

# **Collaborative web-based audiovisual systems**

Mani Nilchiani

<https://github.com/maniart/tadaex14>

Fall 2014 - Tehran - Mohsen Gallery

# Session Two

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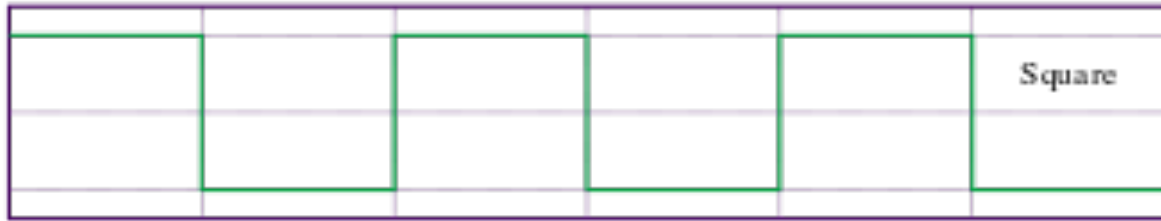
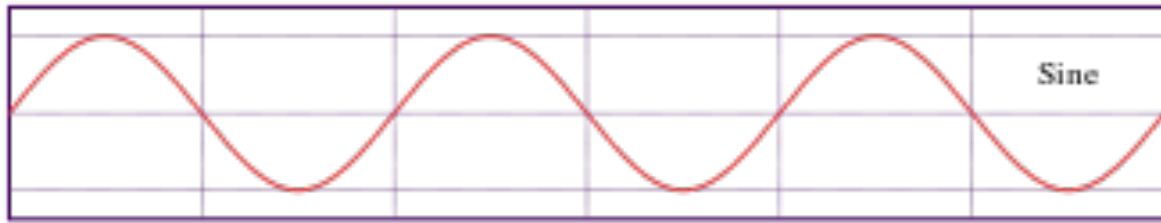
# Session One: Agenda

- . Oscillation
- . Wave Forms
- . Playing a note using oscillation (synthesis)
- . Face as interface (input)
- . Phone as interface
- . Networking: HTTP / WebSockets
- . Realtime collaboration with websockets
- . Collaborative jam session!

# Oscillation

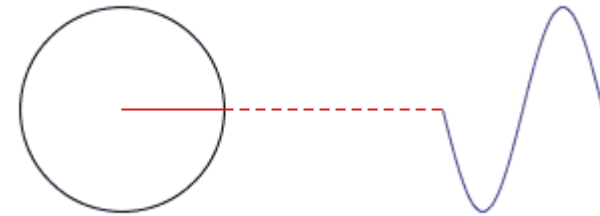


- . Movement back and forth at a regular speed.
- . Oscillation changes the pressure in air, creating waves that we can hear.
- . String instruments
- . Oscillation properties: Frequency (Hz)
- . Oscillation properties: Wavelength (m - mm)



# Wave Forms

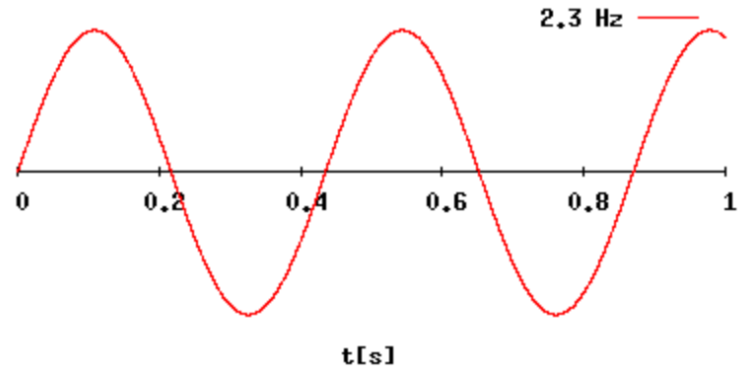
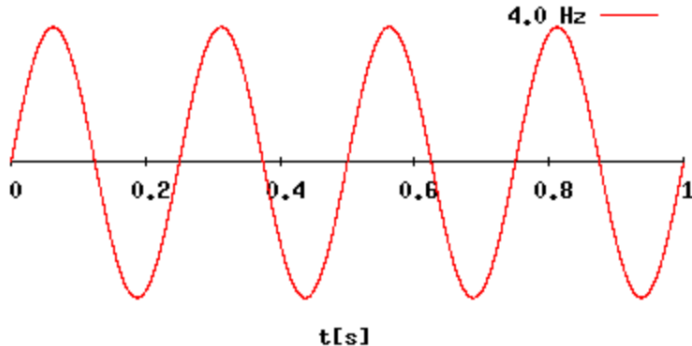
- What do they sound like?
- [Learn more](#)
- [Learn more about custom wave forms](#)
- [Magnificent Classes by MIT's Walter Lewin](#)
- **Example 6**



Custom wave form

# Frequency

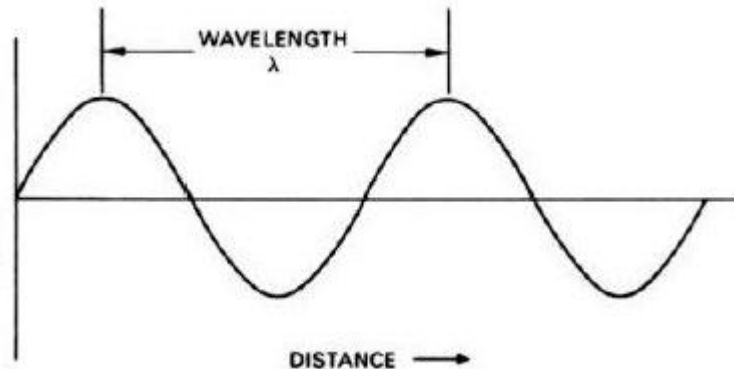
- . Oscillation Properties: frequency
  - Audible to human frequencies: 20 Hz–20 kHz
  - Each note has a frequency
  - [Learn more](#)



# Wavelength

## . Oscillation Properties: Wavelength

- The wavelength of sound is the distance between analogous points of two successive waves.
- Speed of sound is different in different environments -> different wavelengths
- In air at normal atmosphere at 0 °C the speed of sound is 331.2 m/s. The wavelength of a 500 Hz tone can be calculated as  $\lambda = (331.2 \text{ m/s}) / (500 \text{ Hz})$
- [Learn more](#)
- **Example 7**



# Detuning

- . Oscillation Properties: Detuning
  - Detuning is a process of offsetting the sound frequency.
  - Detune unit: cents
  - One cent is  $1/100$  of a semitone.
  - semitone is  $1/12$  of an octave.
  - One octave is the distance between two consecutive C sounds on a piano keyboard.
  - **Example 8**



**Thank you!**

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