

```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?  
LinearSearch.java BinarySearch.java SortElementsByFrequency.java SortColors.java BalancedParentheses.java Stack.java Queue.java Deque.java Ques9.java Ques10.java  
1 class SinglyLinkedList {  
2     private Node head;  
3  
4     public SinglyLinkedList() {  
5         this.head = null;  
6     }  
7  
8     public void insertAtBeginning(int data) {  
9         Node newNode = new Node(data);  
10        newNode.next = head;  
11        head = newNode;  
12    }  
13  
14    public void insertAtEnd(int data) {  
15        Node newNode = new Node(data);  
16        if (head == null) {  
17            head = newNode;  
18            return;  
19        }  
20        Node current = head;  
21        while (current.next != null) {  
22            current = current.next;  
23        }  
24        current.next = newNode;  
25    }  
26  
27    public void display() {  
28        Node current = head;  
29        while (current != null) {  
30            System.out.print(current.data + " ");  
31            current = current.next;  
32        }  
33        System.out.println();  
34    }  
35  
36    public boolean isEmpty() {  
37        return head == null;  
38    }  
39  
40    public static void main(String[] args) {  
41        SinglyLinkedList list = new SinglyLinkedList();  
42        list.insertAtEnd(10);  
43        list.insertAtEnd(20);  
44        list.insertAtEnd(30);  
45        list.insertAtBeginning(5);  
46        list.display();  
47    }  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59
```

```
C:\Windows\System32\cmd.exe + v  
public static void main(String[] args)  
or a JavaFX application class must extend javafx.application.Application  
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Node.java  
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java SinglyLinkedList  
5 10 20 30  
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>
```

C:\Users\weave\OneDrive\Desktop\anuj\assignment3\Node2.java - Notepad++

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LinearSearch.java | BinarySearch.java | SortElementsByFrequency.java | SortColors.java | BalancedParentheses.java | Stack.java | Queue.java | Deque.java | Ques9.java | Ques10.java | Node2.java

```
1
2     public void insertAtBeginning(int data) {
3         Node newNode = new Node(data);
4         if (isEmpty()) {
5             head = newNode;
6             tail = newNode;
7         } else {
8             newNode.next = head;
9             head.prev = newNode;
10            head = newNode;
11        }
12    }
13
14    public void insertAtEnd(int data) {
15        Node newNode = new Node(data);
16        if (isEmpty()) {
17            head = newNode;
18            tail = newNode;
19        } else {
20            newNode.prev = tail;
21            tail.next = newNode;
22            tail = newNode;
23        }
24    }
25
26    public void display() {
27        Node current = head;
28        while (current != null) {
29            System.out.print(current.data + " ");
30            current = current.next;
31        }
32        System.out.println();
33    }
34
35    public boolean isEmpty() {
36        return head == null;
37    }
38
39    public static void main(String[] args) {
40        DoublyLinkedList list = new DoublyLinkedList();
41        list.insertAtEnd(10);
42        list.insertAtEnd(20);
43        list.insertAtEnd(30);
44        list.insertAtBeginning(5);
45        list.display();
46    }
47}
```

C:\Windows\System32\cmd.exe + ▾

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java SinglyLinkedList
5 10 20 30

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Node2.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java DoublyLinkedList
5 10 20 30

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>

length : 1,529 lines : 68 Ln : 67 Col : 2 Pos : 1,528

Windows (CR LF)

Java source file



78°F

ENG IN

\Users\weave\OneDrive\Desktop\anuj\assignment3\Node3.java - Notepad++

Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

ode.java Node2.java Node3.java

```
    }

class LinkedList {
    private Node head;

    public LinkedList() {
        this.head = null;
    }

    // Method to insert at the beginning
    public void insert(int data) {
        Node newNode = new Node(data);
        if (head == null) {
            head = newNode;
        } else {
            newNode.next = head;
            head = newNode;
        }
    }

    // Method to display the Linked List
    public void display() {
        Node current = head;
        while (current != null) {
            System.out.print(current.data + " ");
            current = current.next;
        }
        System.out.println();
    }

    public void reverse() {
        Node prev = null;
        Node current = head;
        Node next = null;
        while (current != null) {
            next = current.next;
            current.next = prev;
            prev = current;
            current = next;
        }
        head = prev;
    }

    public static void main(String[] args) {
        LinkedList list = new LinkedList();
        list.insert(10);
        list.insert(20);
        list.insert(30);
        list.insert(40);
        list.display();
        list.reverse();
        list.display();
    }
}
```

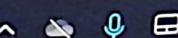
C:\Windows\System32\cmd.exe + ▾

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Node

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java Linked

Original linked list:
40 30 20 10
Reversed linked list:
10 20 30 40

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>



File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

Node.java Node2.java Node3.java Node4.java

```

39     Node current1 = list1.head;
40     Node current2 = list2.head;
41
42     while (current1 != null && current2 != null) {
43         if (current1.data < current2.data) {
44             mergedList.insert(current1.data);
45             current1 = current1.next;
46         } else {
47             mergedList.insert(current2.data);
48             current2 = current2.next;
49         }
50     }
51
52     while (current1 != null) {
53         mergedList.insert(current1.data);
54         current1 = current1.next;
55     }
56
57     while (current2 != null) {
58         mergedList.insert(current2.data);
59         current2 = current2.next;
60     }
61
62     return mergedList;
63 }
64
65
66
67 class Sortlist {
68     public static void main(String[] args) {
69         LinkedList list1 = new LinkedList();
70         list1.insert(5);
71         list1.insert(10);
72         list1.insert(15);
73
74         LinkedList list2 = new LinkedList();
75         list2.insert(2);
76         list2.insert(7);
77         list2.insert(12);
78
79         System.out.println("List 1:");
80         list1.display();
81         System.out.println("List 2:");
82         list2.display();
83
84         LinkedList mergedList = LinkedList.mergeSortedLists(list1, list2);
85         System.out.println("Merged sorted list:");
86         mergedList.display();
87     }
88 }
```

C:\Windows\System32\cmd.exe X + ▾

```

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java Sortlist
List 1:
15 10 5
List 2:
12 7 2
Merged sorted list:
5 10 15 2 7 12
```

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>

```

        } else {
            newNode.next = head;
            head = newNode;
        }
    }

    public void display() {
        Node current = head;
        while (current != null) {
            System.out.print(current.data + " ");
            current = current.next;
        }
        System.out.println();
    }

    public Node findMiddle() {
        if (head == null)
            return null;

        Node slowPtr = head;
        Node fastPtr = head;

        while (fastPtr != null && fastPtr.next != null) {
            slowPtr = slowPtr.next;
            fastPtr = fastPtr.next.next;
        }

        return slowPtr;
    }
}

```

```

class FindMiddleNode {
    public static void main(String[] args) {
        LinkedList list = new LinkedList();
        list.insert(10);
        list.insert(20);
        list.insert(30);
        list.insert(40);
        list.insert(50);

        System.out.println("Original linked list:");
        list.display();

        Node middleNode = list.findMiddle();
        System.out.println("Middle element of the linked list: " + middleNode.data);
    }
}

```

The screenshot shows a Windows Command Prompt window titled 'C:\Windows\System32\cmd.exe'. The command 'javac Main.java' is run, followed by 'java FindMiddleNode'. The output displays the original linked list (50 40 30 20 10) and the middle element (30).

```

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Main.java
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java FindMiddleNode
Original linked list:
50 40 30 20 10
Middle element of the linked list: 30
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>

```

weave\OneDrive\Desktop\anuj\assignment3\Node6.java - Notepad++

Search View Encoding Language Settings Tools Macro Run Plugins Window ?

Node2.java Node3.java Node4.java Node5.java Node6.java

```
if (head == null) {  
    head = newNode;  
} else {  
    newNode.next = head;  
    head = newNode;  
}  
}
```

```
public void createLoop() {  
    Node tail = head;  
    while (tail.next != null) {  
        tail = tail.next;  
    }  
    tail.next = head.next;  
}
```

```
public boolean hasLoop() {  
    if (head == null || head.next == null)  
        return false;  
  
    Node slowPtr = head;  
    Node fastPtr = head.next;  
  
    while (fastPtr != null && fastPtr.next != null) {  
        if (slowPtr == fastPtr)  
            return true;  
  
        slowPtr = slowPtr.next;  
        fastPtr = fastPtr.next.next;  
    }  
  
    return false;  
}
```

C:\Windows\System32\cmd.exe +
50 40 30 20 10
Middle element of the Linked List: 30

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Node6.java

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java DetectLoop
Loop detected in the linked list

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>

C:\Users\weave\OneDrive\Desktop\anuj\assignment3\Node7.java - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

Node.java Node2.java Node3.java Node4.java Node5.java Node6.java Node7.java

```
38
39
40    public int findNthFromEnd(int n) {
41        if (head == null || n < 0) {
42            return -1; // Invalid input
43        }
44
45        Node first = head;
46        Node second = head;
47
48
49        for (int i = 0; i < n; i++) {
50            if (first == null) {
51                return -1;
52            }
53            first = first.next;
54        }
55
56        while (first != null) {
57            first = first.next;
58            second = second.next;
59        }
60
61
62        return second.data;
63    }
64
65
66
67 class NthElement {
68
69     public static void main(String[] args) {
70         LinkedList list = new LinkedList();
71         list.insert(10);
72         list.insert(20);
73         list.insert(30);
74         list.insert(40);
75         list.insert(50);
76
77         System.out.println("Original linked list:");
78         list.display();
79
80         int n = 2;
81         int nthFromEnd = list.findNthFromEnd(n);
82
83         if (nthFromEnd != -1) {
84             System.out.println("The " + n + "th element from the end of the linked list is: " + nthFromEnd);
85         } else {
86             System.out.println("Invalid input or n is greater than the length of the linked list.");
87         }
88     }
89 }
```

C:\Windows\System32\cmd.exe

```
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Node7.java
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java NthElement
Original linked list:
50 40 30 20 10
The 2th element from the end of the linked list is: 20
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>
```

C:\Users\weave\OneDrive\Desktop\anuj\assignment3\Node9.java - Notepad++

```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?  
e.java Node2.java Node3.java Node4.java Node5.java Node6.java Node7.java Node9.java  
ListNode(int x) {  
    val = x;  
    next = null;  
}  
  
class PalindromeLinkedList {  
public boolean isPalindrome(ListNode head) {  
    if (head == null || head.next == null) {  
        return true;  
    }  
  
    ListNode slow = head;  
    ListNode fast = head;  
    while (fast.next != null && fast.next.next != null) {  
        slow = slow.next;  
        fast = fast.next.next;  
    }  
  
    ListNode prev = null;  
    ListNode curr = slow.next;  
    while (curr != null) {  
        ListNode nextTemp = curr.next;  
        curr.next = prev;  
        prev = curr;  
        curr = nextTemp;  
    }  
    slow.next = prev;  
  
    ListNode p1 = head;  
    ListNode p2 = slow.next;  
    while (p2 != null) {  
        if (p1.val != p2.val) {  
            return false;  
        }  
        p1 = p1.next;  
        p2 = p2.next;  
    }  
  
    prev = null;  
    curr = slow.next;  
    while (curr != null) {  
        ListNode nextTemp = curr.next;  
        curr.next = prev;  
        prev = curr;  
        curr = nextTemp;  
    }  
    slow.next = prev;  
}
```

```
C:\Windows\System32\cmd.exe + -  
50 40 30 20 10  
The 2th element from the end of the linked list is: 20  
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Node9.java  
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java PalindromeLinkedList  
Is the linked list a palindrome? true  
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>
```

Java source file

length: 1,769 lines: 72

Ln: 11 Col: 28 Sel: 20 / 1

Windows (CR LF) | UTF-8

80°F
Sunny



08:28
16-04-2024

Search View Encoding Language Settings Tools Macro Run Plugins Window ?

va Node2java Node3java Node4java Node5java Node6java Node7java Node9java Node10.java

}

```
class AddLinkedList {
    public ListNode addTwoNumbers(ListNode l1, ListNode l2) {
        ListNode dummy = new ListNode(0);
        ListNode current = dummy;
        int carry = 0;

        while (l1 != null || l2 != null || carry != 0) {
            int sum = carry;

            if (l1 != null) {
                sum += l1.val;
                l1 = l1.next;
            }

            if (l2 != null) {
                sum += l2.val;
                l2 = l2.next;
            }

            current.next = new ListNode(sum % 10);
            current = current.next;
            carry = sum / 10;
        }

        return dummy.next;
    }

    public static void main(String[] args) {

        ListNode l1 = new ListNode(2);
        l1.next = new ListNode(4);
        l1.next.next = new ListNode(3);

        ListNode l2 = new ListNode(5);
        l2.next = new ListNode(6);
        l2.next.next = new ListNode(4);

        AddLinkedList adder = new AddLinkedList();
        ListNode sum = adder.addTwoNumbers(l1, l2);

        while (sum != null) {
            System.out.print(sum.val + " ");
            sum = sum.next;
        }
    }
}
```

C:\Windows\System32\cmd.exe +

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java Palindrome
Is the linked list a palindrome? true

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>javac Node10.j

C:\Users\weave\OneDrive\Desktop\anuj\assignment3>java AddLinkedList
7 0 8
C:\Users\weave\OneDrive\Desktop\anuj\assignment3>