AP Computer Science In-Class Assignment 1

Due date: Monday, November 7, 2016 at 4:15PM
Instructor: Mr. Alwin Tareen

Part A: Smoothing an Audio Signal by Averaging an Array of Integers

- An audio signal is sometimes stored as a list of `int` values. The values represent the intensity of the signal at successive time intervals. Of course, in a program the signal is represented with an array.
- Often, a small amount of noise is included in the signal. Noise is usually small, momentary changes in the signal level. An example is the "static" that is heard in addition to the signal in AM radio.
- Smoothing a signal removes some of the noise, and improves the perceptual quality of the signal. This assignment requires you to smooth the values in an integer array.
- Consider an array named `signal` that contains the original audio values. Compute the smoothed array by performing the following calculation: Each value in the result array `smooth[N]` is the average of three values: `signal[N-1], signal[N], and signal[N+1]`.
- For the first element of the result array `smooth`, average the first two elements of `signal`. For the last element of the result array `smooth`, average the last two elements of `signal`.
- You must write a `levelling` method for the `SmoothSignal` class. This method accepts an array parameter of type `int`, which represent the original signal audio levels. It returns an array of type `int`, which represent the smoothed out audio levels.
- The array `signal` containing the original signal audio levels has been provided for you. Also, there are two for-each loops which perform the task of displaying the `signal` array and `smooth` array. The output should look like the following:

```
signal: 1 5 4 5 7 6 8 6 5 4 5 4
smooth: 3 3 4 5 6 7 6 6 5 4 4 4
```

- You are provided with the files `SmoothSignal.java` and `SmoothSignalJUnitTest.java` to develop this program.
- Write your code in the area indicated by `// YOUR CODE HERE`.
- On your `BlueJ` project window, you should see a button labelled `Run Tests`. Press this button to run the `JUnit` tests.
- You should see a `BlueJ: Test Results` window pop up. If everything is correct, you should see a green bar that indicates that your code has passed the `JUnit` tests. If your program is incorrect, you will see a red bar. You can click on the method name to get more information about the problem. Otherwise, just click on the `Close` button, and you can go ahead and upload this program to `Web-CAT`.

Part B: Submission

- Submit your Java program `SmoothSignal.java` by uploading it to the Web-CAT automated grading platform.