

AP Computer Science Java

Mr. Clausen

Program 3A

Program 3A LastNameFirstNameP3A (Sphere Of Influence: 25 points)

The purpose of this program is to practice entering data (numbers and strings) from the keyboard, how to fix the `nextLine()` “bug”, perform numeric and string calculations, and display all of the information in output statements. We will be calculating the user’s “Sphere of Influence”.

- 1) Type comments at the beginning of the program to display your name and other information just like those used for program 2A.
- 2) Import the package: `import java.util.Scanner;`
- 3) Declare the class name in the format `LastNameFirstNameP3A`. Don’t forget that the filename needs to be the same when you save your program. This would be a good time to save your program if you haven’t done so already.
- 4) Declare the main method:
`public static void main(String [] args)`
- 5) Next declare all of the constants necessary for this program. Declare a constant of type `double` for `PI = 3.14159`, and declare a constant of type `double` named `FOUR_THIRDS = 4.0/3.0` to ensure a real number quotient. These constants will be used in formulas described later.
- 6) Instantiate an object of the scanner class in order to use input from the keyboard. Use the statement:
`Scanner reader = new Scanner(System.in);`
- 7) Declare all of the variables necessary for this program. You will need an integer to store the user’s age, another integer to store the length of the full name, and another integer variable named `radius`. You will need variables of type `double` for `diameter`, `circumference`, `surface area` and the `volume`. You will need instances of the `String` class to store the user’s `first`, `middle`, `last` and `fullName`. Create a separate string variable for each name. Make sure that you use descriptive variable names to create readable, self-documenting code.
- 8) Type the following comment:
`//-----Display My Information-----`
Follow this comment with `println` statements to display your name and period output just like those used for program 2A,

9) For the Input section, type the following comment:

```
//-----Input-----
```

Next, ask the user to enter the following information in the order that I am listing here.

You will lose points if you change the order of the input statements. Ask the user to enter their age, and then their First, Middle, and Last Names. Enter each name into a separate string variable. Make your program user friendly by using “print” (without the `\n`) statements prompting the user for each of these items. Don’t forget to consume the trailing newline character from the input stream after reading in the integer variable age, and before asking the user for their First Name.

10) For the Calculations section, type the following comment:

```
//-----Calculations-----
```

Use an assignment statement and concatenation to create a string, which contains the user’s first name, a space, their middle name, another space, and their last name. Store this in the variable `fullName`. Calculate the length of the user’s full name and assign this value to the variable that you are using to store the length of the name. Next assign this variable to the variable named `radius`. Using this number as the radius, you need to calculate the diameter, circumference, surface area, and volume of a sphere. Make sure to explicitly convert (cast) the radius into a double in each of the calculations. We want to practice casting, even though there wouldn’t be an error in the order of these calculations.

The formulas (without the type cast operators) are listed below:

$$\text{diameter} = 2.0 * \text{radius}$$

$$\text{circumference} = 2.0 * \text{PI} * \text{radius}$$

$$\text{surface_area} = 4.0 * \text{PI} * \text{radius} * \text{radius}$$

$$\text{volume} = \text{FOUR_THIRDS} * \text{PI} * \text{radius} * \text{radius} * \text{radius}$$

11) For the Output section, type the following comment:

```
//-----Output-----
```

In your output portion of your program, display the user’s age, each of the names including the full name, the length of the full name which is also the value of the radius, as well as the diameter, circumference, surface area and volume. Make this output easy to read and formatted nicely.

Use blank lines to separate each of the program sections listed in all of the steps above. When you are finished with your program, have tested it thoroughly to make sure that your calculations are correct, and are sure that you don’t need to make any changes, then save your program in the “W” network mapping, in the Program 3A folder. **Turn in the file named LastNameFirstNameP3A.java, I don’t need the “.class” file for this program.**