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5 November 2022

CSE 471

Piano Synthesizer

My component was the piano synthesizer and I finished this by making a couple different classes that do different things. I remembered a certain pattern from CSE 335 and implemented it this way. It had to do with factories in the Harold project. In that project, we would have a “Factory” class and using this factory, we could create many different objects. This included other objects, Harold, as well as a whole laboratory. For this project, I was able to do a similar thing involving the piano component.

I started off by making a PianoInstrumentFactory class and this class initially constructed a piano and held lots of information about it. This class also does other things like setting the pedal and making it either loud or quiet as well as setting the note that is to be played. The PianoInstrument class holds lots of information about the instrument, as well as starting the actual instrument to play.

The next class I made was the envelope class. This class is responsible for making it so the note does not just stop playing, rather, the sound slowly fades out just like it does with a real piano. This all happens in the Generate function, and it uses the values saved when the envelope was made. First, it determines the gain, but it depends on what time period it is in. Second, it generates the output from the input multiplied by the gain. Lastly, it updates the time and returns true.

Finally, I finished with the PianoWave class. This is in charge of making the actual sounds of the piano. It does it by making the array of frames while also calculating the samples from the sampleRate. Not only does it create the sound, it also works with the pedal to make that play as well.

Component grade:

10/10 - Plays piano notes

20/20 - Envelope generation

30/30 - Pedal simulation

35/35 - Basic dynamics

40/40 - Pedal noise

50/50 - Advanced dynamics

Group grade:

10/10 - Suitable length audio files and web site turned in.

20/20 - Audio file is recognizable as music in the opinion of the TA and Instructor.

30/30 - Audio file utilizes all system components.

40/40 - Audio file utilizes all capabilities of all system components.

40/50 - The script has at least 240 notes in it.

Overall grade: 90/100