

## Assignment-4

Implement a `LinkedList` class in Java with methods to add, remove, retrieve, and display elements, ensuring efficient handling of edge cases without using Java's built-in collection classes.

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

public class LinkedList {
    private Node head;

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

    public void add(int data) {
        Node newNode = new Node(data);

        if (head == null) {
            head = newNode;
            return;
        }

        Node current = head;
        while (current.next != null) {
            current = current.next;
        }

        current.next = newNode;
    }
}
```

```
}
```

linked list

```
public void remove(int data) {  
    // If the list is empty, return  
    if (head == null) {  
        return;  
    }
```

```
    if (head.data == data) {  
        head = head.next;  
        return;  
    }
```

```
    Node current = head;  
    while (current.next != null && current.next.data != data) {  
        current = current.next;  
    }  
    if (current.next != null) {  
        current.next = current.next.next;  
    }  
}
```

```
public int get(int index) {  
exception  
    if (index < 0 || head == null) {  
        throw new IndexOutOfBoundsException("Index out of bounds");  
    }
```

```
    Node current = head;  
    int currentIndex = 0;  
    while (current != null && currentIndex < index) {  
        current = current.next;  
        currentIndex++;  
    }
```

```
    if (current == null) {  
        throw new IndexOutOfBoundsException("Index out of bounds");  
    }
```

```

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

    public static void main(String[] args) {
        LinkedList list = new LinkedList();

        list.add(1);
        list.add(2);
        list.add(3);
        list.add(4);

        System.out.print("Initial list: ");
        list.display();

        list.remove(3);
        System.out.print("After removing 3: ");
        list.display();

        int elementAtIndex2 = list.get(2);
        System.out.println("Element at index 2: " + elementAtIndex2);
    }
}

```