Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ECE / ETE) (2011 Onwards)

B.Tech.(Electronics Engg.) (2012 Onwards)

(Sem.–5)

DATA STRUCTURES

Subject Code : BTCS-304

Paper ID : [A2102]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

a) If the characters 'D', 'C', 'B', 'A' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed?

b) What does the following function do for a given Linked List?

```
void datastructure(struct node* head)
{
If (head = = NULL)
return;
datastructure(head→next);
printf("%d ", head→data);
}
```

c) Suppose we have a circular array implementation of the queue with ten items in the queue stored at data [2] through data [11]. The current capacity is 12. Where does the insert method place the new entry in the array?

d) Why complexity of linear search is of the order of O(log n)?

e) What is tree data structure? What are different ways of traversing a tree?

f) Given two max heaps of size n each, what is the minimum possible time complexity to make a one max heap of size from elements of two max heaps?

g) What is the difference between Linear and non-linear data structure?

h) Differentiate between BFS and DFS.

i) Discuss the concept of merge sort.

j) What is a graph? How it is represented in memory?

SECTION-B

2. Discuss algorithm to convert infix to postfix notation for solving expression :

   A + (B*C – (D / E ^ F) * G) * H.

3. A sorting method with "Big-Oh" complexity O(n log n) spends exactly 1 millisecond to sort 1,000 data items. Assuming that time T(n) of sorting n items is directly proportional to n log n, that is, T(n) = cn log n, derive a formula for T(n), given the time T(N) for sorting N items, and estimate how long this method will sort 1,000,000 items.

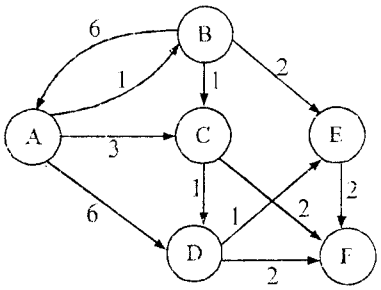
4. Write algorithm for sorting list of integers using Quick sort algorithm. Obtain worst case and average case time complexity of this algorithm. Show the trace of the algorithm for following key sequence. 62, 22,36,6,79,26,75,13,31,76

5. How does Queue work? Explain inserting and deleting from a queue.

6. Construct a binary search tree from the-given values. Consider the first value as the root value. Values : 45, 23, 29, 85, 92, 7, 11, 35, 49, 51.

SECTION-C

7.



For the given Graph perform following operations :

a. Find its adjacency list.

b. Storage representation for adjacency list and edge list.

c. Find its Path matrix.

8. Write an algorithm to delete a specific element in a single linked list. Doubly linked list takes more space than singly linked list for storing one extra address. In what condition could be a doubly linked list be more beneficial than singly linked list.

9. What is Heap? How are they represented in memory? Perform heap sort for the following items :

   44, 30, 50, 22, 60, 55, 77, 55,10.