Python Note Data Generating Script Tutorial

Setting up your environment

You will need to use a shell to run the Python script.

- **MacOS:** The Terminal app is installed by default.
- **Windows:** PowerShell is installed by default on newer computers and otherwise can be installed by following the instructions at https://docs.microsoft.com/en-us/powershell/scripting/install/installing-powershell-core-on-windows.

You will also need to install Python to run the script. Installers for various operating systems can be found at https://www.python.org/downloads/.

Running the script

1. Open your shell and use the "cd" command to change directories into the same directory as the Python script "note_data_gen.py". You can use the "ls" command to list the subdirectories available from your current directory to help you navigate.

2. Once you're in the same directory as "note_data_gen.py" type "python3 note_data_gen.py -h" to view the script's help message.

3. The script accepts 3-4 command-line arguments, which specify the desired note, amplitude, duration, and output filename. This should be entered as:
"python3 note_data_gen.py <note> <amplitude> <duration> <filename>",
with the parts in brackets replaced with the values you want.

   a. See http://www.sengpielaudio.com/calculator-notenames.htm for info on note names and frequencies.
   b. The amplitude is artificially scaled from 1 (soft) to 10 (max).
   c. Duration is in seconds. At the audio codec rate of 48000 Hz, that means every second of duration generates 48000 data points!
   d. On successful execution (*i.e.*, no error messages), the specified filename (or note_data.mif by default) will be created (or overwritten).

4. You can find example usage on the next page.

Example usage terminal transcript

Prompts are shown in bolded blue, user input is shown in yellow, and terminal output is shown in white.

```
user$ ls
 note_data_gen.py
user$ python3 note_data_gen.py -h
usage: note_data_gen.py [-h] note amplitude duration [filename]

Generate a MIF file with audio data with the specified characteristics

positional arguments:
  note        Specify note as either a numerical frequency in Hz (e.g.,
              440.0) or an English 12-tone chromatic note on a piano (e.g.,
              C#3, Ab7)
  amplitude   Relative amplitude/volume (from 1.0 to 10.0)
  duration    Note duration in seconds
  filename    output filename (include the extention .mif)

optional arguments:
  -h, --help  show this help message and exit
user$ python3 note_data_gen.py C4 5 1
Audio characteristics:
 - frequency: 261.63 Hz
 - amplitude: 5.0 out of 10
 - duration:  1.0 seconds = 261.63 wavelengths
 - sample rate of 48000.0 Hz (same as Audio CODEC)

File note_data.mif generated.
user$ ls
 note_data.mif    note_data_gen.py
```