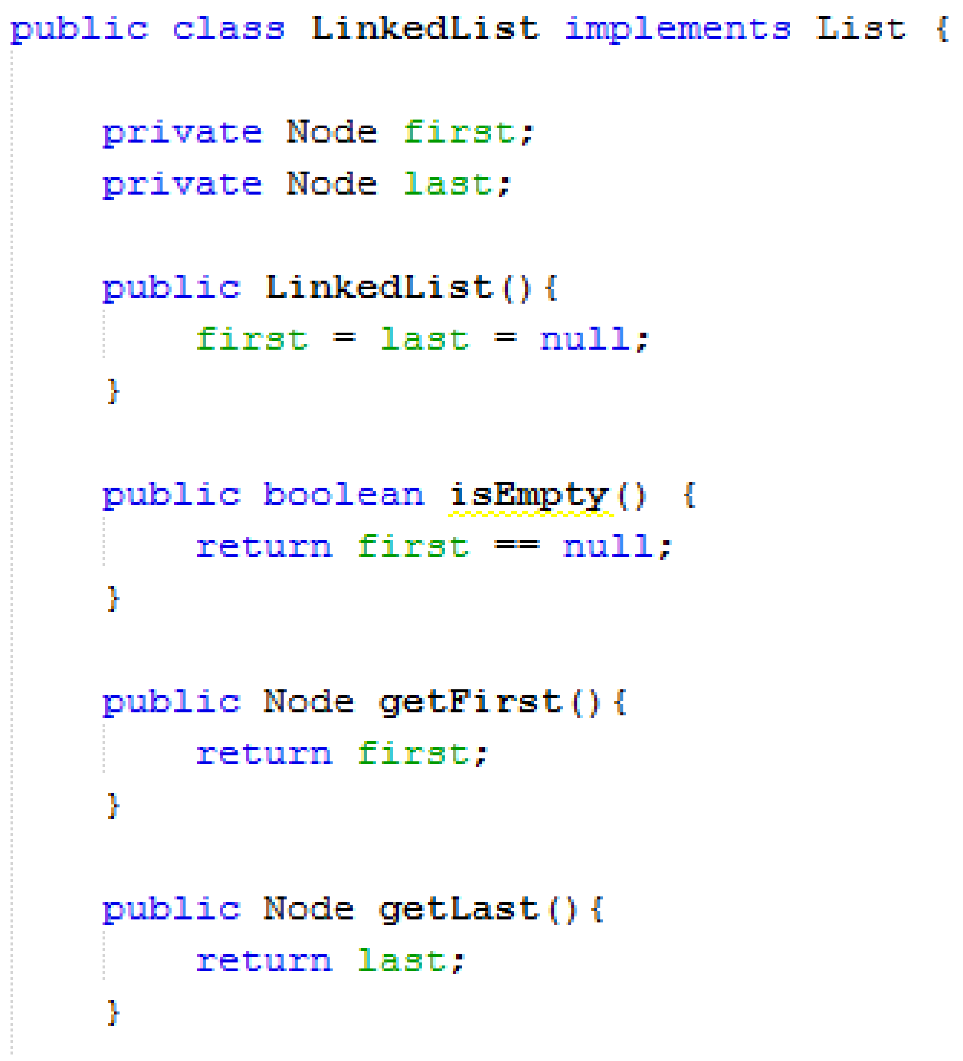
## Η Διασύνδεση της Απλά Συνδεδεμένης Λίστας

```
public interface List {
    public boolean isEmpty();
    // Tests if list is empty (returns true)
    public int size();
    // Returns the current number of elementsof the list
    public void insertFirst(Object data);
    // inserts a new node containing data to the end of the list
    public void insertLast(Object data);
    // inserts a new node containing data in front of the list
    public Object removeFirst( )throws ListEmptyException;
    // removes the first element of the list and returns its content
    public Object removeLast()throws ListEmptyException;
    // removes the last element of the list and returns its content
}
```

## Η κλάση Node

```java
public class Node {

    private Object item;
    private Node next;

    public Node( ) {
        this(null,null);
    }
    public Node(Object it, Node n) {
        item = it;
        next = n;
    }

    public void setItem(Object newItem) {
        item = newItem;   }

    public void setNext(Node newNext) {
        next = newNext;   }

    public Object getItem( ) {
        return(item);   }

    public Node getNext( ) {
        return(next);   }

    public String toString(){
        return item.toString(); }
}
```

## Η κλάση LinkedList



```java
public class LinkedList implements List {

    private Node first;
    private Node last;

    public LinkedList(){
        first = last = null;
    }

    public boolean isEmpty() {
        return first == null;
    }

    public Node getFirst(){
        return first;
    }

    public Node getLast(){
        return last;
    }
```

## Η κλάση LinkedList

```
public void insertFirst(Object data) {
    if(isEmpty())
        first = last = new Node(data, null);
    else
        first = new Node(data, first);
}

public void insertLast(Object data) {
    if(isEmpty())
        first = last = new Node(data, null);
    else {
        Node temp = new Node(data, null);
        last.setNext(temp);
        last = temp;
    }
}
```

## Η κλάση LinkedList

```java
public Object removeFirst() throws ListEmptyException {
    if(isEmpty())
        throw new ListEmptyException("List is Empty.");
    Object removedItem = first.getItem();
    if(first == last)
        first = last = null;
    else
        first = first.getNext();
    return removedItem;
}

public Object removeLast() throws ListEmptyException {
    if(isEmpty())
        throw new ListEmptyException("List is Empty.");
    Object removedItem = last.getItem();
    if(first == last)
        first = last = null;
    else{
        Node position;
        for(position = first; position.getNext() != last;
                              position = position.getNext()){};
        last = position;
        position.setNext(null);
        }
    return removedItem;
}
```

## Η κλάση LinkedList

```
public int size() {
    int size = 0;
    Node position = first;
    while (position !=null) {
        position = position.getNext();
        size++;
    }
    return size;
}
```

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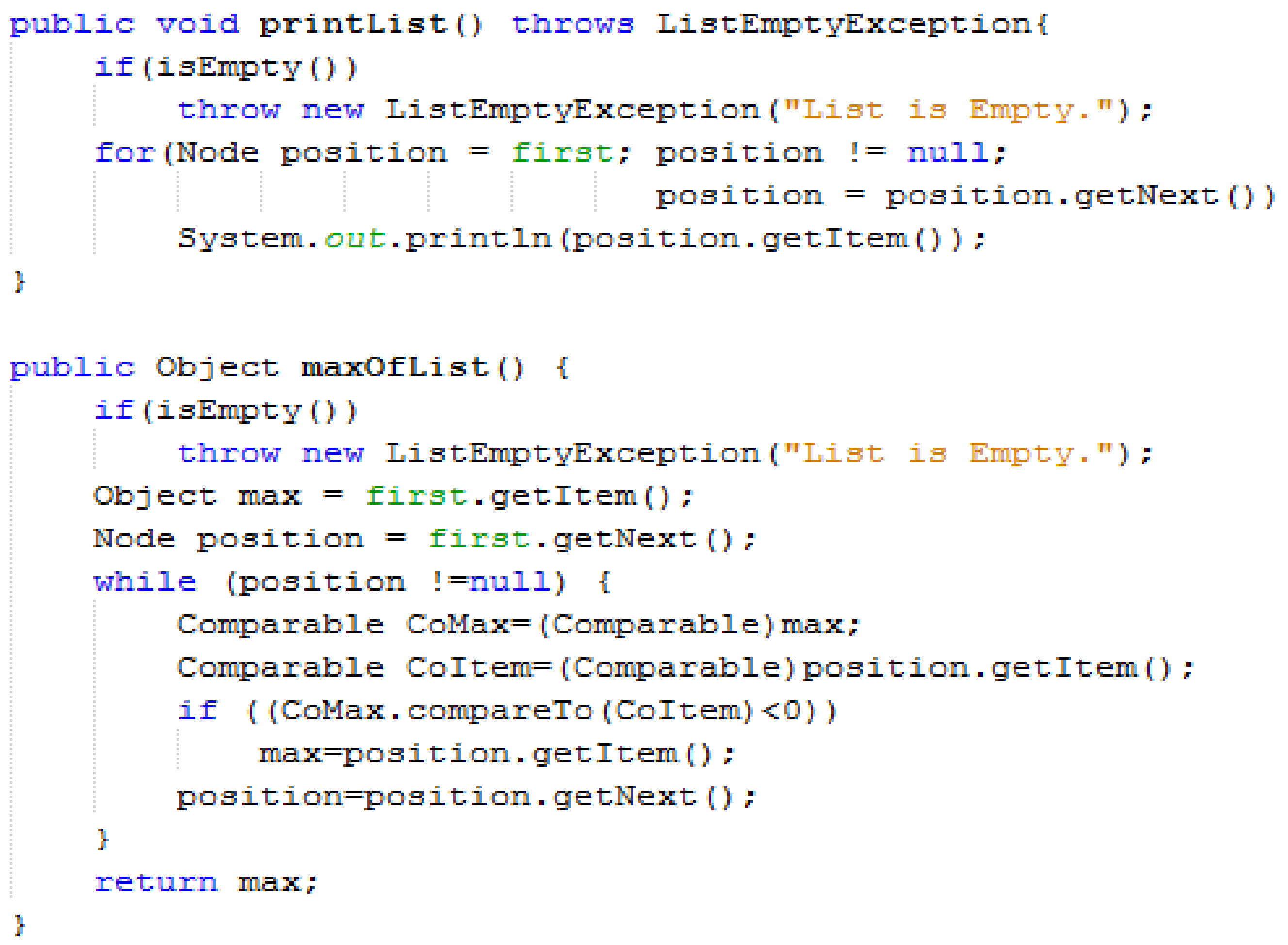
```
public int size() {
    int size = 0;
    for(Node position = first; position != null;
                               position = position.getNext())
        size++;
    return size;
}
```

## Η κλάση LinkedList



```
public void printList() throws ListEmptyException{
    if(isEmpty())
        throw new ListEmptyException("List is Empty.");
    for(Node position = first; position != null;
                            position = position.getNext())
        System.out.println(position.getItem());
}

public Object maxOfList() {
    if(isEmpty())
        throw new ListEmptyException("List is Empty.");
    Object max = first.getItem();
    Node position = first.getNext();
    while (position !=null) {
        Comparable CoMax=(Comparable)max;
        Comparable CoItem=(Comparable)position.getItem();
        if ((CoMax.compareTo(CoItem)<0))
            max=position.getItem();
        position=position.getNext();
    }
    return max;
}
```

// if (((Comparable)max).compareTo((Comparable)position.getItem()) <0)

## Ενδεικτική χρήση της κλάσης LinkedList

```
public static void main(String[] args) {

    LinkedList L = new LinkedList();
    LinkedList L2 = new LinkedList();

    L.insertLast("Stamatis");
    L.insertLast("Adamakis");
    L.insertLast("Sferiou");
    L.insertLast("Santouris");
    L.insertLast("Iliopoulos");

    try {
        System.out.println("LIST SIZE: "+ L.size());
        System.out.println("LIST MAX: "+ L.maxOfList());
        System.out.println("LIST:"); L.printList();
    }
    catch (ListEmptyException Error) {
        System.out.println("IS EMPTY");
    }
}
}
```

## Σύγκριση δύο αντικειμένων

```
// Σε κάθε κλάση που δημιουργούμε πρέπει να
// συμπεριλάβουμε μέθοδο compareTo

public class Student implements Comparable {

  private String name;
  private int am;
 // κ.λπ.

@Override
  public int compareTo(Object ob) {
     return getAM()-((Student)ob).getAM();
  }

  @Override
  public String toString(){
     String s = name+","+am+"\n";
     return s;
  }
}
```