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import java.util.Scanner;
class Node
{
    Node prev;
    int info;
    Node next;
}
public class DoublyLinkedList
{
    public static Node head=null;
    public static Node tail=null;

    public static void create()
    {
        Scanner sc=new Scanner(System.in);
        Node p=new Node();
        System.out.println("Enter the value");
        p.info=sc.nextInt();
        p.next=null;
        p.prev=null;
        head=tail=p;
        System.out.println("Add more? (Y/N)");
        char ch=sc.next().charAt(0);
        while(ch=='y' || ch=='Y')
        {
            Node q=new Node();
            System.out.println("Enter the value");
            q.info=sc.nextInt();
            q.next=null;
            q.prev=tail;
            tail.next=q;
            tail=q;
            System.out.println("Add more? (Y/N)");
            ch=sc.next().charAt(0);
        }
    }

    public static void display()
    {
        Node temp=head;
        System.out.println("Foreward");
        System.out.print("null----->");
        while(temp!=null)
        {
            System.out.print(temp.info+"----->");
            temp=temp.next;
        }
        System.out.println("null");
        temp=tail;
        System.out.println("Backward");
        System.out.print("null<-----");
        while(temp!=null)
        {
            System.out.print(temp.info+"<-----");
            temp=temp.prev;
        }
        System.out.println("null");
    }
}

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}
public static int count()
{
    Node temp=head;
    int c=0;
    while(temp!=null)
    {
        c++;
        temp=temp.next;
    }
    return c;
}
public static void insert_beg()
{
    Scanner sc=new Scanner(System.in);
    Node p=new Node();
    System.out.println("Enter the value");
    p.info=sc.nextInt();
    if(head==null)
    {
        p.prev=p.next=null;
        head=tail=p;
    }
    p.next=head;
    p.prev=null;
    head.prev=p;
    head=p;
}
public static void insert_end()
{
    Scanner sc=new Scanner(System.in);
    Node p=new Node();
    System.out.println("Enter the value");
    p.info=sc.nextInt();
    if(head==null)
    {
        p.prev=p.next=null;
        head=tail=p;
    }
    p.prev=tail;
    p.next=null;
    tail.next=p;
    tail=p;
}
public static void insert_pos(int pos)
{
    Scanner sc=new Scanner(System.in);
    int count=count();
    if(pos>=1&&pos<=count+1)
    {
        if(pos==1)
            insert_beg();
        else if(pos==count+1)
            insert_end();
        else
        {

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        int cnt=1;
        Node temp=head;
        while(cnt<pos)
        {
            cnt=cnt+1;
            temp=temp.next;
        }
        Node p=new Node();
        System.out.println("Enter the value");
        p.info=sc.nextInt();
        p.prev=temp.prev;
        p.next=temp;
        temp.prev.next=p;
        temp.prev=p;
    }
}
else
{
    System.out.println("Invalid position");
}
}
public static void del_beg()
{
    if(head==null)
    {
        System.out.println("Underflow");
        return;
    }
    else if(head.next==null)
        head=tail=null;
    else
    {
        head=head.next;
        head.prev=null;
    }
}
public static void del_end()
{
    if(head==null)
    {
        System.out.println("Underflow");
        return;
    }
    else if(head.next==null)
        head=tail=null;
    else
    {
        tail=tail.prev;
        tail.next=null;
    }
}
public static void del_pos()
{
    Scanner sc=new Scanner(System.in);
    if(head==null)
    {

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        System.out.println("Underflow");
        return;
    }
    System.out.println("Enter the position");
    int pos=sc.nextInt();
    int count=count();
    if(pos>=1&&pos<=count)
    {
        if(pos==1)
            del_beg();
        else if(pos==count)
            del_end();
        else
        {
            int cnt=1;
            Node temp=head;
            while(cnt<pos)
            {
                cnt=cnt+1;
                temp=temp.next;
            }
            temp.prev.next=temp.next;
            temp.next.prev=temp.prev;
            temp.next=temp.next=null;
            temp=null;
        }
    }
    else
        System.out.println("Invalid position");
}

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("3:Count");
        System.out.println("4:Insert");
        System.out.println("5:Delete");
        System.out.println("*****");
        System.out.println("Enter the choice");
        int choice=sc.nextInt();
        switch(choice)
        {
            case 0:
                System.exit(0);
            case 1:
                create();
                break;
            case 2:
                display();
                break;
            case 3:
                System.out.println("No. of Nodes =" +count());

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        break;
    case 4:
        System.out.println("****INSERT****");
        System.out.println("1: Begning");
        System.out.println("2: End");
        System.out.println("3: Specific Position");
        System.out.println("Enter the choice");
        int ch=sc.nextInt();
        switch(ch)
        {
            case 1:
                insert_beg();
                break;
            case 2:
                insert_end();
                break;
            case 3:
                System.out.println("Enter the position");
                int pos=sc.nextInt();
                insert_pos(pos);
                break;
            default:
                System.out.println("Wrong choice");
                break;
        }
        break;
    case 5:
        System.out.println("****DELETE****");
        System.out.println("1: Begning");
        System.out.println("2: End");
        System.out.println("3: Specific Position");
        System.out.println("Enter the choice");
        ch=sc.nextInt();
        switch(ch)
        {
            case 1:
                del_beg();
                break;
            case 2:
                del_end();
                break;
            case 3:
                del_pos();
                break;
            default:
                System.out.println("Wrong choice");
                break;
        }
        break;
    default:
        System.out.println("Wrong choice");
    }
}
}
}

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