SECOND SEMESTER B.VOC. DEGREE EXAMINATION, APRIL 2017

Software Development

SDC 2 IT 05—DATA STRUCTURES

Time : Three Hours   Maximum : 80 Marks

Part A

*Answer **all** questions.*

1. Which of the following data structure is linear ?

    (a) Trees.   (b) Graphs.

    (c) Arrays.   (d) None of these.

2. Ordered arrays , compared with unordered arrays are —————.

    (a) Much quicker at deletion.   (b) Quicker at insert.

    (c) Quicker to create.   (d) Quicker at searching.

3. ————— is very useful in situation when data have to stored and then retrieved in reverse order.

    (a) Stack.   (b) Queue.

    (c) Linked List.   (d) Array.

4. 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.

5. A binary tree whose left subtree and right subtree differ in height by at most 1 unit is called —————.

    (a) AVL Tree.   (b) Green Tree.

    (c) Heap Tree.   (d) Array.

6. What will be the number of pointers used in linked representation of a binary tree with n nodes ?

    (a) n.   (b) $2n$.

    (c) $2 \verb|^| n$.   (d) $n \verb|^| 2$.

Turn over

7. Which data structure is used in Breadth First Search of a graph to hold nodes ?

   (a) Stack.   (b) Queue.

   (c) Tree.   (d) Array.

8. If there is an edge from vertex i to vertex j, then vertex i is said to be ——————— to vertex j.

   (a) Pendant.   (b) Isolated.

   (c) Adjacent.   (d) None of these.

9. What do you call the selected keys in quick sort method ?

   (a) Outer key.   (b) Inner key.

   (c) Partition key.   (d) Pivot key.

10. Which of the following is not a method in open addressing ?

   (a) Linear Probing.   (b) Quadrate Probing.

   (c) Double hashing.   (d) Separate chaining.

$(10 \times 1 = 10 \text{ marks})$

Part B

Answer any **eight** *questions, not exceeding* **a paragraph** *of 50 words.*

11. Give examples for linear data structure.

12. Is random access of elements is possible in linked list ? Why ?

13. What are the applications of Stack ?

14. What are the operations in priority queue ?

15. What is the advantage of heap over a stack ?

16. What is a binary search tree ?

17. List out the various operations on threaded binary trees ?

18. What is a complete graph ?

19. Adjacency matrix is good for representing dense graph. Why ?

20. What are partitions ?

21. What do you mean by load factor ?

22. Define Merge sort in simple words.

$(8 \times 2 = 16 \text{ marks})$

Part C

Answer any **six** *questions, in a page of 50 words.*

23. Explain about the classification of data structures.

24. Write an algorithm to delete a random node from the middle of a singly linked list.

25. Define a queue and write algorithm for implementing operations on queue.

26. How do we implement a circular queue using a linked list ?

27. Briefly explain about direct recursion and indirect recursion.

28. How do we delete an element from a binary search tree ?

29. Explain BFS.

30. Compare separate chaining with open addressing.

31. Explain the algorithm for Insertion sort with a suitable example.

(6 × 4 = 24 marks)

Part D

Answer any **two** *questions, not exceeding* **four pages**

32. Explain the array and linked list implementation of a stack.

33. Construct a Min heap with the following series of values and perform Preorder, Inorder and Postorder traversals :

    33   40   3   17   14   22   54   – 30

34. Write Dijkstra's algorithm to find the shortest path. Use the algorithm to find the shortest path from *s* to *t* in the following graph.
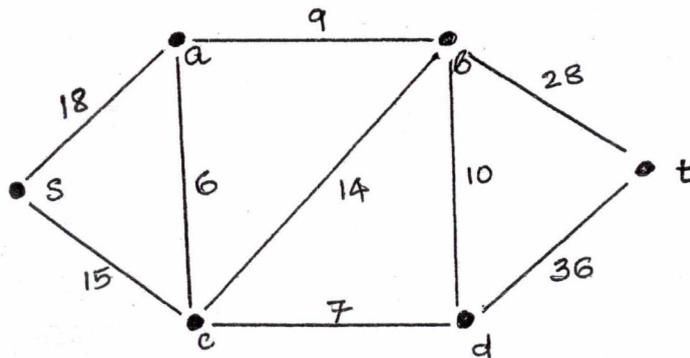
35. Explain Quick Sort algorithm with the help of an example.

(2 × 15 = 30 marks)