

Final Project Progress Report

My synthesizer is slowly making it's way toward playability. No actual graphics have been implemented yet because cutting down delays has taken most of my time of late. Unfortunately, I can't seem to find the source of the delay between key press and sound output. When timing the individual parts I could only account for ~100 microseconds of delay, when the overall delay is around 20,000 microseconds. However, I'll try to move on to actual functionality and come back to it.

Things that work include dynamic generation of waveform samples, continuous play, polyphony, keyboard mapping, and dynamic management of waveforms. The samples stored in each WaveForm object are scaled to be just as long as a period. Then when they are played, their internal index in that array is incremented, looping when necessary. This was needed to remove the clicking which occurred when the samples were of an arbitrary size and the indexer made a harsh jump back to the beginning instead of at a zero-crossing. Four classes have been written, SynthWindow: Qt object which is currently just used for key detection but will eventually have controls and keys drawn on it, WaveForm: An object which creates and stores all relevant information on a waveform of a given frequency, AudioBuffer: A wrapper class which manages the currently played WaveForms, and AudioThread: a QThread which outputs the notes managed by AudioBuffer to the sound card. AudioThread and AudioBuffer are communicating through shared memory, but that might change in order to try and solve the mysterious delays. This project has also inspired me to start using subversion. The time log and the related changes are listed below and adapted from the svn log output. The code can be found at <http://opensynth.googlecode.com/svn/> with more info at <http://code.google.com/p/opensynth/>.

2007-03-24 13:43:23 -0400 (Sat, 24 Mar 2007)

1.5 hours

Used all kinds of gettimeofday's to try and pinpoint the source of the delay in output. All to no avail.

2007-03-14 01:20:15 -0400 (Wed, 14 Mar 2007)

30 minutes

Whew....Well, a long time ago I forgot to add WaveForm and AudioBuffer classes to the repository. Then I deleted them. Just now I rewrote both of them in about 20 minutes. And they work. All aforementioned updates are true.
NEW: AudioThread playflag and size variables are pointless, discard them.

2007-03-14 00:14:52 -0400 (Wed, 14 Mar 2007)

30 minutes

changed key press detection to switch/case for syntactic clarity

2007-03-13 23:41:40 -0400 (Tue, 13 Mar 2007)

2 hours

no more clicking
each waveform has it's own indexer. this also gives better key response.

2007-03-08 18:21:07 -0500 (Thu, 08 Mar 2007)

1.5 hours

Added mutex's to fix mysterious SegFault.

AudioThread now takes the currentNotes passed by reference.

This gets rid of the weird pointer notations and made for a better iterator.

Still an unpredictable delay sounding of single notes when multiple notes are played at once.

2007-03-08 01:05:59 -0500 (Thu, 08 Mar 2007)

3 hours

original implementations of the WaveForm, AudioBuffer classes

Rewrote SynthWindow for new AudioBuffer wrapper.

AudioThread reads the freq and computes sin waves on the fly as of now.

Also, we have a new mysterious SegFault, Yay!

All-in-all, a big update.

2007-03-06 00:01:44 -0500 (Tue, 06 Mar 2007)

45 minutes

added headers for WaveForm & AudioBuffer classes

2007-03-05 20:01:49 -0500 (Mon, 05 Mar 2007)

1.5 hours

rewrote continuous playing of buffer in AudioThread

still same double addition of notes error,

will be fixed with introduction of AudioBuffer and Waveform classes

2007-03-05 16:38:43 -0500 (Mon, 05 Mar 2007)

45 minutes

fixed clicking by making the freqs for each note truncate.

new problem: notes added too often, distorting sound

2007-03-05 00:35:47 -0500 (Mon, 05 Mar 2007)

2 hours

attempting fade buffer to lose clicking

2007-03-04 21:55:31 -0500 (Sun, 04 Mar 2007)

30 minutes

added full octave A-A

2007-03-04 21:01:09 -0500 (Sun, 04 Mar 2007)

1.5 hours

Hurray! Basic functionality from A-E

2007-03-04 00:49:28 -0500 (Sun, 04 Mar 2007)

3 hours

basic classes written but trouble with playing sound