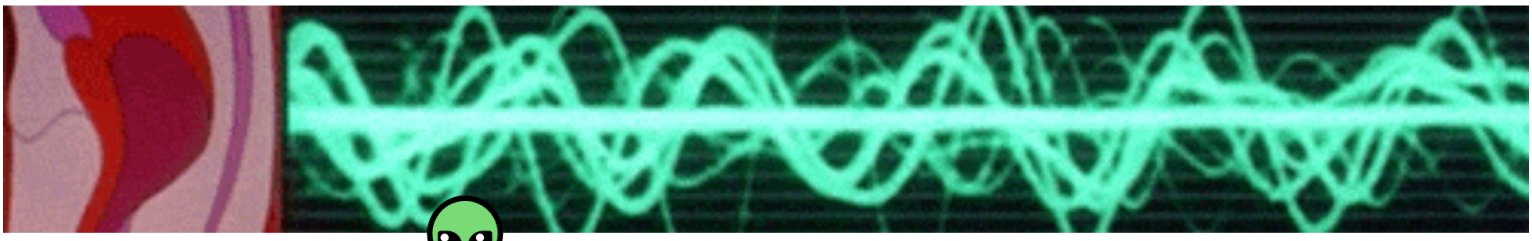


Computational Sound with ShaderToy

Michael Center

Description

This workshop will cover the physics of sound, and how to generate soundscapes through mathematics. Using functions similar to those used to create shader visuals we are going to create audio with ShaderToy.

We will begin with creating simple noises, and ultimately build up to an additive synthesizer that can be used to create a complex soundscape.

Learning Objectives

- Demonstrate a basic understanding of generative sound
- Demonstrate an understanding of the physics of sound
- Understand similarities between writing code for shaders and computational sound

Questions

What is the period of a sine function?

- 2 * PI

What is a "concert pitch"?

- A4, or 440 Hz

What is an octave?

- A range of frequencies where the high end of the range is double that of the beginning.

What is a semitone?

- The smallest tonal increment in western music.

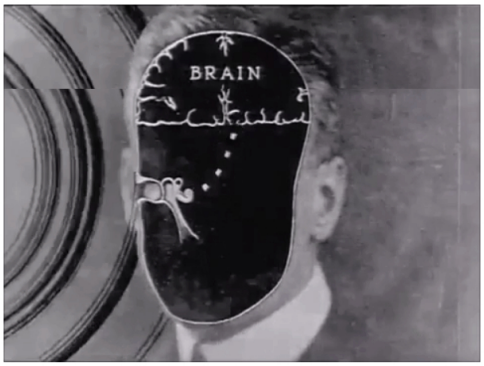
How many semitones/notes in an octave?

- There are 12 semitones and 8 notes in a frequency.

How can we change the pitch of a tone?

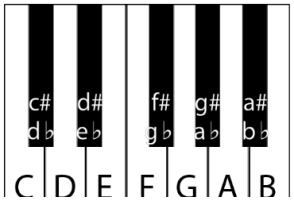
- By increasing the frequency of the wave.

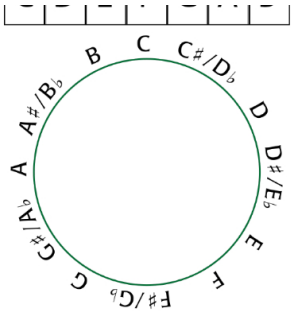
How do we hear, and what is sound?



Schedule

Minutes	Content
New	





Semitones by Pythagoras

Bring:

- Headphones

Links

- Example: https://www.shadertoy.com/view/4l2BW3
- Project Link: https://www.shadertoy.com/view/WlyXD3
- Graph Toy: https://www.iquilezles.org/apps/graphtoy/
- Some useful code: http://paste.dy.fi/ZGH
- Inspiration + more info.: http://www.graffathon.fi/2016/presentations/additive_slides.pdf
- Inspiration + more info: http://compform.net/music/

This is great for understanding the fft - jb: Three Blue One Brown Fast Fourier Transform