Program 1

Worth: 50 points

Due: Tuesday, September 24 by 11:59 PM

Purpose: This assignment explores the use of variables and simple arithmetic.

Create an interactive Windows Console (Chapter 2) or Windows Forms (Chapter 3) application that will calculate the number of gallons of paint needed to paint the walls in a room. Our calculations will be similar to the Dummies article found here:

http://www.dummies.com/how-to/content/estimating-how-much-paint-to-buy.html

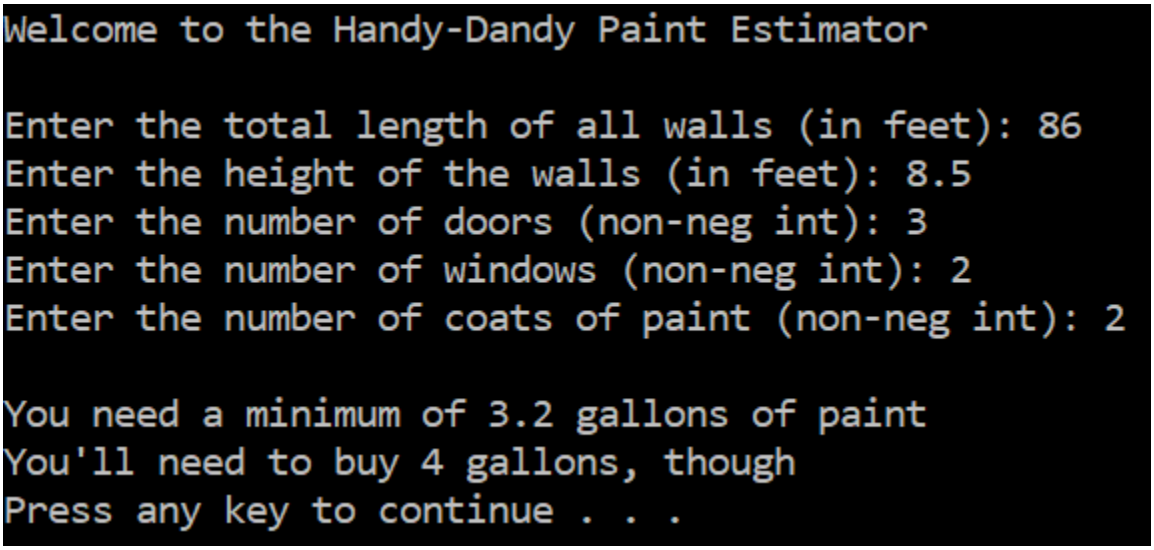
To perform the calculation, you'll need to ask the user for some information about the room:

- Total length (also known as the perimeter) of all the walls in the room (in feet). For example, a rectangular room that is 14x20 would have 14+20+14+20 = 68 feet in length. This value might be a floating point number. Use type **double** to represent it.
- Height of the walls (in feet). This value might be a floating point number. Use type **double** to represent it.
- Number of doors. This value should be an integer. For each door, you'll subtract **21** feet from the total square feet that needs to be painted. Use type **int** to represent it. Remember to create a named constant instead of hard coding the literal 21.
- Number of windows. This value should be an integer. For each window, you'll subtract **12** square feet from the total square feet to be painted. Use type **int** to represent it. Remember to create a named constant instead of hard coding the literal 12.
- Number of coats of paint required. This value should be an integer. If you are covering a dark color with a lighter one, for example, you might need 2 or 3 coats of paint to completely cover the original color. Use type **int** to represent it.

The calculation begins by multiplying the total length of the walls by the height of the walls. This gives the rough number of square feet. Next, subtract out the appropriate amount for each door and window. What's left is the total square feet to be painted, per coat. Multiply this by the number of coats of paint desired and you'll have the total square feet that we need to buy paint for. Each can of paint should cover about **400** square feet, so take the number of square feet and divide by 400. Remember to create a named constant instead of hard coding the literal 400. The result is the *minimum* number of gallons of paint you need to buy. Since you can't buy partial gallons of paint, this will need to be rounded up to the next gallon if necessary. You will find the Math.Ceiling method helpful in this calculation. For example,

gallonsToBuy = (int)Math.Ceiling(minGallons);

Display both the minimum gallons needed (with 1 decimal place of precision) and the recommended (whole number) of gallons to buy (as an integer). A version of the program as a Console application appears below. You can test your results using this data (**corrected 9/16/2019**):



Be sure to add appropriate comments in your code, including your **Grading ID** (not name nor student ID), program number, due date, and course section. Each variable used in your program needs a comment describing its purpose. Remember to create named constants instead of using magic numbers. Here, you'll want to avoid using the numbers 15, 20, and 350. Instead create named constants to represent the square feet per door, square feet per window, and square feet per gallon of paint. These requirements are expected for every program and are listed in the syllabus. Preconditions and postconditions are not expected yet, as we've not covered them in class.

As with our labs, I'm asking you to upload a compressed ZIP archive of the entire project. Rather than giving me floppy disks or printouts, you will upload **all your files** to Blackboard using the *Assignments* tool. I'm asking you to upload a compressed ZIP archive of the entire project, just as with our labs. The steps for doing this will vary somewhat based on the ZIP utility being used. Before you upload this .ZIP file, it's a good idea to make sure that everything was properly zipped. Make sure your code is present and you can run your file. Once you have verified everything, return to the *Assignments, Programs* area of Blackboard. Click on "Program 1" and the *Upload Assignment* page will appear. Add any comments you like in *Comments* field. Click *Browse* next to *File to Attach* to browse the system for your file. Browse to the location of your .ZIP file and select it. Note, multiple files may be attached using the *Add Another File* option. For this assignment, we just need the "Prog1.zip" file. Make sure everything is correct in the form and then click *Submit* to complete the assignment and upload your file to be graded.

Remember, this is an **individual** assignment. Please be mindful of the syllabus' statement on academic dishonesty. If you are unsure about what constitutes academic dishonesty, **ASK!**