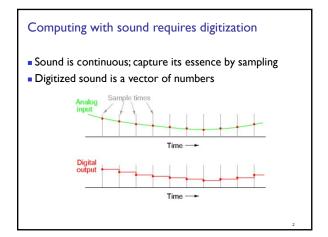
- Previous class:
 - Color vectors RGB
 - I-dimensional array vector
- Now:
 - Play with sound files
 - (more vectors!)



Sampling Rate

Given human perception, 20000 samples/second is pretty good (20000Hz or 20kHz)

8,000 Hz required for speech over the

telephone

44,100 Hz required for audio CD

192,400 Hz required for HD-DVD

audio tracks

Resolution also affects the quality

Typically, each sampled value is encoded as an 8-bit integer in the .wav file.

Possible values: -128, -127,...,-1,0,1,...,127

Loud: -120, 90, 122, etc.

Quiet: 3, 10, -5

Magnitude determines loudness

16-bit used when very high quality is required.

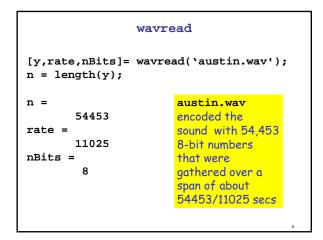
Reading and playing .wav files

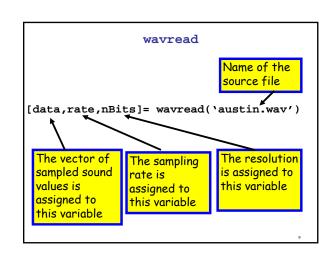
[y,rate,nBits] = wavread('austin.wav')
sound(y,rate)

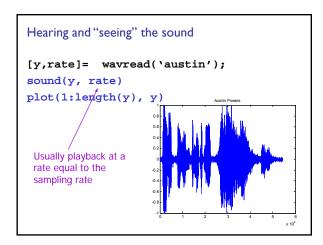
A way file is for the computer to process—software is required to play the sound.

Computing with sound in Matlab requires that we first convert the way format data into simple numeric data—the job of wavread.

wavread converts the 8-bit values to floating point values between - I and I [y,rate,nBits]= wavread('austin.wav') 0.4609 0.3516 0.2734 0.2891 0.2500 **y**(50000:50012) 0.1484 0.1094 0.1641 0.1484 0.0000 -0.1641 -0.2734 -0.3281







Subvectors Can access just part of a vector, or subvector Suppose you have a vector v: v(1) - value in 1st cell v(k) - value in kth cell for valid k v(2:5) - the 2nd thru 5th values in v, as a vector length(v) - how many cells in vector v v(1:length(v)) - all the values in v

```
Building a vector

Concatenate two vectors to make one...

v= ones(1,3); % a row of length 3

w= [4; 7]; % a column of length 2

x= [w; v']; % a column of length 5

Concatenate vectors repeatedly...

a= [];

for k= 1:4

a= [a ones(1,2)];

end

% What is a?
```

Check out these two files that demonstrate sound and graphics commands

movies.m

showSound.m