Assignments: Data Structure and Algorithms 2011-12

1. Write a program to insert N employee information into the Linked List.
    a. Write a function to Search an Employee and display his details.
    b. Display the Average salary of all the Employees with designation Manager.

2. Consider two liked list A and B in sorted order. Write a program to merge the linked list A and B such that the final list C is in sorted order.

3. Consider two liked list A of size N. Write a program to Split the linked list two parts i.e. B and C each of size N/2.

4. Write a program to create a single linked list. The address of the head is to be stored in a separate structure which has two fields

```
struct head {
        struct node *head_ptr;
        int num;
};
```

The head_ptr will store the pointer to the head node num: Is the count of the number of elements present in the linked list. Write implementations for insertion and deletion which will update the head structure appropriately

5. WAP to implement two stacks in one array A[1 .. N] in such a way that neither stack overflows unless the total number of elements in both stacks together is N.

6. WAP to implement stack operations PUSH and POP using 2 Queues.

7. WAP to implement Queue operations INSERT and DELETE using 2 stacks.

8. Write a program to insert N Student information into the Doubly Linked List. Write a function to
    a. Search a Student and display his details.
    b. Display the details of the students who have scored above 90 in Math's and Science.

9. WAP program to create binary tree and traverse the tree using Inorder, PreOrder, Post Order Traversing Technique.

10. WAP to create and delete a node from a binary Search tree. Traverse the BST using Level Order Traversing Technique.

11. Write a program to insert N employee information into the Binary tree. Write a function to
    a. Search an Employee and display his details.
    b. Display the Average salary of Employees between the age 20 and 25.

12. Given the root node of binary tree, write a program that will compute the following
    a. The number of leaf nodes

    b. Total number of nodes in the tree.

    c. Display all the values of the nodes

Last Date of submission: 15th march 2011 (by 4 pm)

13. Write a program to sort an array using following Sorting Techniques:
    a. Bubble Sort
    b. Selection Sort
    c. Insertion Sort
    d. Quick Sort
    e. Merge Sort
    f. Heap Sort

14. Write a program to search an element from the array using following Searching Techniques:
    a. Linear Search
    b. Binary Search

15. Write a program that will take two arrays as input from the user, sort them using the insertion sort and then merge them into single resultant sorted array. The merging should be done only after sorting and the merging should be done in optimal fashion

16. Write a program to convert a given min heap to a max heap

17. WAP to perform following operations
    a. Extracting Maximum element from Heap
    b. Inserting element into Heap

18. Describe a 0(n logn) time algorithm that, given a set of n real numbers and another number x determines whether or not there exits two elements in the set whose sum is exactly x.

17. Write a program to insert N employee information into the Hash Table. Hash value should be the age of the employee.
    a. Write a function to Search an Employee and display his details.

b. Display the Average salary of Employees between the age 22 and 25.

Last Date of Submission: May 20th (by 4pm)