LinkedLists
The List Abstract Data Type

• List: “ordered” sequence of data known as elements
• Ordered: each element has a position in the list (like in an array from 0 to the length of the list -1)
• Ordered in this context does not mean that the list elements are sorted by value
• A list is said to be empty when it contains no elements
• The number of elements currently stored is called the length of the list
• The beginning of the list is called the head, the end of the list is called the tail
Defining the List ADT

This list will contain String object

```java
public interface List // List of String class ADT
{
    // Remove all contents from the list, so it is once again empty
    public void clear();
    // Insert "it" at the position index in this list.
    // throws IndexOutOfBoundsException - if the index is out of range (index < 0 || index > length)
    public boolean insert(int index, String it);
    // Append "it" at the end of the list
    public boolean append(String it);
    // Removes and return the element at the specified position in this list
    // throws IndexOutOfBoundsException - if the index is out of range (index < 0 || index >= length)
    public String remove(int index);
    // Returns the element at the specified position in this list
    // throws IndexOutOfBoundsException - if the index is out of range (index < 0 || index >= length)
    public String get(int index);
    // Returns true if this list contains the specified element. The empty String otherwise
    public boolean contains(String o);
    // Returns the length / number of elements in this list
    public int size();
    // Returns true if this list is empty
    public boolean isEmpty();
}
```
LinkedList

• Implementation of the List ADT
• Uses Linked Nodes to store data
• Node class is hidden inside the LinkedList class
  • The node class is implemented inside the LinkedList class
  • The Node class is the **inner class** and LinkedList is the **wrapper class**
  • The wrapper class has access to the data fields and methods of the inner class
  • The node class is declared as “private”

Note: An inner class is exactly like classes implemented in their own files.
LinkedList implementation

• Coding