**Assignment 3**

1. Implement the following functions of ADT Linked List using singly linked list as a header file:

**init\_l(cur)** – initialise a list

**empty\_l(head)** – boolean function to return true if list pointed to by head is empty

**atend\_l(cur)** – boolean function to return true if cur points to the last node in the list

**insert\_front(target, head)** – insert the node pointed to by target as the first node of the list pointed to by head

**insert\_after(target, prev)** – insert the node pointed to by target after the node pointed to by prev

**delete\_front(head)** – delete the first element of the list pointed to by head

**delete\_after(prev)** – delete the node after the one pointed to by prev

2. Read integers from a file and arrange them in a linked list (a) in the order they are read, (b) in reverse order. Show the lists by printing.

3. Implement the following functions in a menu-driven C program using the data structure operation of Singly Linked List in the header file developed in problem 1:

a) print a list (i) in the same order, (ii) in the reverse order.

b) find the size of a list in number of nodes

c) check whether two lists are equal

d) search for a key in (i) an unordered list, (ii) an ordered list (Return) the node if key found and delete the node from original list)

e) append a list at the end of another list. f) delete the nth Node, last node and first node of a list.

g) check whether a list is ordered h) merge two sorted lists

i) insert a target node in the beginning, before a specified node and at the end of the list (sorted and unsorted).

j) remove duplicates from a linked list (sorted and unsorted)

k) swap elements of a list pairwise l) move last element to front of a list

m) delete alternate nodes of a list n) rotate a list o) delete a list. p) reverse a list. q) sort a list.

4. Write all the above operations of Single Linked List for the implementation using array.

5. Repeat problems 1 and 3 for a circular single linked list, doubly linked list and circular doubly linked list.

6. Implement an application to find out the Inverted Index of a set of text files.

7. Write a simulation program for managing heap memory for allocation and deallocation of user memory requests.

8. Write an application for adding, subtracting and multiplying very large numbers using linked lists

9. Given two polygons, find out whether they intersect or not.