Week 9 – Exercises

Exercise 1 – Linked List:

Define a class namely **Node** with three attributes are **value** (int), **next** (*pointer to the next linked node*), **prev** (*pointer to the previous linked node*), and provide class constructors to initialize value.

a) Create **four nodes** with values are 8, 5, 3, 6. Create a **doubly linked list** by connect them together in sequence.

   Write **two functions** to print out values of connected nodes in **forward** and **backward** orders.

   Sample Run:

   ```
   8 --> 5 --> 3 --> 6 -->
   6 --> 3 --> 5 --> 8 -->
   ```

b) Write two functions to allow **insert** a node, and **delete** a node as below:

   - void **inserNode**(Node *head, Node *priorNode, Node *newNode)
     insert the newNode right after priorNode (insert at the beginning if priorNode *is NULL).*
   - void **deleteNode**(Node *head, Node *delNote)
     delete the delNote from the linked list.

   Test it by inserting a new node with value 100 at the head of the list, another one with value 200 between nodes of values 3 and 6, and removing the node of value 5.

   Print out values to check.
   ```
   100 -->8 --> 3 --> 200 --> 6 -->
   ```

c) Write a function to **swap** two nodes (swap their positions, not values).

d) Write a function to **sort** elements of the linked list in ascending order using Bubble Sort.

Exercise 2 - Graph:

Write a program to model the Facebook social network, in which each **Facebooker** is managed by his/her **name**, and connections with their **friends**. Each Facebooker can have up to 5000 friends.

The program should provide following functionalities:

- View (print out to screen) all friends' names of a given Facebooker.
- View all friends' names of friends of a given Facebooker.
- View all mutual friends of two given Facebookers