
    a. Partite
    b. Bipartite
    c. Rooted
    d. Bisects
21. In a circular queue the value of r will be ..
    a. r=r+1
    b. r=(r+1)% [QUEUE_SIZE – 1]
    c. r=(r+1)% QUEUE_SIZE
    d. r=(r-1)% QUEUE_SIZE
22. The advantage of …….. is that they solve the problem if sequential storage representation. But disadvantage in that is they are sequential lists.
    a. Lists
    b. Linked Lists
    c. Trees
    d. Queues
23. What will be the value of top, if there is a size of stack STACK_SIZE is 5
    a. 5
    b. 6
    c. 4

d. None

24. …… is not the operation that can be performed on queue.
    a. Insertion
    b. Deletion
    c. Retrieval
    d. Traversal

25. There is an extra element at the head of the list called a …….
    a. Antinel
    b. **Sentinel**
    c. List header
    d. List head

26. A graph is a collection of nodes, called ……. And line segments called arcs or …….. that connect pair of nodes.
    a. vertices, edges
    b. edges, vertices
    c. vertices, paths
    d. graph node, edges

27. In general, the binary search method needs no more than …….. comparisons.
    a. [log2n]-1
    b. [logn]+1
    c. [log2n]
    d. [log2n]+1

28. Any node is the path from the root to the node is called
    a. Successor node
    b. **Ancestor node**
    c. Internal node
    d. None of the above

29. A …… is an acyclic digraph, which has only one node with indegree 0, and other nodes have indegree 1.
    a. **Directed tree**
    b. Undirected tree
    c. Dis-joint tree
    d. Direction oriented tree

30. ……. Is a directed tree in which outdegree of each node is less than or equal to two.
    a. Unary tree
    b. **Binary tree**
    c. Trinary tree
    d. Both B and C