Assignment #2

Eric Rouse; Individual Programming 53

Understanding the Problem

Write a program that calculates the areas and volumes of Circles, Rectangles, Trapezoids or Trianlges based on user input. The two main challenges of this problem are interacting with the user and performing correct calculations.

Devising a Plan/Design

Here is the pseudocode that my quiz team and I came up with. I think that it is pretty inclusive, so I am going to use it to develop my program.

{credit where it is due: Quiz Group 10 (C. Hash, K. Marino, K. Root, E. Rouse) }

1) Prompt the user to choose a shape (circle/sphere, rectangle/prism, trapezoid/prism, or triangle/prism).
2) Prompt the user to choose to calculate the area, the volume, or both the area and the volume of the chosen shape.
3) Prompt the user to enter the appropriate dimensions for the chosen shape and measurement.
    a. If the user chose "**area of circle/sphere**", prompt user to enter "radius".
    b. If the user chose "**area of rectangle/prism**", prompt user to enter "height" and "width".
    c. If the user chose "**area of trapezoid/prism**", prompt user to enter "base 1", "base 2", and "height".
    d. If the user chose "**area of triangle/prism**", prompt user to enter "base" and "height".
    e. If the user chose "**volume of circle/sphere)**" or "**both area and volume of circle/sphere**", prompt user to enter "radius".
    f. If the user chose "**volume of rectangle (prism)**" or "**both area and volume of rectangle (prism)**", prompt user to enter "height", "width", and "length".
    g. If the user chose "**volume of trapezoid (prism)**" or **"both area and volume of trapezoid (prism)**", prompt user to enter "base 1", "base 2", "height", and "length".
    h. If the user chose "**area of triangle (prism)**" or "**both area and volume of triangle (prism)**", prompt user to enter "base", "height", and length.
4) Calculate the area, the volume, or the area and the volume of the chosen shape:
    a. If the user chose "**area of circle/sphere**": Area = pi * r^2
    b. If the user chose "**area of rectangle/prism**": Area = h * w
    c. If the user chose "**area of trapezoid/prism**": Area = ½ * (b1 + b2) * h
    d. If the user chose "**area of triangle/prism**": Area = ½ * b * h

e. If the user chose "**volume of circle/sphere)**": Volume = 4/3 * pi * r^3
f. If the user chose "**volume of rectangle (prism)**": Volume = h * w * l
g. If the user chose "**volume of trapezoid (prism)**": Volume = (½ * (b1 + b2) * h) * l
h. If the user chose "**area of triangle (prism)**": Volume = (½ * b * h) * l
i. If the user chose "**both area and volume of circle/sphere**": Area = pi * r^2 and Volume = 4/3 * pi * r^3
j. If the user chose "**both area and volume of rectangle (prism)**": Area = h * w and Volume = h * w * l
k. If the user chose **"both area and volume of trapezoid (prism**)": Area = ½ * (b1 + b2) * h and Volume = (½ * (b1 + b2) * h) * l
l. If the user chose "**both area and volume of triangle (prism)**": Area = ½ * b * h and Volume = (½ * b * h) * l

5) Display the area, volume, or area and volume of the shape as appropriate.
6) Ask the user if he/she would like to have another shape's area and/or volume calculated. If the user choose to continue, repeat steps 1 – 6. If the user chooses to stop, proceed to step 7.
7) Display a "Thank you for playing" type message and end program.

Looking Back/Self-Reflection

Wow, all those selections for the user were a bit tough to keep track of. And I should have done really rigorous error checking on the first case before moving on to the others. I found a couple of small errors that I had replicated 4 times and it would have been easier if I had caught the errors sooner.

In order to prove out the code I ran it through every case and checked the calculations with a calculator to make sure they were correct.

I learned some about user interaction, how it can be difficult to offer a multitude of options. Also I learned about variable scoping, how it can be handy to have the same variables reused in different segments of code.