Audio Programming with Chuck
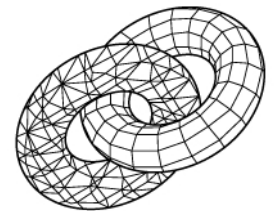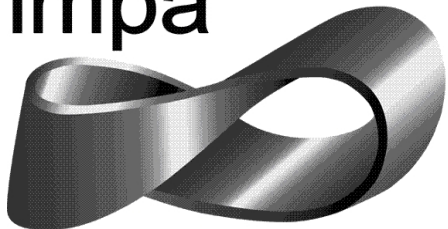
Session 5: Unit Generators and Physical Models

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Mini-course Schedule

08/01/2019   Session 1: Basics: Sound, Waves, and ChucK initiation

10/01/2019   Session 2: MIDI, ChucK Libraries, and Arrays

15/01/2019   Session 3: Sound File Manipulation

17/01/2019   Session 4: Functions

Today   Session 5: Unit Generators and Physical Models

24/01/2019   Session 6: Multi-Threading and Concurrency

29/01/2019   Session 7: Classes and Object-Oriented Programming

Session 5: Unit Generators and Physical Models

adc, blackhole, PulseOsc

ADSR envelope

Frequency Modulation

Effects (Reverb, Chorus, PitShift)

Physical Models:

Mandolin

Shakers

Introduction

digital analog converter (dac) => speakers;

analog digital converter (adc) => mic;
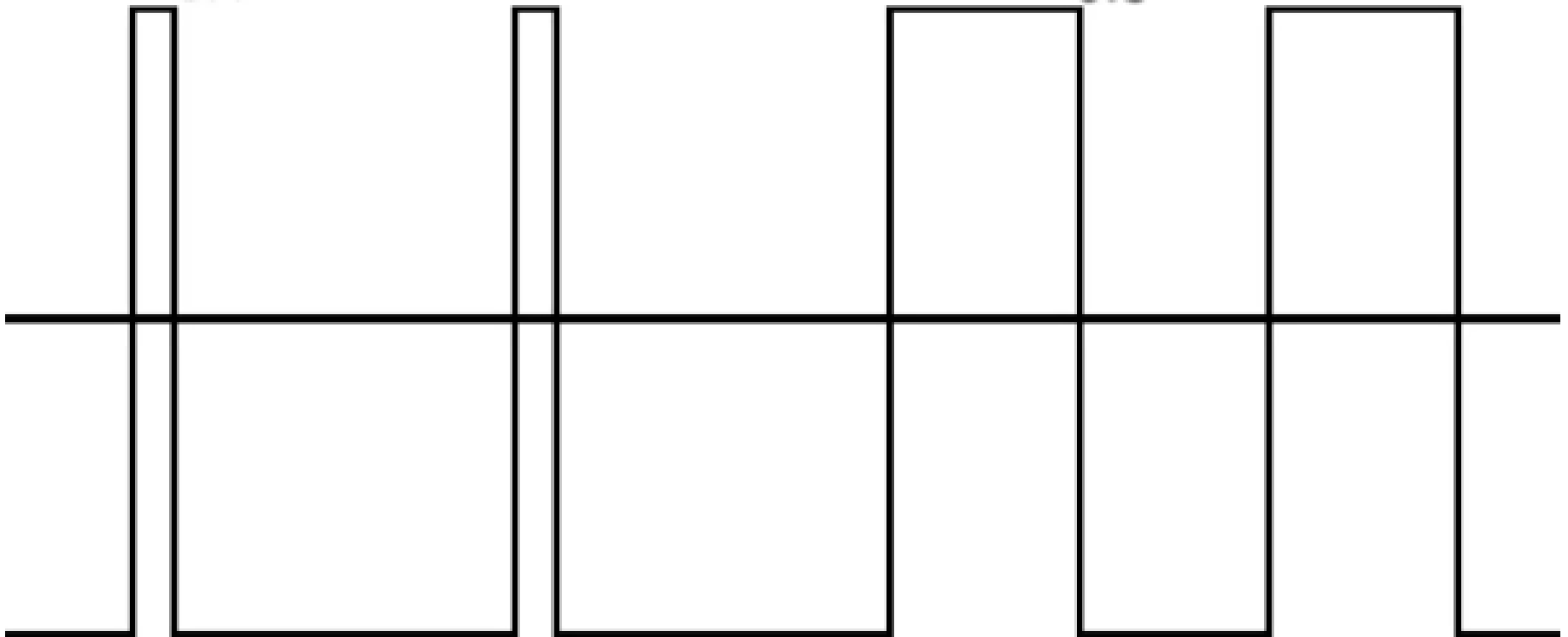
blackhole;

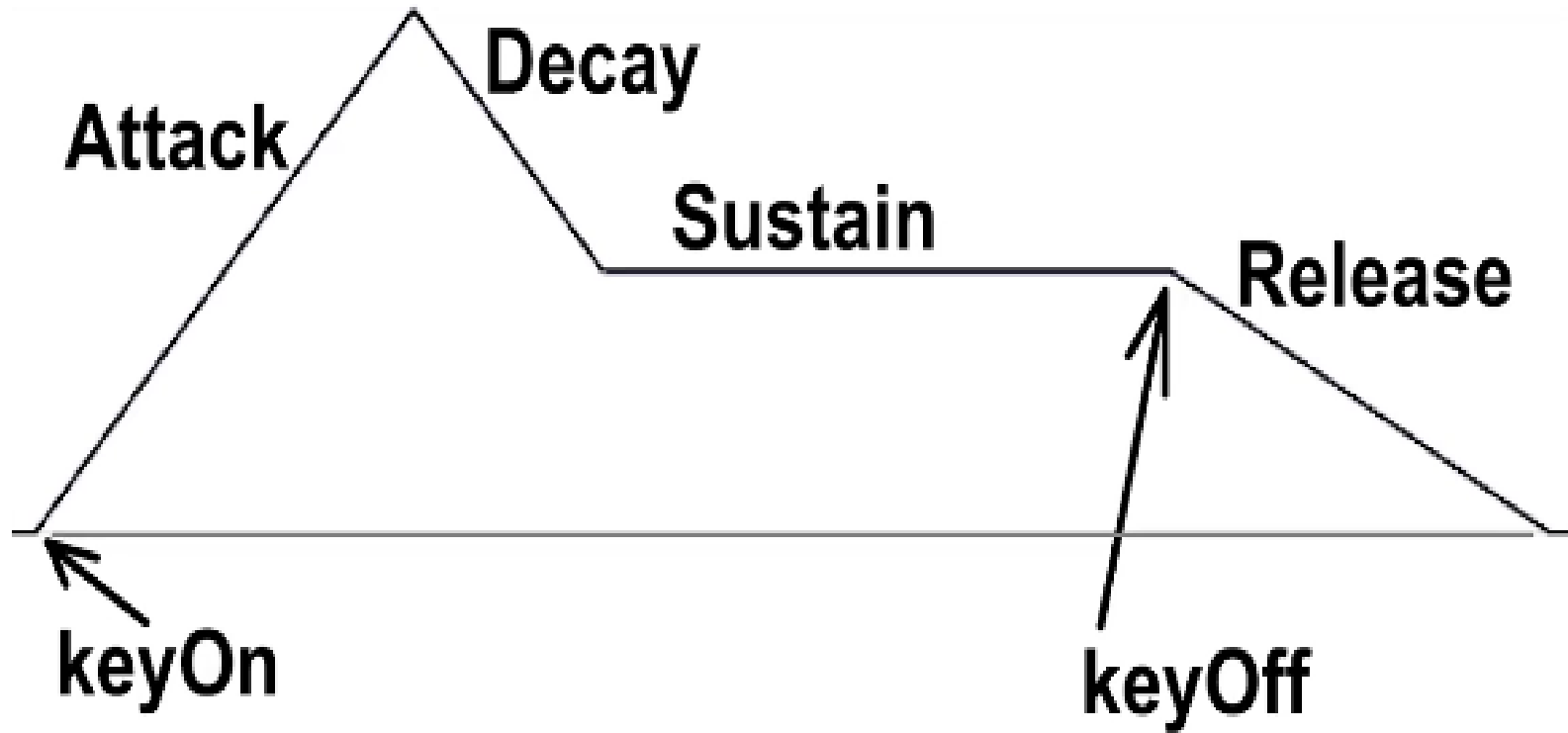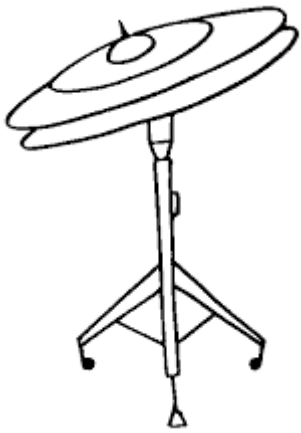http://chuck.cs.princeton.edu/doc/program/ugen.html
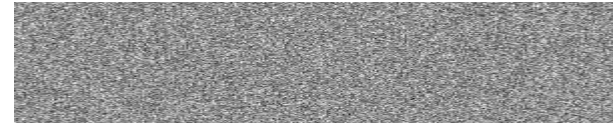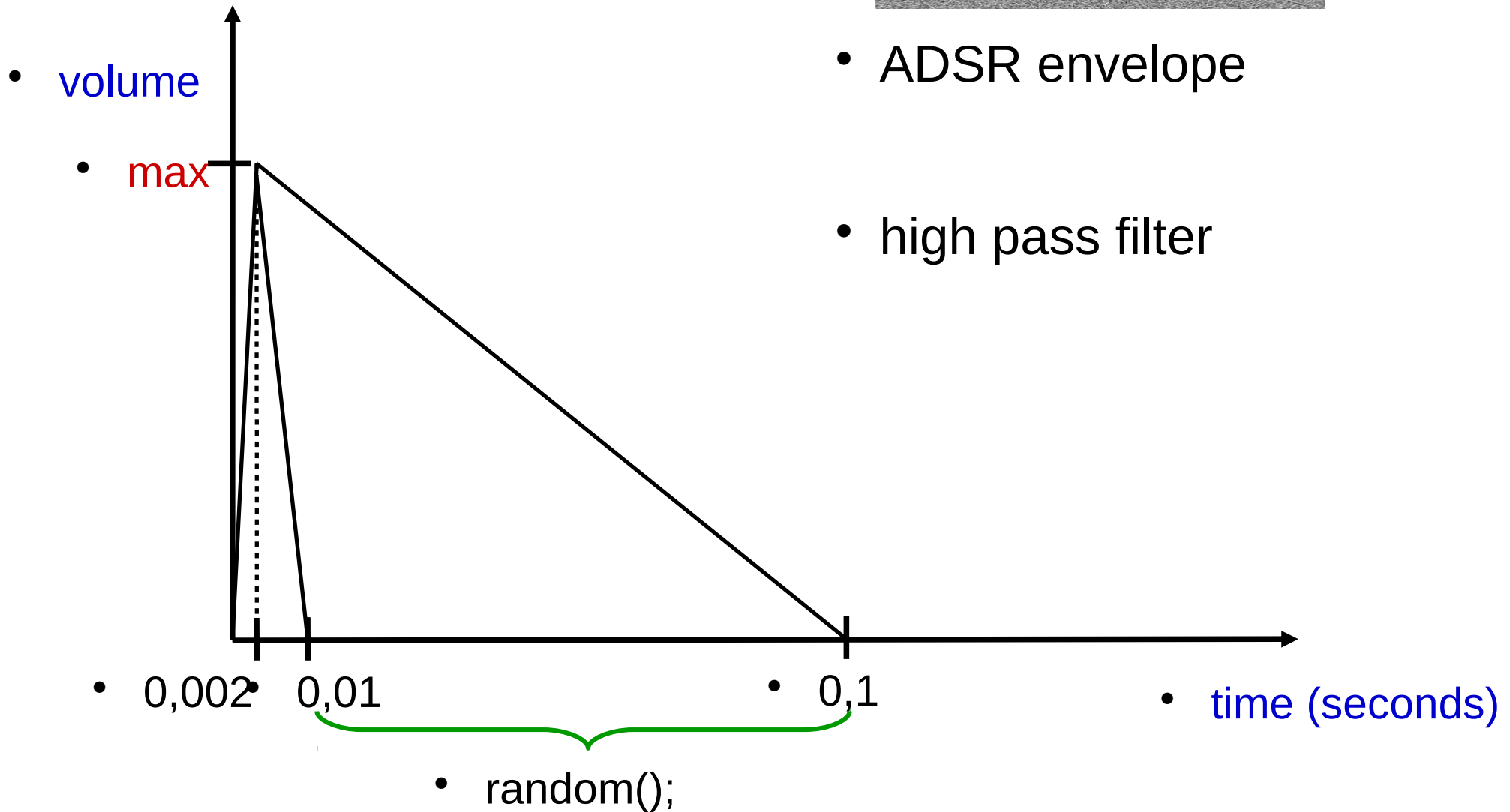
PulseOsc

10% duty cycle

0.1

50% duty cycle

0.5

ADSR Envelope

hi-hat

- noise

- ADSR envelope

- high pass filter

- volume

- max

0,002   0,01   0,1

random();

time (seconds)

Frequency Modulation Synthesis

the frequency of a waveform, called the carrier, is changed by modulating its frequency with a modulator oscillator.

can create both harmonic and in-harmonic sounds.

as the amount of frequency modulation increases, the sound grows progressively more complex.

Reverberation

is created when a sound or signal is reflected causing a large number of reflections to build up and then decay as the sound is absorbed by the surfaces of objects in the space – which could include furniture, people, and air.

Chorus

occurs when individual sounds with approximately the same time, and very similar pitches converge and are perceived as one.

PitShift

is a technique in which the original pitch of a sound is raised or lowered.

Mandolin

synthesis techniques to model mandolin instrument behavior.

Body Size

Pluck Position

String Sustain

String Detuning

Shakers

is an algorithmic approach for simulating collisions of multiple independent sound producing objects.

Ex: Maraca, Sekere, Cabasa, Bamboo Wind Chimes, Water Drops, Tambourine, Sleighbells, and a Guiro.