IST 256
Lab Week 2 – January 21, 2009

Your name: _____

1. Thinking about Constants and Variables

a. For each constant value in the list below, give the most likely Visual Basic type for that value, using the three types: Integer, Single, and String

    219   _____
    16.54   _____
    "To be or not to be"   _____
    - 32.0   _____
    - 3   _____
    "Otto the Orange"   _____

b. Suppose that we have declared a variable named "saleitems" as shown:

    Dim saleitems as Integer

Then we have an assignment statement:

    saleitems = 1

What is the value of the variable in memory after this assignment? _____

Next we have another assignment statement:

    saleitems = saleitems + 2

What is the value of the variable in memory after this assignment? _____

2. Creating the Compute Sum application demonstrated in class:

For this application, you should open **Visual Studio 2008** and create a new project named something like ComputeSum. In last week's lab, it appears that there are two cases for how to tell Visual Studio to save a new project in your lab projects folder on your H: drive:

1. When you get the new project page, with the Name textbox, some people also get a Location textbox. If you do, use the browse button to select the H: drive folder.

2. When you get the new project page, if you don't have a Location text box, then go ahead and create the new project with its new Name, and go to the File menu and select Save All, and it should ask you to browse for a location and you can select the H: drive folder.

Now on to writing the program:

In the **initial form**, change the name Text property of the form for the new ComputeSum project to give a label in the top bar of the form.

Add **three labels, three textboxes and two buttons** as demonstrated in class.
        For each label, change the Text property
        For each button, change the Text property to "ComputeSum" and "Clear"
You may also want to change font size, color, etc. as you have the time.

You may also change the "name" properties of these objects, but if you choose not to, they will be automatically named Label1, Label2, Label3, TextBox1, TextBox2, TextBox3, Button1, and Button2

Now write the programs for the two buttons. First double click on the Compute Sum button and it should open the program tab called Form1.vb as discussed last time. In the blank space between the line starting "Private Sub" and the line "End Sub", type the following text, (except that **if** you changed the TextBox names, where this example has the three textboxes named TextBox1, TextBox2 and TextBox3, put your **own textbox names**)

```
Dim firstnumber As Integer
Dim secondnumber As Integer
Dim sum As Integer
firstnumber = CInt(TextBox1.Text)
secondnumber = CInt(TextBox2.Text)
sum = firstnumber + secondnumber
TextBox3.Text = CStr(sum)
```

Now go back to the Form1.vb[design] window where the form is shown and double click on the Clear button. It should again open the Form1.vb program tab, but now it will also

have Private Sub and End Sub lines for the Clear button. Inside this function, type the text:

```
TextBox1.Text = ""
TextBox2.Text = ""
TextBox3.Text = ""
```

Finally, go to the Debug menu and click on Start (with or without) Debugging in order to execute your program.
If there are errors, don't click ok on the error box until you have read the error message. Can you understand what might be wrong with your program? If not, ask me!

When you are done, be sure to save your project to your folder on the H: drive.

3. Creating an application to convert temperature from Fahrenheit to Celsius.

a. Discussion: Converting a temperature in Fahrenheit to Celsius

Suppose that we declare two variables of type single as follows:

    Dim fahrenheit, celsius as Single

Suppose that there is an assignment of a number to the fahrenheit variable as follows:
    fahrenheit = 86

The mathematical formula to convert Fahrenheit to Celsius is:
    Celsius = 5/9 (Fahrenheit – 32)
This is the mathematical notation that means to first subtract 32 from the Fahrenheit number, and then multiply it by the fraction 5/9.

In order to convert this to programming notation, we can first compute the fraction 5/9 to get a decimal number and declare a constant to have this value:

    Const CONVERT = 0.5556

Now can you write a programming statement that takes whatever value is in the fahrenheit variable, converts it to Celsius, and assigns it to the celsius variable? Think how to write the subtraction operator and the multiplication operator, as well as the assignment. Write your statement here:

b. Go to the file menu and **open another new project** called something like ConvertCelsius. This application should have one textbox where the user should type in a temperature in Fahrenheit. Then they can click a button called "Convert to Celsius" and the equivalent Celsius temperature will appear in the second textbox. Another button called "Clear" will be used to clear the two textboxes.

In the **initial form**, change the text as usual.

On the form, create two labels, two textboxes and two buttons.   It should appear something like:
    Type Temperature in Fahrenheit |_____|
    Temperature in Celsius |_____|

    | Convert to Celsius | | Clear |

Change the name and text properties of the labels, textboxes and buttons as appropriate. (check the list in the first problem)

Write a program for the first button.   (do you remember how to do this?)
First make a constant for the conversion factor (which is actually 5.0/9.0).
        Const CONVERT = 0.5556

Now declare two variables as singles.
        Dim fahrenheit as single
        Dim celsius as single

Get the fahrenheit temperature from the textbox, assuming the name is TextBox1
        fahrenheit = CSng(TextBox1.Text)

Now find the celsius temperature using the celsius assignment statement that you wrote in part a, and put it in the second textbox, named txtCelsius:

        celsius = ' *put your Visual Basic conversion expression here from part a.*
        TextBox2.Text = CStr(celsius)

Finally, write the program for the Clear button. Look at the code that you used for the Clear button in the ComputeSum application and modify it as necessary for the smaller number of textboxes. Be sure to change the names of the textboxes if necessary.

Try out your program by using Debug -> Start (without) Debugging. Try testing your program with 32, 68, 86, and 212 degrees Fahrenheit. What Celsius temperatures do you get?
Write converted temperatures here:
                        32   _____
                        68   _____
                        86   _____
                        212   _____

When you are done, be sure to save your project to your folder on the H: drive.

To hand in this lab:
        Print the ComputeSum and ConvertCelsius programs (from the Form1.vb tab) and staple them to your lab sheet.