**Institute of Engineering & Management**
**Department of Computer Science & Engineering**
**Object Oriented Programming (IT) Lab for 3rd year 5th semester 2018**
**Code: CS594D**

**Date:** 21/08/18

**WEEK-7**

**Assignment-1**

**Problem Statement:** Implement Linked List in Java

**Source code:**

```
import java.util.Scanner;

class LinkedList{
  private Node head;
  private int size;
  LinkedList()
  {
        this.head = null;
        this.size = 0;
  }
  void insert_begin(int num)
  {
        Node newNode = new Node(num, head);
        this.head = newNode;
        this.size++;
  }
  void insert_end(int num)
  {
        Node newNode = new Node(num, null), temp = this.head;
        if(this.head == null)
              this.head = newNode;
        else{
              while(temp.next != null)
                temp = temp.next;
              temp.next = newNode;
        }
        this.size++;
  }
  void insert(int num, int pos)
  {
        Node temp = this.head;
        if(pos < 0 || pos > size)
        {
              System.out.println("invalid position!");
              return;
        }
        if(pos == 0)
        {
              insert_begin(num);
              return;
        }
        while(pos!=1 && temp!=null)
        {
              temp = temp.next;
              pos--;
        }
```

```
        Node newNode = new Node(num, temp.next);
        temp.next = newNode;
        this.size++;
    }
    void delete(int num)
    {
        Node temp = this.head, prev = this.head;
        while(temp!=null)
        {
            if(temp.num == num)
                break;
            prev = temp;
            temp = temp.next;
        }
        if(temp == null)
        {
            System.out.println("No such element present!");
            return;
        }
        if(temp == this.head)
            head = head.next;
        else prev.next = temp.next;
        this.size--;
    }
    void display()
    {
        Node temp = this.head;
        if(this.head == null)
        {
            System.out.println("Empty!");
            return;
        }
        System.out.print("List elements:");
        while(temp != null)
        {
            System.out.print(" "+temp.num);
            temp = temp.next;
        }
        System.out.println();
    }
}

class Node{
    int num;
    Node next = null;
    Node(int num, Node next)
    {
        this.num = num;
        this.next = next;
    }
}

class Main{
    public static void main(String args[])
    {
        LinkedList list = new LinkedList();
        System.out.println("The Linked List Commands:");
        System.out.println(" 1:Insert at beginning\n 2:Insert at end\n
            3:Insert at a particular position\n 4:Delete element\n
            5:Display all the elements\n 6:Exit");
        Scanner sc = new Scanner(System.in);
```

```
            int flag = 0;
            do{
                  System.out.print("Enter the Command: ");
                  int op = sc.nextInt();
                  switch(op)
                  {
                        case 1: System.out.print("Enter the element: ");
                                list.insert_begin(sc.nextInt()); break;
                        case 2: System.out.print("Enter the element: ");
                                list.insert_end(sc.nextInt()); break;
                        case 3: System.out.print("Enter the element & the
                                    position respectively (space separated):);
                                list.insert(sc.nextInt(),sc.nextInt());break;
                        case 4: System.out.print("Enter the element to
                                                delete: ");
                                list.delete(sc.nextInt()); break;
                        case 5: list.display(); break;
                        case 6: flag = 1; break;
                        default: System.out.println("Invalid Input!");
                  }
            }while(flag == 0);
            sc.close();
      }
   }
```

**Screen-Shot:**

```
rana@rana:~/Desktop/Git/College_programs/5th SEM/Java/Assignment 7$ javac Linked_List.java
rana@rana:~/Desktop/Git/College_programs/5th SEM/Java/Assignment 7$ java Main
The Linked List Commands:
 1:Insert at beginning
 2:Insert at end
 3:Insert at a particular position
 4:Delete element
 5:Display all the elements
 6:Exit
Enter the Command: 1
Enter the element: 5
Enter the Command: 2
Enter the element: 4
Enter the Command: 3
Enter the element & the position respectively (space separated): 1 1
Enter the Command: 5
List elements: 5 1 4
Enter the Command: 4
Enter the element to delete: 1
Enter the Command: 5
List elements: 5 4
Enter the Command: 6
rana@rana:~/Desktop/Git/College_programs/5th SEM/Java/Assignment 7$
```

**Fig: Linked-List**