For the synthesizer assignment, I have created a monophonic/polyphonic synth that consists of a polyphonic subtractive synth, and a Monophonic FM synth with 11 algorithms, wave form selection, and filtering capability. It includes a 32 step sequencer in which the user can draw in random notes on a slider object and through selecting which scale via the coll rows object, the drawn in midi data on the sliders will adhere to the midi scale selected. The user can choose from 15 major scales & 12 minor scales. The synth also features a filter with user parameter control over cutoff, gain, and resonance and also includes a menu of filter types. The last unit to this synth is a delay module in which the user has control over feedback amount, delay amount, and the dryness or wetness of the delay.

The Polyphonic portion of the synth is meant to be an accompaniment for the monophonic FM portion. The user can select from 4 different wave forms controlled by one adsr(function object). The waveforms can be blended together by using the gain object and turned off via toggles. Each waveform has 16 voices and can be used with the filter and the delay units.

The Monophonic FM synth is a 4 operator, 11 algorithm based synth in which the user can select the operator's wave forms instead of just modulating with only sine waves. The inspiration for the FM synth came from Ableton's "operator" design, including the 11 algorithms used. The algorithms are selected by using the gswitch2 object connected to a dial controlled preset with the 11 algorithm presets. The mtof message is sent through the gswitch2, into which ever operator comes first in the algorithm, and then to a string of gate~ objects. Each gate~ object is connected to a preset which is connected to the same dial that controls the gswitch 2. Each string of gates and gate rows is controlled consecutively in rows. The output of the first operator used goes into the second string of gates (into the gate directly bellow the last one) and so on until the signal passes through the final operator into the final gate, and out into the *~ object connecting it to the FM synths Master adsr (function object).

The sequencer uses the Coll rows object to call upon midi data that represents midi scales (the major circle of fifths and their relative natural minor scales). In the sub patcher, the selected toggle allows coll rows to find the message labeled with the scale name, and it assigns the midi data to that scale which is then assigned to $1 through the message. The 32 step sequencer fetches which ever $1 is selected and assigns those midi values to it's step interval, meaning that the user can select a scale and draw in random values on the step sequencer which will adhere to the selected scale. The sequencers metro can also modulate the FM algorithm.

The user interface’s layout is designed to be read from right to left in the order of which the units come; the sequencer being on top, the polyphonic synth being on the bottom left, the FM mono synth being in the middle, then followed by the filter, delay, and then output.

Note that the user must select the device that they are using to control the synth under the Midiin object. Also, in the Max project file, the Poly subtractive synth plays notes once the key is released. This does not happen in the regular patter file and I haven’t been able to figure out why.