Chapter 15. Meeting 15, Discussion and Workshop

15.1. Announcements

- Due Today: Music Technology Case Study Draft
- Due Thursday, 12 November: Sonic System project Draft

  Bring prototypes, sketches, ideas to class for discussion

15.2. Quiz Review

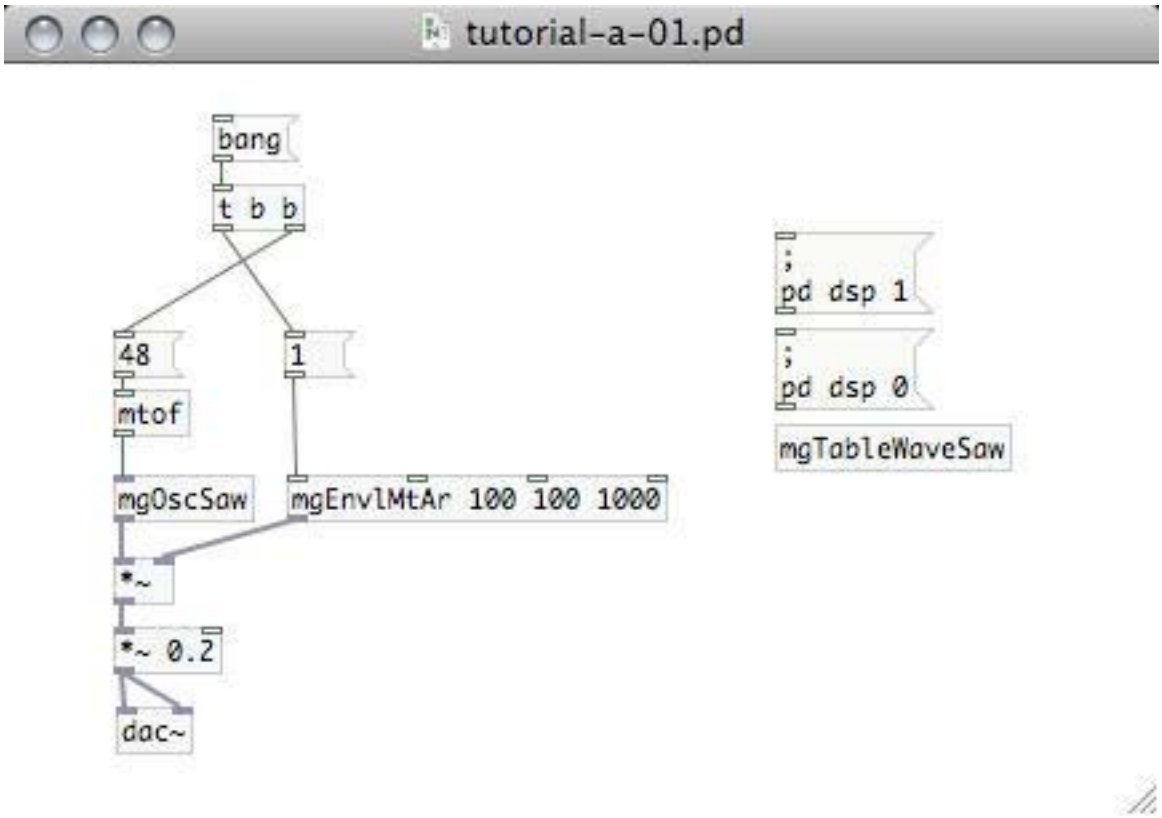
- ?

15.3. Reading: Collins

- Collins, K. 2007. "In the Loop: Creativity and Constraint in 8-bit Video Game Audio." *twentieth-century music* 4(2): 209-227.
- What is technological constraint, and is it like determinism?
- What does it mean to "aestheticize" technical limitations?
- Collins divides dynamic music into interactive and adaptive: what is the difference?
- What were some of the features and constraints of the NES sound chip?
- Collins writes about the influence of social constraints on the development of 8 bit game music: what were these social constraints?
- Collins writes that, in the context of musical features such as loops and repetitions, "the game's audio aesthetic was chosen as much as determined..."; why does she make this distinction?
- What are some of the approaches to looping Collin's describes?

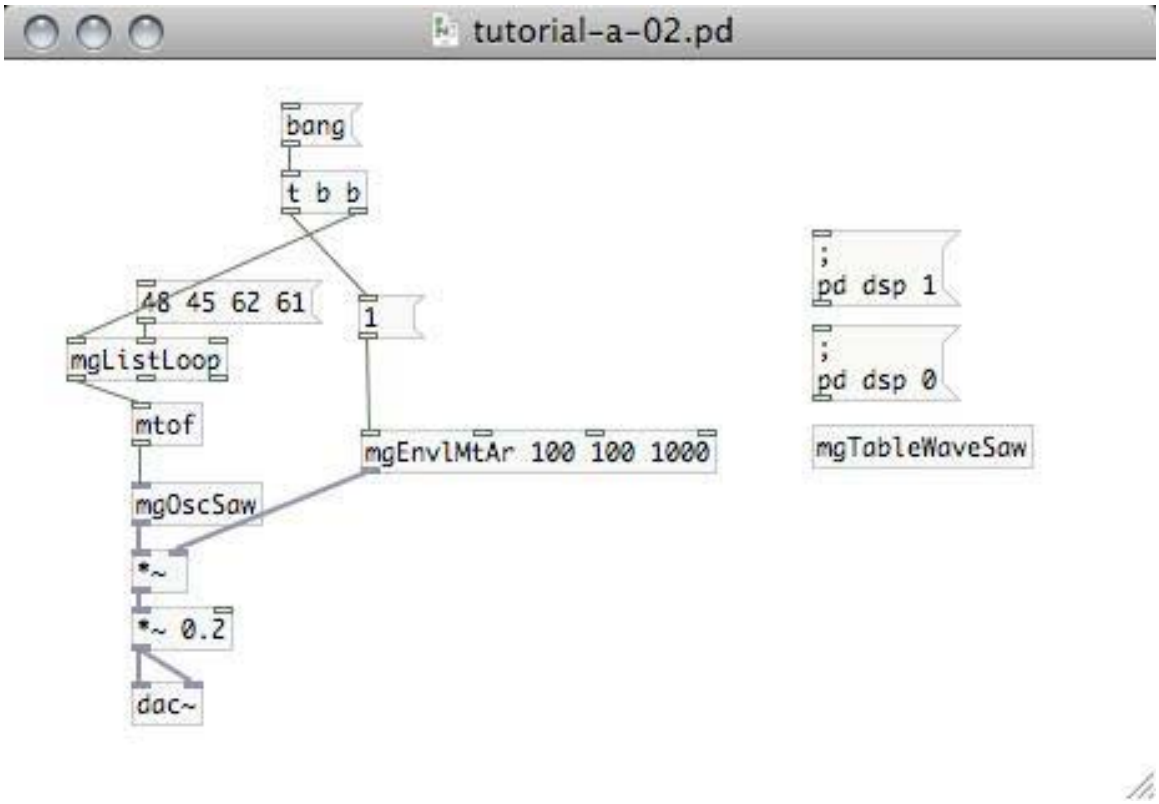
15.4. Workshop: A Basic Synthesizer: Envelope

- Apply an AR envelope to a Saw wave with fixed pitch



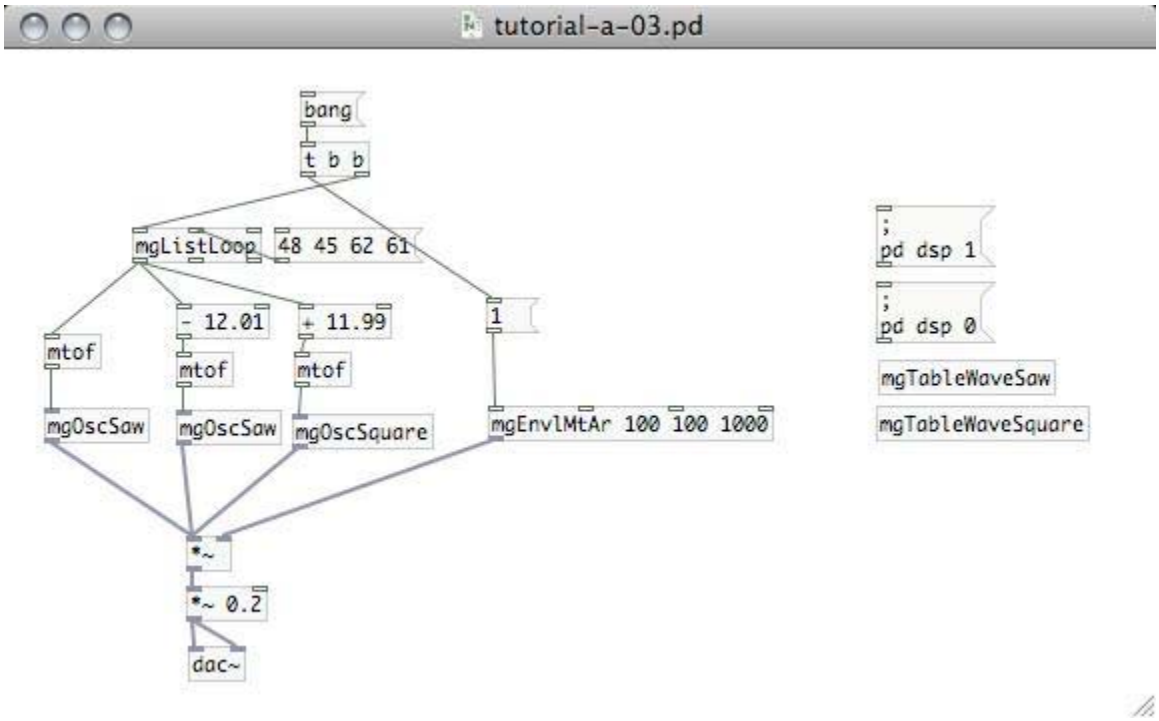
15.5. Workshop: A Basic Synthesizer: Looping Pitches

- Loop through a list of MIDI pitches with [mgListLoop]



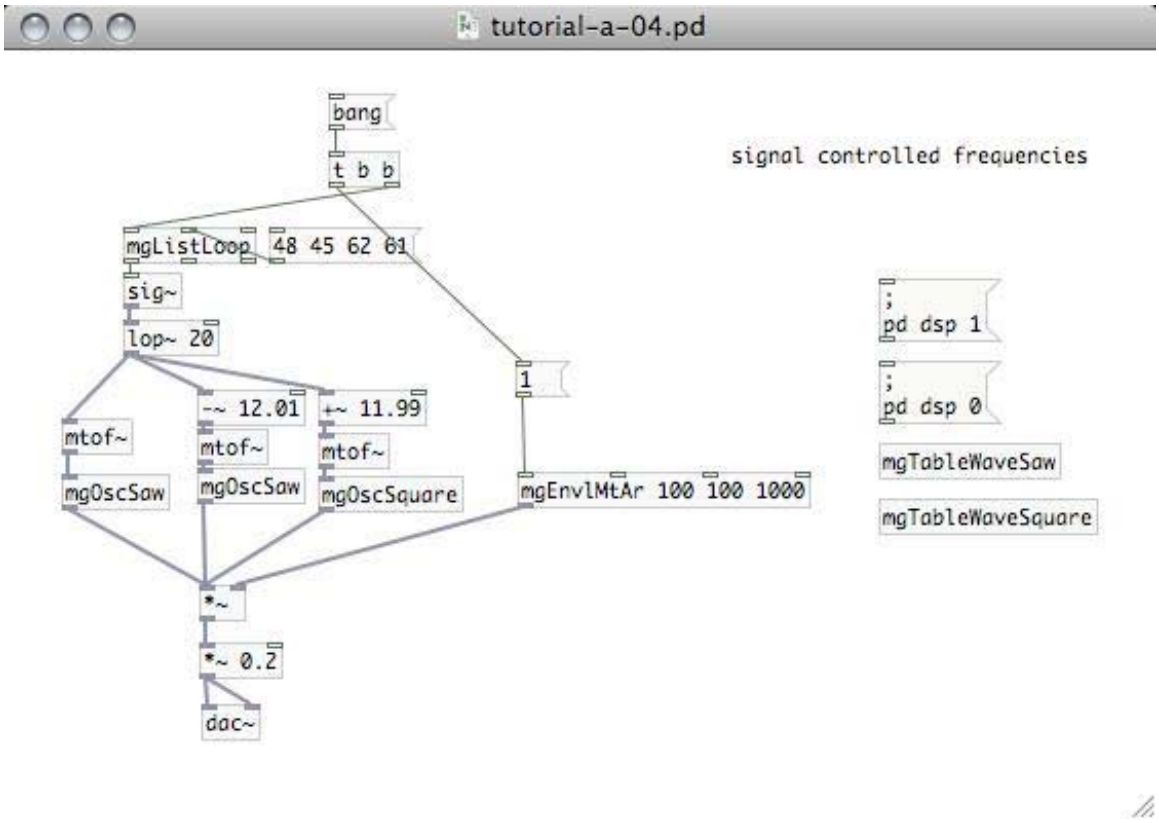
15.6. Workshop: A Basic Synthesizer: Mixing Oscillators

- Combine oscillators with different waveshapes in different octaves and tunings



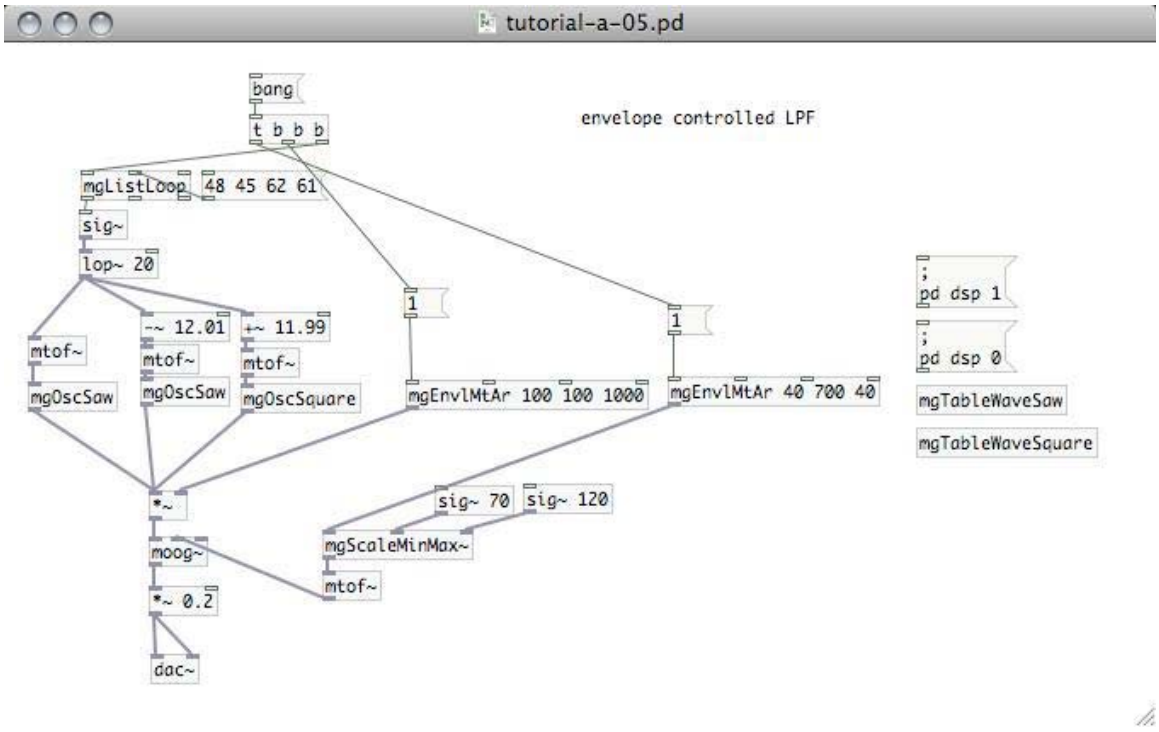
15.7. Workshop: A Basic Synthesizer: Signal Pitch Control

- Convert the MIDI pitch value to a signal and low-pass filter [lop~ 20] to smooth transitions



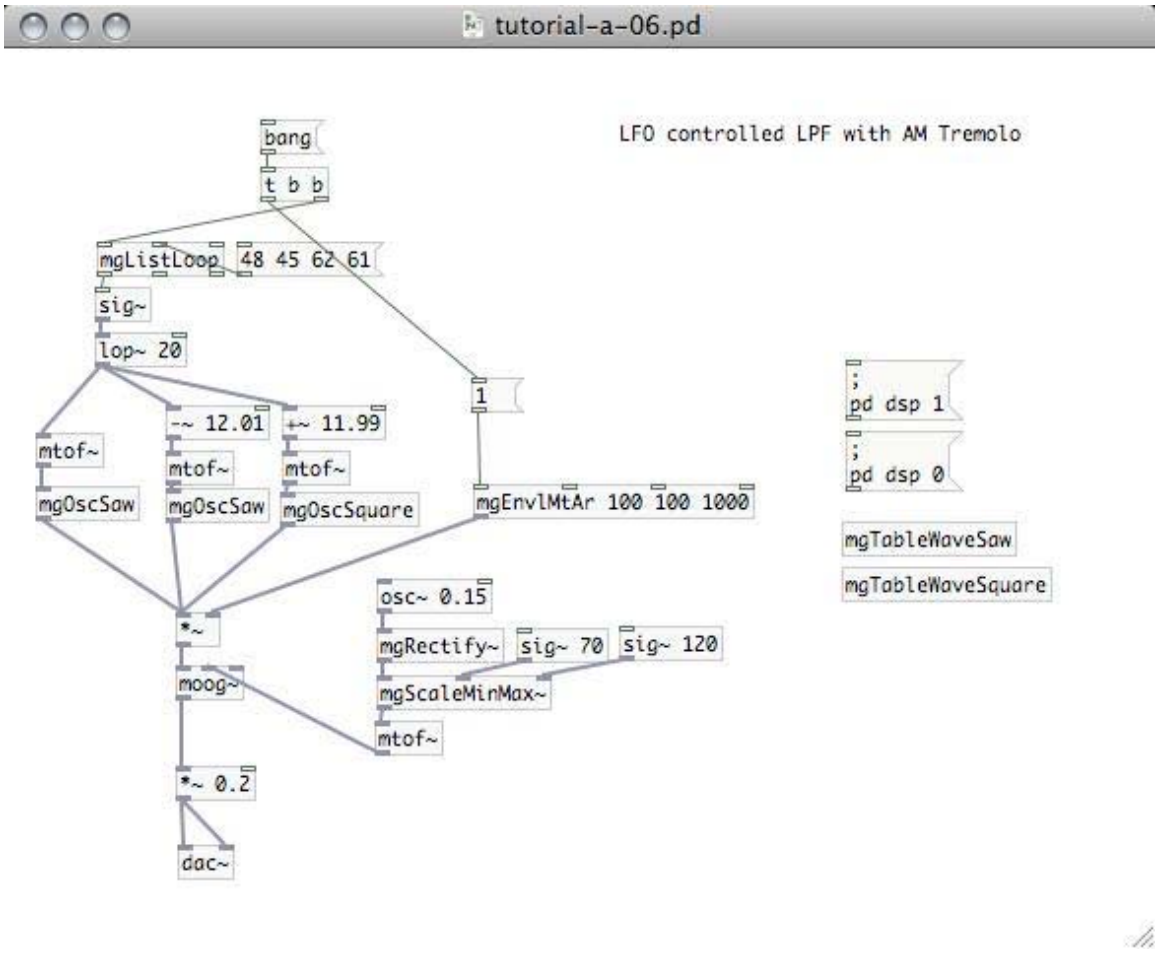
15.8. Workshop: A Basic Synthesizer: LPF Envelope Modulation

- Modulate the cutoff frequency of the low pass filter [moog] with an AR envelope



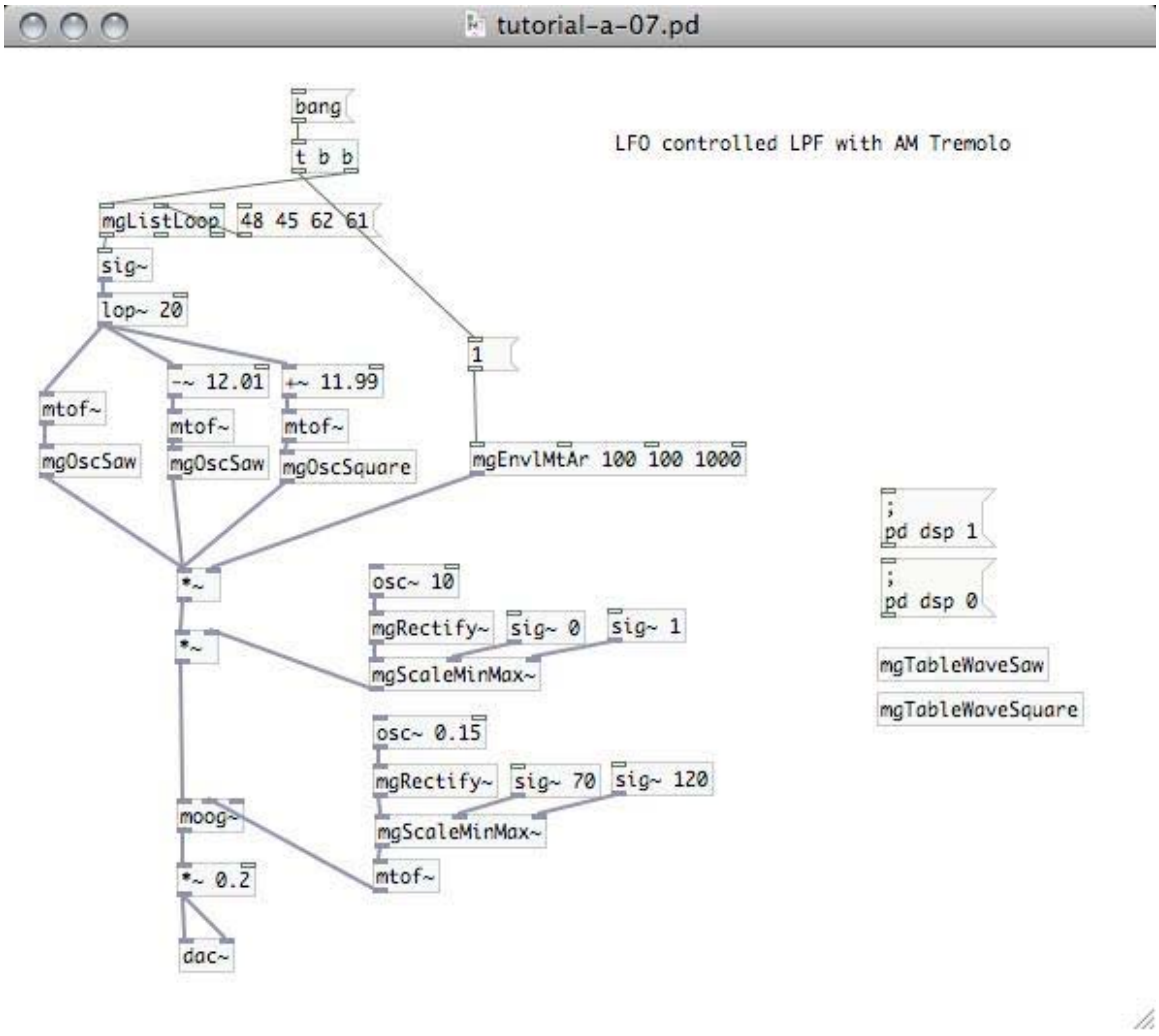
15.9. Workshop: A Basic Synthesizer: LPF Modulation with LFO

- Modulate the cutoff frequency of the low pass filter with a sine wave [osc~ 0.15]



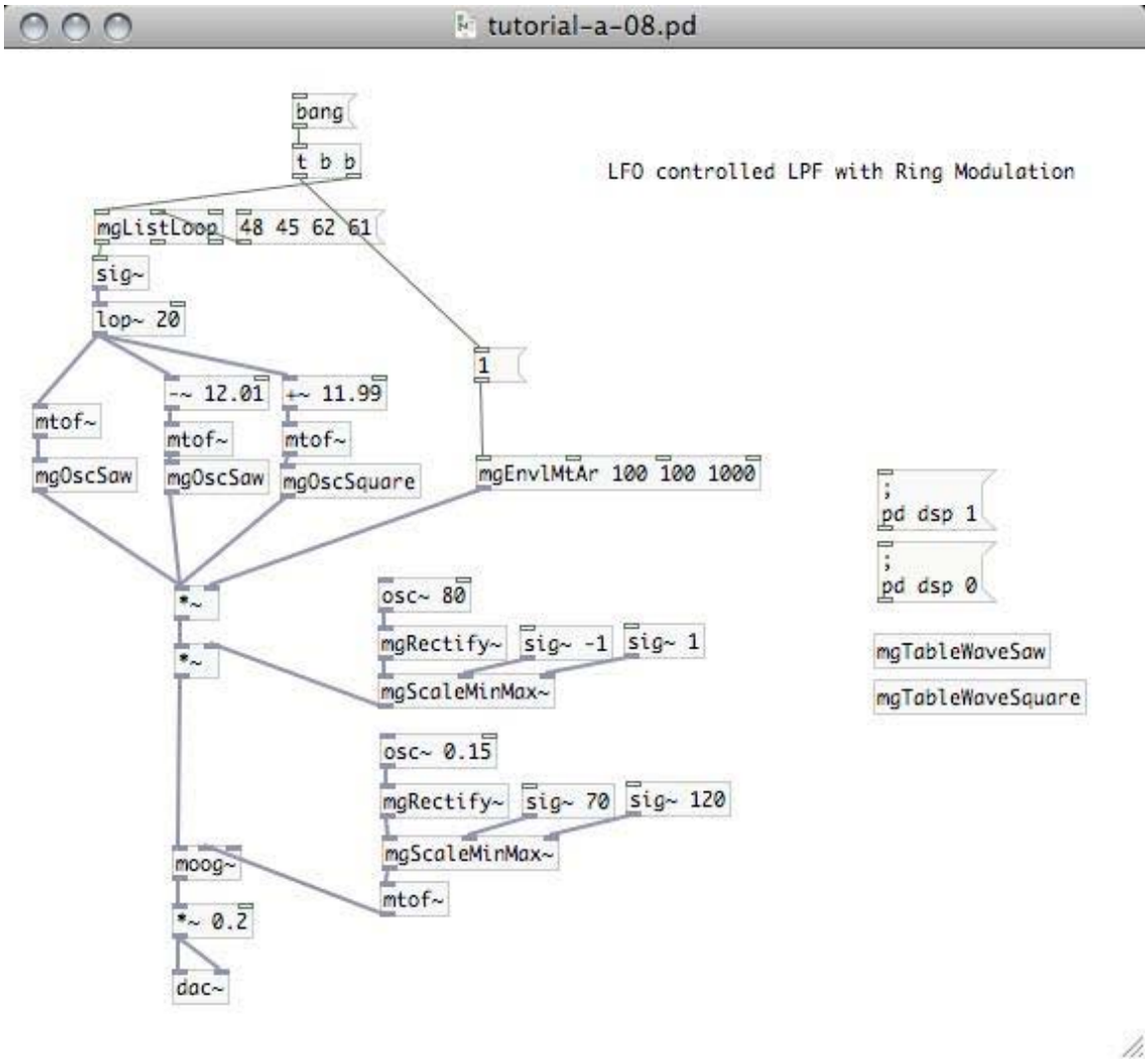
15.10. Workshop: A Basic Synthesizer: AM Tremolo

- Modulate the amplitude between 0 and 1 below the audio rate



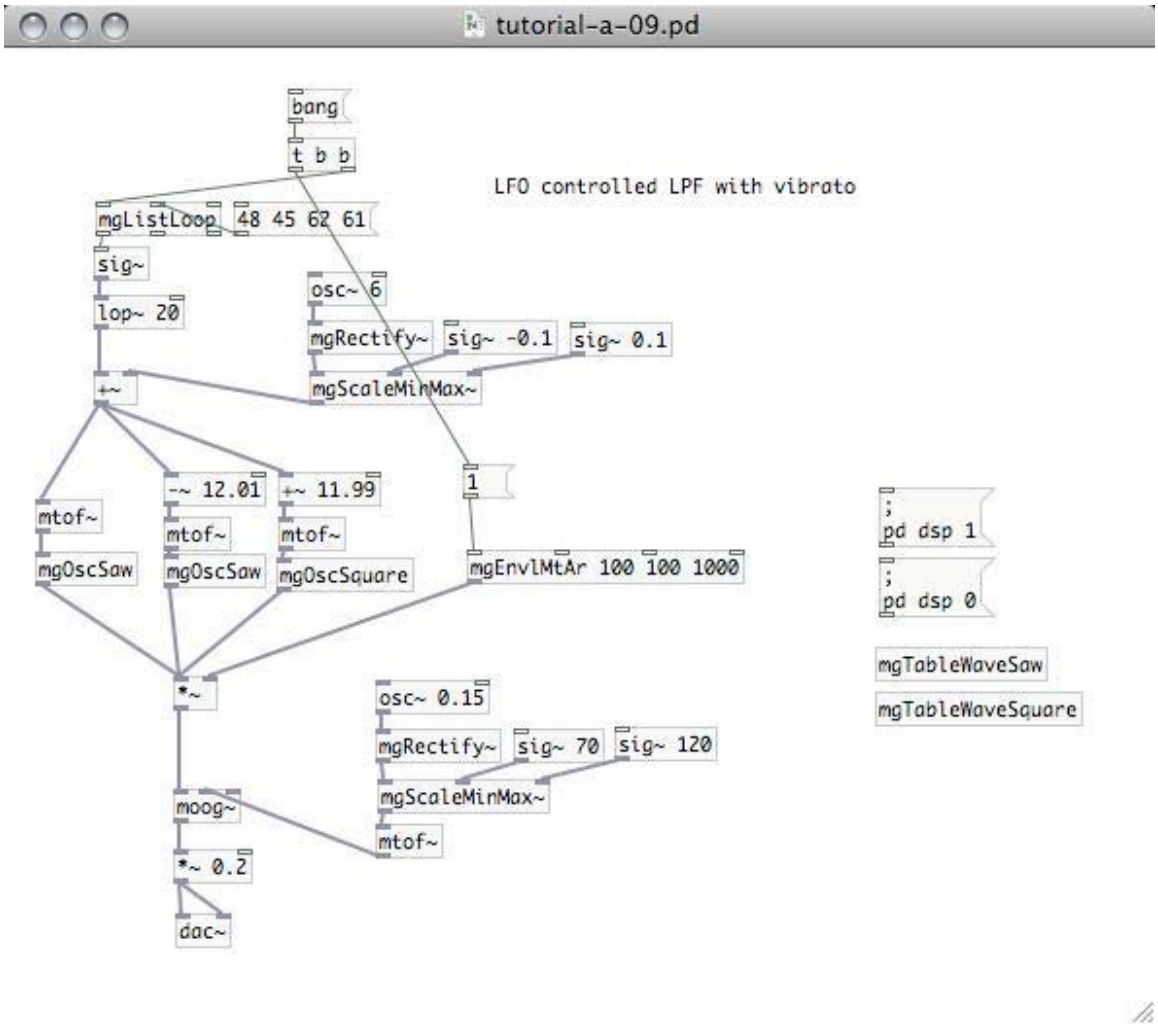
15.11. Workshop: A Basic Synthesizer: Ring Modulation

- Modulate the amplitude between -1 and 1 above the audio rate



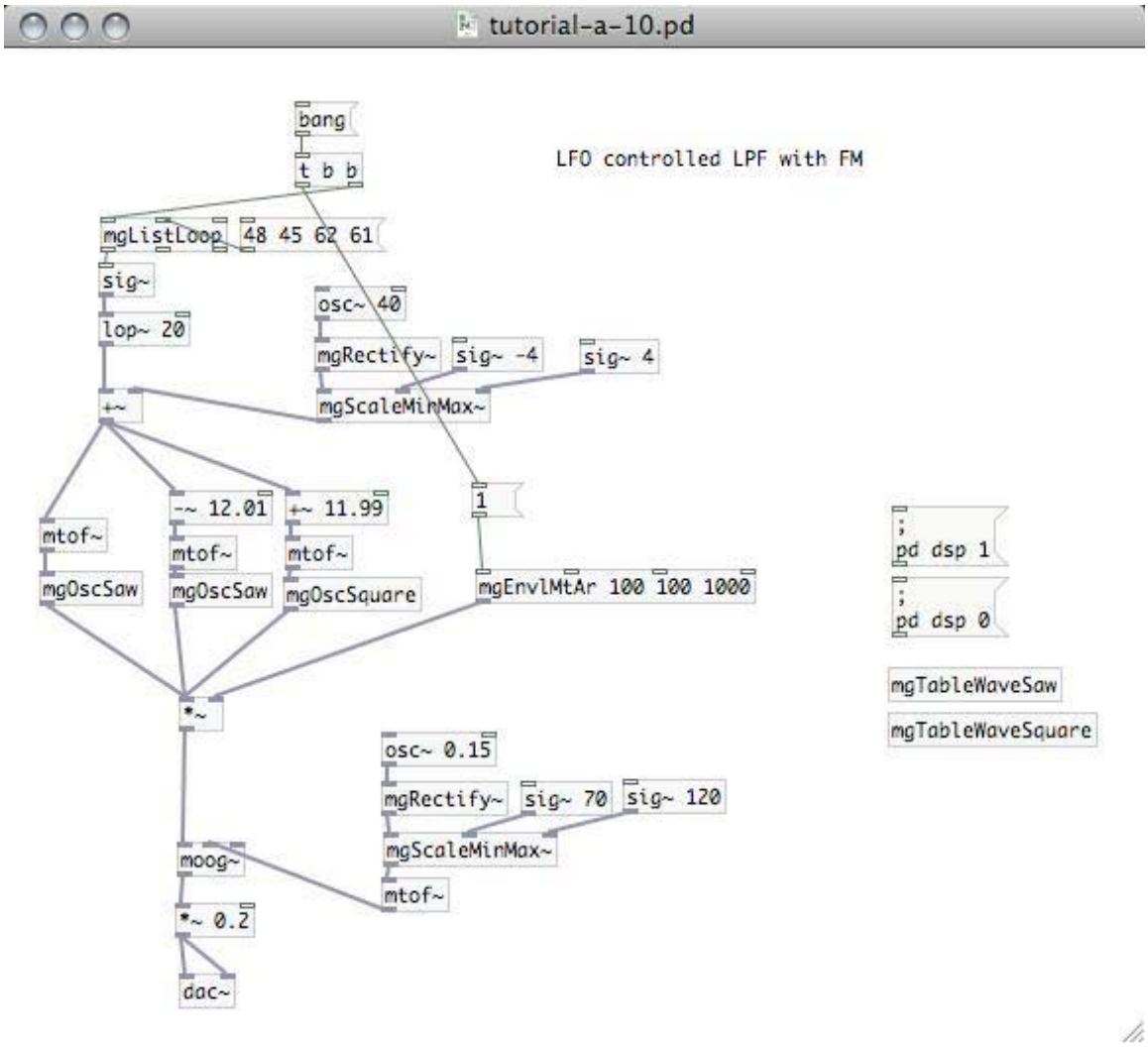
15.12. Workshop: A Basic Synthesizer: Vibrato

- Modulate the oscillator frequency between -0.1 and 0.1 MIDI steps at a slow rate (6 Hz)



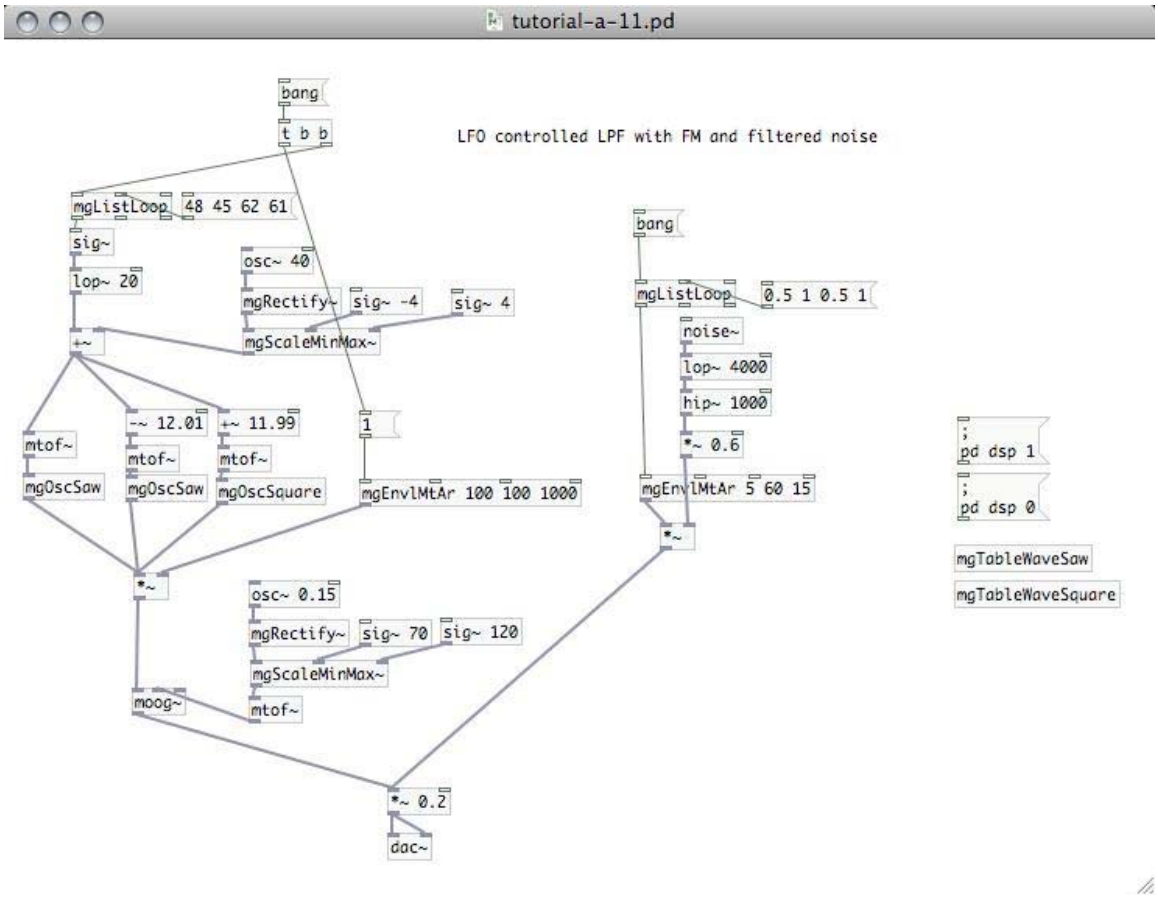
15.13. Workshop: A Basic Synthesizer: Frequency Modulation

- Modulate the oscillator frequency between -4 and 4 MIDI steps at a fast rate (40 Hz)



15.14. Workshop: A Basic Synthesizer: Filtered Noise

- Use a low-pass filtered noise for a percussion sound



15.15. Hardware Hacking: Oscillator Clock Controlled Sequencer

- 74C14 Oscillator (Collins 2009, p. 135)

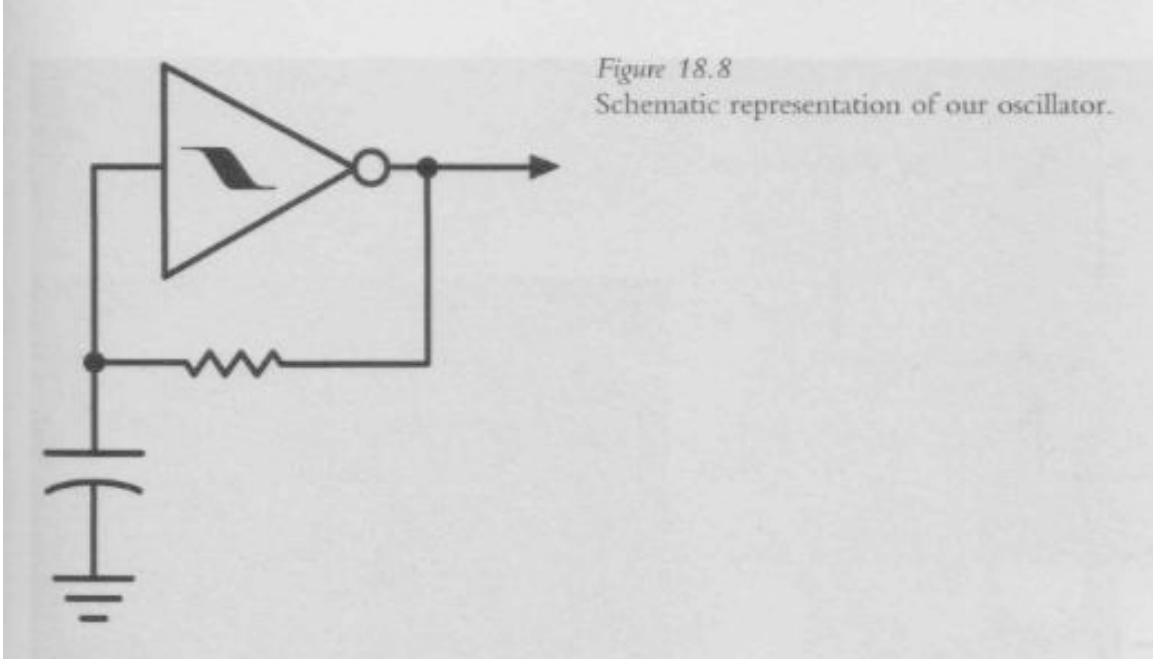


Figure 18.8
Schematic representation of our oscillator.

- CD4017: decade counter, providing 10 output voltages at rate determined by a clock (Collins 2009, p. 208)

  Cycle lengths can be altered by connecting an output to the reset input

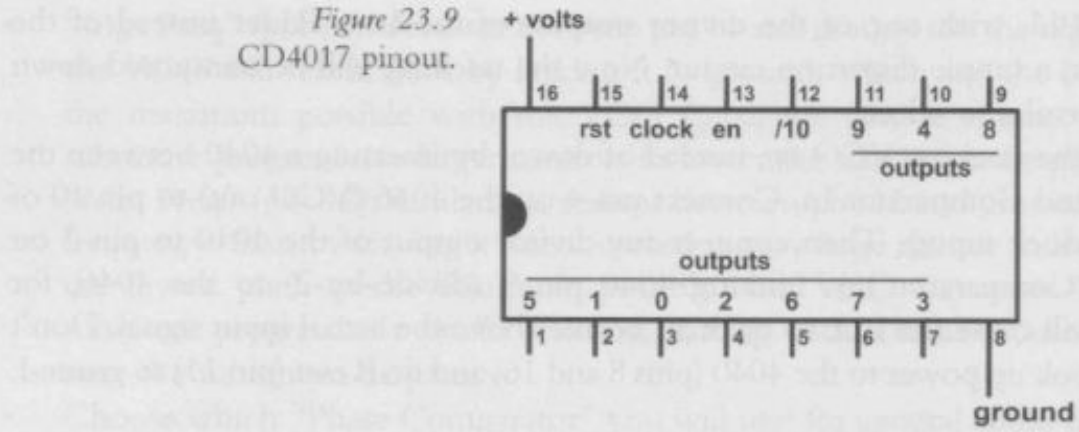


Figure 23.9
CD4017 pinout.

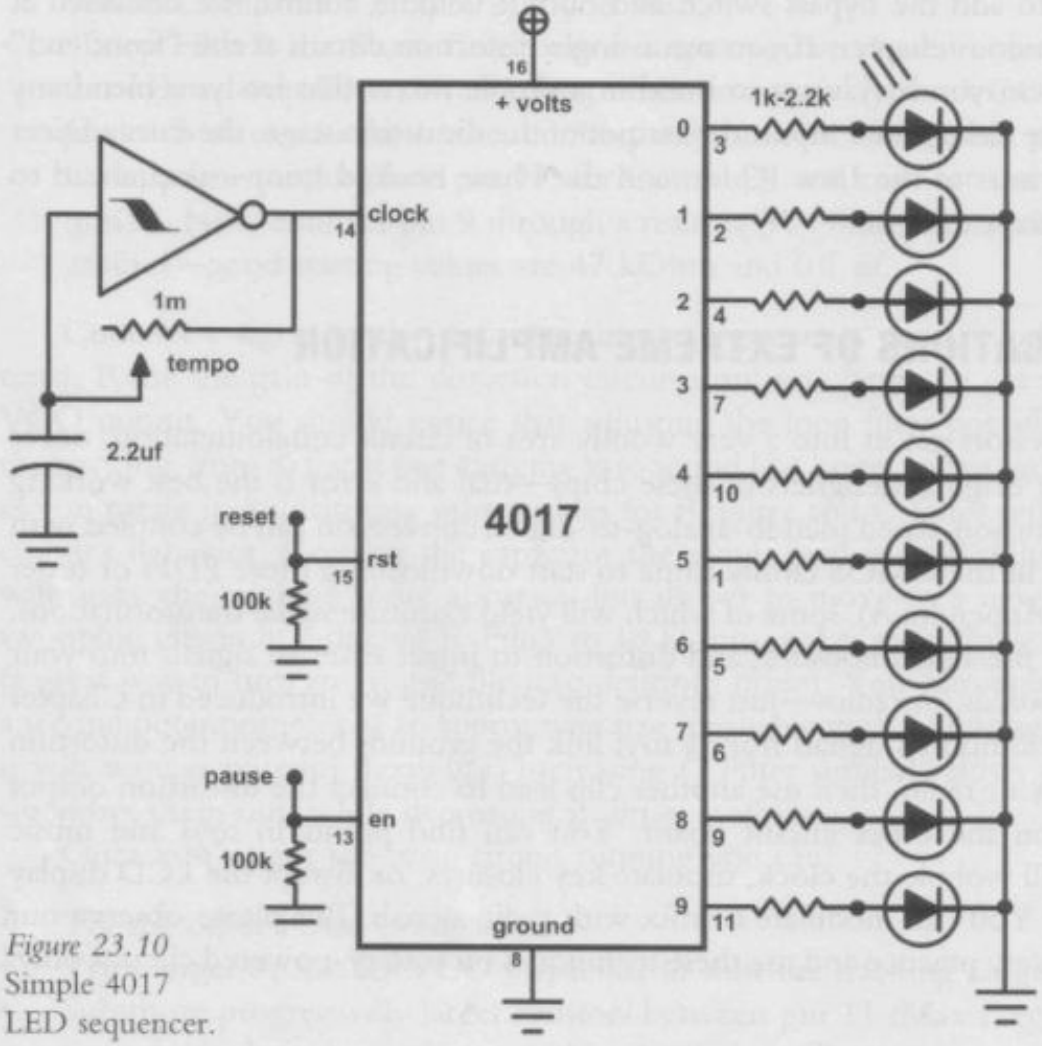
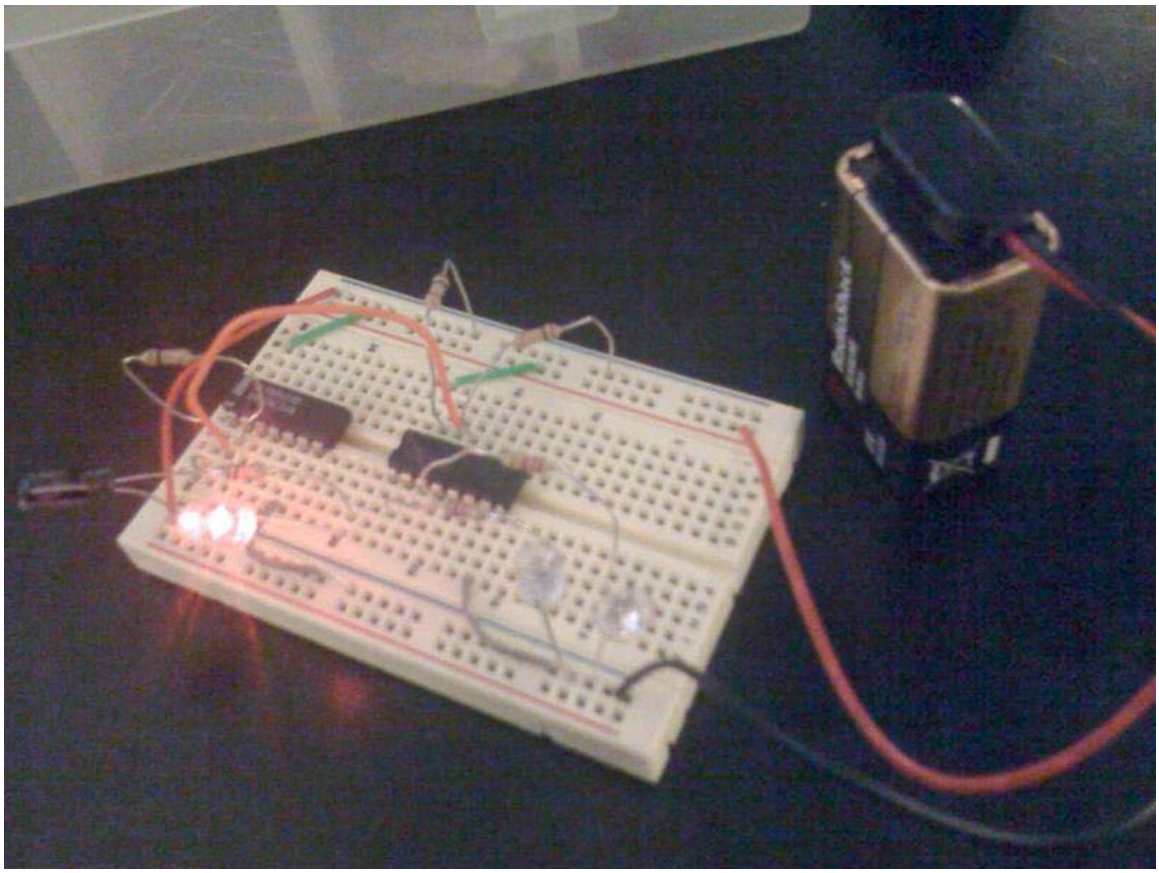
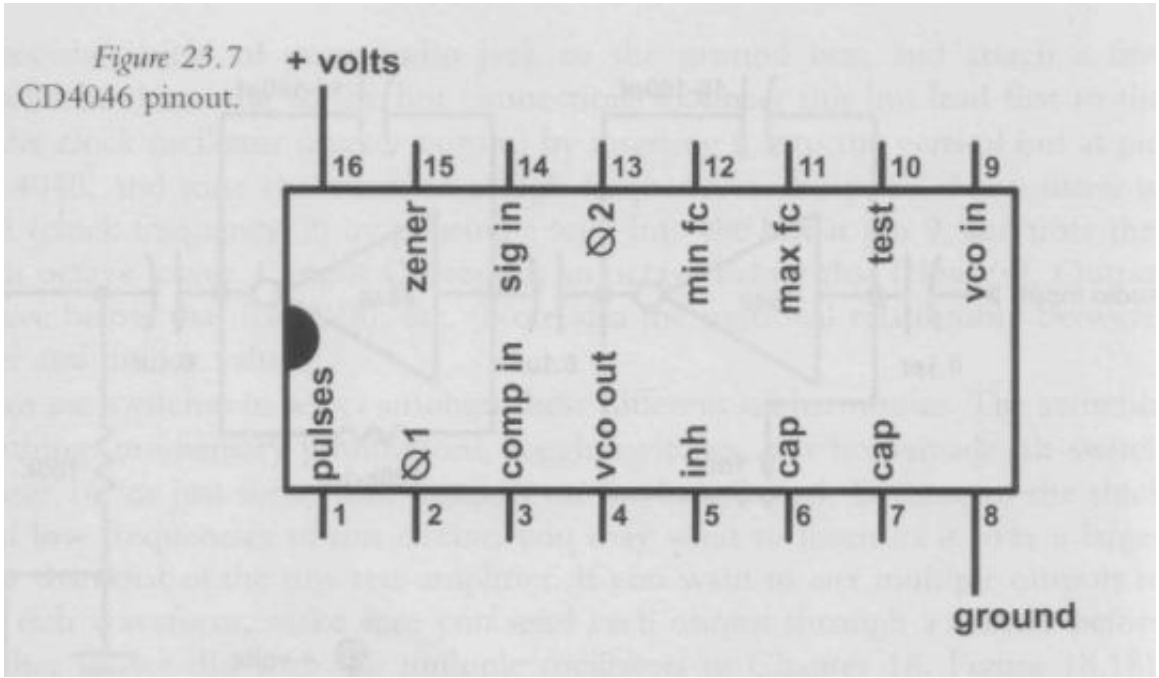


Figure 23.10
Simple 4017
LED sequencer.



- CD4046: Voltage controlled oscillator (capable of pitch tracking) (Collins 2009, p. 204)



- VCO driven by voltages of the CD4017 (Collins 2009, p. 209)

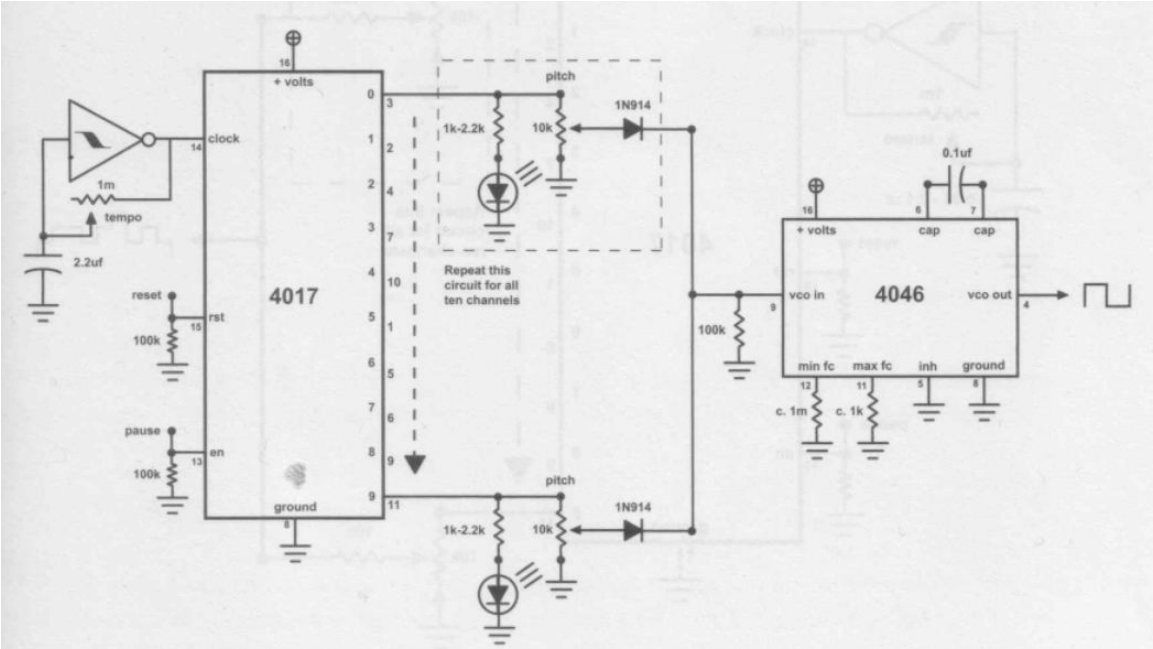
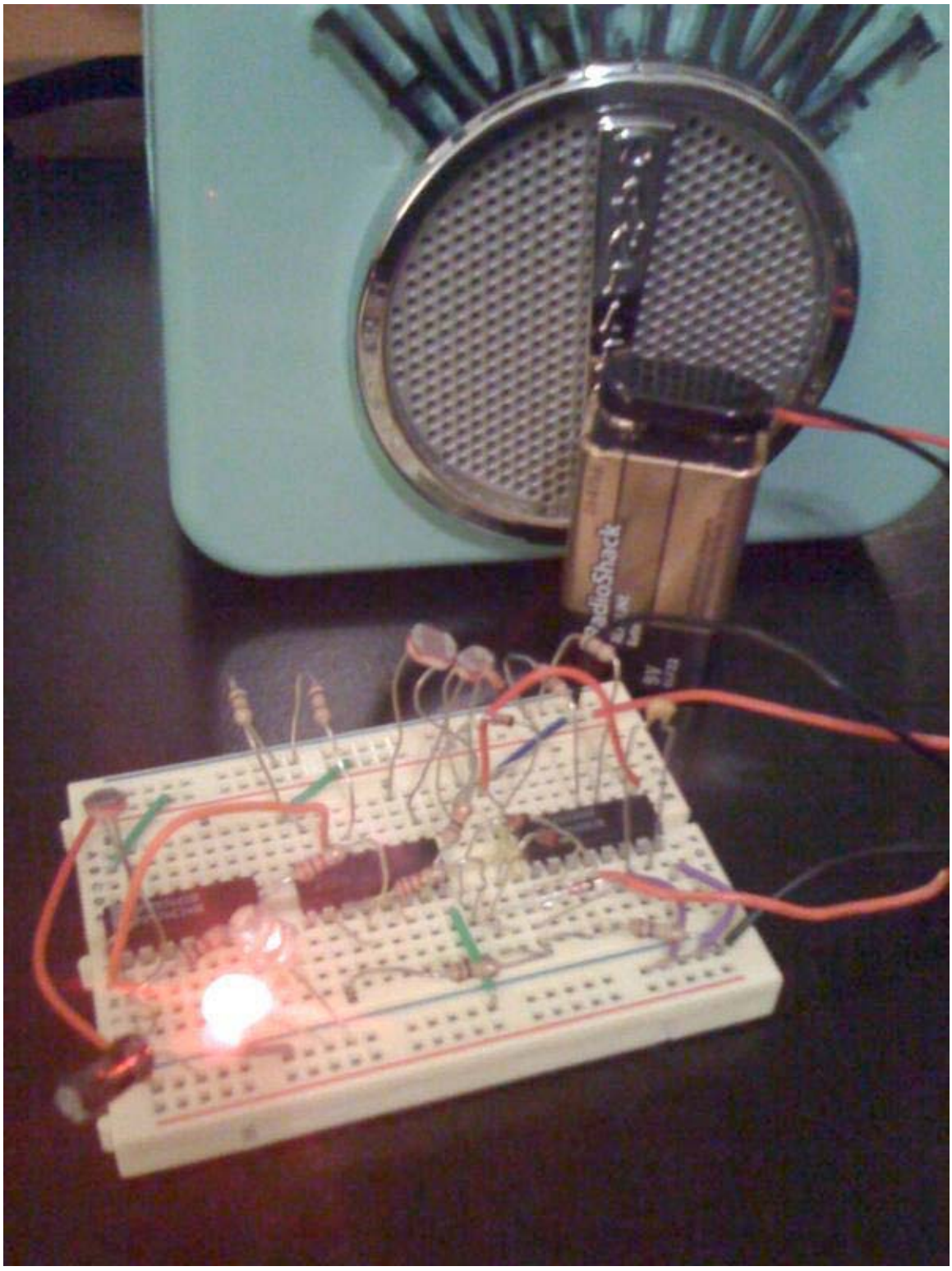


Figure 23.11 Ten-step analog sequencer driving a voltage-controlled oscillator.

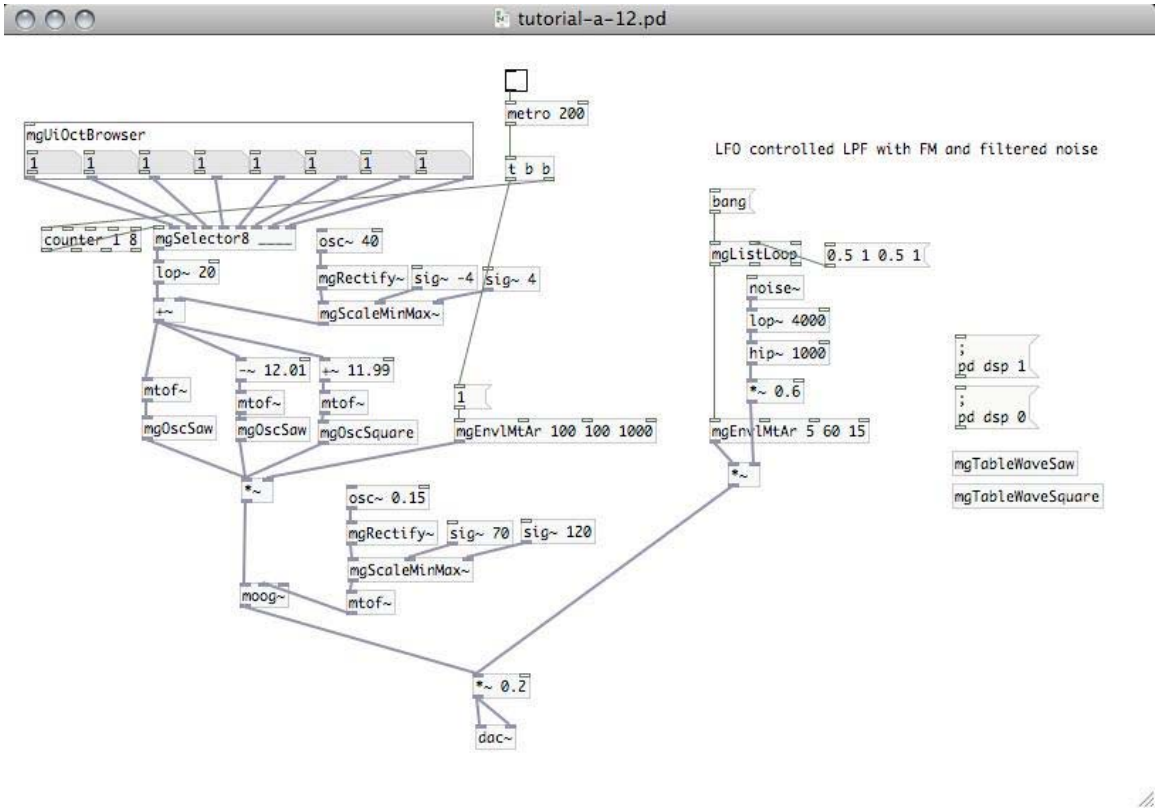


- Alternative examples

  YouTube (http://www.youtube.com/watch?v=FqWzJt3Nm-U)

15.16. Workshop: A Basic Synthesizer: Sequencer Pitch Control

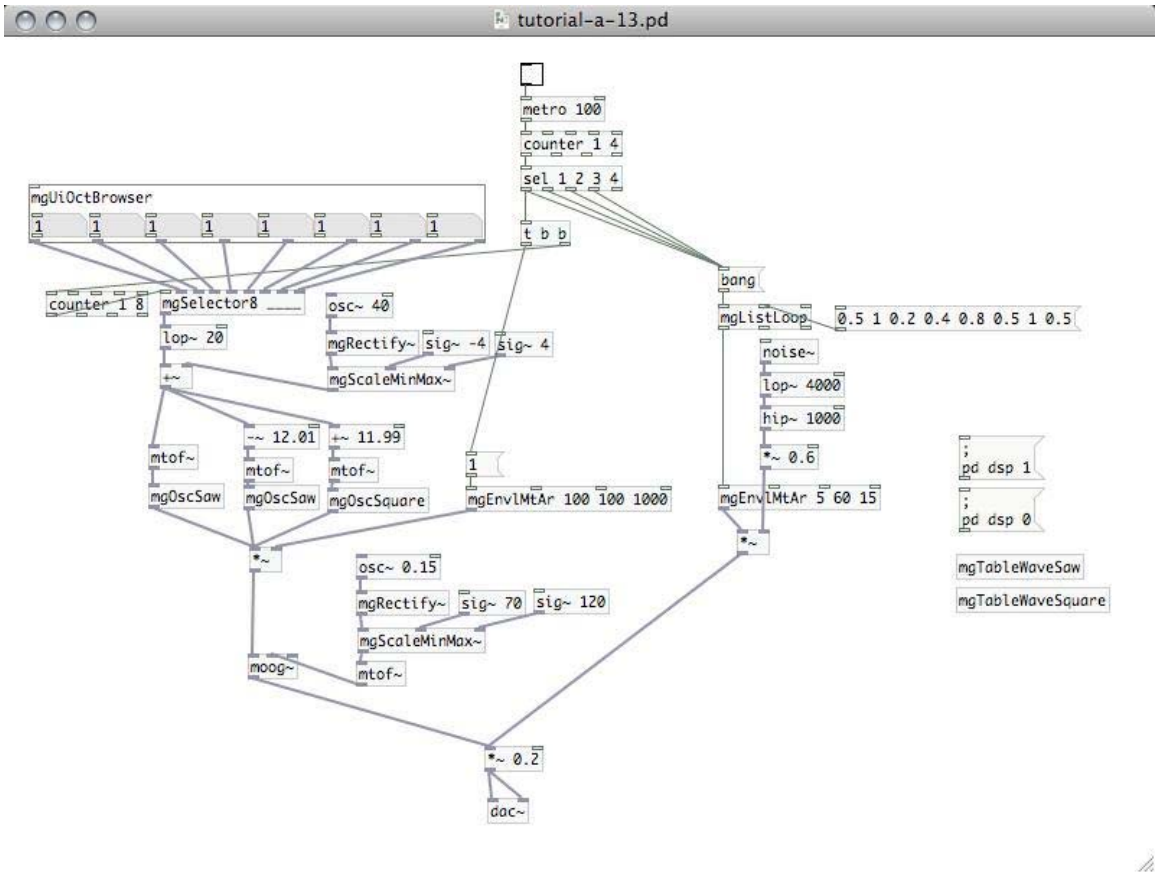
- Counter controlled selection between 8 different MIDI pitch values



15.17. Workshop: A Basic Synthesizer: Sequencer Pitch and Rhythm Control

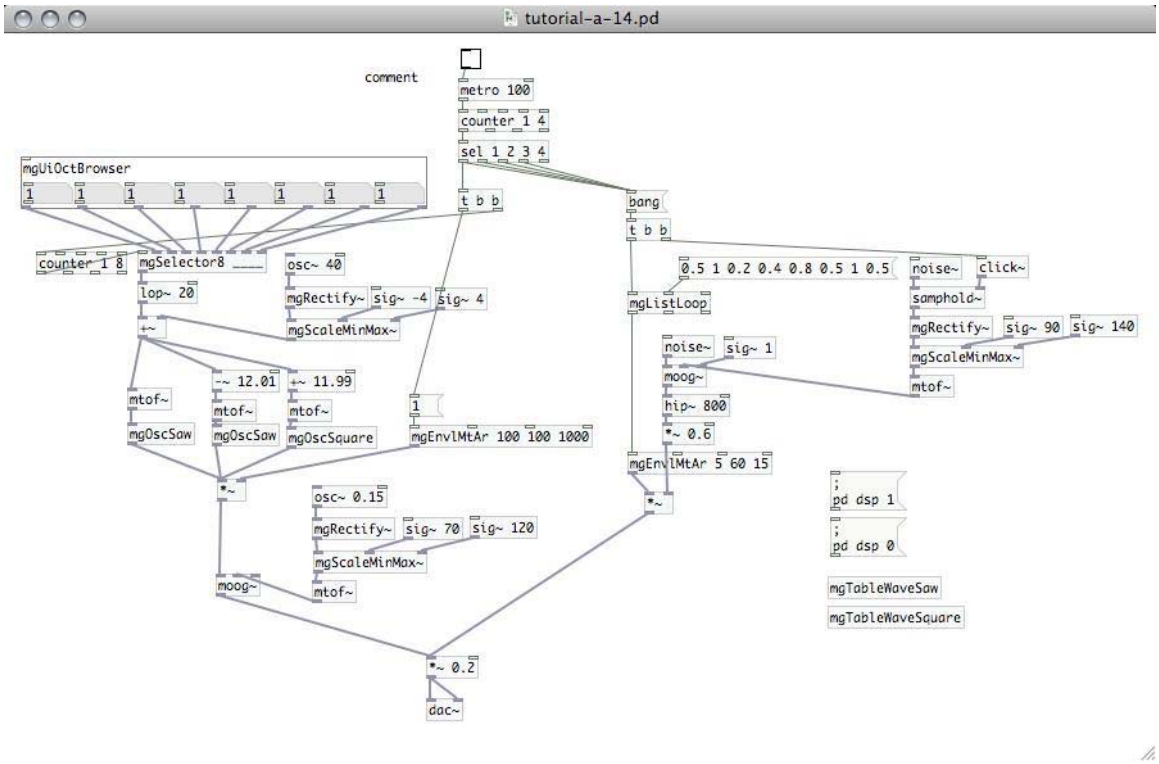
- Apply event triggers to pitched sequencer value selection and rhythm amplitude list loop

  Selecting triggers from a counter provides rhythmic subdivisions



15.18. Workshop: A Basic Synthesizer: Sequencer Control with SAH Random LPF Modulation

- Use noise through a SAH to produce random LPF cutoff frequencies applied ot noise



15.19. Listening: Vaggione

- Audio: Horacio Vaggione, "24 Variations," 2002

- Contemporary electro-acoustic music employing approaches to sample layering, transformation, and micro-organization (micromontage and granular synthesis)

21M.380 Music and Technology (Contemporary History and Aesthetics)
Fall 2009