Introduction to Sound

Digital Sound

- Encoding and decoding of sound in computers
- In-between: manipulation of sound
- What is sound – physically/actually?
  - How we perceive sound - *psychoacoustics*
- What we know
  - sound travels in waves ...physically
  - speed of sound: ~767 mph

Disturbances

- energy via height == amplitude
- energy via speed == frequency
  - amplitude is loudness (loud/soft)
  - frequency is pitch (high/low)

- Three dimensional model: sphere (reality)
- Two dimensional model: wave
- Model → simple list of numbers ("encoding")

"Speed" of a Wave

- Can change the speed by changing the machine
- Note: in "Earth air" at sea-level, speed of sound 767 mph

Same concepts:

  - energy/disturbance
  - high/low energy; fast/slow energy
- Different machine:
  - air molecules in three dimensions; floating billiard balls
  - balls are spread out; equilibrium == "normal" air pressure
  - disturbance: transfer of energy

Perception

- What is perception? What's actually (physically) happening vs. what goes on in our heads?
  - note: "sound of one hand clapping" - Zen Buddhist concept
  - ear drums perceive air pressure, above and below "normal"
  - how much? REALLY good changes in air-pressure hundreds or thousands of time per second!
  - "A" == 440Hz == 440 up and down changes in air pressure PER SECOND
- Reality: if you could see sound (spheres), you still couldn't see them (too small, too fast)