

# 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");
            }
        }
    }
}
```

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