Total number of printed pages–4

16 (CS 678) DSAL

2018

DATA STRUCTURE AND ALGORITHM

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Compare Linked lists with arrays. 4

(b) What do you mean by efficiency of an algorithm? How can you compare the efficiency of 2 algorithms? 2+2=4

(c) What is a priority queue? How is it different from a normal queue? 2+2=4

(d) What is a graph? What are the different ways of representing a graph? 2+2=4

Contd.

(e) What are the different search techniques? What is the complexity of the most efficient technique? 2+2=4

2. Write algorithms for the following: 4×5= 20

(a) To display the elements of a dequeue.

(b) To count the no.of nodes in a linked list.

(c) To perform linear search on 'n' data elements for a given key, k.

(d) To count the total no.of nodes in a BST.

3. (a) Write a program to implement a circular queue using an array. 10

(b) Write a program to reverse a string using a stack. 10

4. (a) Write the pre-order expression for the following using a stack 8

$$[a+(b-c)]*[(d-e)/(f+g-h)]$$

Prefix

(b) Sort (increasing order showing all the steps) the following using merge sort and quick sort.

8, 2, 4, 6, 9, 7, 10, 1, 5, 3

6+6=12

5. (a) Write a function to insert an element in a circular queue. 4

(b) Write a function to pop an element from a stack. 4

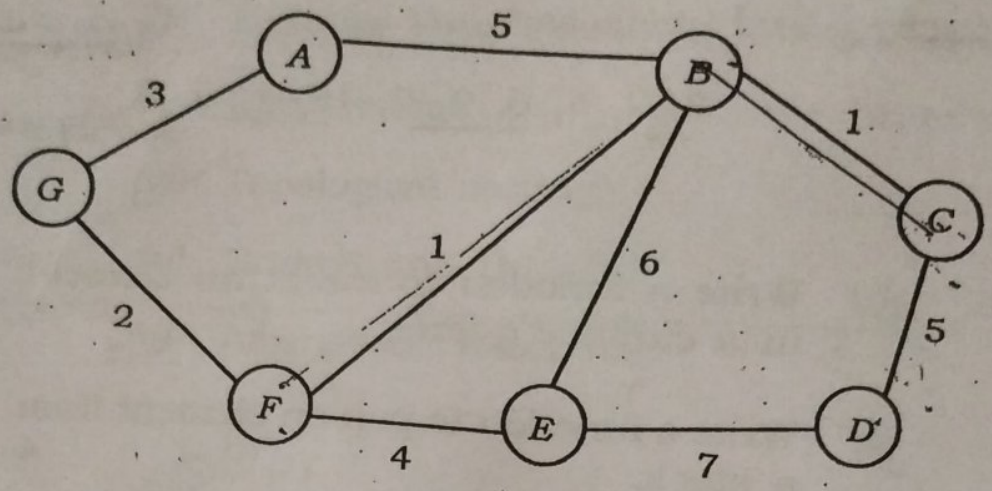
(c) Write a function to delete an element from the end in a doubly linked list. 4

(d) Write the functions to insert an element in an output restricted dequeue. 4+4=8

6. (a) What is hashing and rehashing? Give its applications. Discuss the advantages and disadvantages of hashing. 2+2+2+4=10

(b) How do you resolve hash clashes by open addressing method? Explain. 10

7. (a) Use Prim's/ Kruskal algorithm to find the minimum spanning tree of the graph 5



(b) Using the following traversals, construct the corresponding binary tree (show all steps). 5

In-order : H K D B I L E A F C M J G

Pre-order : A B D H K E I L C F G J M

(c) What is the difference between a BST and a heap ? For the given sequence of numbers, construct a heap and a BST.

34, 23, 67, 45, 12, 54, 87, 43, 98, 75, 84, 93, 31

4+3+3=10