CS 111C Homework 1: Lists
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100 points total.

2. If `myList` is an empty list of strings, what does it contain after the following statements execute? (8 points)

```
myList.add("alpha");
myList.add(1, "beta");
myList.add("gamma");
myList.add(2, "delta");
myList.add(4, "alpha");
myList.remove(2);
myList.remove(2);
myList.replace(3, "delta");
```

3. Suppose that you want an operation for the ADT list that returns the position of a given object in the list. The header of the method could be as follows:

```
public int getPosition(T anObject)
```

Write comments that specify this method. (5 points)

4. Suppose that you want an operation for the ADT list that removes the first occurrence of a given object from the list. The header of the method could be as follows:

```
public boolean remove(T anObject)
```

Write comments that specify this method. (5 points)

6. Write Java statements at the client level that return the position of a given object in the list `myList`. Assume that the object is in the list. (8 points)

7. Suppose that the ADT list did not have a method replace. Write Java statements at the client level that replace an object in the list `nameList`. The object's position in the list is `givenPosition` and the replacement object is `newObject`. (5 points)

8. Suppose that the ADT list did not have a method contains. Suppose further that `nameList` is a list of `Name` objects, where `Name` is as defined in Chapter 1. Write Java statements at the client level that see whether the `Name` object `myName` is in the list `nameList`. (8 points)

9. Suppose that you have a list that is created by the following statement:

```
ListInterface<Student> studentList = new AList<Student>();
```

Imagine that someone has added to the list several instances of the class `Student` that Chapter 2 defined in Segment 2.2.

a. Write Java statements that display the last names of the students in the list in the same order in which the students appear in the list. Do not alter the list. (8 points)

b. Write Java statements that interchange the first and last students in the list. (8 points)

10. Suppose that you have a list that is created by the following statement:

```
ListInterface<Double> quizScores = new AList<Double>();
```

Imagine that someone has added to this list the quiz scores received by a student throughout a course. The professor would like to know the average of these quiz scores, ignoring the lowest score.

a. Write Java statements at the client level that will find and remove the lowest score in the list. (15 points)

b. Write Java statements at the client level that will compute the average of the scores remaining in the list. (15 points)

11. Consider a class `Coin` that represents a coin. The class has methods such as `getValue`, `toss`, and `isHeads`. The method `getValue` returns the value, or denomination, of a coin. The method `toss` simulates a coin toss in which the coin lands either heads up or tails up. The method `isHeads` returns true if a coin is heads up.

Suppose that `coinList` is an ADT list of coins that have randomly selected denominations. Toss each of these coins. If the result of a coin toss is heads, most the coin to a second list called `headsList`; if it is tails, leave the coin in the original list. When you are finished tossing coins, compute the total value of the coins that came up heads. Assume that the list `headsList` has been created for you and is empty initially. (15 points)