UNIVERSITY OF MICHIGAN

Creative Coding (PAT 204/504, Fall 2025)

Lecture 17: Drum Machines

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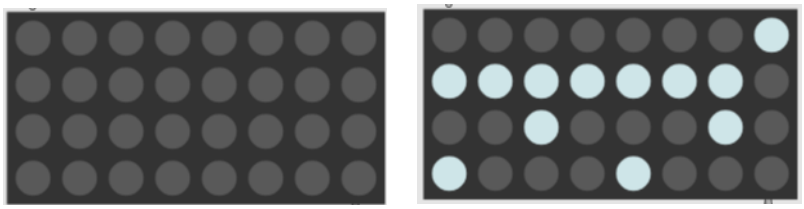
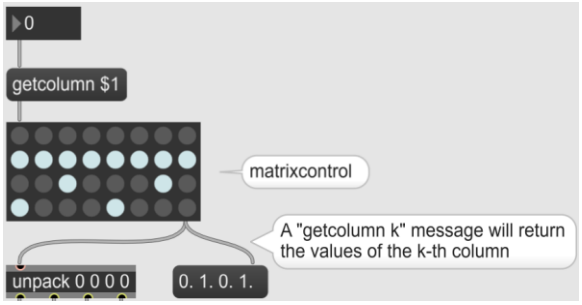
Example 1: MIDI Drum Machine ("1_midi_drum_machine.maxpat")

- Use the "matrixcontrol" object to create a simple sequencer

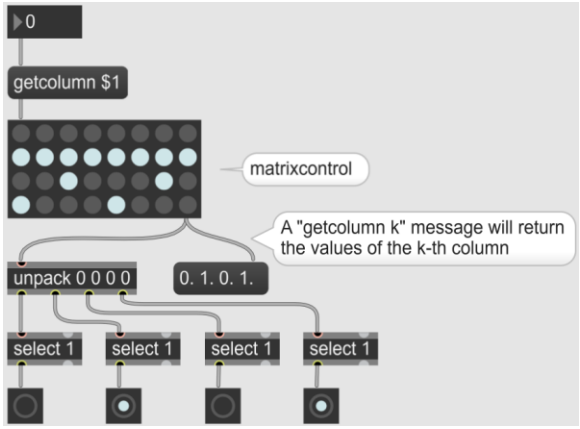


  - Click on the circles in lock mode to switch between 1 and 0
- Send a "getcolumn k" message to the "matrixcontrol" object to get the values of the k-th column as a list

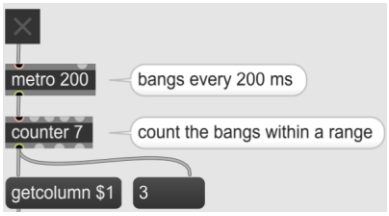


  - In the example above, we send a "getcolumn 0" message to the "matrixcontrol" object, and the output is "0., 1., 0., 1.", which is the first column (from top to bottom)
  - Note that the "matrixcontrol" object is zero-based (i.e., the index starts from zero) by default

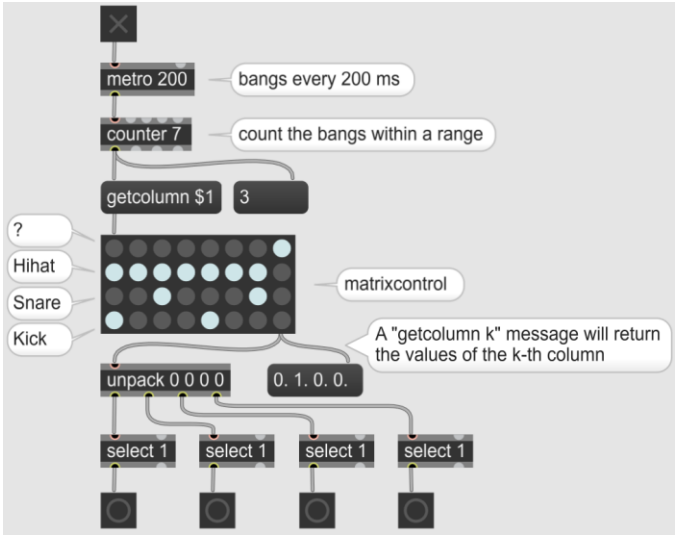
- Use several “select” objects to see if we get a one in a specific row



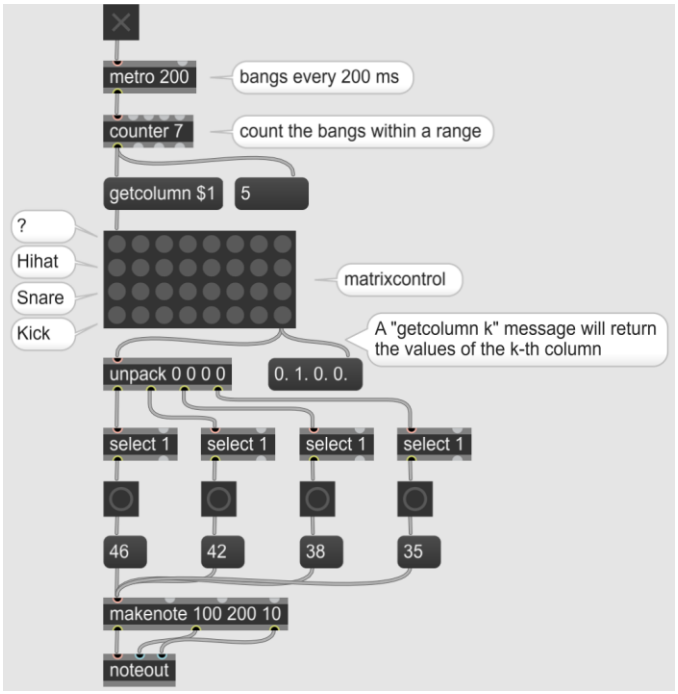
- Use a “metro” object to send a bang message every 200 ms and a “counter” object to count the bangs within a range, i.e., “0, 1, 2, 3, 4, 5, 6, 7, 0, 1, 2, 3, 4, 5, 6, 7, 0, 1, 2, …”



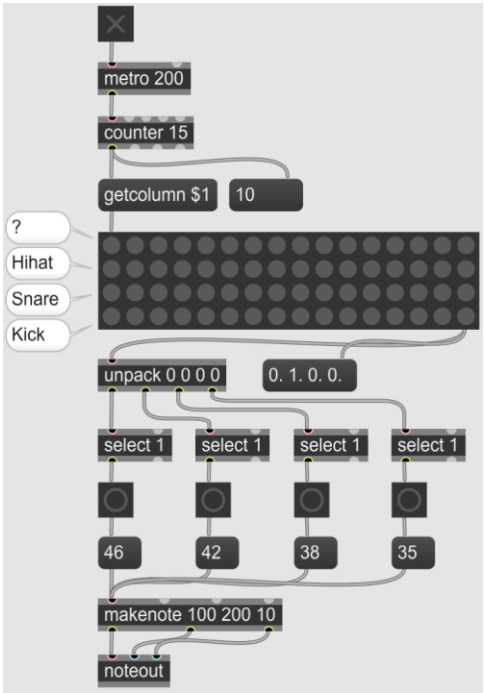
- Connecting everything gives us a simple sequencer interface



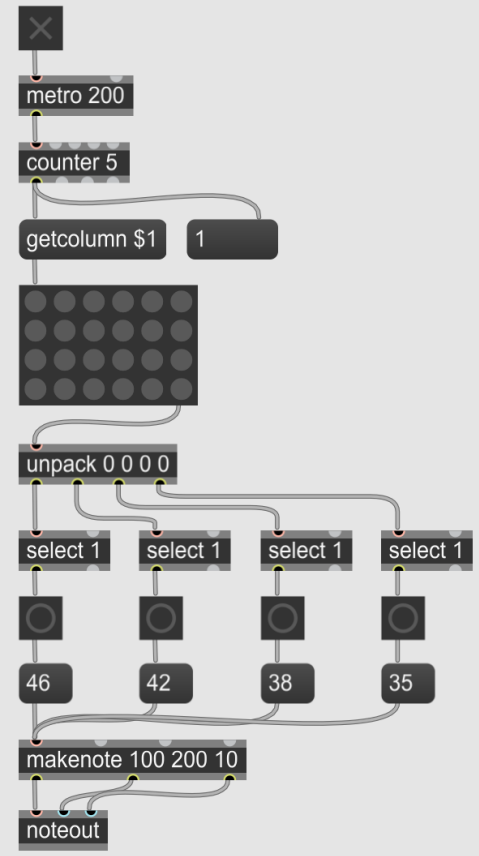
- Connecting the buttons at the bottom to a specific MIDI drum pitch gives us a simple MIDI drum machine



- We can do more than 16-beat rather than 8-beat drum patterns

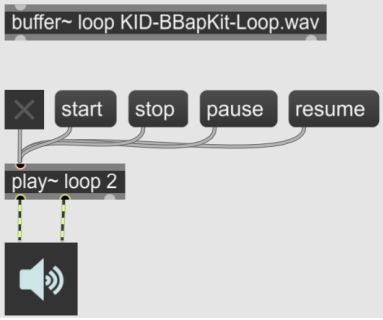


- We can also do 6/8 times



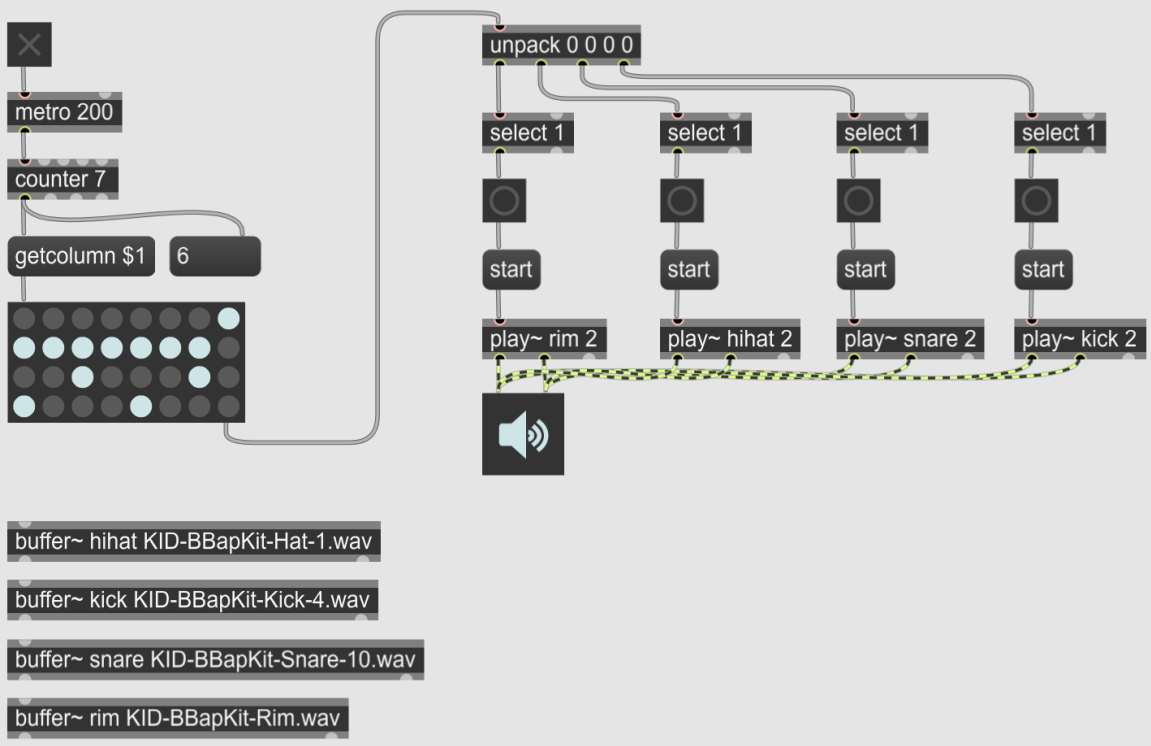
Example 2: Sample-based Drum Machine ("2_sample_drum_machine.maxpat")

- Use a "buffer~" object to store an audio sample and a "play~" object to play the audio buffer



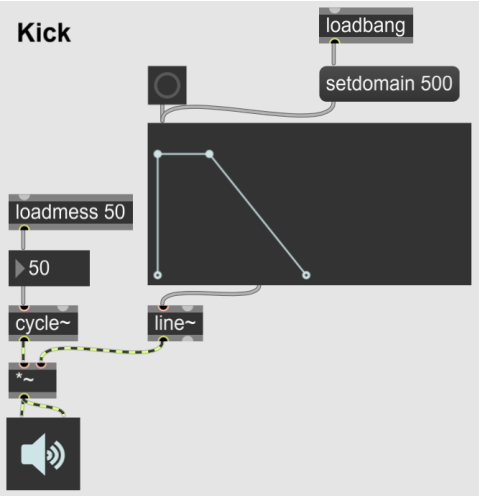
  - In the example above, "buffer~ loop KID-BBapKit-Loop.wav" creates an audio buffer named "loop" that loads the "KID-BBapKit-Loop.wav" file at load time
  - In the example above, "play~ loop 2" plays the audio buffer named "loop" with two channels (i.e., stereo sounds)

- Use multiple “buffer~” and “play~” objects to create a sample-based drum machine



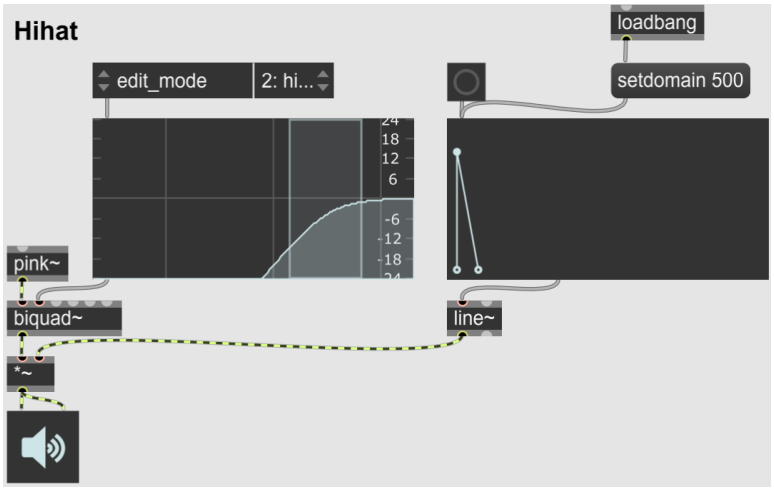
Example 3: Synth Drum Machine (“3_synth_drum_machine.maxpat”)

- Create a synth kick drum sound using a “cycle~” object with a low frequency and a “functiongraph~” based envelope

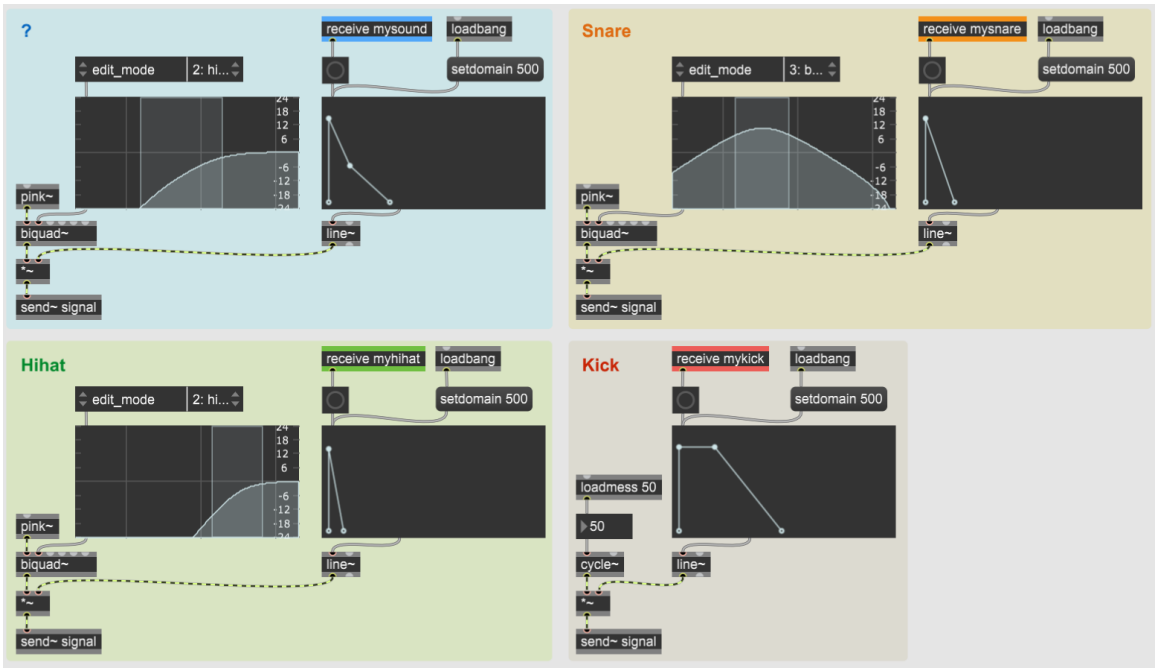


- Create a synth hihat drum sound using a “filtered noise” by filtering a pink noise signal (the “pink~” object) by a “filtergraph~” based lowpass filter and a

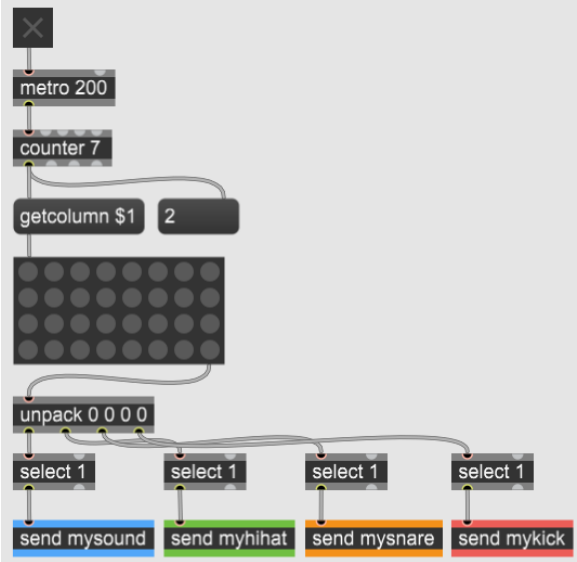
“functiongraph~” based envelope



- Use different oscillators, noise generators and filters to create the drum sounds



- Control the drum sounds using a “matrixcontrol” based sequencer using the “send” and “receive” objects to send and receive numbers or messages



- Use “send~” and “receive~” objects to send and receive signals

- Combing everything gives us a basic synth drum machines