Learning VB.Net

Tutorial 03 – understanding controls : buttons, text boxes

Hello everyone… welcome to vb.net tutorials. These are going to be very basic tutorials about using the language to create simple applications, hope you enjoy it. If you have any notes about it, please send them to **notes@mka-soft.com** I will be happy to receive them. Finally if you find these tutorials are useful, it would be nice from you to send a small donation via PayPal to **donation@mka-soft.com**.

tutorial posted on 2009-MAY-12.

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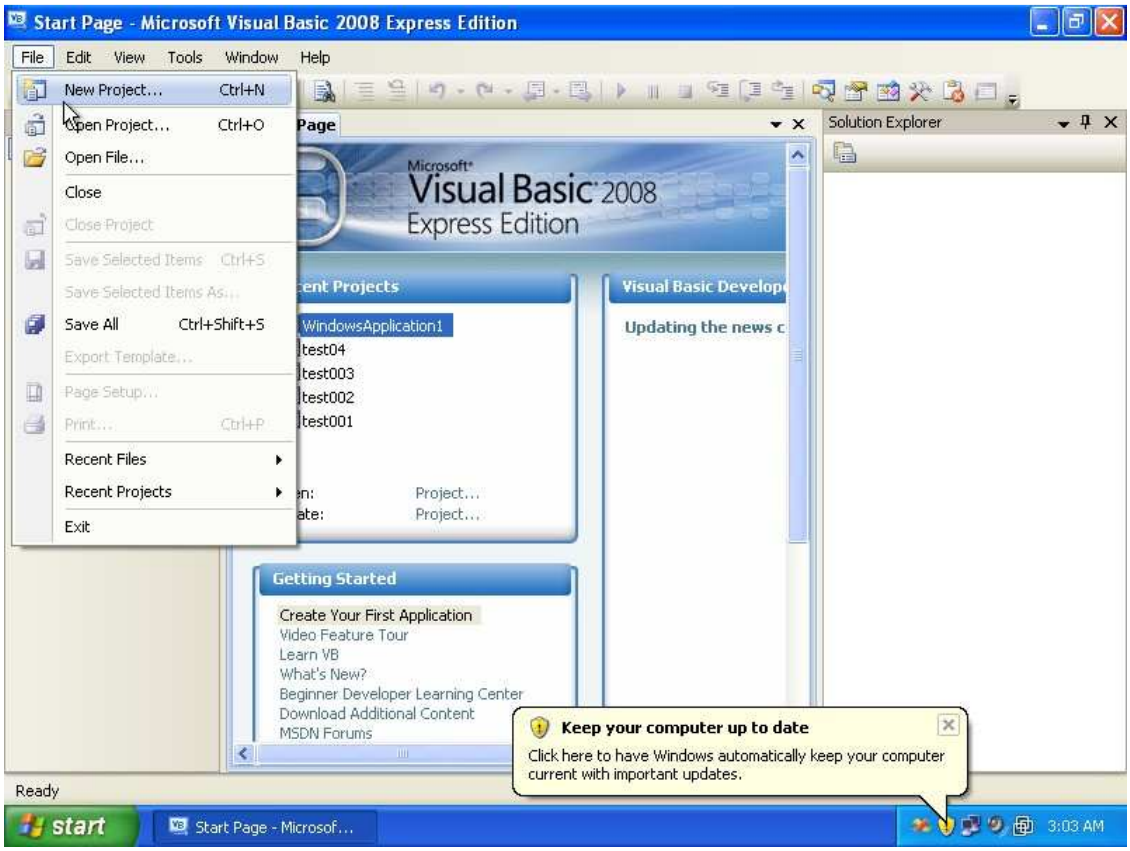
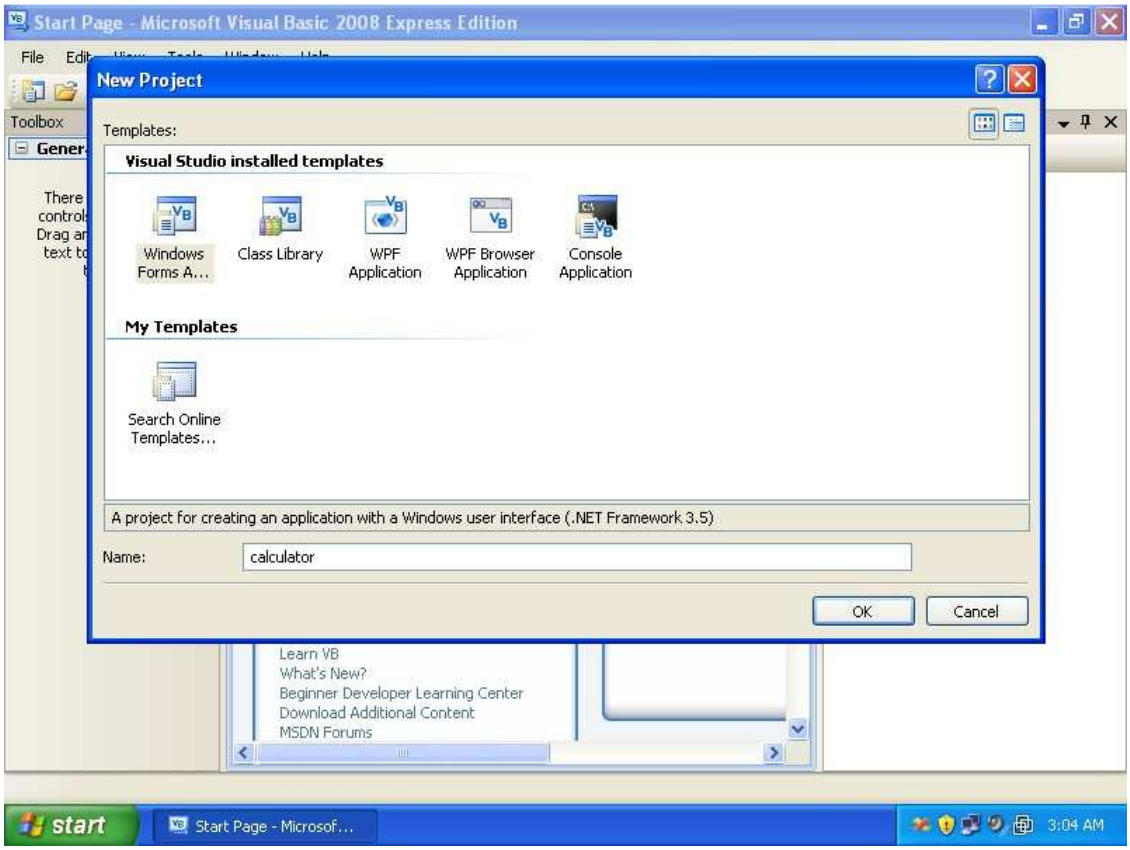
Hi everyone… It has been a while since the last tutorial, hopefully I will be posting tutorials regularly. Today we are going to examine how to develop a simple calculator application using VB.NET, and examine some controls, and their properties. These are the form, text box, and command button.

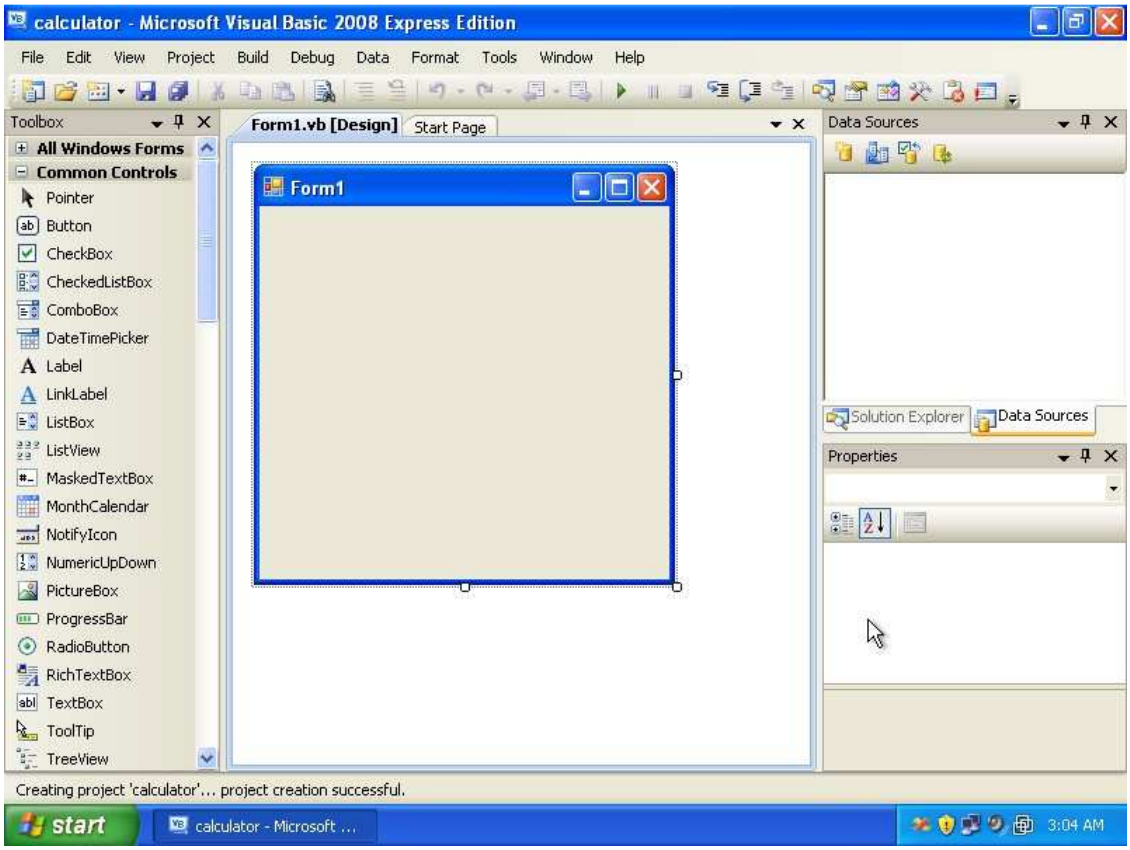
Ok then, let us start, first open VB.NET



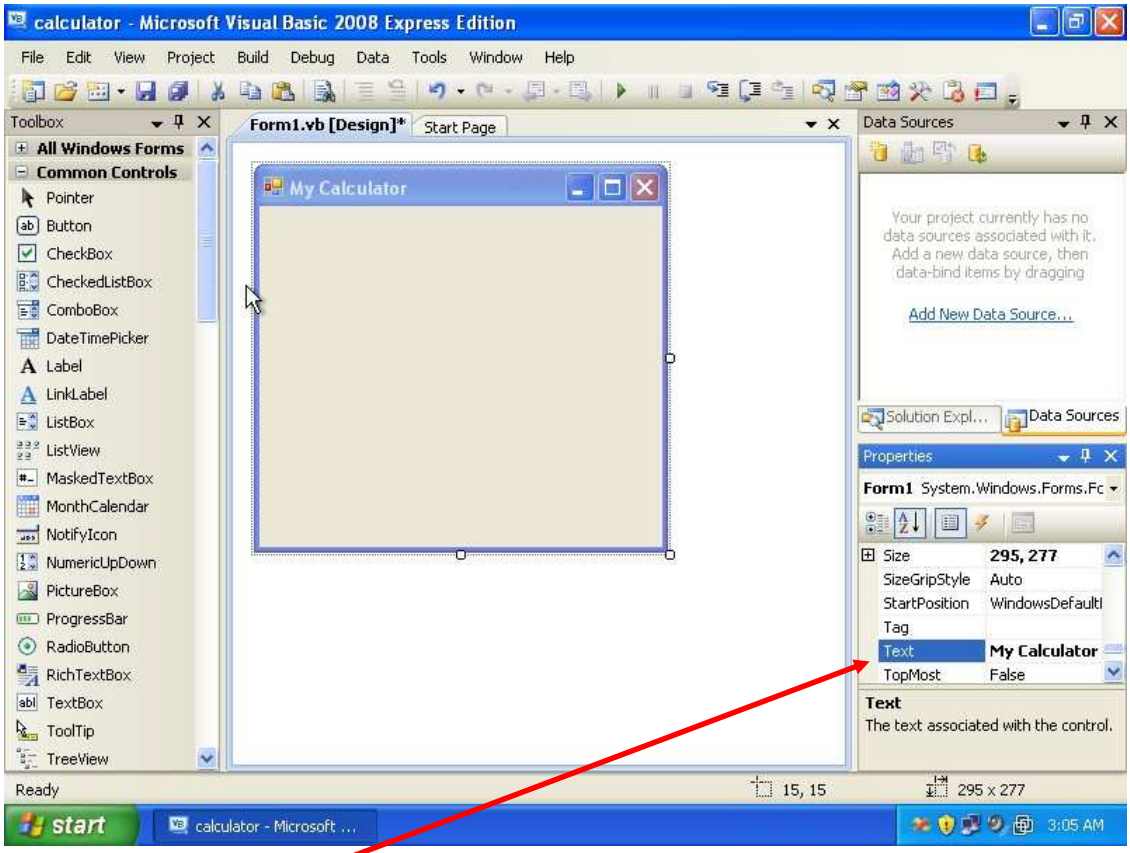
Create a new project



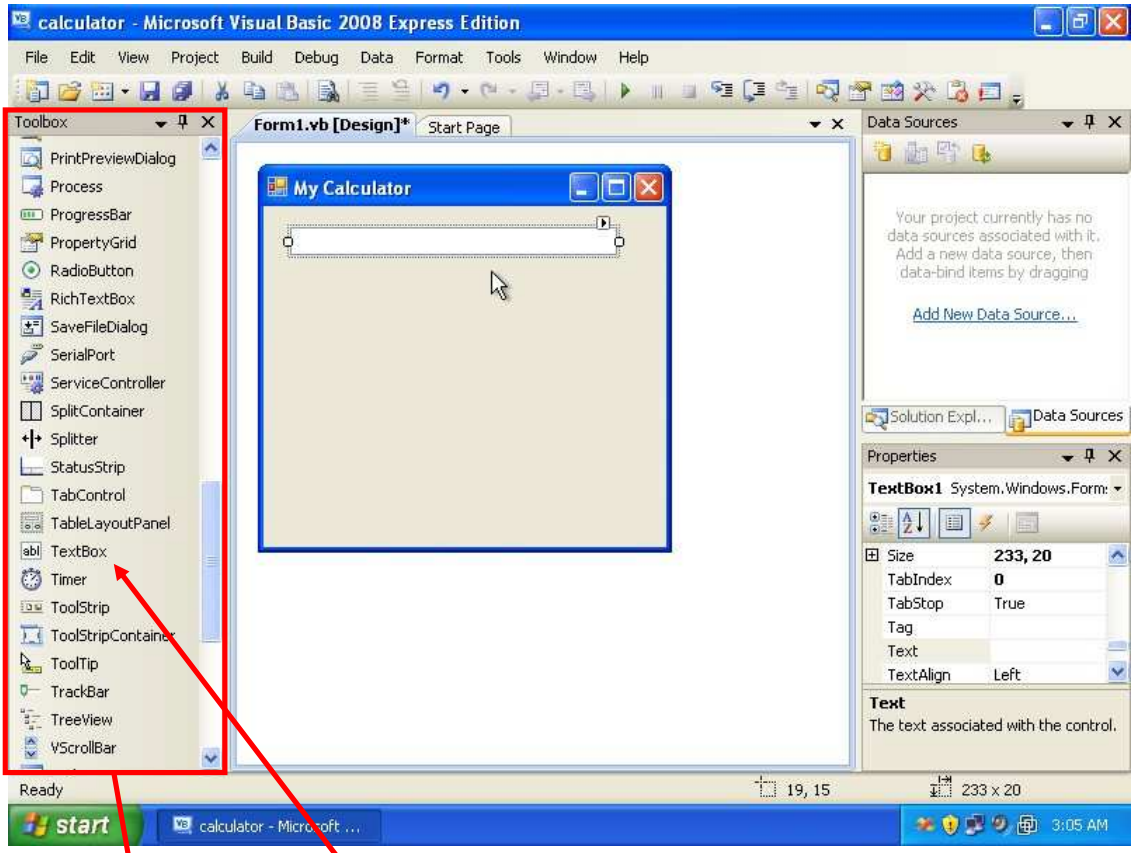
Set its type to **windows forms application** and set its name to **calculator**. Press **OK**



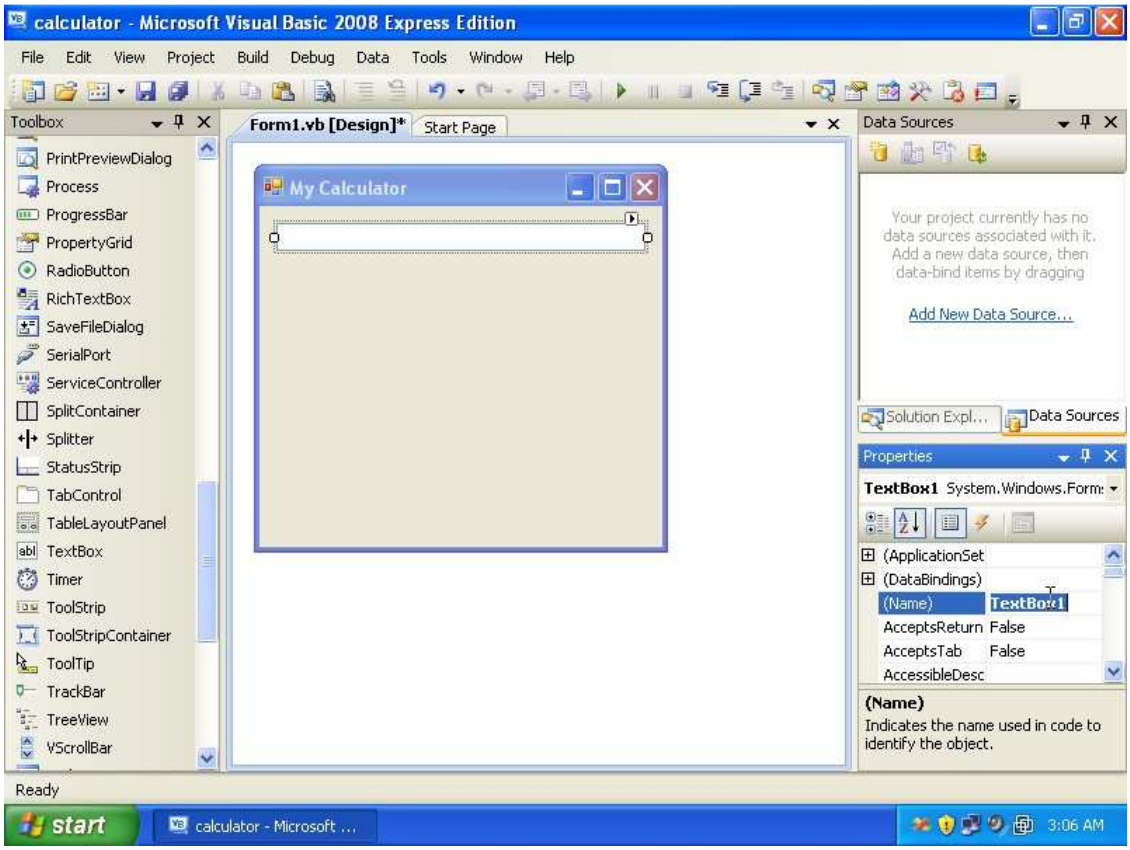
You should see the main form on the workspace



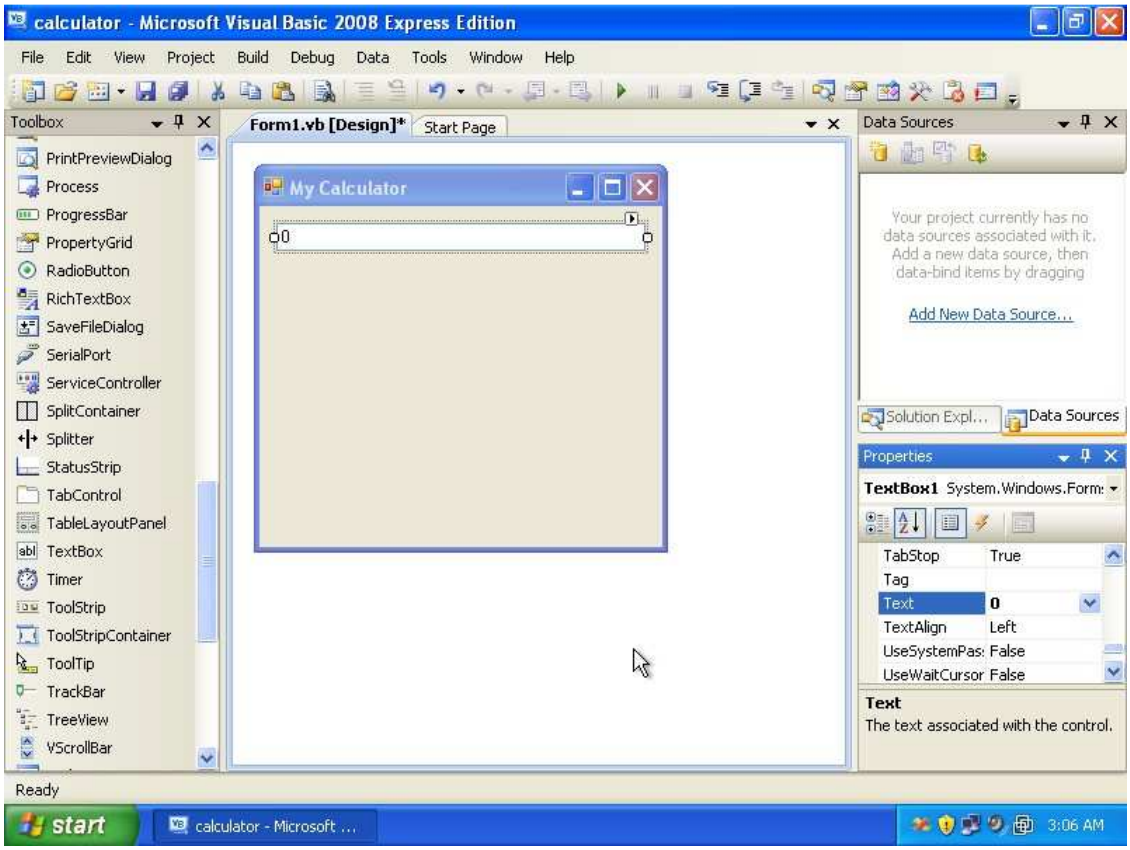
Change the form text property to **My Calculator**, you don't want your application to have the title **Form1** when it starts.



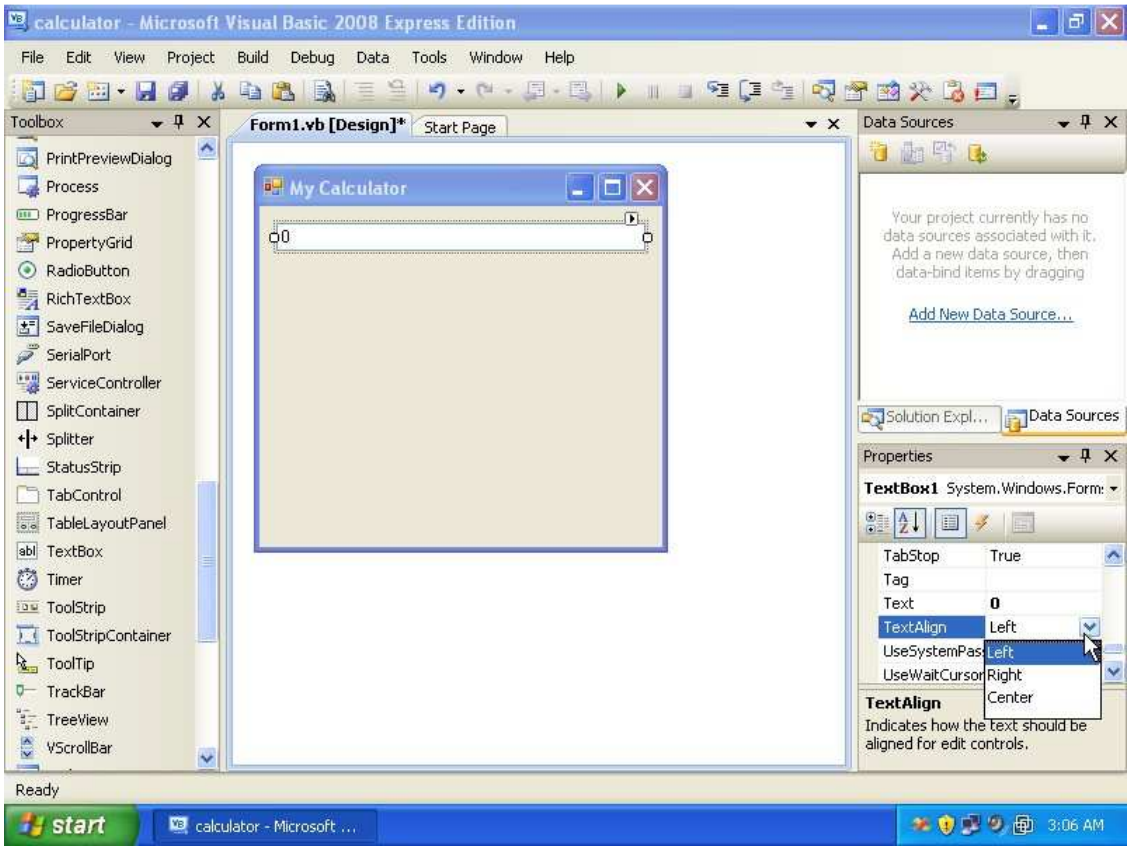
From the **ToolBox**, drop a **TextBox** control onto the form, and resize it.



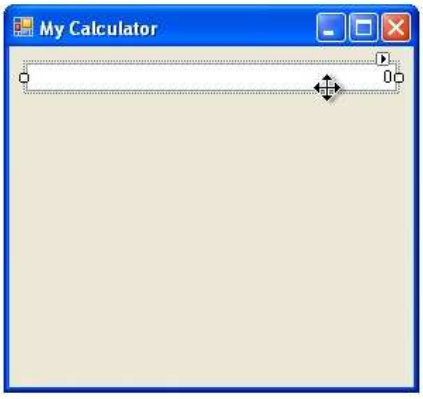
After setting the text box location, we will change its **Name** property. This property allows us to modify and access this control at runtime and change its behavior, or perform something for us. So, set it to **LCD** since it will be used to display the numbers. You can leave the name **TextBox1** without change, or select any other name. Keep in mind that the name you choose will be used instead of **LCD** in the code. Note that the **Name** property does not have any visible effect, you can't see the result of its change, because it will be used internally only to reference this control.



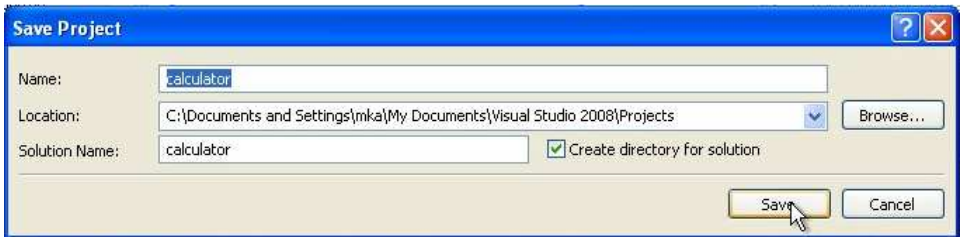
Now, we start working with the display, usually when the calculator starts it should display the number 0. In out case it does not. So we modify the Text Property and write 0 in that. Make sure you don't add any spaces before or after the 0.



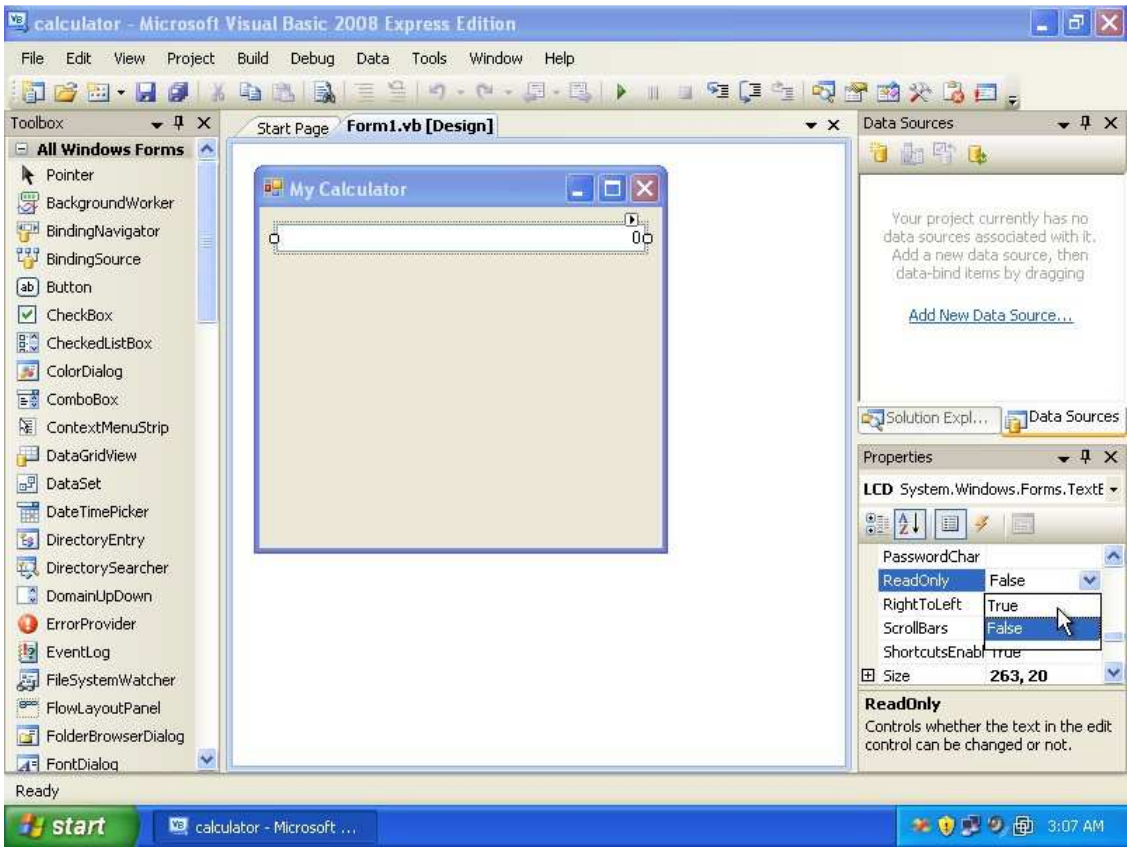
The second thing to note is that the number is aligned to the left, while calculators align the number to the right. Search for the **TextAlign** property and change it to Right.



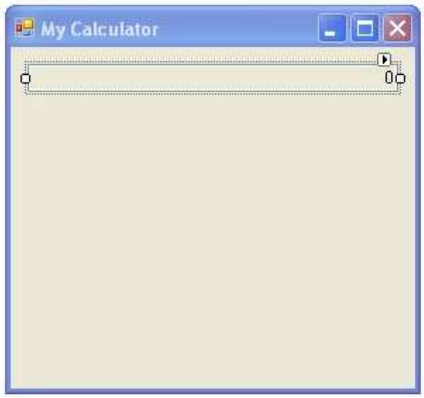
This what the window will look like.



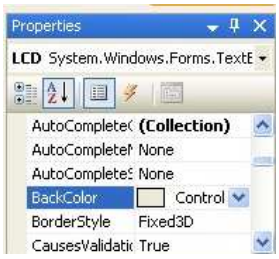
By the way, we forgot to save the project, so, press save all. It is good practice to save your work every few minutes.



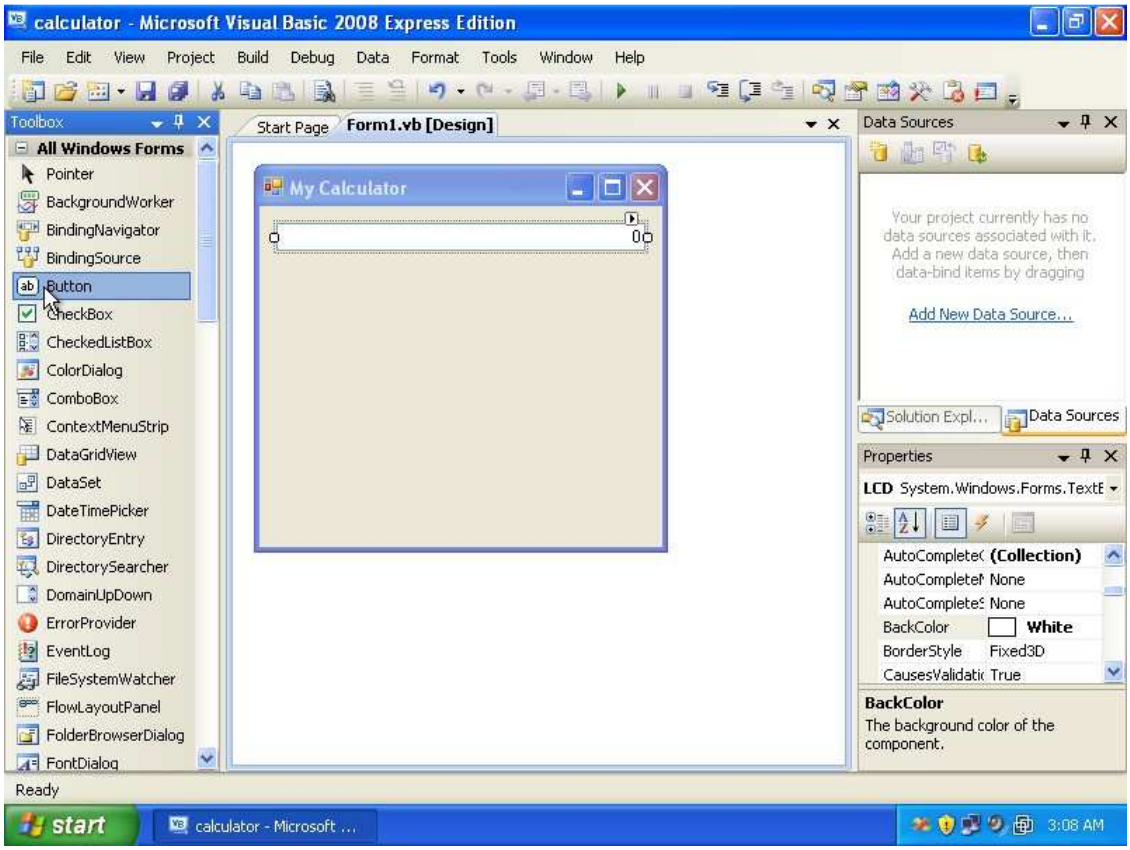
Now if you run the application, you will notice that you can access the text box via the cursor, and write some text, or remove the text. You don't want that to happen. Simply change the **ReadOnly** property to **True**. Notice that once the **ReadOnly** property is ture, the text box will look like this:



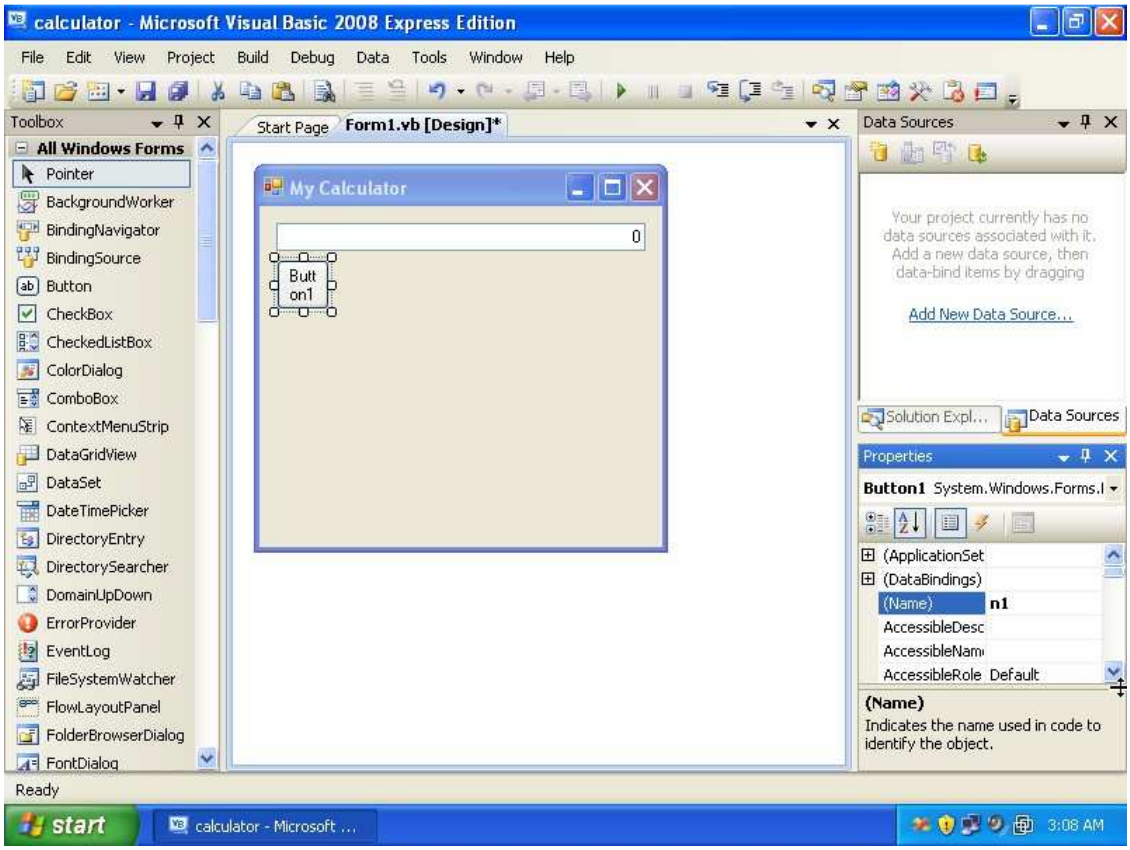
The solution to this problem is simple. Go to the **BackColor** property of the text box and select the white color for it.



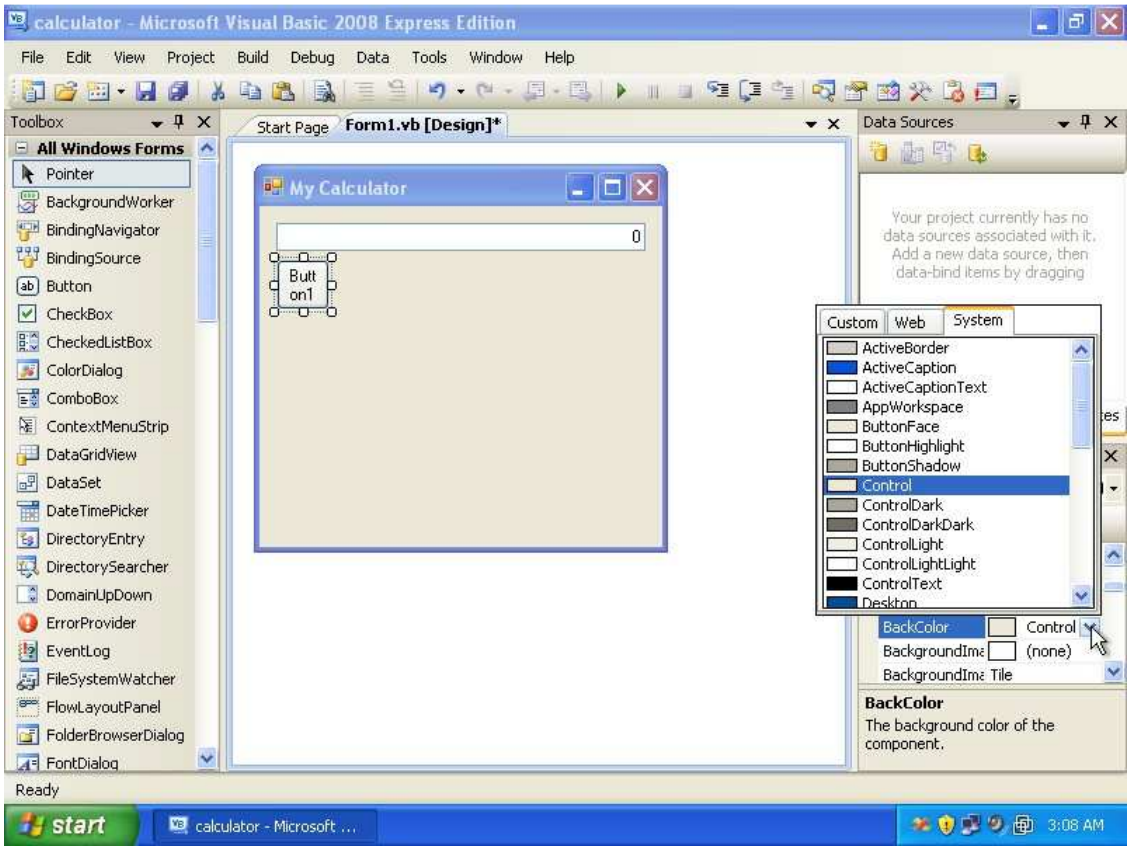
The window should look fine, next we will add the buttons to the form.



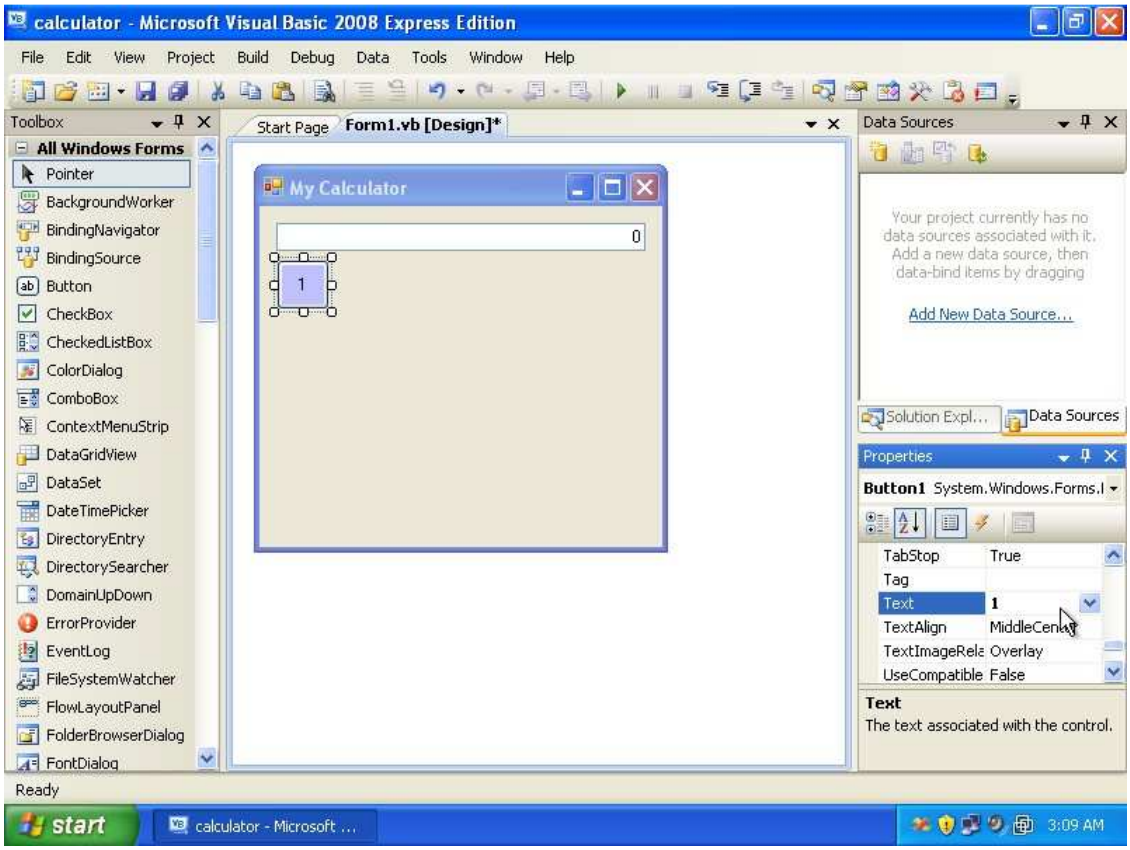
From the tool box window, drag and drop a **Button** onto the form.



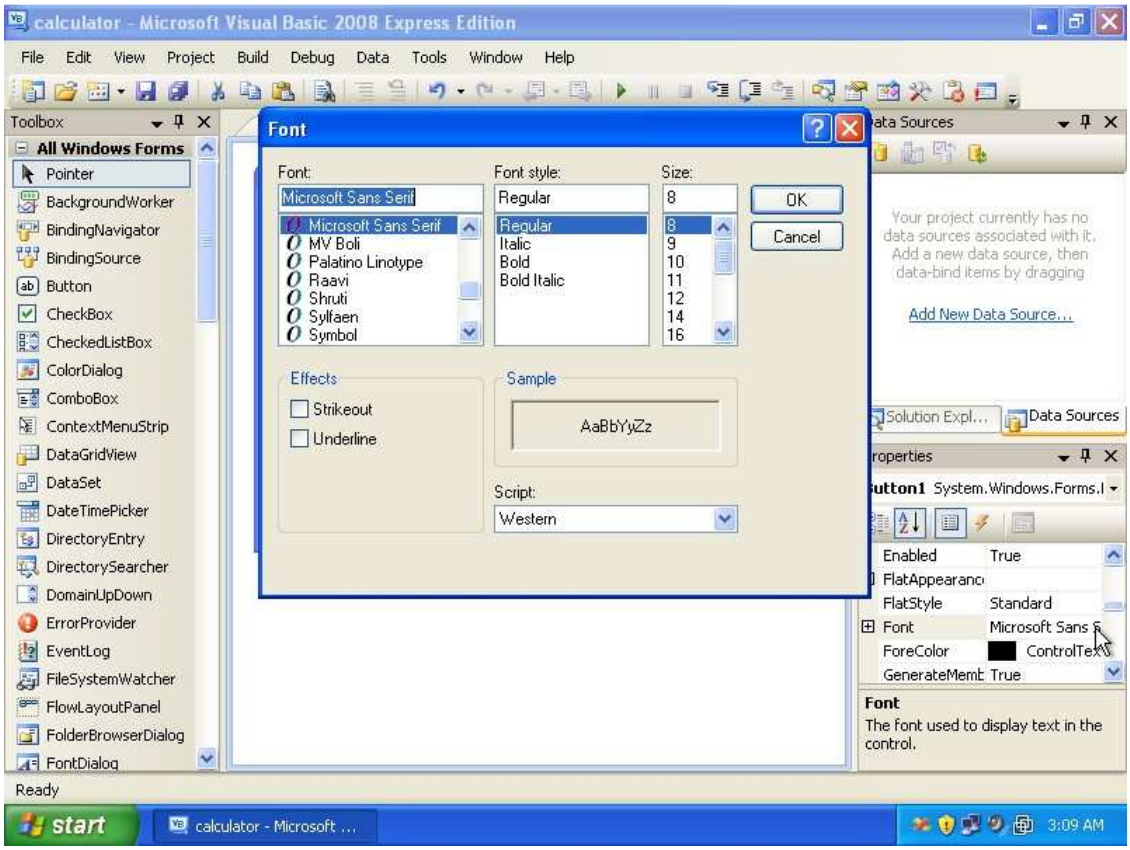
Change its **Name** property to **n1**. This will help us identify which number was pressed.



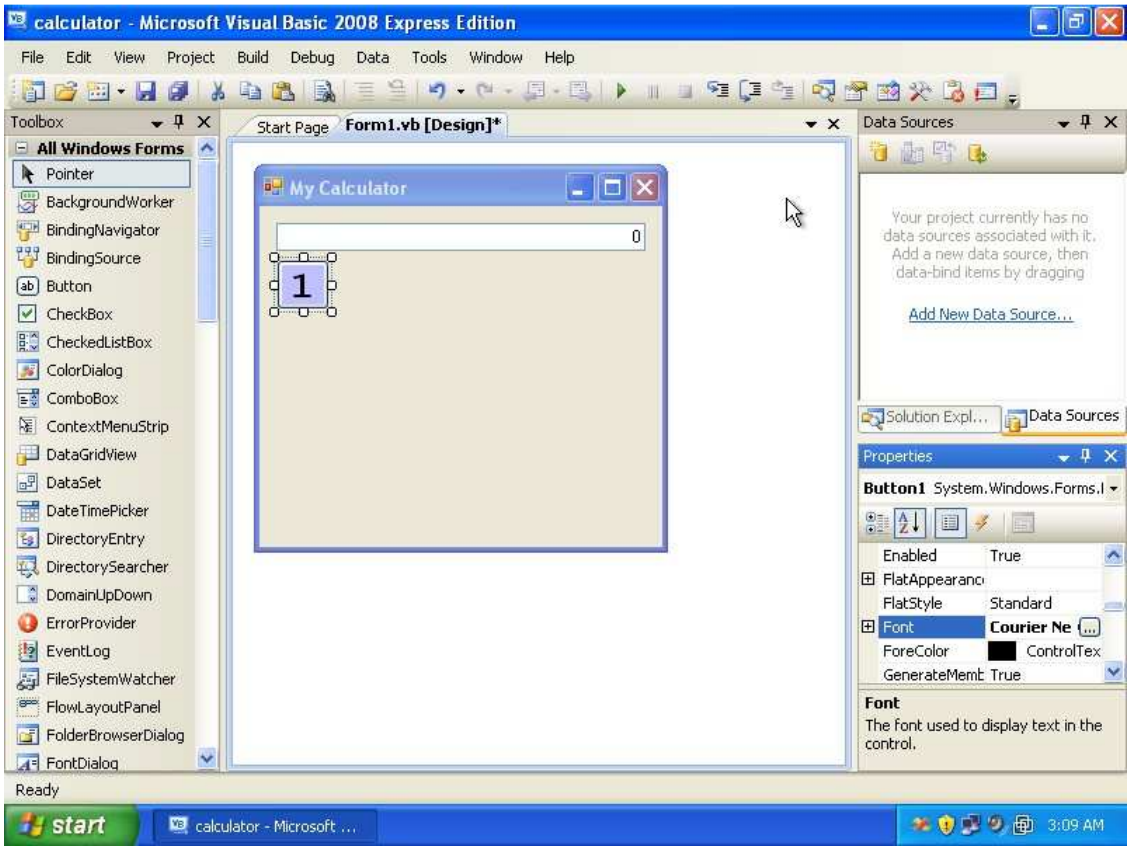
Change the **backcolor** property for the button, usually you can select from **Custom** a different color other than the ones the system provide.



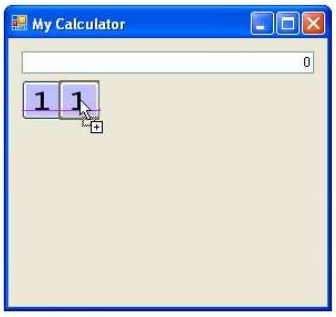
After the color changes, we will modify the text that the button is displaying, so change the text property into **1**.



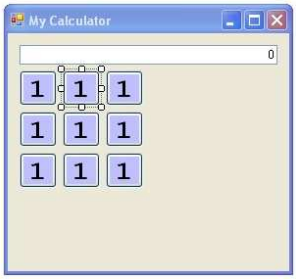
Now the number is very small, we can increase its size a little bit, so go to the **font** property, and set its font to courier new, and size to 20 for example.



Now we can repeat the same operation to all the other nine buttons, or we can just copy this button and get the same result quickly. Just hold the **ctrl** key and drag the control.



Repeat the operation again for all the numbers



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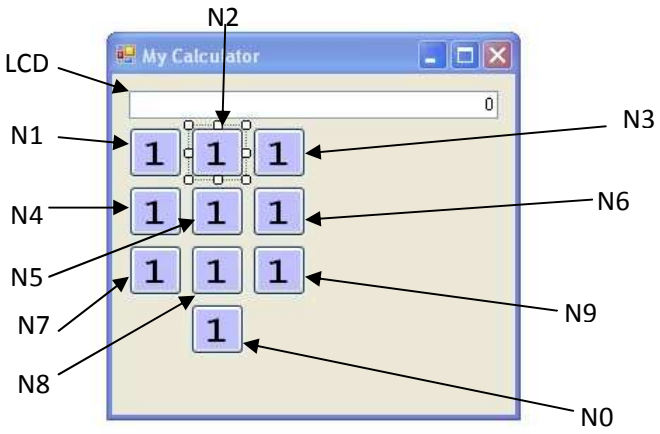
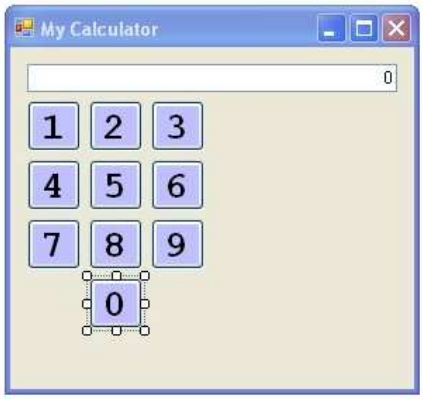
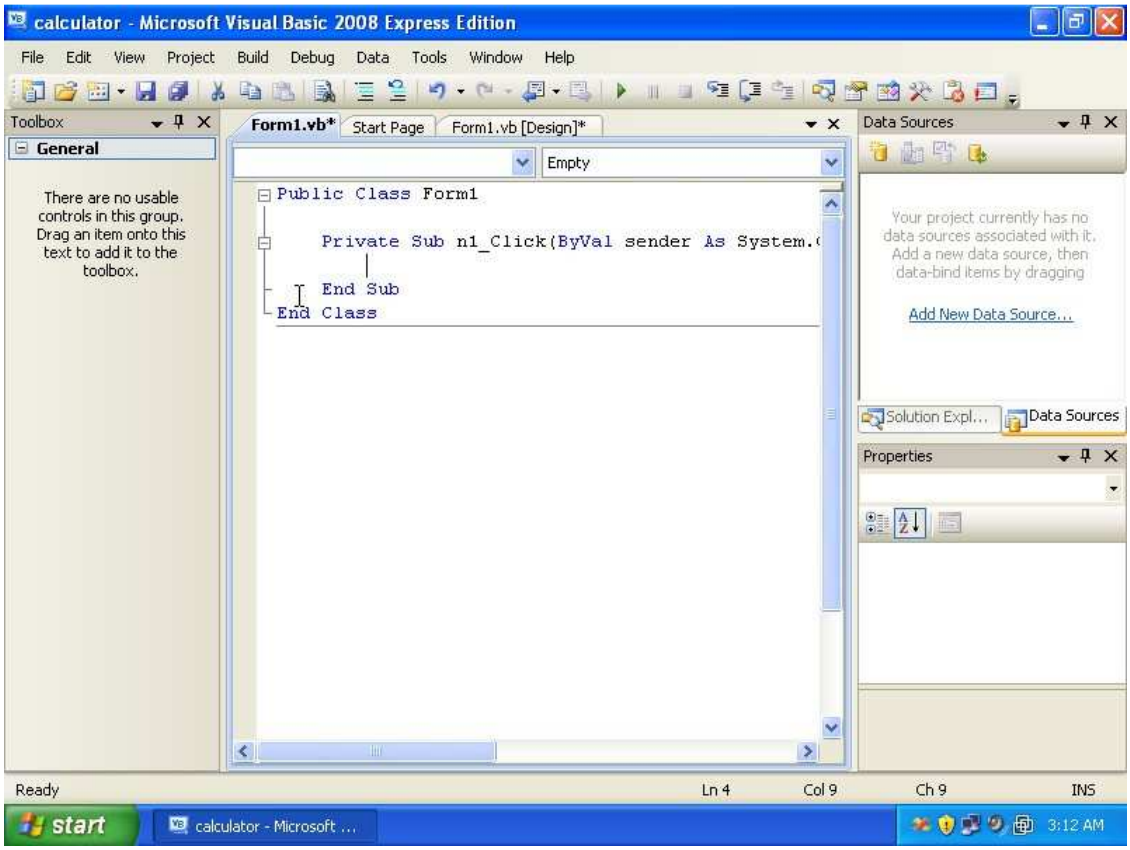
Now we change the names of the buttons (or you can leave them as they are and skip this part). The names will continue to be n2,n3,n4,n5,n6,n7,n8,n9, and n0.



Next we change the text property for each one to display the numbers from 1 to 9, and 0 finally.



Now if you run the application, you won't be able to do anything, i.e. the form appears, and pressing the buttons will have no effect. This is because we haven't tell the application what to do when you click any of the buttons. So, double click the button N1 to go to its event



What you see here is a procedure or subroutine. This is a small block of code that you write to tell the application what to do when a button is clicked. The **n1_Click** is the name of this procedure. It tells you that it get executed when the button whose name **n1** is clicked by the user. Write down the code to have it like this:

```
Private Sub n1_Click(ByVal sender As System.Object, ByVal e As   System.EventArgs) Handles n1.Click
        LCD.Text = LCD.Text & "1"
End Sub
```

Note:I made the text small so that it fits one line. In VB.NET the new line is a sentence terminator.

The code means the following:

`Private Sub` part defines the subroutine. It is part of the language (or keywords as they call it).

`n1_Click` is the name of that subroutine. You can use the name to call the subroutine whenever you need. The name can be anything you choose. More on that in later tutorials.

`(ByVal sender As System.Object, ByVal e As  System.EventArgs`) : these are called the arguments. The allow the subroutine to be flexible by checking some inputs, to process things differently. More on that later.

Handles n1.Click : this one means that this subroutine will be automatically called whenever the button n1 is clicked by the end user.

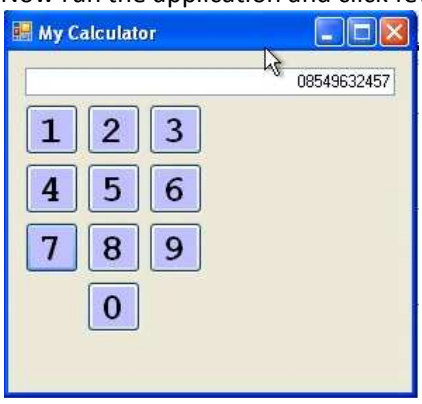
LCD.Text = LCD.Text & "1" : this is the processing we are performing when we press the button 1. Its meaning is add to the current text on the display (which we call **LCD**) the number 1. Note that we used the Text property which we modified previously using the properties window.

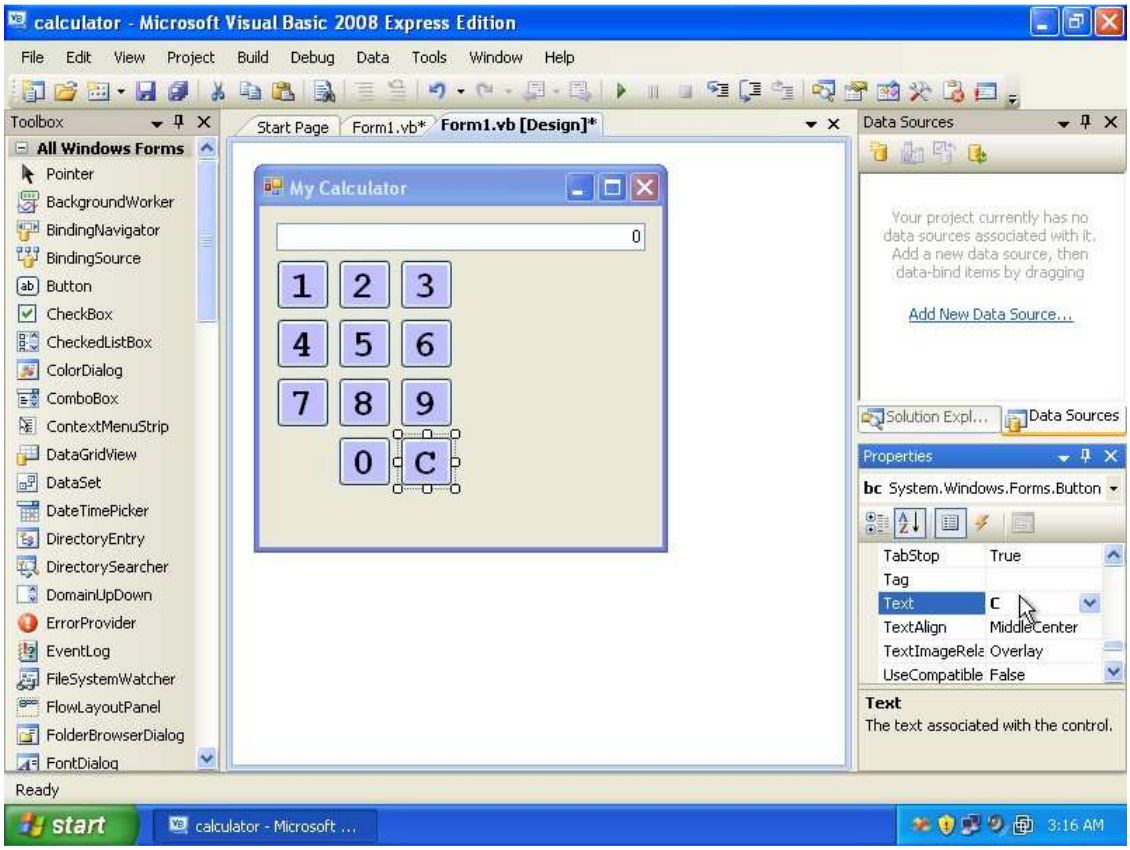
End Sub : signals the end of subroutine.

You should repeat the code for buttons n2,n3,n4,n5,n6,n7,n8,n9, and n0 to add the numbers 2,3,4,5,6,7,8,9,0 respectively. So the code should look like this:

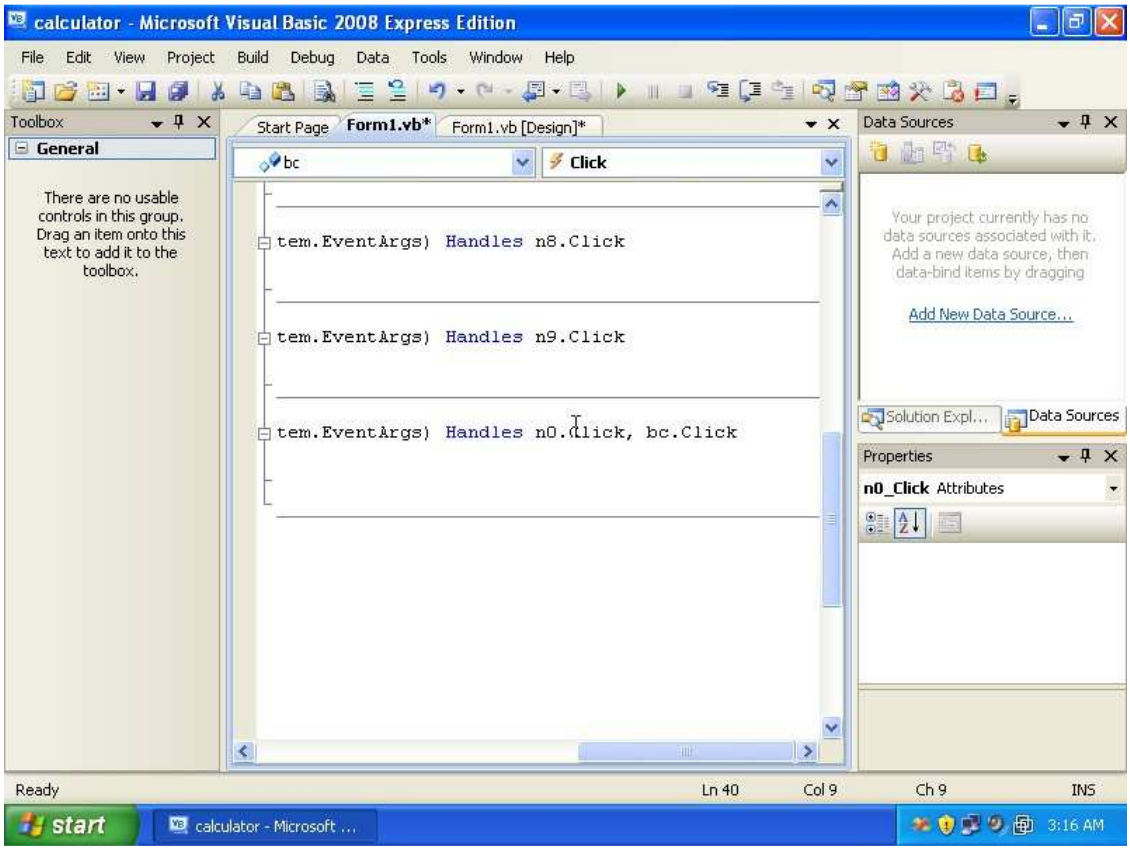
```
Private Sub n1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n1.Click
        LCD.Text = LCD.Text & "1"
End Sub

Private Sub n2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n2.Click
        LCD.Text = LCD.Text & "2"
End Sub

Private Sub n3_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n3.Click
        LCD.Text = LCD.Text & "3"
End Sub

Private Sub n4_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n4.Click
        LCD.Text = LCD.Text & "4"
End Sub

Private Sub n5_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n5.Click
        LCD.Text = LCD.Text & "5"
End Sub

Private Sub n6_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n6.Click
        LCD.Text = LCD.Text & "6"
End Sub

Private Sub n7_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n7.Click
        LCD.Text = LCD.Text & "7"
End Sub

Private Sub n8_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n8.Click
        LCD.Text = LCD.Text & "8"
End Sub

Private Sub n9_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n9.Click
        LCD.Text = LCD.Text & "9"
End Sub

Private Sub n0_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n0.Click
        LCD.Text = LCD.Text & "0"
End Sub
```

Now run the application and click few buttons:

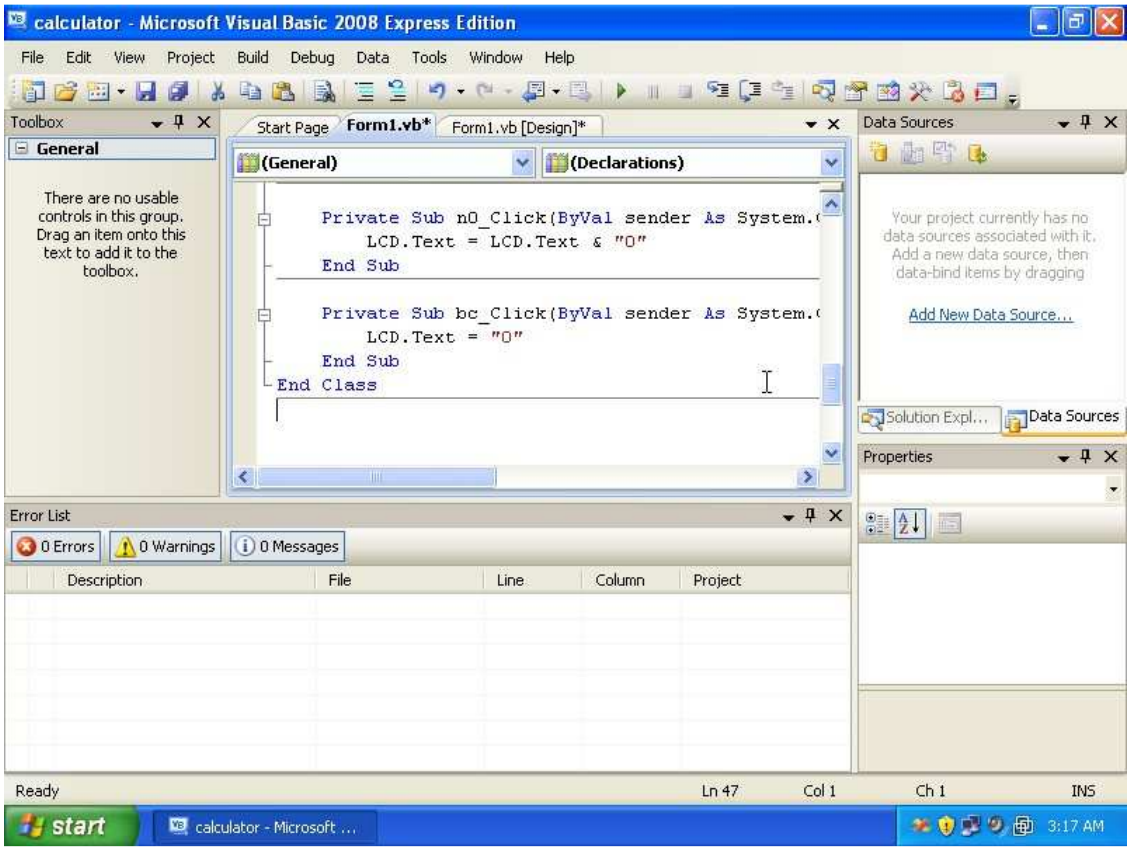




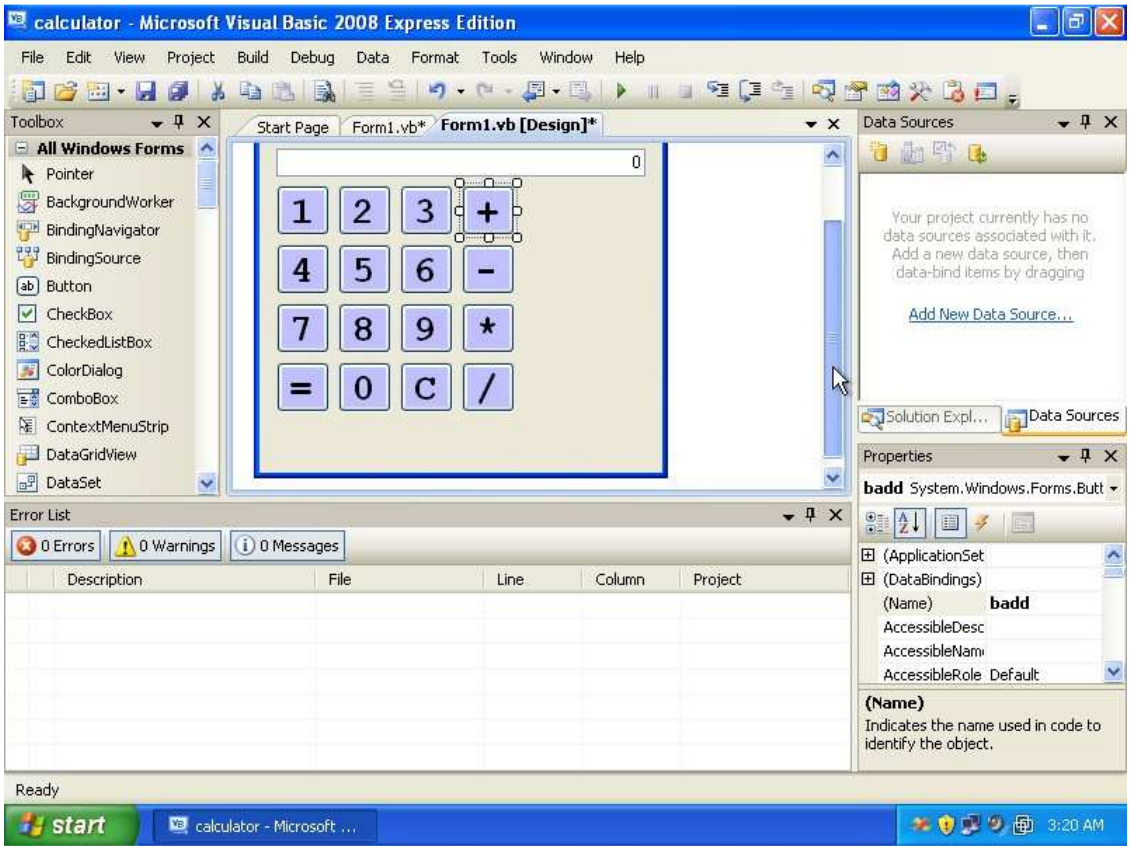
Next we create the clear button, copy the 0 button, and place the copy next to the 0. Change its name to **bc**, and text property to **C**.



Now if you double click the C button, you will go to the code handler of 0. Check the code and you will see that this subroutine will handle the events of **n0.click** and **bc.click**. Actually this will make both buttons behave the same way, so you should create a separate handler for **bc**. The reason why VB.NET linked them together into the same subroutine, is that you copied n0, so VB assumes that the copies should behave the same way as the original. What you should do now is remove the **`, bc.Click`** from the procedure and then create the handler for clear button.



Just go back to design window, then double click the **C** button and add the text shown above. Try to run the program, clicking some numbers and then pressing the **C** button.



Now assuming you know now how to copy a control and change its text property, now, add the operations as shown above. Next name them as follows:

\+ name is **bad**

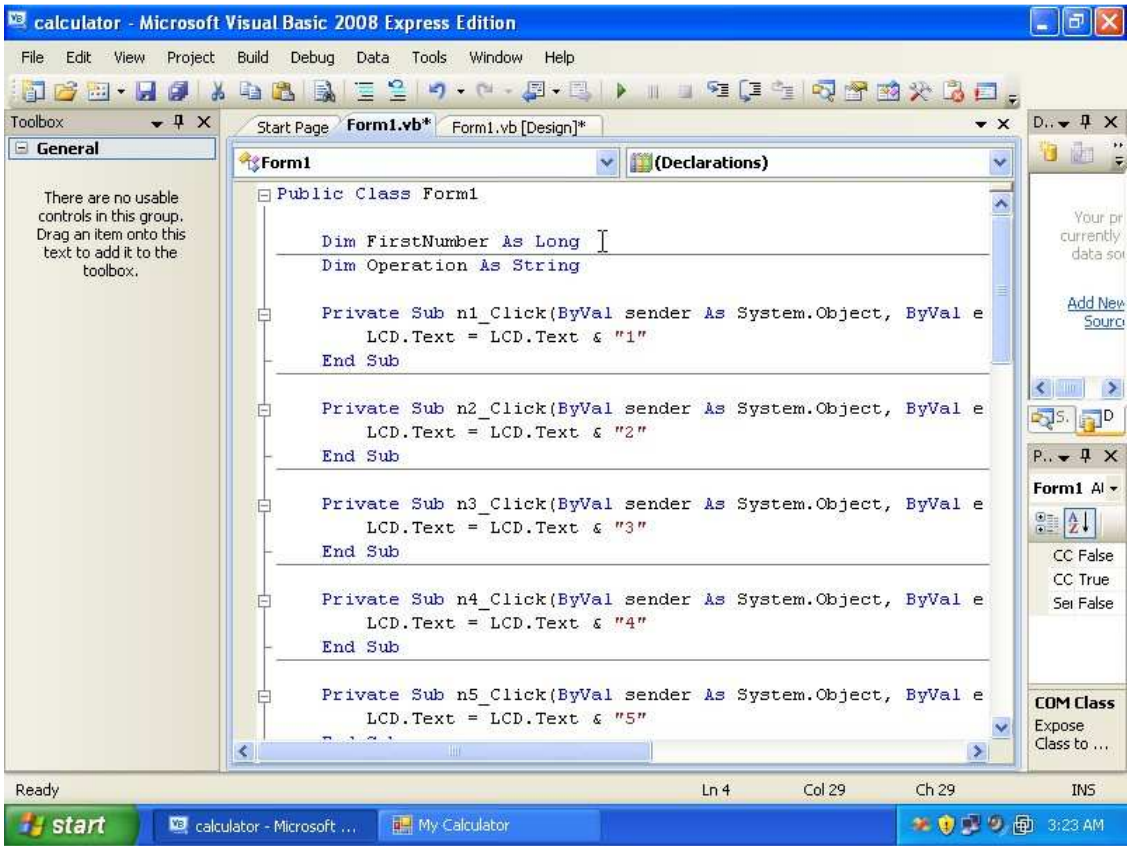
\- name is **bsub**

* name is **bmult**

/ name is **bdiv**

= name is **bequal**

And then remove their handlers from the subroutines because we want to write new event handlers for them.



Double click the + button to go to the code window. Now add the code :

```
Dim FirstNumber As Long
Dim Operation As String
```

`FirstNumber` is a variable that helps the application remember integer numbers. The reason we use it is to keep track of the last number we entered into the calculator. When we press any operation the display is going to be cleared and so the number is lost, so this variable will store the number before it is removed from the display. `Operation` is a variable used to remember the last operation that is being pressed. It will store +,-,*,/.

Next add the following code event handles into the subroutines of +,-,*,/ respectively:

```
FirstNumber = LCD.Text
LCD.Text = "0"
Operation = "+"
```

The – event hanlder

```
FirstNumber = LCD.Text
LCD.Text = "0"
Operation = "-"
```

The * event handler

```
FirstNumber = LCD.Text
LCD.Text = "0"
```

```
        Operation = "*"
```

The / event handler

```
        FirstNumber = LCD.Text
        LCD.Text = "0"
        Operation = "/"
```

So the code should look like

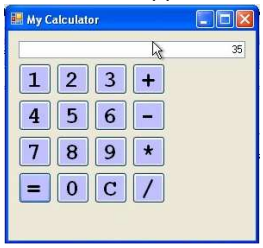
```
Private Sub badd_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles badd.Click
    FirstNumber = LCD.Text
    LCD.Text = "0"
    Operation = "+"
End Sub

Private Sub bsub_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bsub.Click
    FirstNumber = LCD.Text
    LCD.Text = "0"
    Operation = "-"
End Sub

Private Sub bmult_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bmult.Click
    FirstNumber = LCD.Text
    LCD.Text = "0"
    Operation = "*"
End Sub

Private Sub bdiv_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bdiv.Click
    FirstNumber = LCD.Text
    LCD.Text = "0"
    Operation = "/"
End Sub
```

The last thing to do is the = handler where the operation should be executed

```
Private Sub bequal_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bequal.Click
    Dim SecondNumber As Long
    Dim Result As Long

    SecondNumber = LCD.Text

    If Operation = "+" Then
        Result = FirstNumber + SecondNumber
    ElseIf Operation = "-" Then
        Result = FirstNumber - SecondNumber
    ElseIf Operation = "*" Then
        Result = FirstNumber * SecondNumber
    ElseIf Operation = "/" Then
        Result = FirstNumber / SecondNumber
    End If

    FirstNumber = Result
    LCD.Text = Result

End Sub
```

The code first gets the value from the display, then it check the last operation, if it is addition, then the result will be the sum of the number in memory and the number just we get from the display. If subtraction then subtract one from the other and so on. Finally store the result into memory for further operations on it (you can neglect that, it is not that you have to do it), and then display the result by updating the text property of LCD.

Now run the application and try adding two numbers like 30 and 5:

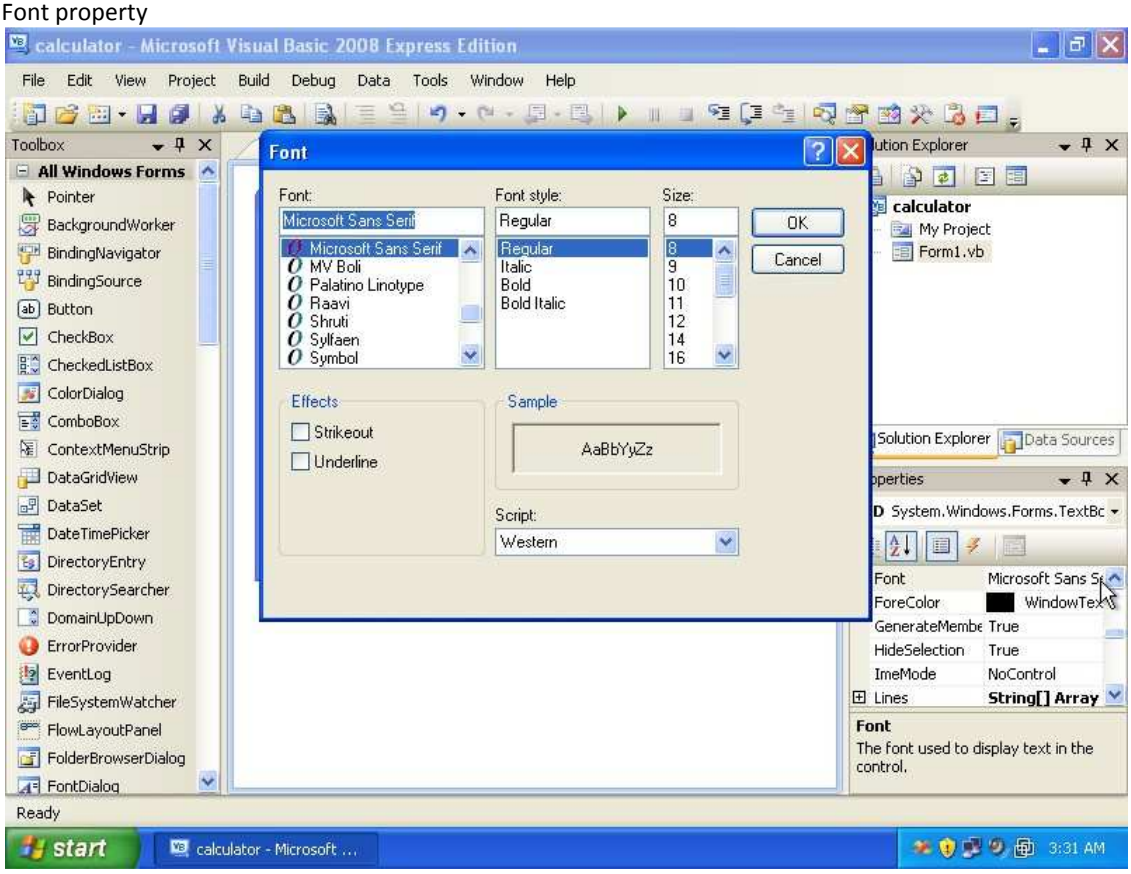


Next you will notice that when you enter any number you always gets a zero before that number. This is meaningless and should not happen in a calculator. So we will update our code to get rid of the zero in case we clicked on any number (0,1,2,3,4,5,6,7,8,9) and there is a 0 in the display. So update the code to be:

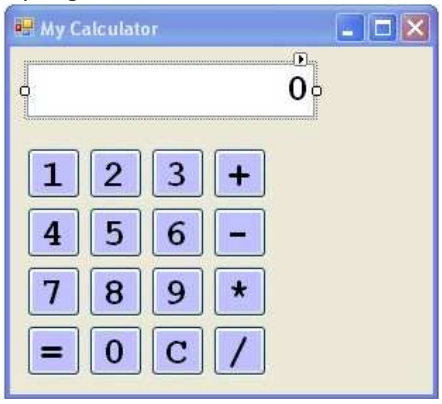
```
Private Sub n1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n1.Click
    If LCD.Text = "0" Then
        LCD.Text = "1"
    Else
        LCD.Text = LCD.Text & "1"
    End If
End Sub

Private Sub n2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n2.Click
    If LCD.Text = "0" Then
        LCD.Text = "2"
    Else
        LCD.Text = LCD.Text & "2"
    End If
End Sub

Private Sub n3_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n3.Click
    If LCD.Text = "0" Then
        LCD.Text = "3"
    Else
        LCD.Text = LCD.Text & "3"
    End If
End Sub

Private Sub n4_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n4.Click
    If LCD.Text = "0" Then
        LCD.Text = "4"
    Else
        LCD.Text = LCD.Text & "4"
    End If
End Sub

Private Sub n5_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n5.Click
    If LCD.Text = "0" Then
        LCD.Text = "5"
    Else
        LCD.Text = LCD.Text & "5"
    End If
End Sub

Private Sub n6_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n6.Click
    If LCD.Text = "0" Then
        LCD.Text = "6"
    Else
        LCD.Text = LCD.Text & "6"
    End If
End Sub

Private Sub n7_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n7.Click
    If LCD.Text = "0" Then
        LCD.Text = "7"
    Else
        LCD.Text = LCD.Text & "7"
    End If
End Sub

Private Sub n8_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n8.Click
    If LCD.Text = "0" Then
        LCD.Text = "8"
    Else
        LCD.Text = LCD.Text & "8"
    End If
End Sub

Private Sub n9_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n9.Click
    If LCD.Text = "0" Then
        LCD.Text = "9"
    Else
        LCD.Text = LCD.Text & "9"
    End If
End Sub

Private Sub n0_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n0.Click
    If LCD.Text = "0" Then
        LCD.Text = "0"
    Else
        LCD.Text = LCD.Text & "0"
    End If
End Sub
```

This is not the best way to write the code, but it is just to practice working in the environment. Later on we will get into the language itself and understand how it works after understanding most of the controls. Now run the application and see that the zero disappears when you click any number.

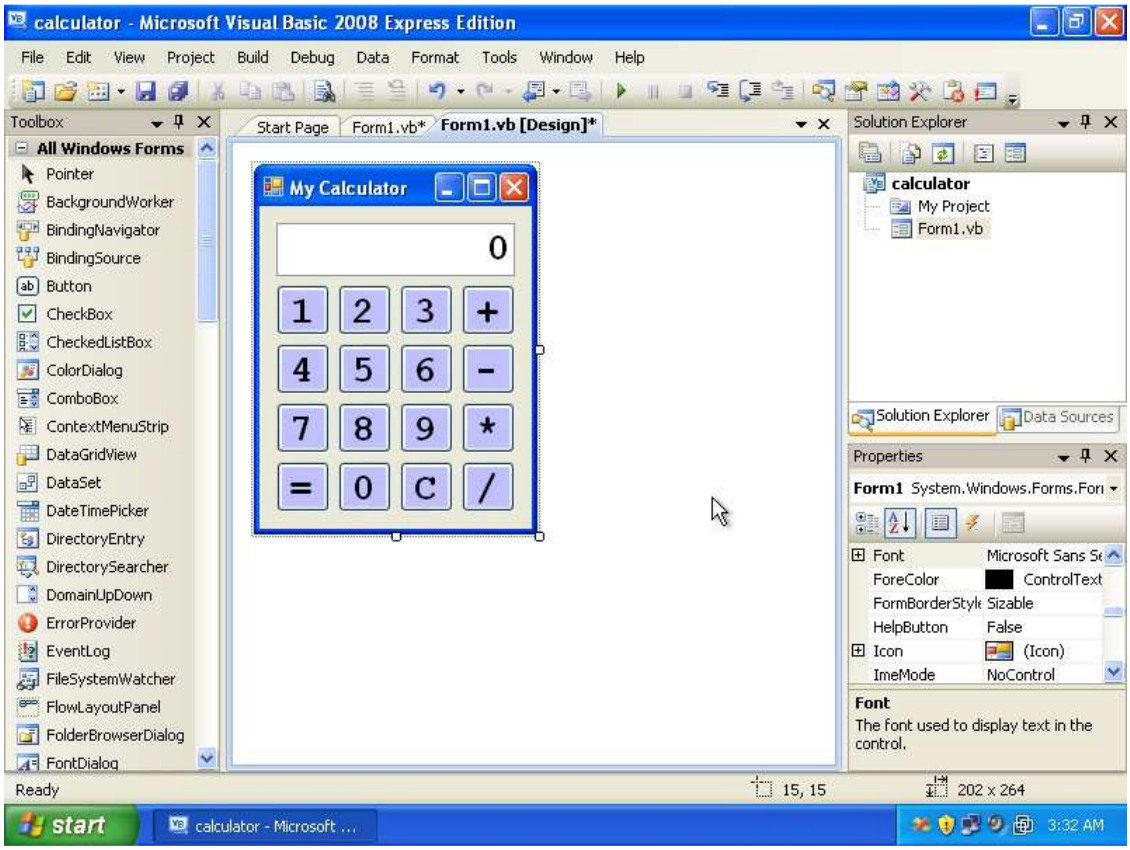
Now our calculator works fine, we will make some changes into it. First we change the size of the font in the LCD to be a little bit bigger so select the LCD control (the textbox whose name is LCD), and change its Font property



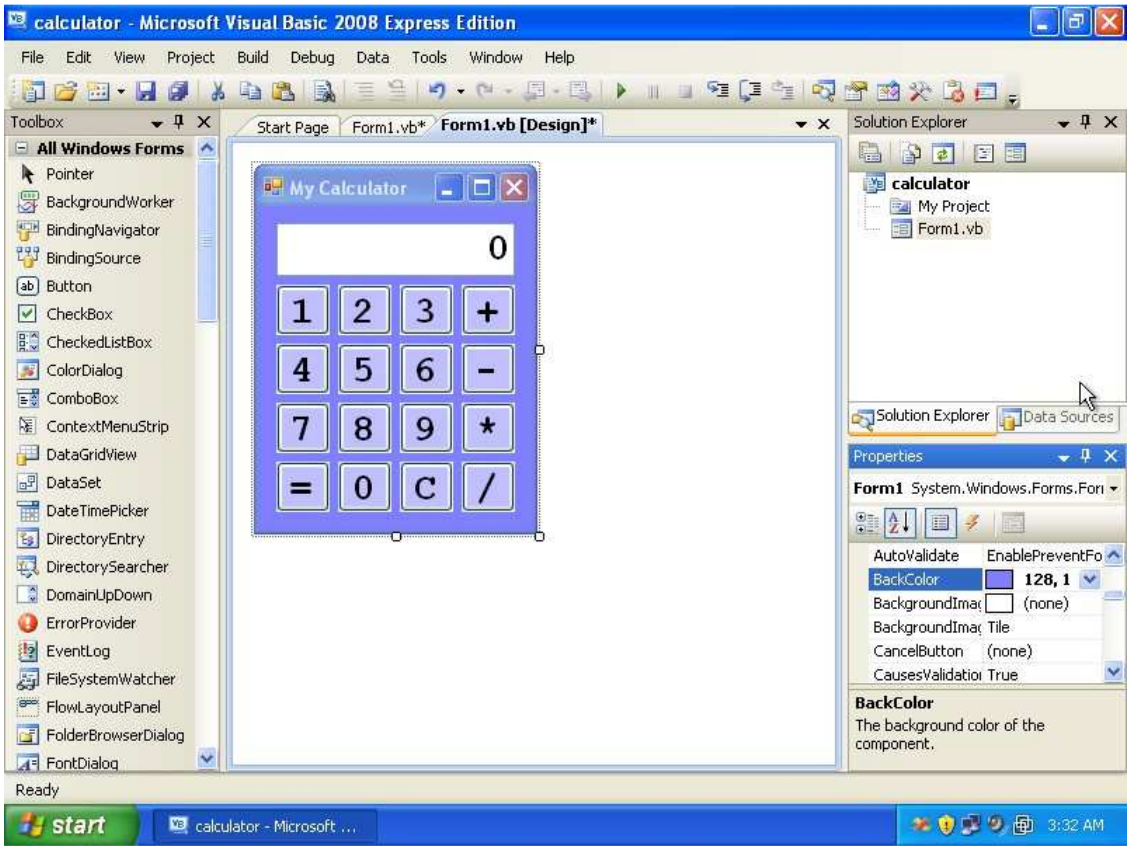
Try to get a result similar to this:



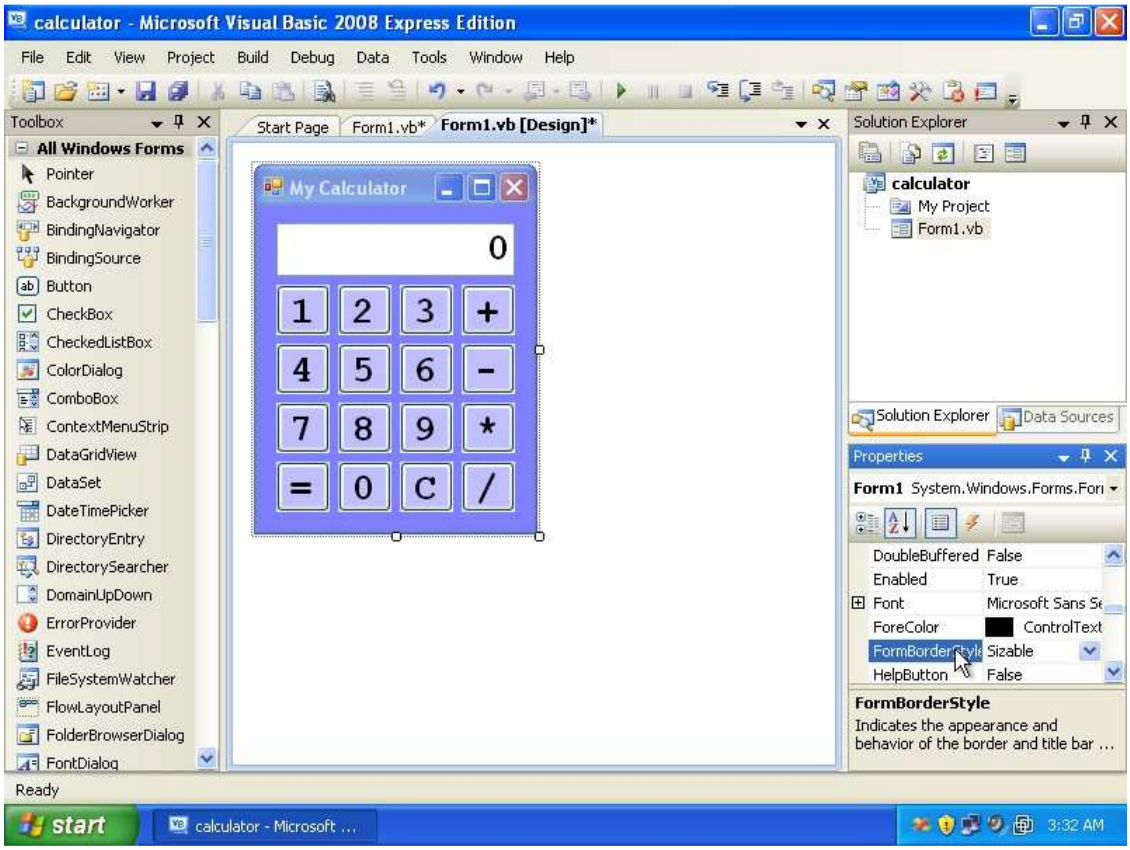
Next we will modify the form behavior so that it does not change size.



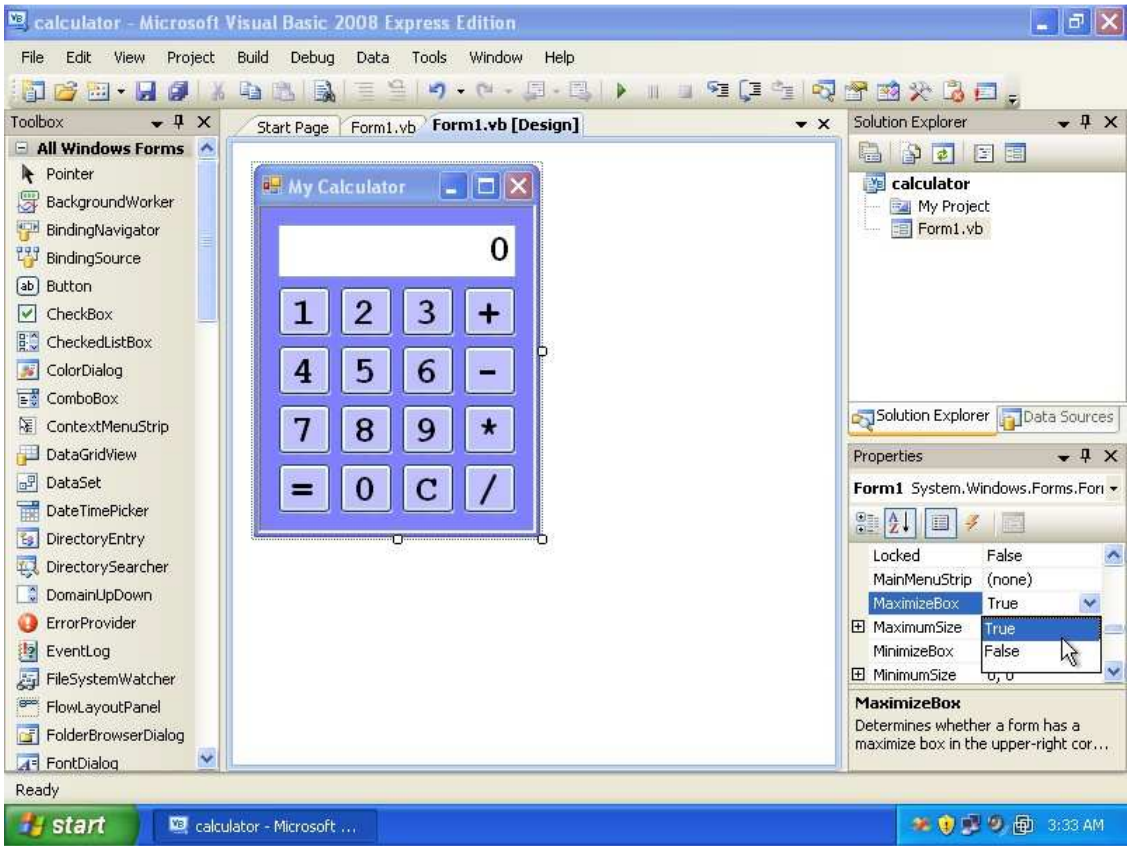
First try to position the controls again to look more professional, you can move all the controls together by selecting them all. The selection works by drawing a box that embed them all. Next click on any empty space on the form so that you can change its properties



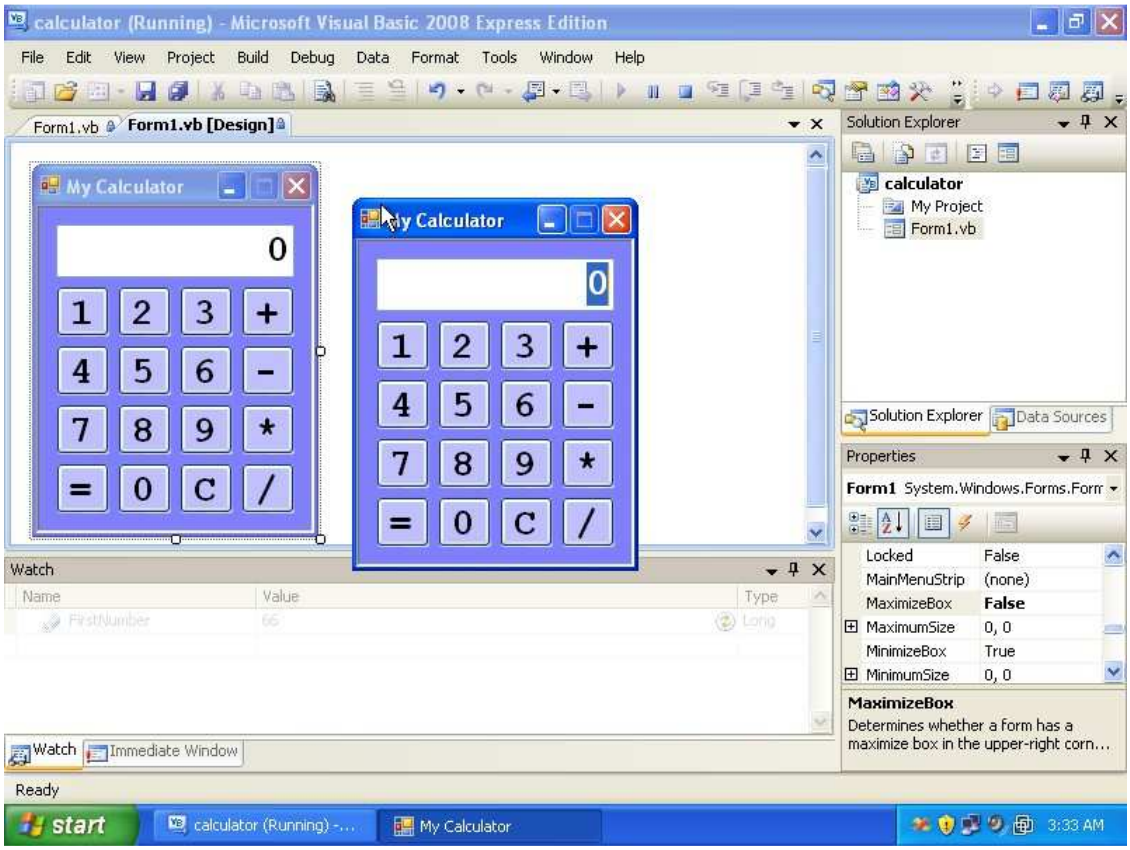
Change **Backcolor** property as you see fit.



Next change the **FormBorderStyle** property from **Sizable** to **FixedSingle**, this will prevent your calculator from being resized.



Finally change the **MaximizeBox** for your form to be **False**. This prevents the form from being maximized.



So this is how your calculator should look like.

Just in case it does not work, the code should be as below assuming you used the same names:

```
Public Class Form1

    Dim FirstNumber As Long
    Dim Operation As String

    Private Sub n1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n1.Click
        If LCD.Text = "0" Then
            LCD.Text = "1"
        Else
            LCD.Text = LCD.Text & "1"
        End If
    End Sub

    Private Sub n2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n2.Click
        If LCD.Text = "0" Then
            LCD.Text = "2"
        Else
            LCD.Text = LCD.Text & "2"
        End If
    End Sub

    Private Sub n3_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n3.Click
        If LCD.Text = "0" Then
            LCD.Text = "3"
        Else
            LCD.Text = LCD.Text & "3"
        End If
    End Sub

    Private Sub n4_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n4.Click
        If LCD.Text = "0" Then
            LCD.Text = "4"
        Else
            LCD.Text = LCD.Text & "4"
        End If
    End Sub

    Private Sub n5_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n5.Click
        If LCD.Text = "0" Then
            LCD.Text = "5"
```

```
        Else
            LCD.Text = LCD.Text & "5"
        End If
    End Sub

    Private Sub n6_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n6.Click
        If LCD.Text = "0" Then
            LCD.Text = "6"
        Else
            LCD.Text = LCD.Text & "6"
        End If
    End Sub

    Private Sub n7_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n7.Click
        If LCD.Text = "0" Then
            LCD.Text = "7"
        Else
            LCD.Text = LCD.Text & "7"
        End If
    End Sub

    Private Sub n8_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n8.Click
        If LCD.Text = "0" Then
            LCD.Text = "8"
        Else
            LCD.Text = LCD.Text & "8"
        End If
    End Sub

    Private Sub n9_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n9.Click
        If LCD.Text = "0" Then
            LCD.Text = "9"
        Else
            LCD.Text = LCD.Text & "9"
        End If
    End Sub

    Private Sub n0_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles n0.Click
        If LCD.Text = "0" Then
            LCD.Text = "0"
        Else
            LCD.Text = LCD.Text & "0"
        End If
    End Sub

    Private Sub bc_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bc.Click
        LCD.Text = "0"
    End Sub

    Private Sub badd_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles badd.Click
        FirstNumber = LCD.Text
        LCD.Text = "0"
        Operation = "+"
    End Sub

    Private Sub bsub_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bsub.Click
        FirstNumber = LCD.Text
        LCD.Text = "0"
        Operation = "-"
    End Sub

    Private Sub bmult_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bmult.Click
        FirstNumber = LCD.Text
        LCD.Text = "0"
        Operation = "*"
    End Sub

    Private Sub bdiv_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bdiv.Click
        FirstNumber = LCD.Text
        LCD.Text = "0"
        Operation = "/"
    End Sub

    Private Sub bequal_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles bequal.Click
        Dim SecondNumber As Long
        Dim Result As Long

        SecondNumber = LCD.Text

        If Operation = "+" Then
            Result = FirstNumber + SecondNumber
        ElseIf Operation = "-" Then
            Result = FirstNumber - SecondNumber
        ElseIf Operation = "*" Then
            Result = FirstNumber * SecondNumber
        ElseIf Operation = "/" Then
            Result = FirstNumber / SecondNumber
        End If

        FirstNumber = Result
        LCD.Text = Result

    End Sub
End Class
```

http://www.mka-soft.com

You can download the source code of the example, or watch the tutorials on you tube, just check the web site.

If you have any notes, or suggestions, please let me know via **notes@mka-soft.com**.

Next tutorial will be about more controls like Labels, Menus, and Dialogs.