CSE 2001: Data Structure & Algorithms

Programming Assignment-V

(Doubly Linked List)

1. Write a menu driven Java Program using class, methods and reference variables, to construct a **doubly linked list** consisting of the following information in each node: student regd_no (int), mark secured in a subject (float).

   The class definition should be as follows.

```
class Node
{
protected int regd_no;
protected float mark;
        protected Node next;
        protected Node prev;

}
```

   The prototype of the create method should be as follows.

```
public static Node create(Node start, Node end)
```

   Define the methods for each of the following operations to be supported by the above linked list are:

   a) The insertion operation

      i. At the beginning of the list

         Method Prototype: `public static Node insBeg(Node start, Node end)`

      ii. At the end of the list

         Method Prototype: `public static Node insEnd(Node start, Node end)`

      iii. At any position in the list

Method Prototype: **public static** Node insAny(Node start, Node end)

b) The deletion operation

i. From the beginning of the list

Method Prototype: **public static** Node delBeg(Node start, Node end) ii. From the end of the list

Method Prototype: **public static** Node delEnd(Node start, Node end) iii. From any position in the list

Method Prototype: **public static** Node delAny(Node start, Node end)

c) Search a node based on student regd_no and update the mark of the student. If the specified node is not present in the list an error message should be displayed. Method Prototype: **public static void** search(Node start)

d) Displaying all the nodes in the list

The prototype of the display method should be as follows.

public static void display(Node start, Node end)

The template for menu driven java program to use the above list and invoke the required methods to perform different operations is given below.

```
public class DLinkedList {

    public static Node create(Node start, Node end)
    {
        ...
    }

    public static void display(Node start, Node end)
    {
        ...
    }

    public static Node insBeg(Node start, Node end)
    {
        ...
    }
    /* Code for the remaining user defined methods*/

    public static void main(String[] args) {

        Scanner sc=new Scanner(System.in);
        ------
        ------
        while(true)
```

```
                {
                        System.out.println("****MENU*****");
                        System.out.println("0: Exit");
                        System.out.println("1: Creation");
                        System.out.println("2: Display");
                         .....
.....
                        System.out.println("Enter your choice");
                        int choice=sc.nextInt();
                        switch(choice)
                        {
                        case 0:
                                System.exit(0);
                        case 1:
                                end=create(start,end);
                                break;
                        case 2:
                                display(start,end);
                                break;
.....
                         .....

                        default:
                                        System.out.println("Wrong choice");
                        }

                }

        }
}
```

****