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Music Sound Computers
Project Proposal

# PT-12 Rhythm

**Overview:** My project will be a virtual drum machine/step sequencer that will be able to create beat loops and play them to an output device or save as an audio file. I plan on implementing this in python and just using the command line as a user interface to interact with the step sequencer.

**Inspiration:** There is a little device called the PO-12 Rhythm that has a similar functionality that I would like to implement (as physical hardware) and I would like to create a version of this device that can just run in the terminal. Reference: TE PO-12 Rhythm Introduction

**Functionality:** The program should have sounds to choose from, a way of creating a pattern, sound effects, BPM control, a way to pitch the sounds, chaining patterns, some effects to apply to sounds, ability to save to a file. Upon startup, you should be able to specify which pattern (a pattern consists of 16 steps) you want to work on, select sounds, apply effects to the sounds and modify pitch, write to steps in the pattern, playback pattern, chain patterns and playback, adjust tempo and swing.

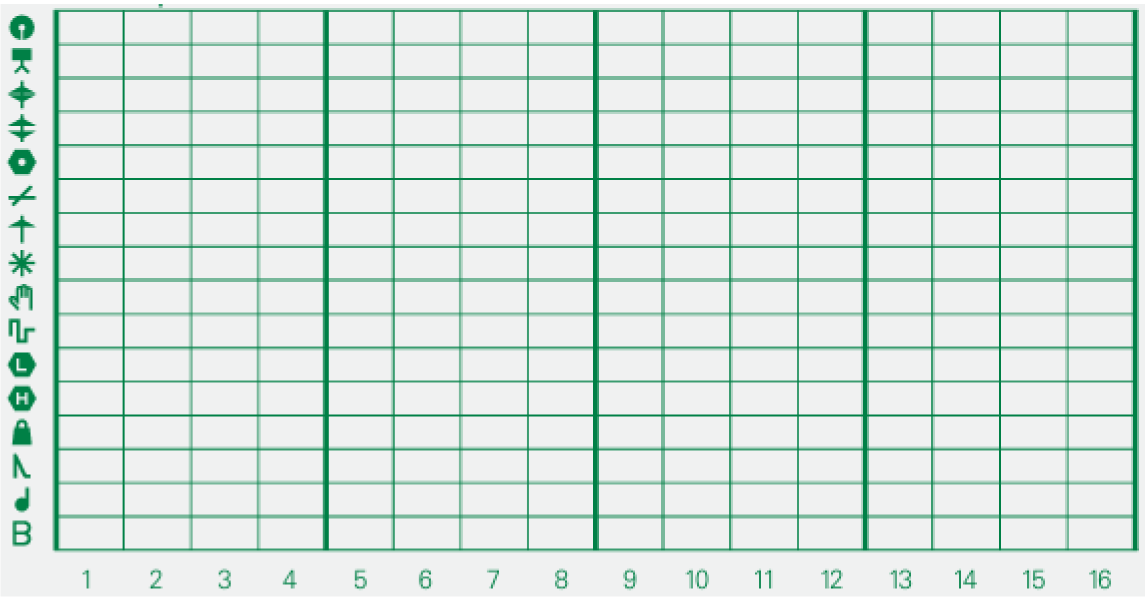
**Specifications:** As with the PO-12, I would like to aim to have 16 different drum sounds, some sampled, some generated. A potential list would look like:

1. bass drum
2. snare drum
3. closed hi-hat
4. open hi-hat
5. synthesized snare
6. sticks
7. cymbal
8. noise
9. hand clap
10. click
11. low tom
12. hi tom
13. cow bell
14. blip
15. tone
16. bass tone

The sequencer will be a 16-step sequencer (16 steps per sound) and should have the option to hold 16 different patterns, with a play functionality that allows the chaining of up to 16 patterns together which could be saved as a media file or just played back to the audio device.

There should be some built in effects to choose from (simple envelopes, distortion, reverb, ect) to apply to sounds. I think for a project of this size, I will just opt to have preset parameters for the effects.

**Implementation:** I believe the hardest part of this project will be creating an effective UI. The step sequencer should be easy to represent in a data structure using booleans (does sound play on this step). For applying effects to sounds, I think that there should be an original sound constant and an active sound variable that changes depending on the effect applied, making it so that effects can be removed easily. To represent the current pattern, a grid could be displayed where each sound is a row, each step a column; with the pattern getting filled out as the user defines their pattern:



As to playback, sounddevice works fine, with during the playback of a pattern, sounddevice being called with the sound corresponding to the pattern defined.