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Program-1

Q1. Write a Java program to concatenate two singly linked list.

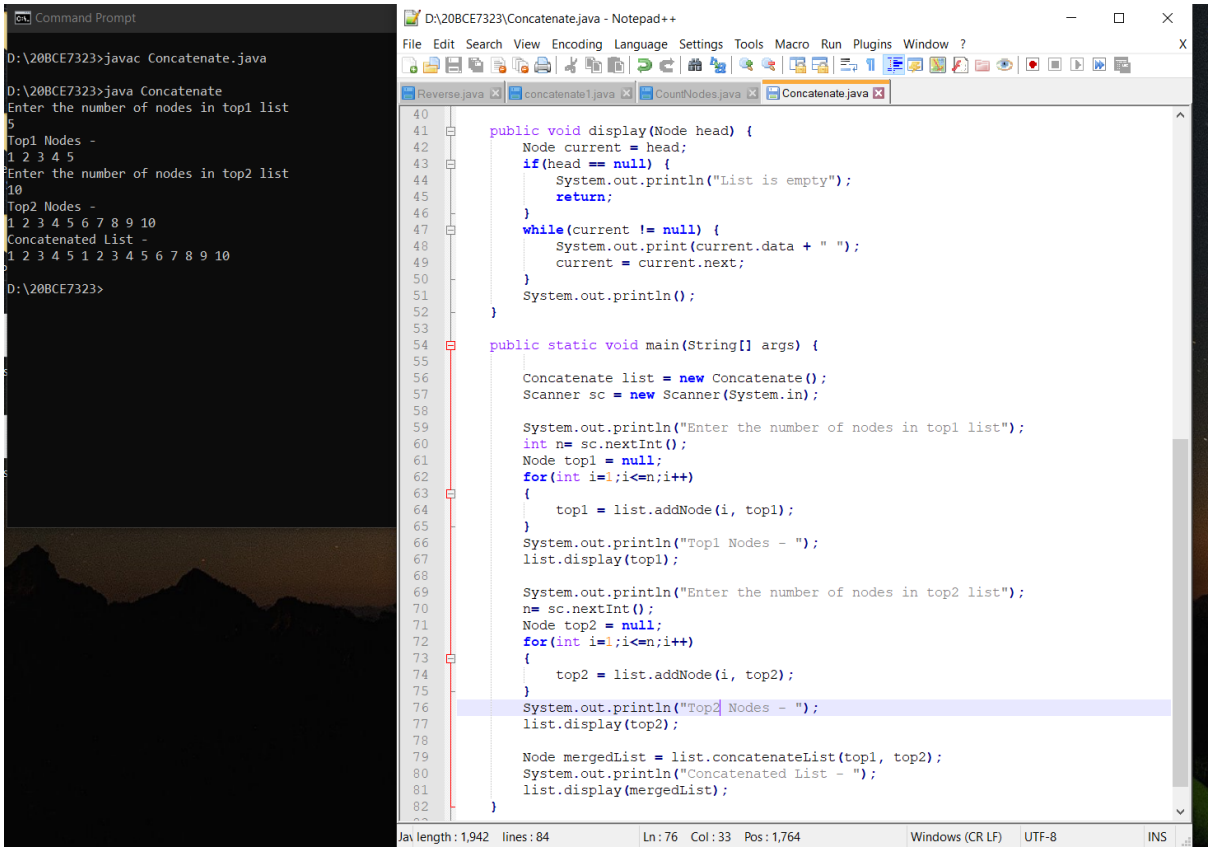
Code

```
import java.util.*;
public class Concatenate {

        class Node{
    int data;
    Node next;

    public Node(int data) {
       this.data = data;
       this.next = null;
    }
  }

       public Node addNode(int data, Node head) {
    Node newNode = new Node(data);
                Node temp = head;
    if(head == null) {
       head = newNode;
                        return head;
    }
                while(temp.next != null) {
```

```
                temp = temp.next;
            }
            temp.next = newNode;
            return head;
    }

    public Node concatenateList(Node top1, Node top2) {
            if(top1 == null) {
                top1 = top2;
                return top1;
            }
            Node temp = top1;
            while(temp.next != null) {
                temp = temp.next;
            }
            temp.next = top2;
            return top1;
    }

    public void display(Node head) {
   Node current = head;
   if(head == null) {
      System.out.println("List is empty");
      return;
   }
   while(current != null) {
```

```
        System.out.print(current.data + " ");
        current = current.next;
    }
    System.out.println();
}

    public static void main(String[] args) {

    Concatenate list = new Concatenate();
    Scanner sc = new Scanner(System.in);

            System.out.println("Enter the number of nodes in top1 list");
            int n= sc.nextInt();
            Node top1 = null;
            for(int i=1;i<=n;i++)
            {
                top1 = list.addNode(i, top1);
            }
            System.out.println("Top1 Nodes - ");
            list.display(top1);

            System.out.println("Enter the number of nodes in top2 list");
            n= sc.nextInt();
            Node top2 = null;
            for(int i=1;i<=n;i++)
            {
```

```
                top2 = list.addNode(i, top2);
            }
            System.out.println("Top2 Nodes - ");
            list.display(top2);

            Node mergedList = list.concatenateList(top1, top2);
            System.out.println("Concatenated List - ");
            list.display(mergedList);
        }

}
```


Command Prompt
D:\20BCE7323>javac Concatenate.java
D:\20BCE7323>java Concatenate
Enter the number of nodes in top1 list
5
Top1 Nodes -
1 2 3 4 5
Enter the number of nodes in top2 list
10
Top2 Nodes -
1 2 3 4 5 6 7 8 9 10
Concatenated List -
1 2 3 4 5 1 2 3 4 5 6 7 8 9 10
D:\20BCE7323>
D:\20BCE7323\Concatenate.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Reverse.java
concatenate1.java
CountNodes.java
Concatenate.java
public void display(Node head) {
Node current = head;
if(head == null) {
System.out.println("List is empty");
return;
}
while(current != null) {
System.out.print(current.data + " ");
current = current.next;
}
System.out.println();
}
public static void main(String[] args) {
Concatenate list = new Concatenate();
Scanner sc = new Scanner(System.in);
System.out.println("Enter the number of nodes in top1 list");
int n= sc.nextInt();
Node top1 = null;
for(int i=1;i<=n;i++)
{
top1 = list.addNode(i, top1);
}
System.out.println("Top1 Nodes - ");
list.display(top1);
System.out.println("Enter the number of nodes in top2 list");
n= sc.nextInt();
Node top2 = null;
for(int i=1;i<=n;i++)
{
top2 = list.addNode(i, top2);
}
System.out.println("Top2 Nodes - ");
list.display(top2);
Node mergedList = list.concatenateList(top1, top2);
System.out.println("Concatenated List - ");
list.display(mergedList);
}
Ja\ length : 1,942 lines : 84
Ln : 76 Col : 33 Pos : 1,764
Windows (CR LF)
UTF-8
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Q2. Write a Java program to insert a node at given specified location in a doubly linked list.

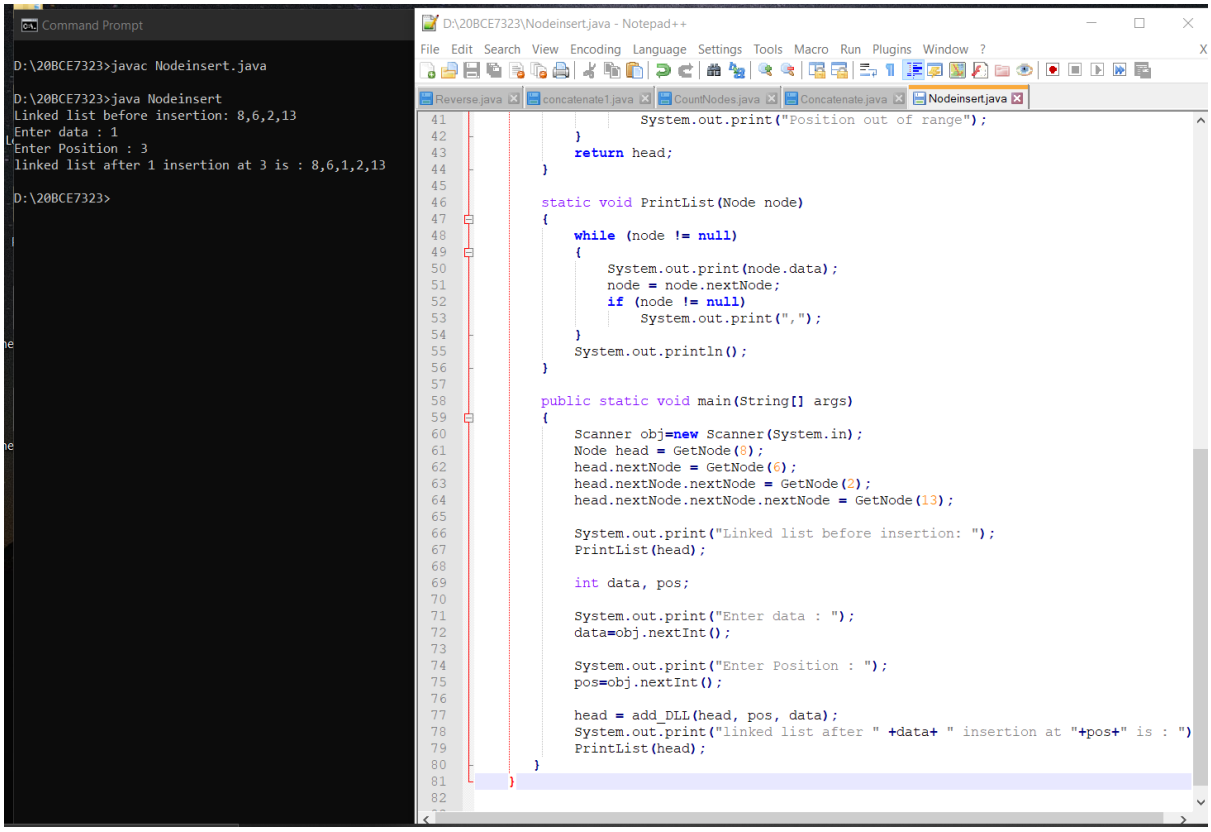
Code

```
import java.util.*;
public class Nodeinsert {
        static class Node {
            public int data;
            public Node nextNode;

            public Node(int data)
            {
               this.data = data;
            }
         }
         static Node GetNode(int data)
         {
            return new Node(data);
         }
         static Node add_DLL(Node headNode, int position, int data)
         {
            Node head = headNode;
            if (position < 1)
               System.out.print("Invalid position");
            if (position == 1)
            {
               Node newNode = new Node(data);
               newNode.nextNode = headNode;
```

```
        head = newNode;
    }
    else
        {
        while (position-- != 0) {
            if (position == 1) {

                Node newNode = GetNode(data);

                newNode.nextNode = headNode.nextNode;
                headNode.nextNode = newNode;
                break;
            }
            headNode = headNode.nextNode;
        }
        if (position != 1)
            System.out.print("Position out of range");
    }
    return head;
}

static void PrintList(Node node)
{
    while (node != null)
    {
        System.out.print(node.data);
```

```
        node = node.nextNode;
        if (node != null)
            System.out.print(",");
    }
    System.out.println();
}

public static void main(String[] args)
{
    Scanner obj=new Scanner(System.in);
    Node head = GetNode(8);
    head.nextNode = GetNode(6);
    head.nextNode.nextNode = GetNode(2);
    head.nextNode.nextNode.nextNode = GetNode(13);

    System.out.print("Linked list before insertion: ");
    PrintList(head);

    int data, pos;

    System.out.print("Enter data : ");
    data=obj.nextInt();

    System.out.print("Enter Position : ");
    pos=obj.nextInt();
```

```
                head = add_DLL(head, pos, data);
                System.out.print("linked list after " +data+ " insertion at "+pos+" is :
");
                PrintList(head);
            }
        }
```


Command Prompt
D:\20BCE7323>javac Nodeinsert.java
D:\20BCE7323>java Nodeinsert
Linked list before insertion: 8,6,2,13
Enter data : 1
Enter Position : 3
linked list after 1 insertion at 3 is : 8,6,1,2,13
D:\20BCE7323>
D:\20BCE7323\Nodeinsert.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Reverse.java
concatenate1.java
CountNodes.java
Concatenate.java
Nodeinsert.java
System.out.print("Position out of range");
}
return head;
}
static void PrintList(Node node)
{
while (node != null)
{
System.out.print(node.data);
node = node.nextNode;
if (node != null)
System.out.print(",");
}
System.out.println();
}
public static void main(String[] args)
{
Scanner obj=new Scanner(System.in);
Node head = GetNode(8);
head.nextNode = GetNode(6);
head.nextNode.nextNode = GetNode(2);
head.nextNode.nextNode.nextNode = GetNode(13);
System.out.print("Linked list before insertion: ");
PrintList(head);
int data, pos;
System.out.print("Enter data : ");
data=obj.nextInt();
System.out.print("Enter Position : ");
pos=obj.nextInt();
head = add_DLL(head, pos, data);
System.out.print("linked list after " +data+ " insertion at "+pos+" is : ")
PrintList(head);
}
}