

A dark blue vertical bar on the left side of the page. A blue arrow points to the right from the bar, containing the date.

9/1/2024

FAHEEM AKBAR

DSA Lab: 02 Solution

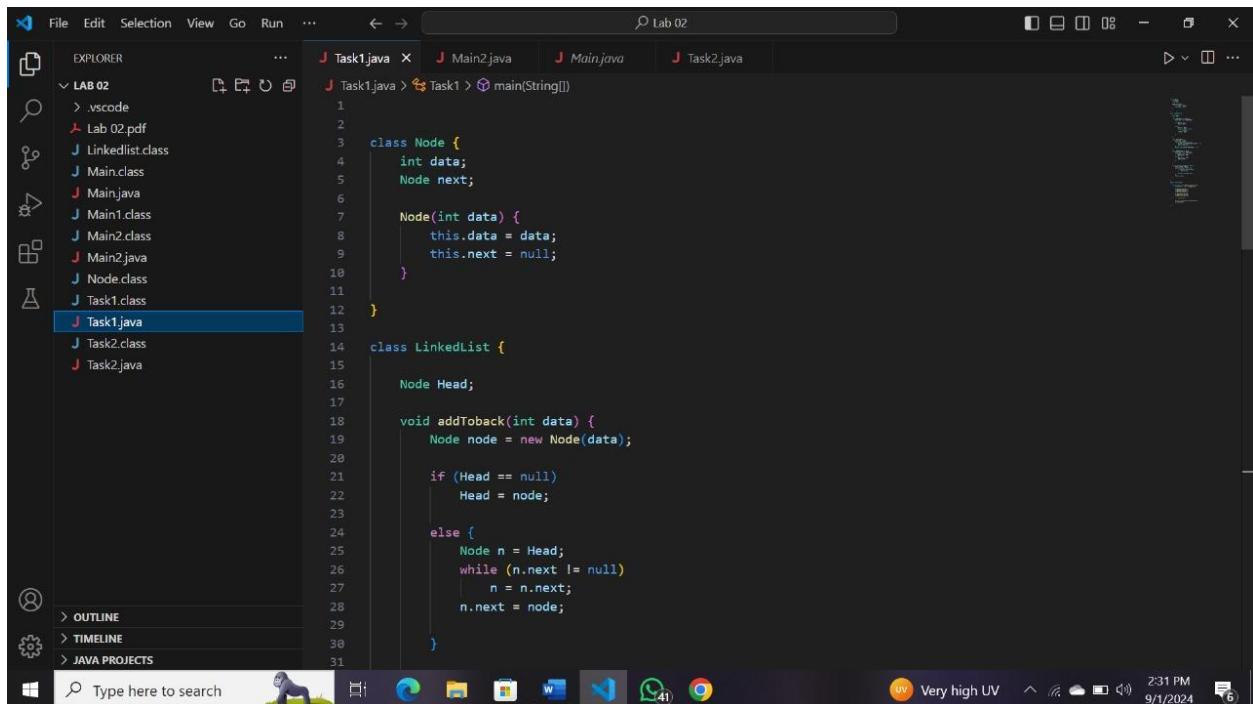
Several thin, curved lines in dark blue and light grey originate from the bottom left corner and curve upwards and to the right.

CMS ID: 023-23-0365

DSA LAB 02 || SUBMITTED TO MA'AM MARINA GUL

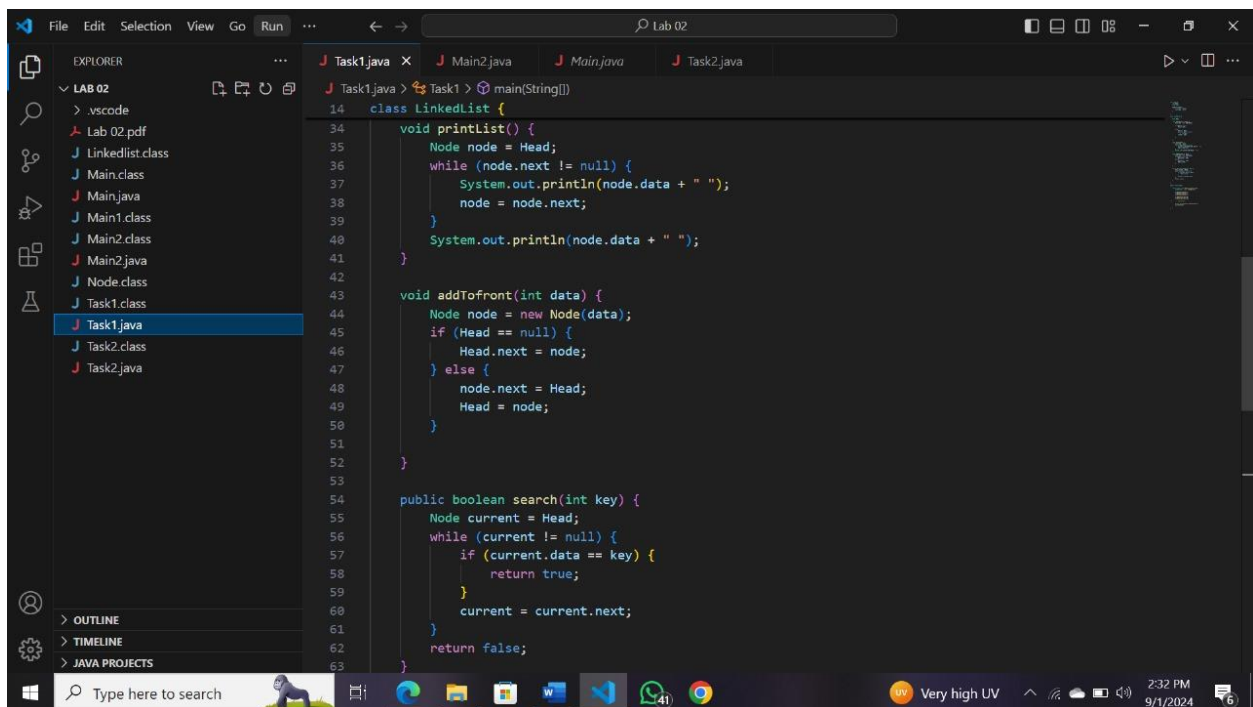
Task 01: Search number in Linked List

Solution:



This screenshot shows the initial implementation of a linked list in VS Code. The Explorer panel on the left shows a project named 'LAB 02' with files including 'Task1.java'. The main editor displays the code for 'Task1.java' with the following content:

```
1
2
3 class Node {
4     int data;
5     Node next;
6
7     Node(int data) {
8         this.data = data;
9         this.next = null;
10    }
11
12 }
13
14 class LinkedList {
15
16     Node Head;
17
18     void addToback(int data) {
19         Node node = new Node(data);
20
21         if (Head == null)
22             Head = node;
23
24         else {
25             Node n = Head;
26             while (n.next != null)
27                 n = n.next;
28             n.next = node;
29         }
30     }
31 }
```



This screenshot shows the completed implementation of the linked list in VS Code. The Explorer panel on the left shows the same project structure. The main editor displays the code for 'Task1.java' with the following content:

```
14 class LinkedList {
34     void printlist() {
35         Node node = Head;
36         while (node.next != null) {
37             System.out.println(node.data + " ");
38             node = node.next;
39         }
40         System.out.println(node.data + " ");
41     }
42
43     void addTofront(int data) {
44         Node node = new Node(data);
45         if (Head == null) {
46             Head = node;
47         } else {
48             node.next = Head;
49             Head = node;
50         }
51     }
52
53     public boolean search(int key) {
54         Node current = Head;
55         while (current != null) {
56             if (current.data == key) {
57                 return true;
58             }
59             current = current.next;
60         }
61         return false;
62     }
63 }
```

Output

```
public class Task1 {  
    public static void main(String[] args) {  
        LinkedList l = new LinkedList();  
  
        l.addToBack(data:5);  
        l.addToBack(data:8);  
        l.addToBack(data:9);  
  
        l.addToFront(data:9);  
        l.addToFront(data:6);  
  
        // l.printList();  
  
        System.out.println(l.search(key:5));  
        l.printList();  
    }  
}
```

```
PS C:\Faheem Study\BSCS Semester 3\DSA\LAB\Lab 02> java Task1  
true  
6  
9  
5  
8  
9  
PS C:\Faheem Study\BSCS Semester 3\DSA\LAB\Lab 02>
```

Task 2: Find length of Linked List

Solution

```
class Node {  
    int data;  
    Node next;  
  
    Node(int data) {  
        this.data = data;  
        this.next = null;  
    }  
}  
  
class LinkedList {  
    Node Head;  
  
    void addToBack(int data) {  
        Node node = new Node(data);  
  
        if (Head == null)  
            Head = node;  
        else {  
            Node n = Head;  
            while (n.next != null)  
                n = n.next;  
            n.next = node;  
        }  
    }  
  
    void printList() {  
        Node node = Head;  
        while (node.next != null) {  
            System.out.println(node.data + " ");  
        }  
    }  
}
```

```
PS C:\Faheem Study\BSCS Semester 3\DSA\LAB\Lab 02> java Task2
```

The screenshot shows the Visual Studio Code editor with a project named 'LAB 02'. The Explorer sidebar on the left lists files including 'Lab 02.pdf', 'LinkedList.class', 'Main.class', 'Main.java', 'Main1.class', 'Main2.class', 'Main2.java', 'Node.class', 'Task1.class', 'Task1.java', 'Task2.class', and 'Task2.java'. The main editor window displays the code for 'Task2.java', which defines a 'LinkedList' class with methods 'printList()', 'addToFront(int data)', and 'length()'. The 'printList()' method iterates through the linked list and prints each node's data. The 'addToFront()' method adds a new node to the beginning of the list. The 'length()' method returns the number of nodes in the list. The bottom status bar shows the time as 3:03 PM on 9/1/2024.

```
10 class LinkedList {
28     void printList() {
31         System.out.println(node.data + " ");
32         node = node.next;
33     }
34     System.out.println(node.data + " ");
35 }
36
37 void addToFront(int data) {
38     Node node = new Node(data);
39     if (Head == null) {
40         Head.next = node;
41     } else {
42         node.next = Head;
43         Head = node;
44     }
45 }
46
47
48 int length() {
49     int count = 0;
50     Node current = Head;
51     while (current != null) {
52         count++;
53         current = current.next;
54     }
55     return count;
56 }
57
58 }
59 }
```

Output:

The screenshot shows the Visual Studio Code editor with the same project 'LAB 02'. The main editor window displays the code for 'Task2.java', which defines a 'Task2' class with a 'main' method. The 'main' method creates a 'LinkedList' object 'l' and performs a series of operations: adding 5, 8, and 9 to the back of the list, and adding 9 and 6 to the front of the list. It then prints the length of the list and the list itself. The bottom status bar shows the time as 3:00 PM on 9/1/2024. The terminal window at the bottom shows the command 'javac Task2.java' and 'java Task2', followed by the output 'Length is : 5' and the list contents '6 9 5 8 9'.

```
60 public class Task2 {
61
62     Run | Debug
63     public static void main(String[] args) {
64         LinkedList l = new LinkedList();
65
66         l.addToBack(data:5);
67         l.addToBack(data:8);
68         l.addToBack(data:9);
69
70         l.addToFront(data:9);
71         l.addToFront(data:6);
72
73         // l.printList();
74
75         System.out.println("Length is : " + l.length());
76         l.printList();
77     }
78 }
```

PS C:\Faheem Study\BSCS Semester 3\DSA\DSA LAB\Lab 02> javac Task2.java
PS C:\Faheem Study\BSCS Semester 3\DSA\DSA LAB\Lab 02> java Task2
Length is : 5
6
9
5
8
9