Computer & Programming I
Quiz #5
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1. What is the output of the following program?

**Driver Program**

```java
public class ThingTester {
    public static void main (String[] args) {
        Thing one = new Thing();
        System.out.println (one);
        one.putThing(5);
        System.out.println (one);
        Thing two = new Thing();
        two.putThing(9);
        System.out.println (two);
        Thing three = new Thing();
        three.putThing(11);
        System.out.println (one);
        System.out.println (two);
        System.out.println (three);
    }
}
```

**Class Thing**

```java
public class Thing {
    private int x;
    private int y;
    private static int z = 0;
    public Thing() {
        x = z + 1;
        y = z + 5;
    }
    static void putThing( int a) {
        z = a;
    }
    public String toString () {
        return (" x = " + x + " y = " + y + " z = " + z + "\n");
    }
}
```

**Sample Run:**

```java
---jGRASP exec: java ThingTester
x = 1   y = 5   z = 0
x = 1   y = 5   z = 5
x = 6   y = 10  z = 9
x = 1   y = 5   z = 11
x = 6   y = 10  z = 11
x = 10  y = 14  z = 11
```
2. Write a method called `average` that accepts two integer parameters and returns their average as a floating point value.

```java
public double average (int num1, int num2) {
    return (num1 + num2) / 2.0;
}
```

3. Overload the `average` method of Exercise 6.1 such that if three integers are provided as parameters, the method returns the average of all three.

```java
public double average (int num1, int num2, int num3) {
    return (num1 + num2 + num3) / 3.0;
}
```

4. Write a method called `multiConcat` that takes a `String` and an integer as parameters. Return a `String` that consists of the string parameter concatenated with itself count times, where count is the integer parameter. For example, if the parameter values are "hi" and 4, the return value is "hihihihi". Return the original string if the integer parameter is less than 2.

```java
public String multiConcat (String text, int count) {
    String result = text;
    if (repeats > 1) {
        for (int i=2; i <= count; i++)
            result += text;
    }
    return result;
}
```

**Implementation 1**

```java
import java.util.Scanner;

public class Concat_Driver {
    public static void main(String[] args) {
        Scanner s=new Scanner(System.in);
        String text = s.nextLine();
        int repeats = s.nextInt();
        String result = text;
        if (repeats > 1){
            for (int i=2; i <= repeats; i++)
                result += text;
        }
        System.out.println("The multi-concatenated string is: " + result );
    }
}
```
Implementation 2: Driver

```java
import java.util.Scanner;

public class Concat_Driver_01
{
    public static void main(String[] args)
    {
        String results;
        Scanner s = new Scanner(System.in);
        String text = s.nextLine();
        int repeats = s.nextInt();
        Multi_Concat obj = new Multi_Concat(text, repeats);
        results = obj.multiConcat(text, repeats);
        System.out.println("The multi-concatenated string is: " + results);
    }
}
```

Implementation 2: Driver: Class

```java
public class Multi_Concat
{
    private String text;
    private int repeats;

    public Multi_Concat(String s, int i)
    {
        text = s;
        repeats = i;
    }

    public String multiConcat(String text, int repeats)
    {
        String result = text;
        if (repeats > 1)
            for (int i = 2; i <= repeats; i++)
                result += text;
        return result;
    }
}
```

Sample Run:

```bash
----jGRASP exec: java Concat_Driver_01

hi
5
The multi-concatenated string is: hihihihih

----jGRASP: operation complete.
```
5. Write a method called drawCircle that draws a circle based on the method's parameters: a Graphics object through which to draw the circle, two integer values representing the (x, y) coordinates of the center of the circle, another integer that represents the circle's radius, and a Color object that defines the circle's color. The method does not return anything.

```java
public void drawCircle (Graphics page, int x, int y, int rad, Color color)
{
    page.setColor (color);
    page.drawOval (x–rad, y–rad, rad*2, rad*2);
}
```

6. Overload the drawCircle method of Exercise 6.6 such that if the Color parameter is not provided, the circle's color will default to black.

```java
public void drawCircle (Graphics page, int x, int y, int rad)
{
    page.setColor (Color.black);
    page.drawOval (x–rad, y–rad, rad*2, rad*2);
}
```
7. Rewrite the following “Applet” program as an “Application”:
import javax.swing.JApplet;
import java.awt.*;

public class ConcentricCircles extends JApplet {
    // private final int NUM_CIRCLES = 10;
    private final int MIN_RADIUS = 5;
    private final int MAX_RADIUS = 140;
    private final int CENTER_X = 150;
    private final int CENTER_Y = 150;

    // Paints several concentric circles of random radius.
    public void paint(Graphics page) {
        int radius, x, y;
        setBackground(Color.black);
        page.setColor(Color.green);
        for (int count=1; count <= NUM_CIRCLES; count++) {
            radius = (int) (Math.random() * MAX_RADIUS) + MIN_RADIUS;
            x = CENTER_X - radius;
            y = CENTER_Y - radius;
            page.drawOval(x, y, radius*2, radius*2);
        }
    }
}

Sample Run:
8. What is the output of the following program?

```java
import java.awt.*;
import javax.swing.*;

public class NameOrientation {

    public static void main (String[] args) {
        JFrame frame = new JFrame("Name Orientation");
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        JPanel primary = new JPanel();
        primary.setBackground(Color.cyan);
        primary.setPreferredSize(new Dimension(200, 50));

        JLabel firstName = new JLabel("John");
        JLabel lastName = new JLabel("Smith");

        primary.add(firstName);
        primary.add(lastName);

        frame.getContentPane().add(primary);
        frame.pack();
        frame.setVisible(true);
    }
}

Sample Run:

John Smith
```