

Cs 125 Exam 2 Review

Before you start, please note: it is possible to get strong clues for answering some of the questions in the review by referring to other questions. For example, converting from code to a flow chart and vice versa. In general, you should not depend on both versions of a question showing up in the exam.

Also note: this study guide is not comprehensive. I strongly suggest reviewing: the practice problems worked on during class, homework assignments, material from the last exam & the self check questions in the text.

Defining constant variables

Write out the statement to create a constant in a method for the rotation of Jupiter in hours and set it equal to 9.925. Observe proper naming conventions & select an appropriate data type.

```
final double ROTATION_OF_JUPITER_IN_HRS = 9.925;
```

Write out the statement to create a constant in a class for the number of satellites orbiting Jupiter and set it equal to 63. Observe proper naming conventions & select an appropriate data type.

```
public static final int JUPITER_SATELLITE_COUNT = 63;
```

Determine the output for the following operations – if the answer is text, enclose it in quotes:

$7 / 4$	=	1	$123 + 456$	=	579
$7 \% 4$	=	3	"123" + 456	=	"123456"
$1 / 2.0$	=	0.5	123 + "456"	=	"123456"
$1.0 / 2$	=	0.5	"123" + "456"	=	"123456"
$7 \% -2$	=	-1	$9 \% 3$	=	0
$-7 / 2$	=	-3	$7 \% 0$	=	error – requires division by zero!

Write out the following formulas as Java code:

$$q = 2 \cos \frac{1}{2}(a + b) \cos \frac{1}{2}(a - b)$$

```
q = 2 * Math.cos(0.5*(a+b)) * Math.cos(0.5*(a-b));
```

$$\text{posX} = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

```
posX = (-b + Math.sqrt(b*b - 4*a*c))/(2*a);
```

Write out the equation for the following Java code:

```
f = 4*Math.pow(x, 4) + 2*y*y + 1.0 / 2 * Math.sqrt(z)
```

$$f = 4x^4 + 2y^2 + \frac{\sqrt{z}}{2}$$

```
g = Math.cos(Math.pow(y, x));
```

$$g = \cos(y^x)$$

Using three bits to represent an integer number range demonstrate how an integer overflow works by adding the decimal values 5 & 6. You must show your binary addition work for full credit.

```
 101
+110
----
1011  but we only have room for 3 bits so
the answer overflows
```

Create a class called **PlainOldSphere**. It will need an instance field for its radius. It should have two constructors, one that sets the radius to 1.0 & another that sets the radius based on a parameter. It should have a method called **scaleRadius** that multiplies the radius by parameter & another method called **getRadius** that returns the current radius. Finally, it should have method called **getVolume** that returns the volume based on the formula: $V = \frac{4}{3}\pi r^3$. Follow proper naming, coding and documenting conventions. Try to do write the class out on paper first without referring to other code files or the compiler for help.

see last page

Fill in some code to print out whether or not a number is positive.

For example:

if the user enters 6, display: "6 is positive"

if the user enters -3, display: "-3 is negative"

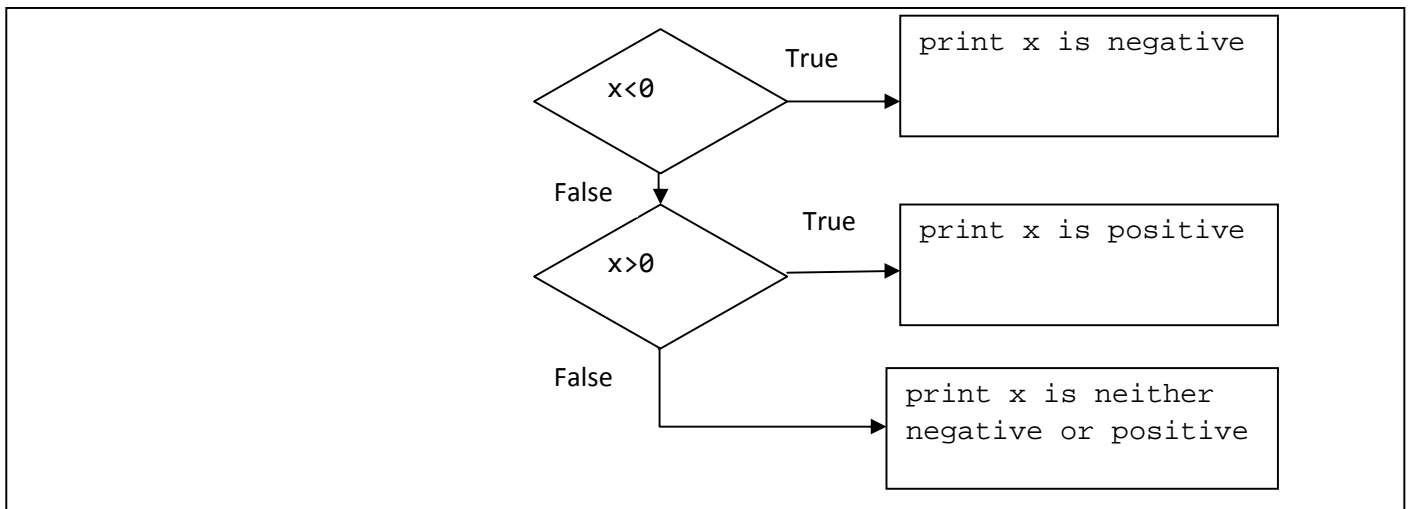
if the user enters 0, display: "0 is neither positive or negative"

```
// get input from user & save it in x
int x = in.nextInt();
```

```
// your code goes below here
```

```
if(x > 0)
    System.out.println(x + " is positive");
else if(x < 0)
    System.out.println(x + " is negative");
else
    System.out.println(x + " is neither positive or negative");
```

Write out a flow chart for the code you wrote above:



Add in a single line of code to test if $-5 < x < 0$ or if $10 > x > 20$

```
// get input from user & save it in x
int x = in.nextInt();
```

```
// your code goes below here
```

```
if((-5 < x && x < 0) || (10 < x && x < 20))
```

```
// your code goes above here
```

```
{
    System.out.println("value is in the range -5 to 0 or 10 to 20");
}
```

Write the code to set the value of the variable price based on the variables age & balconySeating (balconySeating is true if the tickets are for the balcony area, otherwise it is false). Use the chart below to determine the prices.

	Age:		
Area:	0-6	7-59	60+
Floor	Free	5.00	4.00
Balcony	free	10.00	9.00

```
int age;
boolean balconySeating;
double price;

// code to set the values of age & balconySeating
...
// your code goes below here
```

```
if(age <= 6)
{
    price = 0.0;
}
else if(age <= 59)
{
    if(balconySeating)
        price = 10.0;
    else
        price = 5.0;
}
else
{
    if(balconySeating)
        price = 9.0;
    else
        price = 4.0;
}
```

Given the following code, write the code that:

- uses the substring method to set g equal to the text "gram"
- sets e equal to the empty string
- prints the length of string g

```
String p = "programming";  
String g;  
String e;
```

```
// set g equal to the substring "gram"
```

```
g = p.substring(3,7);
```

```
// set e equal to the empty string
```

```
e = "";
```

```
// print the length of g
```

```
System.out.println( g.length() );
```

```

/**
 * class to model a sphere
 */
public class PlainOldSphere
{
    private double radius;

    /**
     * default constructor, sets radius to 1.0
     */
    public PlainOldSphere()
    {
        radius = 1.0;
    }

    /**
     * constructor, sets radius to given value
     * @param r the value to use for the radius
     */
    public PlainOldSphere(double r)
    {
        radius = r;
    }

    /**
     * returns the current radius
     * @return the current radius
     */
    public double getRadius()
    {
        return radius;
    }

    /**
     * scales the radius by the given factor
     * @param s the amount to scale radius by
     */
    public void scaleRadius(double s)
    {
        radius = radius * s;
    }

    /**
     * calculates the current volume of the sphere
     * @return volume of the sphere based on the current radius
     */
    public double getVolume()
    {
        double volume = (4.0/3.0)*Math.PI*radius*radius*radius;
        return volume;
    }
}

```