

```

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

// Utility method to print the Doubly Linked List
private static void printList(Node node) {
    while (node != null) {
        System.out.print(node.data + " <-> ");
        node = node.next;
    }
    System.out.println("null");
}

public static void main(String[] args) {
    DoublyLinkedList dll = new DoublyLinkedList();

    // Insert elements at the beginning
    dll.insertAtBeginning(10);
    dll.insertAtBeginning(20);

    // Insert elements at the end
    dll.insertAtEnd(30);
    dll.insertAtEnd(40);

    // Insert after a specific node
    Node thirdNode = dll.head.next;
    dll.insertAfter(thirdNode, 25);

    // Print the list
    System.out.println("Doubly Linked List:");
    printList(dll.head);
}

```

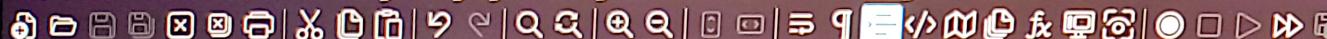
```

C:\Windows\System32\cmd.exe + ^
Microsoft Windows [Version 10.0.22631.34]
(c) Microsoft Corporation. All rights reserved.

C:\Users\weave\OneDrive\Desktop\anuj\ass...
error: file not found: DoublyLinked.java
Usage: javac <options> <source files>
use --help for a list of possible option...

C:\Users\weave\OneDrive\Desktop\anuj\ass...
C:\Users\weave\OneDrive\Desktop\anuj\ass...
Doubly Linked List:
20 <-> 10 <-> 25 <-> 30 <-> 40 <-> null

```



```
26         current.prev = nextNode;
27
28         prev = current;
29         current = nextNode;
30     }
31
32     head = prev;
33
34     return head;
35 }
36
37
38 public void printList(DoublyListNode head) {
39     DoublyListNode temp = head;
40     while (temp != null) {
41         System.out.print(temp.val + " ");
42         temp = temp.next;
43     }
44     System.out.println();
45 }
46
47
48 public static void main(String[] args) {
49     DoublyListNode head = new DoublyListNode(1);
50     head.next = new DoublyListNode(2);
51     head.next.prev = head;
52     head.next.next = new DoublyListNode(3);
53     head.next.next.prev = head.next;
54
55     ReverseDoublyLinkedList reverser = new ReverseDoublyLinkedList();
56     System.out.println("Original Doubly Linked List:");
57     reverser.printList(head);
58
59     head = reverser.reverse(head);
60
61     System.out.println("Reversed Doubly Linked List:");
62     reverser.printList(head);
63 }
64 }
```



C:\Windows\System32\cmd.exe

public class ReverseDoublyLinkedList {

1 error

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>javac Ques2.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>java ReverseDoublyLinkedList

Original Doubly Linked List:

1 2 3

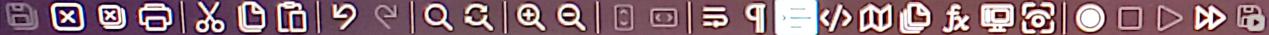
Reversed Doubly Linked List:

3 2 1

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>

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LinkedList.java | Ques2.java | Ques3.java

```
if (nodeToDelete.next != null) {
    nodeToDelete.next.prev = nodeToDelete.prev;
}

if (nodeToDelete.prev != null) {
    nodeToDelete.prev.next = nodeToDelete.next;
}

nodeToDelete = null;

return head;
}

public void printList(DoublyListNode head) {
    DoublyListNode temp = head;
    while (temp != null) {
        System.out.print(temp.data + " ");
        temp = temp.next;
    }
    System.out.println();
}

public static void main(String[] args) {
    DoublyListNode head = new DoublyListNode(1);
    head.next = new DoublyListNode(2);
    head.next.prev = head;
    head.next.next = new DoublyListNode(3);
    head.next.next.prev = head.next;
    head.next.next.next = new DoublyListNode(4);
    head.next.next.next.prev = head.next.next;

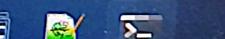
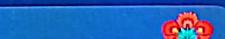
    DeleteNodeDoublyLinkedList deleter = new DeleteNodeDoublyLinkedList();
    System.out.println("Original Doubly Linked List:");
    deleter.printList(head);

    head = deleter.deleteNode(head, head.next);
    System.out.println("Doubly Linked List after deleting node :");
    deleter.printList(head);
}
```

source file

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C:\Windows\System32\cmd.exe



Microsoft Windows [Version 10.0.22631.3447]
(c) Microsoft Corporation. All rights reserved.

C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques3.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques3.java
Error: Main method not found in class DoublyLinkedList, please define the main method as:
public static void main(String[] args)
or a JavaFX application class must extend javafx.application.Application

C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques3.java
Original Doubly Linked List:

1 2 3 4

Doubly Linked List after deleting node :

1 3 4

C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques3.java

length : 1,740 lines : 67

Ln: 11 Col: 8 Sel: 26 | 1

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C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques4.java - Notepad++

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DoublyLinkedList.java | Ques2.java | Ques3.java | Ques4.java

```
1 class DoublyListNode {
2     int val;
3     DoublyListNode prev;
4     DoublyListNode next;
5
6     DoublyListNode(int x) {
7         val = x;
8     }
9 }
10
11 class DoublyLinkedListLength {
12     public int findLength(DoublyListNode head) {
13         int length = 0;
14         DoublyListNode current = head;
15
16         while (current != null) {
17             length++;
18             current = current.next;
19         }
20
21         return length;
22     }
23
24
25     public static void main(String[] args) {
26         DoublyListNode head = new DoublyListNode(1);
27         head.next = new DoublyListNode(2);
28         head.next.prev = head;
29         head.next.next = new DoublyListNode(3);
30         head.next.next.prev = head.next;
31         head.next.next.next = new DoublyListNode(4);
32         head.next.next.next.prev = head.next.next;
33
34         DoublyLinkedListLength lengthFinder = new DoublyLinkedListLength();
35         int length = lengthFinder.findLength(head);
36         System.out.println("Length of the Doubly Linked List: " + length);
37     }
38 }
39 }
```

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```
C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques4.java
Ques4.java:11: error: class DoublyLinkedListLength
      is public, should be declared in a file named
      DoublyLinkedListLength.java
public class DoublyLinkedListLength {
^
1 error

C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques4.java
C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques4.java
Length of the Doubly Linked List: 4

C:\Users\weave\OneDrive\Desktop\anuj\assignment4\Ques4.java
```

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LinkedList.java Ques2.java Ques3.java Ques4.java Ques5.java

```
class DoublyListNode {
```

```
    int val;  
    DoublyListNode prev;  
    DoublyListNode next;
```

```
    DoublyListNode(int x) {  
        val = x;  
    }
```

```
}
```

```
class LargestNodeDoublyLinkedList {
```

```
    public int findLargest(DoublyListNode head) {  
        if (head == null) {  
            throw new IllegalArgumentException("The list is empty.");  
        }
```

```
        int maxVal = head.val;  
        DoublyListNode current = head.next;
```

```
        while (current != null) {  
            if (current.val > maxVal) {  
                maxVal = current.val;  
            }  
            current = current.next;  
        }
```

```
        return maxVal;  
    }
```

```
    public static void main(String[] args) {  
        DoublyListNode head = new DoublyListNode(1);  
        head.next = new DoublyListNode(2);  
        head.next.prev = head;  
        head.next.next = new DoublyListNode(6);  
        head.next.next.prev = head.next;  
        head.next.next.next = new DoublyListNode(4);  
        head.next.next.next.prev = head.next.next;
```

```
        LargestNodeDoublyLinkedList largestFinder = new LargestNodeDoublyLinkedList();  
        int largest = largestFinder.findLargest(head);  
        System.out.println("Largest node in the Doubly Linked List: " + largest);
```

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C:\Users\weave\OneDrive\Desktop\anuj\assignment4>j
avac Ques5.java

Ques5.java:11: error: class LargestNodeDoublyLinke
dList is public, should be declared in a file name
d LargestNodeDoublyLinkedList.java
public class LargestNodeDoublyLinkedList {
^

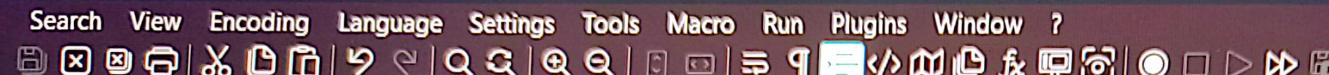
1 error

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>j
avac Ques5.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>j
ava LargestNodeDoublyLinkedList
Largest node in the Doubly Linked List: 6

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>

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linkedList.java | Ques2.java | Ques3.java | Ques4.java | Ques5.java | Ques6.java

```
DoublyListNode current = head;
```

```
while (current.next != null && current.next.val < val) {  
    current = current.next;  
}
```

```
newNode.next = current.next;  
if (current.next != null) {  
    current.next.prev = newNode;  
}
```

```
current.next = newNode;  
newNode.prev = current;
```

```
return head;
```

```
}
```

```
public void printList(DoublyListNode head) {  
    DoublyListNode temp = head;  
    while (temp != null) {  
        System.out.print(temp.val + " ");  
        temp = temp.next;  
    }  
    System.out.println();
```

```
}
```

```
public static void main(String[] args) {  
    DoublyListNode head = new DoublyListNode(1);  
    head.next = new DoublyListNode(2);  
    head.next.prev = head;  
    head.next.next = new DoublyListNode(4);  
    head.next.next.prev = head.next;
```

```
InsertSortedDoublyLinkedList inserter = new InsertSortedDoublyLinkedList();
```

```
System.out.println("Original Doubly Linked List:");
```

```
inserter.printList(head);
```

```
head = inserter.insert(head, 3);
```

```
System.out.println("Doubly Linked List after inserting 3:");
```

```
inserter.printList(head);
```

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C:\Users\weave\OneDrive\Desktop\anuj\assignment4>j
avac Ques5.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>j
avac LargestNodeDoublyLinkedList
Largest node in the Doubly Linked List: 6

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>j
avac Ques6.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>j
avac InsertSortedDoublyLinkedList
Original Doubly Linked List:
1 2 4
Doubly Linked List after inserting 3:
1 2 3 4

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>

Users\weave\OneDrive\Desktop\anuj\assignment4\Ques7.java - Notepad++

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ublyLinkedList.java | Ques2.java | Ques3.java | Ques4.java | Ques5.java | Ques6.java | Ques7.java

```
if (root == null) {
    return;
}
inorderTraversal(root.left);
System.out.print(root.val + " ");
inorderTraversal(root.right);
}

public void postorderTraversal(TreeNode root) {
    if (root == null) {
        return;
    }
    postorderTraversal(root.left);
    postorderTraversal(root.right);
    System.out.print(root.val + " ");
}

public static void main(String[] args) {
    TreeNode root = new TreeNode(1);
    root.left = new TreeNode(2);
    root.right = new TreeNode(3);
    root.left.left = new TreeNode(4);
    root.left.right = new TreeNode(5);

    TreeTraversal treeTraversal = new TreeTraversal();

    System.out.print("Preorder Traversal: ");
    treeTraversal.preorderTraversal(root);
    System.out.println();

    System.out.print("Inorder Traversal: ");
    treeTraversal.inorderTraversal(root);
    System.out.println();

    System.out.print("Postorder Traversal: ");
    treeTraversal.postorderTraversal(root);
    System.out.println();
}
```

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Override location of upgradeable modules
-verbose
ut what the compiler is doing
--version, -version
-Werror
on if warnings occur
Output messages about
Version information
Terminate compilation

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>javac Ques7.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>java TreeTraversal
Preorder Traversal: 1 2 4 5 3
Inorder Traversal: 4 2 5 1 3
Postorder Traversal: 4 5 2 3 1

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>javac Ques7.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>java TreeTraversal

Preorder Traversal: 1 2 4 5 3

Inorder Traversal: 4 2 5 1 3

Postorder Traversal: 4 5 2 3 1

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>javac Ques8.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment4>java BinaryTreeSearch

Node with value 5 found in the binary tree.

```
public class BinaryTreeNode {  
    int val;  
    BinaryTreeNode left;  
    BinaryTreeNode right;  
}  
  
public class BinaryTreeSearch {  
  
    public boolean search(BinaryTreeNode root, int target) {  
        if (root == null) {  
            return false;  
        }  
  
        if (search(root.left, target)) {  
            return true;  
        }  
  
        if (root.val == target) {  
            return true;  
        }  
  
        return search(root.right, target);  
    }  
  
    public static void main(String[] args) {  
  
        BinaryTreeNode root = new BinaryTreeNode(1);  
        root.left = new BinaryTreeNode(2);  
        root.right = new BinaryTreeNode(3);  
        root.left.left = new BinaryTreeNode(4);  
        root.left.right = new BinaryTreeNode(5);  
        root.right.left = new BinaryTreeNode(6);  
        root.right.right = new BinaryTreeNode(7);  
  
        BinaryTreeSearch searcher = new BinaryTreeSearch();  
  
        int target = 5;  
        boolean found = searcher.search(root, target);  
  
        if (found) {  
            System.out.println("Node with value " + target + " found in the binary tree.");  
        } else {  
            System.out.println("Node with value " + target + " not found in the binary tree.");  
        }  
    }  
}
```