CS 1316 - Exam 2 - Spring 2010

Name: _____

Grading TA: _____ Section: _____

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- Do your best to prevent anyone else from seeing your work.
- Do NOT communicate with anyone other than a proctor for ANY reason in ANY language in ANY manner.
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I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Georgia Tech community.

Signature: _____

Problem	Points Earned	Points Possible	Grader Initials
1. Vocabulary		12	
2. Short Answers		8	
3. Turtle Graphics		8	
4. Slash Picture		12	
5. Mystery Sound		8	
6. Inheritance Question		6	
TOTAL:		54	

Exam Percentage: _____ / 54 = _____ %

1. Vocabulary (12 points)

For each of the following words, write a 1-2 sentence definition of the word as used in this class. Your definition should be concise and to the point, while demonstrating that you know what the term means.

a) constructor -

b) inheritance -

c) overriding (a superclass method) -

d) queue -

2. Short Answers (8 points)

For each of the following questions, write a 1-4 sentence answer.

a. A sound is made up of SoundSamples stored in an array. Each SoundSample has a value associated with it, ranging in size from _____ to _____.

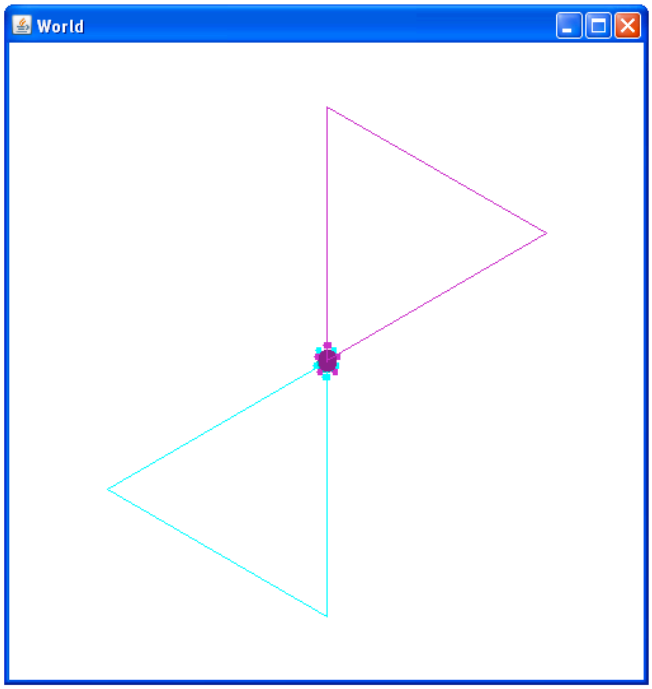
b. What is the default sampling rate (in samples per second) of the Sound class?

c. What happens if you double the value of every SoundSample in a sound?

d. How would you double the frequency of a sound stored in a Sound object?

3. Turtle Graphics (8 Points)

Create a new class named BowTie that contains a main method that will create the image below when it is run. You must use ***two*** turtles and only ***one*** for loop to create the drawing. Each "leg" of the bow-tie is 200 pixels in length. The World measures 500 by 500 pixels. (You do ***not*** need to specify the color of the turtles.)



4. Slash Picture (12 points)

Write a class called SlashPicture that is a subclass of the Picture class you've been working with on your homework. SlashPicture should have a constructor that takes in a String for the file name and calls the superclass constructor with that String.

SlashPicture should also have an object method called *drawSlash* that takes in no parameters and draws a diagonal black line (or slash) across the image from the upper left corner to the lower right corner. The line should be one pixel wide, and should go from corner to corner. Note: you may assume that the image you're modifying will be perfectly square-shaped (the width and height are equal) The method acts by modifying the picture, and should return nothing.

5. Mystery Sound (8 points)

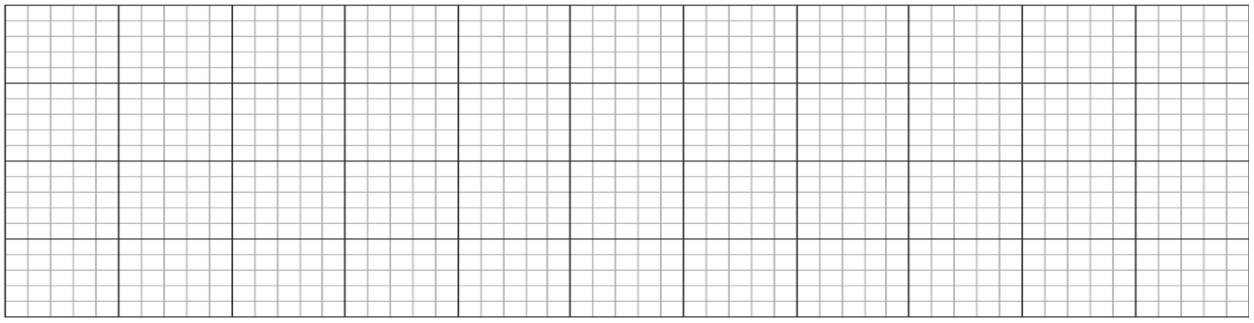
Here is a Mystery method from the Sound class:

```
public static Sound mystery(double time, int wavelength){
  int rate = 22050;
  Sound ret = new Sound((int) (time*rate));

  int currVal = 12000;
  SoundSample currSample;
  SoundSample[] samples = ret.getSamples();

  for(int i=0; i<samples.length; i++){
    if(i%wavelength==0){
      currVal = -1 * currVal;
      currSample = samples[i];
      currSample.setValue(currVal);
    }
    else {
      currSample = samples[i];
      currSample.setValue(currVal);
    }
  }
  return ret;
}
```

What does the following block of code produce?

```
Sound s = Sound.mystery(1 , 2500);
s.explore();
```

Fill in the graph below with the sound. Draw the line that represents the sample values, and label any high and low points with the sample values at those points. Also label the x position (or sample number) of any zero crossing points.



6. Inheritance Question (4 points)

Examine the following class definitions:

```
public class Person{
  private int age;
  private double weight;
  public double height;
  public String name;

  public Person(){
    age = 0;
    weight = 3.0;
    height = 0.9;
    name = "Child";
  }

  public Person(int a, double w, double h, String n){
    age = a;
    weight = w;
    height = h;
    name = n;
  }

  public void personMethod(){
    System.out.println(name + " says hello!");
  }
}
```

```
public class Student extends
Person{
  public int year;
  public double gpa;
  public String major;

  public Student(int age,
      double weight,
      double height,
      String name){
    super(age,weight,height,name);
    year = 1;
    gpa = 4.0;
    major = "Undecided";
  }
}
```

Would either of the following object instantiations generate an error when entered in the interactions pane? Circle the line(s) that cause an error and explain why or write “No errors” if both would run without a problem.

```
>> Student s = new Student();

>> Student p = new Student(18, 130.0, 6.0, "George P. Burdell");
```

Now, assume that the “stu” variable points at a properly initialized Student object. Would any of the following lines generate an error when entered into the interactions pane? Circle the line(s) that cause an error and explain why or write “No errors” if all the lines would run without a problem.

```
>> int myAge = stu.age;

>> String myDescrip = stu.name + " is a " + major + " student.";

>> stu.weight += 15.0;

>> stu.personMethod();
```