

## LAB SHEET -4

### AIM 1: Understanding the concepts Linked List (10points)

1. Implement a program to count the length of a singly linked list.

**Solution:**

The screenshot shows the Eclipse IDE with the following components:

- Package Explorer (Left):** Shows the project structure. The 'src' folder contains 'LinkedList.java', 'program1.java', 'program2.java', 'Queue.java', and 'reverse.java'.
- Editor (Center):** Displays the code for 'LinkedList.java'. The code defines a 'Node' class with 'data' and 'next' attributes, and a 'LinkedList' class with a 'head' attribute and methods 'push' and 'getCount'.
- Outline (Right):** Shows the class hierarchy. The 'LinkedList' class is expanded, showing its methods: 'push(int): void', 'getCount(): int', and 'main(String[]): void'.
- Console (Bottom):** Shows the output of the program: 'Count of nodes is 6'.

The screenshot shows the Eclipse IDE interface. The Package Explorer on the left lists the project structure: DSA, JRE System Library [JavaSE-17], src, (default package), array.java, delete.java, expression.java, LinkedList.java, program1.java, program2.java, Queue.java, and reverse.java. The main editor displays the code for LinkedList.java, which includes a getCount() method and a main method that creates a LinkedList, pushes several values, and prints the count of nodes. The Outline on the right shows the class structure: Node, LinkedList, head: Node, push(int): void, getCount(): int, and main(String[]): void. The Console at the bottom shows the output: 'Count of nodes is 6'.

## 2. Implement a program to move last node of a singly linked list to front.

Solution:

```
1 class MoveNode {
2     Node head;
3
4     class Node {
5         int data;
6         Node next;
7         Node(int d)
8         {
9             data = d;
10            next = null;
11        }
12    }
13
14    void moveToFront()
15    {
16        if (head == null || head.next == null)
17            return;
18        Node secLast = null;
19        Node last = head;
20
21        while (last.next != null) {
22            secLast = last;
23            last = last.next;
24        }
25
26        secLast.next = null;
27        last.next = head;
28        head = last;
29    }
30
31    public void push(int new_data)
32    {
33        Node new_node = new Node(new_data);
34    }
35
36}
```

Linked List before moving last to front  
3 5 8 1 4  
Linked List after moving last to front  
4 3 5 8 1

```
14 void moveToFront()
15 {
16     if (head == null || head.next == null)
17         return;
18     Node secLast = null;
19     Node last = head;
20
21     while (last.next != null) {
22         secLast = last;
23         last = last.next;
24     }
25
26     secLast.next = null;
27     last.next = head;
28     head = last;
29 }
30
31 public void push(int new_data)
32 {
33     Node new_node = new Node(new_data);
34 }
35
36}
```

Linked List before moving last to front  
3 5 8 1 4  
Linked List after moving last to front  
4 3 5 8 1

```
DSAsrcMoveNode.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer x
AutoLab
DSAsrc
JRE System Library [JavaSE-17]
array.java
delete.java
expression.java
LinkedList.java
MoveNode.java
program1.java
program2.java
Queue.java
reverse.java
Exam
Labsheet-2
Labsheet-3
Labsheet-4
Labsheet-5
Project 1
DSAsrcMoveNode.java x
LinkedList.java x
MoveNode.java x
main(String[]): void
33
34 public void push(int new_data)
35 {
36     Node new_node = new Node(new_data);
37     new_node.next = head;
38     head = new_node;
39 }
40
41 void printList()
42 {
43     Node temp = head;
44     while (temp != null) {
45         System.out.print(temp.data + " ");
46         temp = temp.next;
47     }
48     System.out.println();
49 }
50
51
52 public static void main(String args[])
53 {
54     MoveNode mn = new MoveNode();
55     mn.push(4);
56     mn.push(1);
57 }
Problems Javadoc Declaration Console x
<terminated> MoveNode [Java Application] C:\Users\DELL\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.3.v20220515-1416\jre\bin\javaw.exe (23-Feb-2023, 8:16:37)
Linked List before moving last to front
3 5 8 1 4
Linked List after moving last to front
4 3 5 8 1
```

```
DSAsrcMoveNode.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer x
AutoLab
DSAsrc
JRE System Library [JavaSE-17]
array.java
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Exam
Labsheet-2
Labsheet-3
Labsheet-4
Labsheet-5
Project 1
DSAsrcMoveNode.java x
LinkedList.java x
MoveNode.java x
main(String[]): void
46
47     temp = temp.next;
48 }
49 System.out.println();
50 }
51
52 public static void main(String args[])
53 {
54     MoveNode mn = new MoveNode();
55     mn.push(4);
56     mn.push(1);
57     mn.push(8);
58     mn.push(5);
59     mn.push(3);
60     System.out.println("Linked List before moving last to front ");
61     mn.printList();
62     mn.moveToFront();
63     System.out.println("Linked List after moving last to front ");
64     mn.printList();
65 }
66 }
67
68
Problems Javadoc Declaration Console x
<terminated> MoveNode [Java Application] C:\Users\DELL\p2\pool\plugins\org.eclipse.justi.openjdk.hotspot.jre.full.win32.x86_64_17.0.3.v20220515-1416\jre\bin\javaw.exe (23-Feb-2023, 8:16:37)
Linked List before moving last to front
3 5 8 1 4
Linked List after moving last to front
4 3 5 8 1
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```

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