Lab 3 – Elements of Programming

Introduction

Recall your Fahrenheit to Celsius converter project from Lab-2. Your final GUI should have looked something like this:
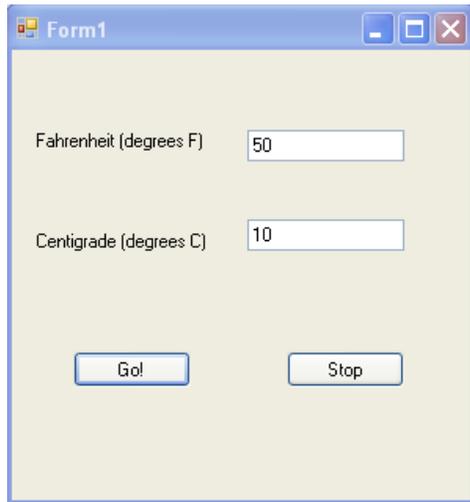
In this lab, we want to build on this program as an example; we will give the user an option of converting from Fahrenheit to Celsius or from Celsius to Fahrenheit.

Access Visual Basic

1. Open VB from the "start" menu, that is:
   Start\All Programs\Microsoft Visual Basic

2. Select "**File → New Project**" to create a new project

3. Select "**Windows Form Application**". You can give your "application" a name, or simply accept the default offered "**WindowsApplication1**". Click "**OK**".

Prepare the Graphic User Interface

Develop the "form" shown in the figure above that we will use in the project. The form should contain a label, a text box, two command buttons, and a picture box with the following properties, and look like:
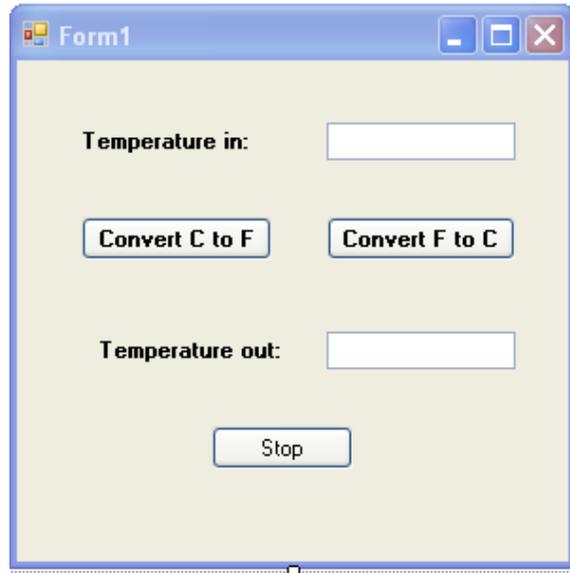
Add VB Code to the Project

Now, let's add some code to the "Convert C to F" and "Convert F to C" buttons.

First, double click on the "C to F" button and type in the following code:

```
Private Sub Button1_Click(…) Handles Button1.Click

        Dim C, F As Double
        C = TextBox1.Text
        F = 32 + (9 / 5) * C
        TextBox2.Text = F

    End Sub
```

In the code, we declare the variables "C" and "F" to be "double" variables (with the "Dim" statement). When the user clicks the button "C to F", the procedure Button1_Click(…) is invoked and the lines of code are executed; the program reads the C value from TextBox1, converts t to F, and writes the value of F to TextBox2.

The user should have entered a Deg C value in the text box before clicking the button. However, if they don't what will happen?

The first line of code gets the characters typed in the "TextBox1" text box and converts them to a number. That number gets assigned to the variable "C". What happens if you type letters into the text box instead of numbers?

Next, the value of "C" is converted to degrees F by the formula. What happens if the integer division symbol "\" is used instead of the regular division symbol "/" (try it with a value of 100 degrees C)?

Finally the code prints the value in the second text box, "TextBox2".

Next, double click on the "F to C" button and type in the following code:

```
Private Sub Button2_Click(...) Handles Button2.Click

        Dim C, F As Double
        F = TextBox1.Text
        C = (F – 32) * (5 / 9)
        TextBox2.Text = C

    End Sub
```

Now, test your code.

Assignment

Suppose you have a three–year auto loan with an 8.5% annual interest rate. Your monthly payment is $350. You have made payments on the loan for the past *k* months, and you wants to know the payoff balance. Write a program to determine the payoff balance of your auto loan. Demonstrate your program for *k* = 18 months, but be sure that you could enter other months and the program would work for those as well. The applicable formula is:

$$B = P\left[\frac{1-\left(1+i\right)^{k-n}}{i}\right]$$

where:
   B = the payoff balance ($)
   P = the monthly payment ($)
   i = the monthly interest rate (in decimal form)
   k = the number of monthly payments already made
   n = the total number of monthly payments

To be turned in:

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You can paste all of the following items into a MS Word document and print it and hand it in, or email it to me at: <u>daene@aol.com</u>. Be sure to put you name on the first line of the document.

1. A screenshot of your program working for $k = 18$ months.

2. A printout of the VB code used in your program.