Homework 5 – Lists

1. You can read pages:
   https://opendsa-server.cs.vt.edu/ODSA/Books/Everything/html/ListADT.html
   https://opendsa-server.cs.vt.edu/ODSA/Books/Everything/html/ListArray.html
   https://opendsa-server.cs.vt.edu/ODSA/Books/Everything/html/ListLinked.html

   And try the examples.

2. For each of the methods of ListADT, fill in the run time in the worst case on each implementation (constant or linear)

Method name	AList	LList
Clear		
insert		
append		
remove		
moveToStart		
moveToEnd		
prev		
next		
Length		
currPos		
moveToPos		
isAtEnd		
getValue		
isEmpty		

3. Write the resulting list L after the following code was executed.
   What are the return values of L.currPos(), L.length() after the code executes? (Hint: use the printList function to verify your answer)

   Example:

```
L.clear();
L.append(3);
L.append(5);
L.append(9);
L.append(2);
L.moveToPos(2);
```

Generates the list < 3 5 | 9 2 >. CurrPos() returns 2, length() returns 4

a.

```
L.clear();
L.insert(1);
L.insert(2);
L.next();
L.insert(3);
L.insert(4);
L.insert(5);
L.moveToEnd();
```

b.

```
L.clear();
L.append(4);
L.append(5);
L.next();
L.insert(6);
L.append(7);
```

c.

```
L.clear();
L.insert(3);
L.insert(4);
L.moveToEnd();
L.insert(6);
L.moveToStart();
L.insert(7);
L.append(8);
L.getValue();
```

d.

```
L.clear();
L.append(4);
L.append(5);
L.next();
L.remove();
L.append(6);
L.append(7);
```

e.

```
L.clear();
L.append(4);
L.append(5);
L.append(6);
L.next();
L.remove();
L.remove();
```

4. The AList A1 is the list < 1 2 3 | 4 5 6>.
   We perform A1.insert(10).
   Trace the code of AList.insert, and draw the steps to insert the value 10 to
   A1. Include the values of listSize and curr.

5. The AList A2 is the list < 4 5 | 6 7 8 9 10 >.
   We perform A2.remove()
   Trace the code of AList.remove, and draw the steps to remove the current
   value from A2. Include the values of listSize and curr.

6. The AList A3 is the list < 4 5 | 6>.
   We perform A3.remove()
   Trace the code of AList.remove. Why would the loop performs 0 iterations?

7. The AList A4 is the list < 4 5 | 6>.
   We perform A4.append(10).
   Trace the code of AList.append(), and draw the steps to append the value
   10 to A4. Include the values of listSize and curr.

8. The LList L1 is the list < 1 2 3 | 4 5 >
   We perform L1.insert(10).

Trace the code of LList.insert, and draw the steps to insert the value 10 to L1. Include the null header and null tail, the value of listSize, and the location of curr and tail.

9. The LList L2 is the list < 4 5 | 6 >
   We perform L2.remove() . Trace the code of LList.remove, and draw the steps to remove the current value from L2. Include the null header and null tail, the value of listSize, and the location of curr and tail.

10. The LList L3 is the list <4 5 | > .
    We perform L3.remove()
    Trace the code of LList.remove, what is the result?

11. The LList L4 is the list < | 3 4 5 >
    We perform L4.append(10). Trace the code of LList.append, and draw the steps to append 10. Include the null header and null tail, the value of listSize, and the location of curr and tail.

12. Implement all unimplemented methods in the class ListMethods.java, as described on the file. The method isSorted, is implemented as an example.

Submit the file class ListMethods.java with the implemented methods, and the answers to the written assignment as a pdf.

Reminder:

To open the tar file, go to eclipse -> File -> import projects from file system -> Archive... -> Choose the tar file Week_6_lists_homework -> pick the second folder (eclipse project) -> Finish

This will create the project in eclipse workspace.