Programming Project 2 – MetalArt

Note: When you turn in an assignment to be graded in this class, you are making the claim that you neither gave nor received assistance on the work you turned in (except, of course, assistance from the instructor or teaching assistants).

Write a program called **MetalArt.java** that calculates the price for building a model of the following sculpture:

Georgia Metal Art Tabletop Sculpture located at:
https://www.pinterest.com/pin/564990715722622504/

You will be calculating the surface area of each regular triangular pyramid as well as the rectangular prism. You will then use the areas to calculate the cost of building a model of this sculpture.

In this project you will ask the users for the name of their sculpture, the length of one of the base sides and height of each pyramid, and the height, width and length of the rectangular prism. You will then use the following formulas to calculate the surface area of the pyramids as well as the surface area of the rectangular prism:

- Surface Area of a regular triangular pyramid: SA = B + ½ * 3bl, where B is the area of the Base of the triangle, b is the length of one of the base sides, and l is the slant length
- Area of the base of the pyramid: B =1/2 * b * $\sqrt{b^2 - (\frac{1}{2} * b)^2}$, where b is the length of one of the base sides of the pyramid
- Slant length: l = $\sqrt{(\frac{1}{2} * b)^2 + h^2}$, where b is the length of one of the base sides of the pyramid and h is the height of the pyramid

- Surface Area of a rectangular prism: 2lw + 2lh + 2wh, where l is the length, h is the height, and w is the width

To find the price of the sculpture, you will multiply the cost of the material, which is $1.67 per inch, times the surface areas that you calculated for your model.

Here is a typical program run. The sample user input is shown in blue italics.

Sara Student

Project 2 – MetalArt

This project displays the area and costs of building a model sculpture based on user input for the size of the pyramids and rectangular prism.

Month Day, 20XX

CMSC 255 Section XXX

Enter the name of the pyramid: *Sara's Metal Art*

Enter the length of the base of the first pyramid (inches): *16*

Enter the height of the first pyramid (inches): *24*

Enter the length of the base of the second pyramid (inches): *8*

Enter the height of the second pyramid (inches): *15*

Enter the height of the rectangular prism (inches): *10*

Enter the length of the rectangular prism (inches): *48*

Enter the width of the rectangular prism (inches): *25*

The Sara's Metal Art surface area calculations are:

Surface area of the first pyramid: 718.01 square inches

Surface area of the second pyramid: 214.00 square inches

Surface area of the rectangular prism: 3,860.00 square inches

Total Surface area: 4,792.01 square inches

The total cost of the material to build Sara's Metal Art is $8,002.66

Please note that your output should be rounded to the nearest hundredths, or two decimal places and should have comma spacing. Please use print formatting to achieve this precision. Before beginning this project, you will document your algorithm as a list of steps to take you from your inputs to your outputs. Each step will be added

as a comment block within your code. You will have the comment block right above the code that performs the actions specified. For example, before your lines of code that ask the user for inputs, you would have a comment block that states what inputs you are requesting from the user.

As shown above, the program must display specific identifying information grouped together in a block of code, above the name you created. In the code block, write Java statements that output to the console the following:

- your name
- the Java project
- project description
- the version date
- the course number and section

This and all program files in this course must include a comment block at the beginning (top) of the source code file that contains:

- the Java program name
- project description
- your name
- the version date
- the course number and section

The comment lines should look like this:

```
/*******************************************************************************
 * Java program name
 *******************************************************************************
 * Project description
*
 ______________________________________________________________________________
 * Your name
 * The version date
 * The course number and section
 *******************************************************************************/
```

You will document your tests using the form shown below.

You will submit your Java source code file (MetalArt.java) and test documentation (TestPlan.docx) by uploading the files to the Assignment link in Blackboard.

Ask questions about any part of the programming project that is not clear!

Test Plan:

Expected output – expected test results against which the output of the test is compared.

Test Name	1	2
sculpture name		
length of the base of the first pyramid		
height of the first pyramid		
length of the base of the second pyramid		
height of the second pyramid		
height of rectangular prism		
length of rectangular prism		
base of rectangular prism		
surface area of first pyramid		
surface area of second pyramid		
surface area of rectangular prism		
total surface area		
material Cost		

Rubric for Programming Project 2 – 75 points

Item	Points
Program file named and submitted as specified	5
Comment blocks stating the algorithm step above the code as specified including comment header block	15
Appropriate choice of variable names	5
Appropriate use of constants	5
Program layout and appearance (Coding style is clear and easily understood)	5
User prompts are in the correct order and clearly written	5
Output is correct	10
Output correctly displays name of the sculpture entered	5
Output is displayed with two significant digits to the right of the decimal point and is easy to understand	10
Documentation of test plan submitted	10
Total	**75**