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# ReadMe
## CMU 15-323 Project 3

## About the Project

This folder contains the code for a real-time program that outputs randomly generated music using MIDI and generates animation according to the music being played.

The project uses OSC Server and Client communication. The Client is able to control the music generated at the Server side through a control panel with buttons and sliders.

The music being played consists of four independent sound tracks, and can be extended to any number of sounds tracks. Although all tracks as a whole are controlled by a universal tempo, each sound track has its own rhythm, own sound effect, and own set of pitches. The rhythm is randomly generated, and the next pitch to be played is randomly selected from the set of pitches.

The canvas displays an animation that corresponds to the music being played. Each sound track is represented by a horizontal line segment. The color of the segment becomes more red when the volume is larger, and the horizontal position of the segment becomes higher when the pitch rises.

## Music Generation

The music has four sound tracks, each with a different sound effect and a different set of pitches that will be played by that track. While playing, the track decides which pitch to play by randomly picking one pitch from the set of pitches belonging to it.

Each track also has its own randomly generated rhythm. The rhythm is a cycle of 16 notes. The rhythm is generated by randomly deciding whether to play each of the 16 notes with probability half and half.

## Image Generatio

The program also generates image together with the music. For each track, there is a line representing the note being played. The height of the line corresponds to the pitch, and the color of the line corresponds to the volume. When the pitch is higher, the line jumps higher. When the volume is larger, the line becomes more red; when the volume is lower, the line becomes more yellow.

## Content of the Folder

– The folder contains the following files (not including the source files) –

+ readme.pdf

+ server.srp : the OSC Server that plays the music

+ client.srp : the OSC Client that controls the music played at the Server side

+ control_panel.srp : the control panel with sliders and buttons used by the Client

+ canvas.srp : the MusicCanvas class that subclasses Canvas

+ choir.srp : the Choir class that represents the entire music

+ track.srp : the Track class that represents each sound track

+ constants.srp : the constants and libraries used by the program

## How to run the program

1. Open output devide
2. Run the Server : Open a terminal, cd into the folder; Run "wxserpent64 server.srp"
3. Run the Client : Open a terminal, cd into the folder; Run "wxserpent64 client.srp"

## How to use the GUI

+ The slider labeled "Period" controls the tempo of the music

+ The button labeled "Start All" starts all tracks

+ The button labeled "Stop All" stops all tracks

+ The slider labeled "Sound x Velocity" controls the volume of the sound track (the color of the corresponding segment changes as you adjust this slider)

+ The button labeled "Stop" stops the corresponding track

+ The button labeled "Start" starts the corresponding track

+ The button labeled "Octave Up" raises the pitches of the track by one octave if possible (the level of the segment will jump higher)

+ The button labeled "Octave Down" lowers the pitches of the track by one octave if possible (the level of the segment will jump lower)