CS174: Homework 1

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This is due on Canvas by February 5, 2017.

For your first homework assignment, you will implement a vector for integers. It will duplicate the functionality of the `ArrayList` in Java. Recall that arrays cannot be resized. Vectors, however, can. This is accomplished by creating a class that contains an array and expanding the array when it is filled. You are provided with a file that runs some tests on your code to let you know if you're on the right track and gives you an *estimated* grade.

You will implement the following functions in a public class, called `IntVector`. For this assignment, it is not necessary or recommended that you use an IDE, such as NetBeans.

- `private expandArray()` This helper function expands the internal array to accommodate more values.
- `public IntVector(int initialSize)` Constructor that defines the initial size of the internal array.
- `public void add(int val)` This function adds a value to the end of the vector.
- `public removeLast()` This function removes the last element of the vector.
- `public int get(int index)` This function returns the value contained at `index`.
- `public void set(int index, int val)` This function sets the value at `index` to be `val`.
- `public void remove(int index) throws ArrayIndexOutOfBoundsException` This function removes the value at `index`. Any elements after it are shifted to the left in the internal array.
- `public int size()` This function returns the number of elements in the vector.
- `public String toString()` (You must override this function). This function overrides the `toString()` method and prints out a string representation of the current state of the vector. It should be formatted in the same way as the Java ArrayList.

When you instantiate the `IntVector`, it will have an initial size of 0. Recall that the size of an array is fixed. It cannot be changed. The purpose of the `IntVector` class is to create a class that allows one to add an arbitrary number of elements to the vector. If you fill up the array, you create a new array and copy all of the elements from the old array into the new one.

Likewise, in a basic array, one cannot "delete" elements. Again, the size of the array is fixed. However, your `IntVector` class will be able to remove elements. When an element is removed, all of the elements following it will be shifted to the left, so that they remain contiguous.

What to submit

Submit a tar.gz file with your `IntVector.java` file in a directory named `lastname_firstname` (with your actual last and first name). So, when you decompress the file, there should be a directory with your files therein.

Your program *must* run if compiled with `javac` and run with `java` from the command line.