CMPSC 111
Introduction to Computer Science I
Spring 2016

Practical 9
15 April 2016
Due in Bitbucket by midnight on the Monday after your practical "Checkmark" grade

Summary

In this practical assignment, you will explore Java programs that create music using arrays and `for` loops. In addition, you will learn more about how to set the `CLASSPATH` environment variable to load a third-party Java archive that provides music playing and generating capabilities.

Review the Textbook

To learn more about the concepts associated with arrays, please study the content in Section 8.2. Students who want to learn more about the `for` loop can review Section 6.4.

Creating Computer-Based Music

Please return to the "share" repository for this course and type the command "`git pull`". Now, please find the "`practical09/`" directory and view this source code. Please note that these two Java programs will not work correctly unless the Java compiler and virtual machine have access to the Java archive (JAR) file available in the "`lib/`" directory. To make this file available you need to input the following type of command in your terminal window:

```
export CLASSPATH=<full path>/jfugue-4.0.3.jar:.
```

To learn what to type for the "`<full path>`" you should go into the "`lib/`" directory in the "`practical09/`" directory and type the command "`pwd`". Then, you can place this value in the aforementioned command. Please see the course instructor if you are having trouble with this step.

Now, please compile and run the "`FrereJacques.java`" program. What does this program do when you run it? How does this program use an array to create the first pattern in the song? Please note that this program will save a musical instrument digital interface (MIDI) file in the directory where it is executed. If you would like to play the generated file, you can type the following command in the terminal window: "`timidity frerejacues.mid`". This file should also play on any computer or mobile device that supports MIDI. You may listen to the musical output that this program produces by either using the built-in speakers or connecting your own headphones.

You should notice that the "`FrereJacques.java`" program only plays the song one time. Your task for this practical assignment is to improve the program so that it accepts, as input from the user, the number of times that the song should repeat. You should add this feature to the program through the inclusion of a "`for`" loop. That is, if the user input is stored in the variable called "`repeats`", then the calls to the "`add`" methods should take place for a total of "`repeats`" number of times. Please submit the enhanced version of this program to your Git repository. Students who would like to further explore music creation may also compile and run "`CrabCanon.java`".