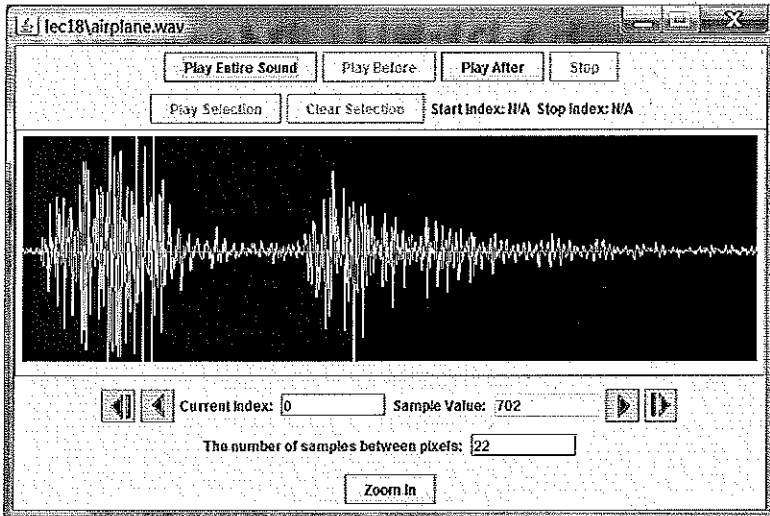


1. Chapter 6, Modifying Sounds Using Loops clearly deals with manipulating sound, but what is sound?

Air pressure changes as waves

2. A visual representation of a word being spoken using JES Sound Tool is shown below.



a) How many syllables do you think the word has? Why?

2 since 2 "blabs" of wave activity

b) Which syllable do you think is accented?

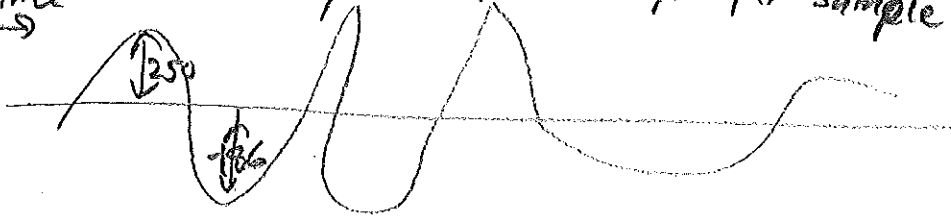
1st since it has higher/lou waves

c) Which of these words do you think is this sound? airplane, crochet, or crocodile?

airplane
two syllables with accent on first syllable

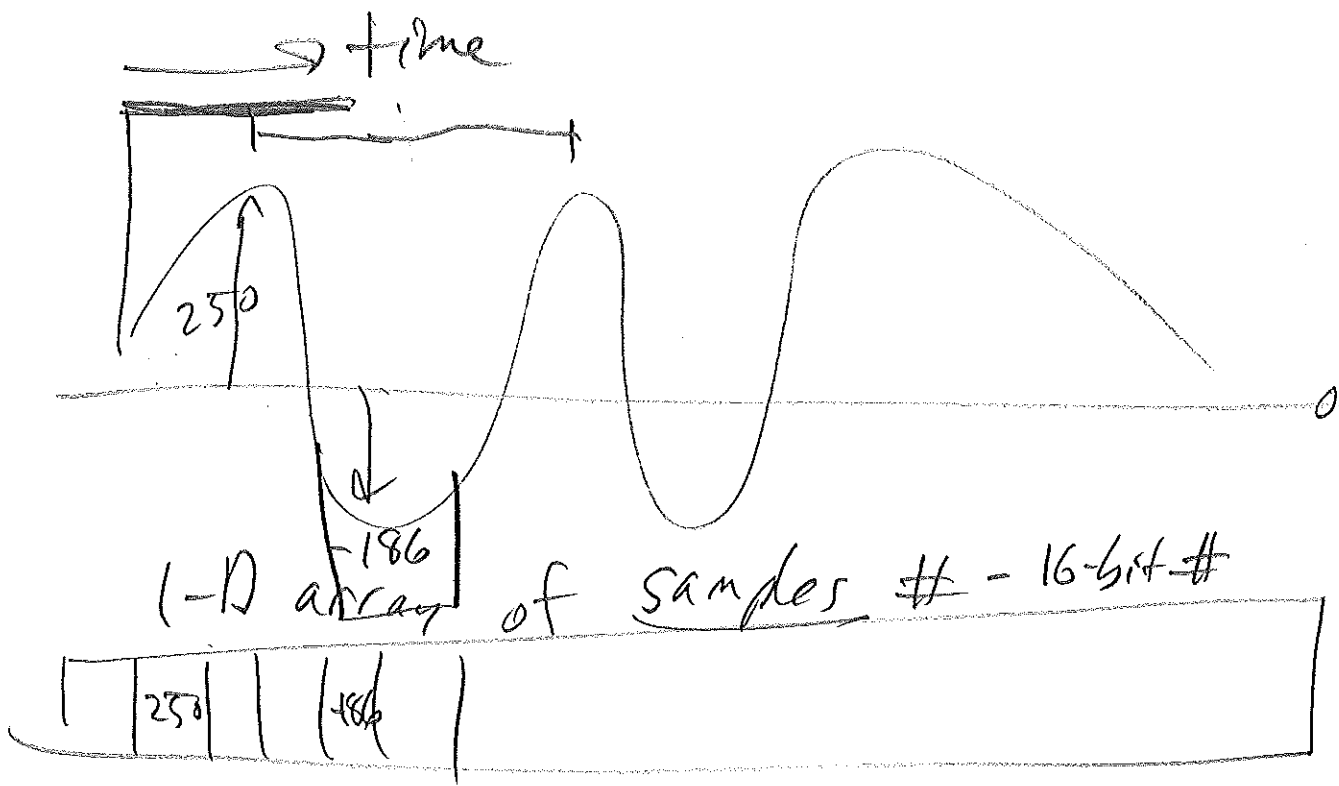
3. How do you suppose we can digitize sound?

time → 1-D Array - signed integer per sample with each sample 16-bit value



4. How much memory is necessary to store 1 minute of CD quality stereo sound?

$$1 \text{ min.} \left(\frac{60 \text{ sec}}{1 \text{ min}} \right) \left(\frac{44,100 \text{ samples}}{1 \text{ sec}} \right) \left(\frac{2 \text{ bytes}}{1 \text{ sample}} \right) \times 2 \text{ stereo} = 210 \text{ MB}$$



RGB 0-255
 ||| 8-bits binary

$$\begin{array}{r}
 128 \ 64 \ 32 \ 16 \ 8 \ 4 \ 2 \ 1 \quad 2^8 = 256 \\
 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 = 255_{10} \\
 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 \ 0 = 0_{10}
 \end{array}$$

16-bit # of binary combinations $2^{16} = 2 \cdot 2^{15}$

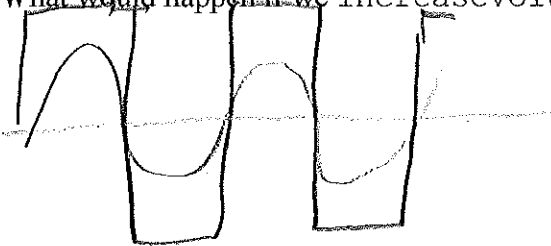
Signed binary #

$$\begin{array}{l}
 -2^{15} \\
 +2^{15}-1
 \end{array}$$

5. The following function increases the volume by doubling each sample's value.

```
def increaseVolume(sound):
    for sample in getSamples(sound):
        value = getSampleValue(sample)
        setSampleValue(sample, value*2)
```

a) What would happen if we increaseVolume() too many times? = all the positive values will max. out and all the negatives will "min. out"



will max. out and all the negatives will "min. out"

b) Why can we still understand the word after doubling the value 10 times?

The frequencies of the sound will still be preserved.

A more general sound manipulation example to adjust the volume.

```
""" Select a sound and repeatedly adjust its volume. """
def main():
    print "Select the Media Folder"
    setMediaFolder()
    print "Select the sound (.wav) file to play repeatedly"
    fileName = pickAFile()
    sound = makeSound(fileName)

    volumeAdjustment = requestNumber("Enter factor to increase (>1) or decrease (<1) the volume.")

    for counter in range(10):
        blockingPlay(sound)
        #play(sound)
        changeVolume(sound, volumeAdjustment)
        print "Open Sound Tool to 'view' sound"
        openSoundTool(sound)

    writeSoundTo(sound, getMediaPath("volumeAdjusted.wav"))
    print "Open Sound Tool to 'view' sound"
    openSoundTool(sound)

def changeVolume(sound, factor):
    """ Changes the sound volume by a given factor with
        factor < 1 decreasing and factor > 1 increasing the volume """
    for sampleNum in range(0, getLength(sound)):
        sample = getSampleObjectAt(sound, sampleNum)
        value = getSampleValue(sample)
        setSampleValue(sample, value * factor)

main() # starts the program
```

c) Why was the blockingPlay(sound) used instead of the play(sound) function?

Only want one sound at a time being played. The "play" function starts the next sound playing before previous finishes.