

Name: _____

CS 151 Fall 2010 at ISU, Exam 2 SAMPLE

Prepared by assistant professor Jeff Kinne on October 24, 2010. You have until 2:55pm to take the exam. I will give you a copy of the latest version of my study sheet that you can use, but this and blank paper I provide are all you will have to use (no computer, textbook, notes, cellphone, calculator, etc.). I have put point values on the questions so it adds up to 28. There are 2 true/false (1 point each), 2 multiple choice (1 point each), 2 fill in the code (2 points each), 2 say what the output is (2 points each), 2 short answer (3 points each), 1 explain how to write a function (5 points), and 1 give code for a function (5 points).

True/False

(1 point each, 2 points total). For each, circle True or False.

Problem 1 Suppose you run the following code:

```
sound = makeSound(pickAFile())  
x = getSamplingRate(sound)
```

True or False: x is equal to the number of samples in the sound.

Problem 2 True or False: the sample right in the middle of a sound has index `getLength(sound)/2`.

Multiple Choice

(1 point each, 2 points total). For each of the following, circle the correct answer.

Problem 3 What is the total number of bytes needed to store the samples of a sound in JES, with 16-bits per sample, that is 4 minutes long, and has a sampling rate of 22050?

- a. $16 \cdot 4 \cdot 60 \cdot 22050$
- b. $2 \cdot 4 \cdot 60 \cdot 22050$
- c. $16 \cdot 60 \cdot 22050$
- d. $16 \cdot 4 \cdot 60$

Problem 4 Suppose you have two sounds that you want to **splice** into one, the sounds are in variables called `sound1` and `sound2`, and both are the default 22050 samples per second. Which of the following correctly creates a new sound that is the right length to have `sound1` followed by `sound2` in the new sound?

- a. `newSound = makeEmptySound(getLength(sound1) + getLength(sound2))`
- b. `newSound = makeEmptySoundBySeconds(getLength(sound1)+getLength(sound2))`
- c. `newSound = makeEmptySound(getLength(sound1)*getLength(sound2))`
- d. `newSound = makeEmptySound(getLength(sound1))`

Fill in the code

(2 points each problem, 4 points total). For each of the following, fill in what the missing code should be to complete the function correctly.

Problem 5 Fill in the blanks of the following function that is supposed to compute the smallest sample value in the sound.

```
def minSampleValue(sound):
    smallest = 0
    for i in range(0, getLength(sound)):
        value = getSampleValueAt(sound, i)
        if _____:
            smallest = value
    return _____
```

First blank:

Second blank:

Problem 6 Suppose you have a sound, and you want to create a new sound that has a 1 second pause and then has a copy of the sound. The following is a partially completed function to do this. Fill in the blanks.

```
def addPause(sound):
    newSound = makeEmptySound(getLength(sound)+22050)
    for i in range(22050, getLength(newSound)):
        value = getSampleValueAt(_____, _____)
        setSampleValueAt(newSound, i, value)
    return newSound
```

First blank:

Second blank:

What is the output

(2 points each problem, 4 points total) For each of the following, give what the output of the function will be.

Problem 7 Suppose you have the following function loaded.

```
def myFunction(n):
    t = 0
    for i in range(0, n):
        t = t + 3
    print t
    print i
```

What values are printed by the function when you call `>>> myFunction(7)?`

First output:

Second output:

Problem 8 Suppose you have the following function loaded.

```
def huh(sound1, sound2):
    x = getLength(sound1)/float(getSamplingRate(sound1))
    y = getLength(sound2)/float(getSamplingRate(sound2))
    if (x > y):
        print x
        print "first one"
    if (y > x):
        print y
        print "second one"
    if (y == x):
        print y
        print "both"
```

If `sounda` and `soundb` are sounds that have sampling rate 22050, `sounda` has 44100 samples, and `soundb` has 66150 samples, what values are printed by the function when you call `>>> huh(soundb, sounda)?`

First output:

Second output:

Short Answer

(3 points each, 6 points total) Give a brief response for each of the following.

Problem 9 Explain briefly how the computer (JES in particular) stores a sound.

Problem 10 Suppose you have a sound object in JES that is someone saying something. Explain how you could look at the sound wave and figure out how many words were spoken.

Explain How To

(5 points) Explain how you would write a JES/Python function to accomplish the task.

Problem 11 Suppose you have a sound object in JES that is a musical note. Explain how you would write a function that creates a new sound that is the same note but one octave higher.

Give JES/Python Code

(5 points) Give JES/Python code to solve the problem.

Problem 12 Give the code for a function called `makePartQuieter`. It takes three inputs: a sound object, a beginning index, and an end index. It should make the sound $1/2$ as loud for all samples between the beginning and end indices.

```
def makePartQuieter(sound, begin, end):
```