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 by developing a function Print_list. The functions for (a) is Build_list and for (b) is Build_list_reverse.

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 is 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. You need to develop Build_list and Build_list_reverse, as well as Print_list.

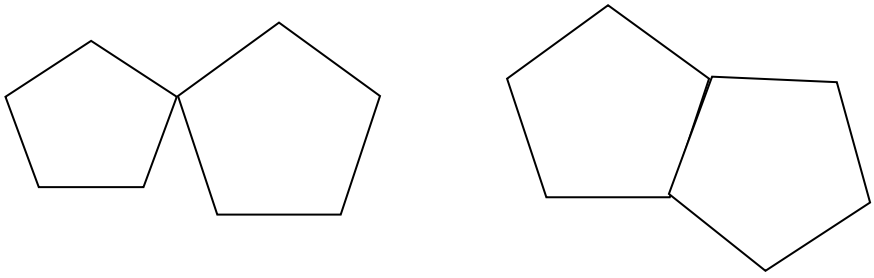
5. Repeat problems 1 and 3 for a circular single linked list, doubly linked list and circular doubly linked list. You need to develop Build_list and Build_list_reverse, as well as Print_list for each case.

6. Implement an application to find out the Inverted Index of a set of text files, given a set of keywords. Create a set of 6 text files having the keywords in different positions in the text files. The keywords may occur multiple times in a file. The inverted index file will list the key words along with the filenames in which they occur and how many times they occur in that file.

7. Write an application for adding, subtracting and multiplying very large numbers, say more than 70-digit integers, using (a) arrays and (b) linked lists to represent the large integers.

8. Given two polygons, say pentagons, find out whether they intersect or not.

Touching polygons:



Intersecting polygons: