CS-341 Lecture 4

February 9, 2001

Encoding Audio Information

- A *transducer* converts sound pressure to voltage.
  - *Microphone.*
- Voltage is periodically *sampled* and converted to binary numbers by an Analog to Digital Converter (ADC) circuit.
  - *Nyquist Theorem:* Sampling rate must be two times the highest frequency to be reproduced.
    - Human auditory sensitivity ends at about 20KHz.
    - CD standard is 44KHz per channel.
  - Number of bits per sample determines how many different pressure levels can be reconstructed.
    - CD standard is 12 bits per sample.

Decoding Audio Information

- Sequence of binary numbers are entered into a Digital to Analog Converter (DAC) circuit in real time. ("Real-time" depends on original sampling rate.)
- A *transducer* converts the voltages generated by the DAC into sound pressure.
  - *Speakers, earphones.*

Audio Sampling Web Page

- Click Here to read additional material and to get the demonstration program.
  - Vary sampling rate
  - Vary bits per sample

Visual Information Encoding

- Graphics
  - Two dimensional array of *pixels*.
    - Spatial sampling instead of temporal sampling.
  - Each pixel has a set of color intensities.
  - CRT technology
    - Phosphor triads
    - Three electron beams
    - Raster scan
    - Frame buffer
- Video
  - Sequence of graphics *frames* in time
    - Refresh rate