CSE 2001: Data Structure & Algorithms

Programming Assignment-IV

(Singly Linked List)

1. Write a menu driven Java Program using class, methods and reference variables, to construct a **singly 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;

}
```

   The prototype of the create method should be as follows.

```
public static void create(Node start)
```

   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)

      ii. At the end of the list

         Method Prototype: **public static** Node InsEnd(Node start)

      iii. At any position in the list

         Method Prototype: **public static** Node InsAny(Node start)

   b) The deletion operation

i. From the beginning of the list

Method Prototype: **public static** Node DelBeg(Node start)

ii. From the end of the list

Method Prototype: **public static** Node DelEnd(Node start)

iii. From any position in the list

Method Prototype: **public static** Node DelAny(Node start)

iv. Deleting a node based on student regd_no. If the specified node is not present in the list an error message should be displayed. Both the option should be demonstrated.

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) Sort the nodes of the linked list according to the mark secured by the student from higher to lower.

Method Prototype: **public static void** sort(Node start)

e) Count the number of nodes present in the linked list

Method Prototype: **public static int** count(Node start)

f) Reverse the linked list

Method Prototype: **public static** Node reverse(Node start)

g) Displaying all the nodes in the list

The prototype of the display function should be as follows.

public static void display(Node start)

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 LinkedList
{
 public static void create(Node start)
        {
         -------
         -----
        }
```

```
public static void display(Node start)
{
-----
------
}

/* Code for the remaining user defined methods*/

public static void main(String[] args) {
-----
          -----
           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 the choice");
          choice=sc.nextInt();
          switch(choice)
          {
          case 0:
          System.exit(0);
          case 1:
          create(start);
          break;
          case 2:
          display(start);
          break;
-----

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

          }

}
                    }
          }
```

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