Homework 6 - Resistor

GUI

Description

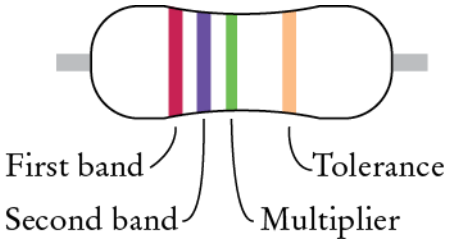
For this assignment we will allow the user to create Resistors. Create a form with four Combo Boxes which contain the appropriate colors from the list below. The user will select the colors of the resister and click a Generate Button. The form will then create an instance of the Resistor class and display all the Resistor information.

Color	DIgit	Multiplier	Tolerance
Black	0	$\times 10^{0}$	—
Brown	1	$\times 10^{1}$	±1%
Red	2	$\times 10^{2}$	±2%
Orange	3	$\times 10^{3}$	—
Yellow	4	$\times 10^{4}$	—
Green	5	$\times 10^{5}$	±0.5%
Blue	6	$\times 10^{6}$	±0.25%
Violet	7	$\times 10^{7}$	±0.1%
Gray	8	$\times 10^{8}$	±0.05%
White	9	$\times 10^{9}$	—
Gold	—	$\times 10^{-1}$	±5%
Silver	—	$\times 10^{-2}$	±10%
None	—	—	±20%

Specifications

You will need to complete the following:

1. Create a new Project called Resistor.
2. Create a Resistor class which models the resistor as shown below –



   a. The first band is the first significant digit of the resistance value.
   b. The second band is the second significant digit of the resistance value.
   c. The third band is the decimal multiplier.
   d. The fourth band indicates the tolerance.
3. For example, (using the values from the table as a key), a resistor with red, violet, green, and gold bands (left to right) will have 2 as the first digit, 7 as the second digit, a multiplier of 10^5, and a tolerance of ±5 percent, for a resistance of 2,700 kΩ, plus or minus 5 percent.
   a. In this example, the max resistance would be 2700 + 5% with the lowest as 2700 – 5% and an actual resistance which is random between that range.
4. Create four ComboBoxes which allow the user to select each band. The ComboBoxes should contain the Colors (as appropriate) from the table above.
   a. Use collections of Colors and Values to bind to the ComboBoxes on the Form Load.
5. After the user selects the four colors and clicks a Generate Button – Create an instance of the Resistor class and display all information about the Resistor to the user. The information should be: The four colors chosen, the min and max resistance and the actual resistance (use the Random Class to generate the actual percentage and calculate the resistance). NOTE – Make sure you display the randomly generated percentage (3.2%, etc..). For example, from above the min and max is -%5 and +5%. Using a random number generate a percentage in the range from -5 to 5 and use that percentage to calculate the actual resistance.
6. The class should have Properties for MinimumResistance, MaximumResistance, ActualResistance, etc... One for each of the values (Colors and their associated values).
7. Make sure you do not forget to put all XML comments and a comment at the top of the code file which contains your name and the assignment.

Documentation

You will create a document (.docx, .rtf, .pdf) which contains the following:

- Your name and assignment.
- A screenshot of your form running with at four test cases.
- Work the calculations out by hand to show your results match those displayed.
- Explain how you used the Random Class to generate the actual resistance of the Resistor.
- What collections did you use for the ComboBox colors and their associated values? Why?

What to Submit

You need to submit your entire solution folder (zipped) and your document. ***DO NOT*** zip your document. Make sure your document is in the correct format and all your files include your name and assignment.