
DSP First
Mini-Project 01: Music Synthesis

Background:

For this mini project you will write a simple LabVIEW program that synthesizes music with sinusoids. Starting with sheet music for the *Little Fugue* by J. S. Bach, you will learn how to map each note on the staff to its frequency and duration and then have LabVIEW generate a sinusoid for that note. Adding up all the sinusoids will generate a wave that when played through speakers will sound like *Little Fugue*. You will then save this file as a **wav** (or mp3) file and turn it in.

Approach

You will need to look at two places to learn how to do this mini project. The first will give you some hints on how to do the project; the second will give you the sheet music for *Little Fugue*.

1. **Point your browser to www.rose-hulman.edu/DSPFirst**. In the menu tree on the left, expand chapter 3. Expand **Labs**, and click on **Lab04**. You do not have to do this lab, however it has many good ideas on how to do this mini project. Take a look at it.
2. A quick search for "Little Fugue Free Sheet Music" on Google found several hits. You are free to find you own sheet music. Here are some that will work:

http://www.mit.edu/~jcb/MOTley/dances/little-fugue-2violins.shtml	Nice and simple, two violins.
http://www.sheetmusicarchive.net/dlpage_new.cfm?composition_id=1014	This one is for organ

This is a fun mini project. Start early so you have time to ask questions if needed. Once you have something working, create a **wav** file using LabVIEW's **wavwrite VI**. **Wavwrite** expects input values between ± 1 . You will have to scale your signal to be in this range. (Try searching for **Max**) Note: For those who want to do more, the **wavwrite VI** can write stereo files too.

Grading

Getting a few measures working with just sinusoids will get you no more than 7 out of 10 points. If you want more points you will have to be creative. Adding more voices, or using more than sinusoids are creative. Simply synthesizing more measures is not creative. Just switching to a square wave is not creative either.

Well written code may gain a point; ugly code (copy and pasting stuff over and over that should be in a loop for example) will certainly loose points.

What's Due

For this mini project, you may work in groups of one or two (preferably two).

What is due:

1. wav (or mp3) file of your song
2. One page memo describing what you did. Highlight any **extras** you've added
3. Print out your LabVIEW code. Selecting File→Print will start a print wizard. When you reach the "Print Contents" window, select "Icon, description, panel, and diagram." This will print out the whole works in a compact format.

Zip (i.e. rar) up the .wav file and place it in the Angel drop box. Be sure that your name is contained in the file name. Hard copy of the memo and LabVIEW printout are to be handed in at the start of class on the due date.