CMSC 131
Object Oriented Programming I
Midterm Exam #1
March 3, 2004

Name: _____

Problem 1 (20 points) General Questions:

a. What is the name of the IDE you have been using for this class?

b. Is a parameter an instance variable? (Answer Yes or No)

c. Which of the following are valid names for Java variables? (Circle valid variable names)

```
10    dog    77temperature    abc15
```

d. Is RAM classified as main or secondary memory?

e. Are hard disks volatile or non-volatile memory?

f. Are all reference variables local variables? (Yes or No)

Grader Use Only:

#1	a		(2)
	b		(2)
	c		(2)
	d		(2)
	e		(2)
	f		(2)
	g		(2)
	h		(2)
	i		(2)
	j		(2)
#1 subtotal			(20)
#2	a		(6)
	b		(6)
	c		(6)
	d		(11)
#2 subtotal			(29)
#3			(27)
#4	a		(12)
	b		(12)
#4 subtotal			(24)
Total			(100)

g. What is the name of the entity within the Java Virtual machine that is responsible for collecting objects that have no more reference variables that reference them?

h. Can we declare two instance variables with the same name in a class? (Yes or No)

i. Are instance variables initialized to a default value? (Yes or No)

j. Which of the following are valid primitive types in Java? (Circle valid types)

```
int    boolean   float   scientific
```

Problem 2 (29 points) Understanding Code

This problem refers to the code on the next page. You can assume that the Weather class is stored in a file named Weather.java and the ProbTwo class is stored in a file named ProbTwo.java

```
public class Weather {
   private double humidity;

   public Weather(double theHumidity) {
      humidity = theHumidity;
   }

   public void setHumidity(double theHumidity) {
      humidity = theHumidity;
   }

   public double getHumidity() {
      return humidity;
   }
}

public class ProbTwo {
   public void one(int x, int y) {
      System.out.println(x * y);
      System.out.println(x % y);
      System.out.println(x / y);
      System.out.println(x + (y / 5));
      System.out.println(x == y);
   }

   public void two(double f, double g, double k) {
      if ((f <= g) || (f == 0.0)) {
         if (!(g > k) || false) {
            System.out.println("Case 1");
         } else {
            System.out.println("Case 2");
         }
      } else {
         System.out.println("Case 3");
      }
   }

   public void three(int b) {
      int i = 1;
      while (i <= b) {
         if (i == 2) {
            i = i + 1;
         }
         System.out.println(i);
         i = i + 1;
      }
      System.out.println(i);
   }

   public void four(Weather mon, Weather fri, double maxTemp) {
      mon = new Weather(100.00);
      fri.setHumidity(90);
      fri.setHumidity(70);
      maxTemp = 110;
      // Draw the memory diagram when code execution reaches this point
   }
}
```

a. (6 points) What is the output produced by executing the following code segment:

```
ProbTwo prob2 = new ProbTwo();
prob2.one(8, 4);
```

b. (6 points) What is the output produced by executing the following code segment:

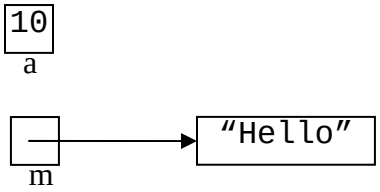
```
ProbTwo prob2 = new ProbTwo();
prob2.two(5.0, 10.0, 7.0);
prob2.two(5.0, 8.0, 9.0);
```

c. (6 points) What is the the output produced by executing the following code segment:

```
ProbTwo prob2 = new ProbTwo();
prob2.three(3);
```

d. (11 points) For this part you will draw a memory diagram. The following is a memory diagram example:

```
int a = 10;
String m = new String("Hello");
```



Draw a memory diagram that represents the state of the variables `monday`, `friday`, `maximum`, `mon`, `fri`, `maxTemp` and all objects after the following code segment has been executed, but just *before* the "`four`" method returns (that is, we want to see the values of the local variables within "`four`" before it exits.)

```
Weather monday = new Weather(80.0);
Weather friday = new Weather(60.0);
double maximum = 120;
prob2.four(monday, friday, maximum);
```

Problem 3 (27 points) Class Implementation

Write the complete code for a class named TwoStripes (similar to Stripes from the homework) that implements a picture with two **vertical** stripes, each having a particular color. Each strip should have the same width, and the two stripes should fill the picture. You can assume the specified width of the picture is even. The constructor has the following signature:

```
public TwoStripes(int width, int height,
     PictureColor firstStripe, PictureColor secondStripe);
```

Your class must implement the following interface:

```
public interface Picture {
     public PictureColor getColor(int x, int y);
     public int getWidth();
     public int getHeight();
}
```

You may use one character variable names but you must have good indentation.

Problem 4 (24 points) Syntax Errors

Circle the pieces of code that have syntax (i.e., compiler) errors in each of the following code segments.

a. (12 points) There are 6 syntax errors in this code segment.

```
public class {
   private area;
   private boolean int;

   public void f2(int x, y) {
      if (x = 3) {
         System.out.println("Step 1");
      } else {
         System.out.println("Step 2");
      }
   }

   /* A simple method
   public void setArea(theArea double) {
      area = theArea;
   }
}
```

b. (12 points) There are 3 syntax errors in this code segment.

```
public class ProbThreeC {
   private int numBananas;
   private double gallonsCoffee;

   public void test(boolean likesMe) {
      numBananas = gallonsCoffee;
      gallonsCoffee = numBananas;
      gallonsCoffee = likesMe;

      if (numBananas == gallonsCoffee) {
         System.out.println("hello");
      }

      int a = 0;
      if ((a = 2) == 3) {
         System.out.println("hello");
      }

      if ((a == 2) = 3) {
         System.out.println("hello");
      }
   }
}
```