INFO-C 210 (Problem Solving and Programming I)
Homework#4 – 50 points
No late submission **Group Assignment**

Keep in mind that this assignment requires careful reading of the related module sections in Canvas, including watching the video that I provided. The video includes helpful notes about this assignment. Make sure to document your code very well and follow proper programming practices.

Consider the StringLog Java files that I provided earlier in this module (StringLogInterface.java, ArrayStringLog.java, and UseStringLog.java). Using these files as a starting point, implement the following additional methods. Make sure to provide test code in the use class to ensure that your implementation for each method is correct.

Q1. Design and code a new method in the `ArrayStringLog` called `isEmpty()`, with the following signature:

```
public boolean isEmpty()
```

The method returns `true` if the log is empty and `false` otherwise

Q2. Design and code a new method in the `ArrayStringLog` called `howMany()`, with the following signature:

```
public int howMany(String element)
```

The method returns a integer value indicating how many times `element` occurs in the log.

Q3. Design and code a new method in the `ArrayStringLog` called `uniqueInsert()`, with the following signature:

```
public boolean uniqInsert(String element)
```

The method inserts an element in the log unless an identical string already exists in the log, in which case it has no effect on the log. If it does insert the string, the method returns true, otherwise it returns false. Use case-insensitive string comparison.

Q4. Design and code a new method in the `ArrayStringLog` called deleteAll`()`, with the following signature:

```
public int deleteAll(String element)
```

The method deletes all occurrences of element from the string log and returns a integer value indicating the number of deletions. Hint: it would be better if you implement a delete (String element) method. Once this method is created, you can simply implement deleteAll by having a loop that calls delete (String element) repeatedly and counts the number of deletions.

Q4 (Bonus – 10 points). Create a new implementation of the StringLog ADT using the Java library's `ArrayList` class instead of an array to hold the strings. You may create a case-sensitive `contains` method. Name your class **ArrayListStringLog.java**.

Use the same test driver you used for the array-based log to test this new implementation.

Submission Guidelines (Read Carefully)

- This is a group assignment
- Include all your solution files (only the ***.java** files, no .class files) in a Zip archive. Submit only the Zip file. If you do not hand in all *.java files, you will receive no credit for the submission. Also, include the UML diagrams (if any) in this Zip archive
- Submit your assignment via the "Submit Assignment" link. Don't email it to me directly
- Each exercises/projects/cases must be done in accordance to coding standards, as discussed in class. You may not just put something together' and exclaim; "but it works!" That's not acceptable!