

MUS4633 Final Project - Documentation

Phase Distortion Synthesis

Design:

The design is fairly simple. A few command line arguments are expected as parameters for the program execution. These command line arguments drive the majority of the logic for creating the wave. The header for the .wav file is constructed first, it contains all the meta-data used to describe the .wav file itself. After the header is written to the output file, memory is allocated for the samples to be included in the .wav file.

Next, wave tables are generated for the base frequency and the phasor frequency. The base frequency is used to create one full period of a Sawtooth wave with additive synthesis. The phasor frequency is used to create one full period of a sine wave. These two waves are then mixed together continuously using an index for the base frequency phase. The sine wave may go through more than once before the end of the Sawtooth wave period. Once the end of the period is reached, the phase index is reset and both waves start from the beginning.

The ADSR is applied to each sample at a particular moment in time according to the values supplied by the user when prompted.

Source Code Documentation:

Source code can be found at: <https://github.com/MUSI4633/Phase-Dist>

Refer to comments in 'project.c' for source code documentation.

User Instructions:

To make the executable, navigate to the root directory for the project, and type:

```
gcc -o finalProject project.c -l. -lm
```

This should create the "finalProject" executable.

The executable expects 5 command line arguments, in order, they are:

Output .wav file name: pds.wav
File duration in second: 10
Base Frequency: 300
Phasor Frequency: 345
Sample rate: 44100

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As such, to run the Phase Distortion Synthesis program, type:

```
./finalProject pds.wav 10 300 400 44100
```

This will launch the program and next prompt the user to enter values to adjust the ADSR envelope. Once these values are entered, the .wav file will be generated, and usable once the program terminates, after which, it can be played/viewed using programs such as Audacity.

Sample File Parameters:

```
pds.wav = ./finalProject pds.wav 10 550 880 44100
```

```
wiki.wav = ./finalProject wiki.wav 10 300 345 44100
```

```
other.wav = ./finalProject other.wav 10 200 770 44100
```