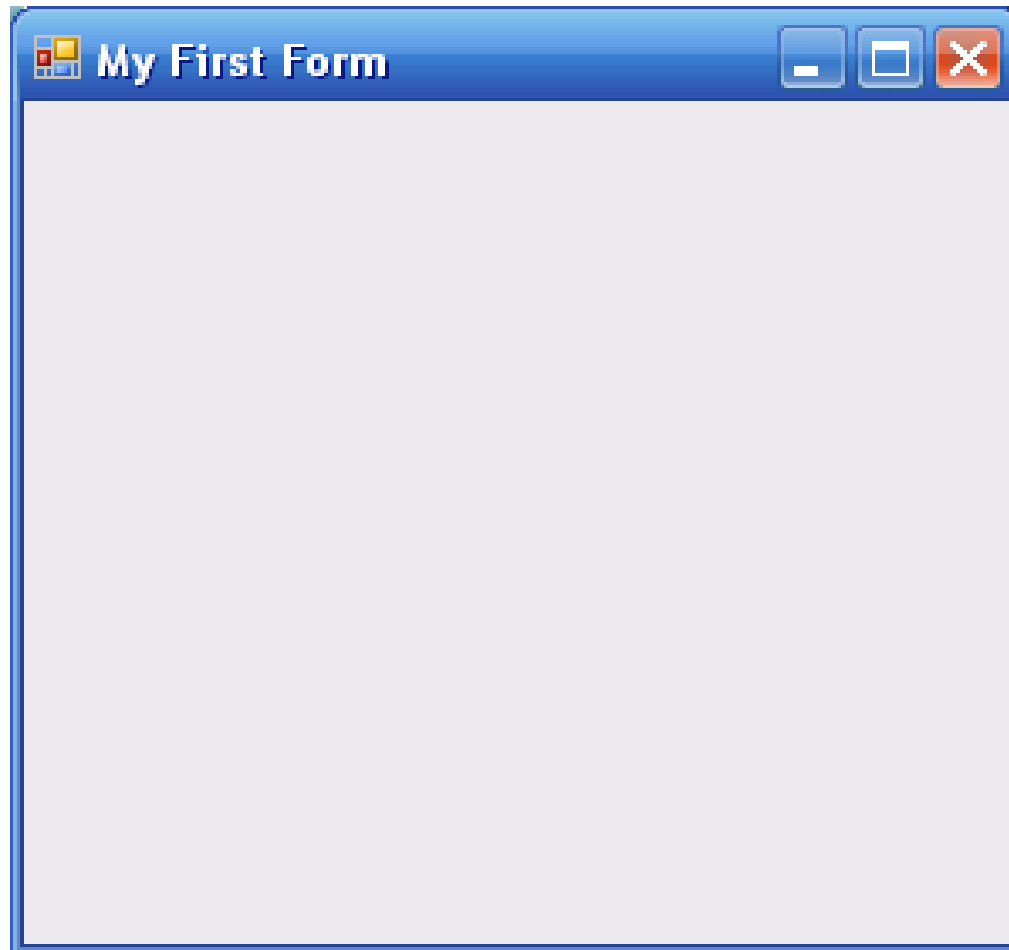


Systems Programming & Scripting

Lecture 6: C# GUI Development

Blank Form



First Form Code

```
using System;
using System.Drawing;
using System.Windows.Forms;

public class HelloWorld : Form
{
    static public void Main ()
    {
        Application.Run (new HelloWorld ());
    }

    public HelloWorld ()
    {
        Button b = new Button ();
        b.Text = "Click Me!";
        b.Click += new EventHandler (Button_Click);
        Controls.Add (b);
    }

    private void Button_Click (object sender, EventArgs e)
    {
        MessageBox.Show ("Button Clicked!");
    }
}
```

Discussion

- The main GUI library to import is `System.Windows.Forms`
- Our form `HelloWorld` inherits from the `Form` class in the above library
- The form is created by calling `Application.Run` on an instance of the `HelloWorld` class.
- The constructor of the class `HelloWorld` defines the contents and layout.
- It also associates an event handler with the button component of the form.
- This way, on clicking the button the text “Button Clicked” will appear.

First Form Code

```
using System.Windows.Forms;

namespace WindowsFormsApplication1
{
    class Form1 : Form
    {
        public Form1()
        {
            Text = "My First Form";
        }

        static void Main()
        {
            Form1 f1 = new Form1();
            Application.Run(f1);
        }
    }
}
```

Code Explained

- The *System.Windows.Forms* namespace contains most classes for developing GUIs.
- *Form1* inherits the *Form* class.
- *Text* is a property used to get/set the title of the form.
- An instance of *Form1* is created in *Main()*.
- The *Run()* function of the *Application* class is an argument to display the form on the screen.

Example: echo textbox

- Imported modules for GUI programs:

```
using System;
```

```
using System.Drawing;
```

```
using System.Windows.Forms;
```

Example: echo textbox

```
class MForm : Form {
    private Label text;

    public MForm() {
        Text = "TextBox";
        Size = new Size(250, 200);
        CenterToScreen();

        text = new Label();
        text.Parent = this;
        text.Text = "...";
        text.Location = new Point(60, 40);
        text.AutoSize = true;

        TextBox tbox = new TextBox();
        tbox.Parent = this;
        tbox.Location = new Point(60, 100);
        tbox.KeyUp += new KeyEventHandler(OnKeyUp);
    }
}
```


Example: echo textbox

```
void OnKeyUp(object sender, KeyEventArgs e) {
    TextBox tb = (TextBox) sender;
    this.text.Text = tb.Text;
}
}

// Main class
class MApplication {
    public static void Main() {
        Application.Run(new MForm());
    }
}
```

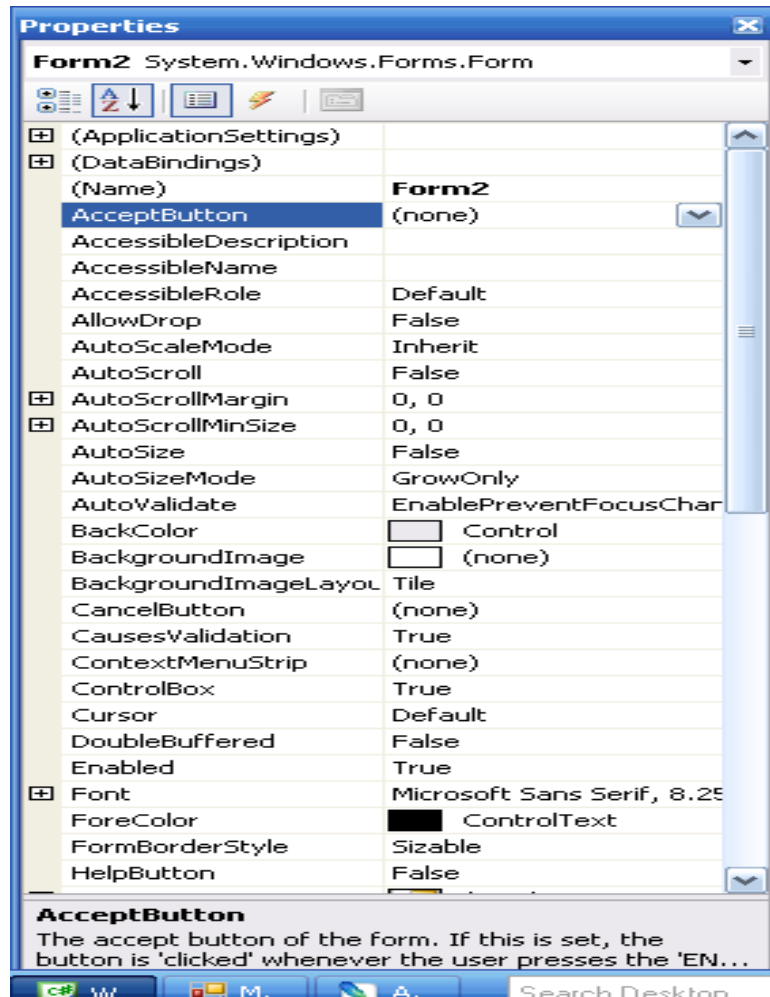
Discussion

- The main GUI library to import is `System.Windows.Forms`
- Our `MForm` class inherits from `Form`.
- The `MForm` method defines contents and positioning of the form.
- It also associates an event handler `OnKeyUp` to the textbox
- The `OnKeyUp` handler simply displays the text typed in so far.
- A standard `Main` method starts the application.

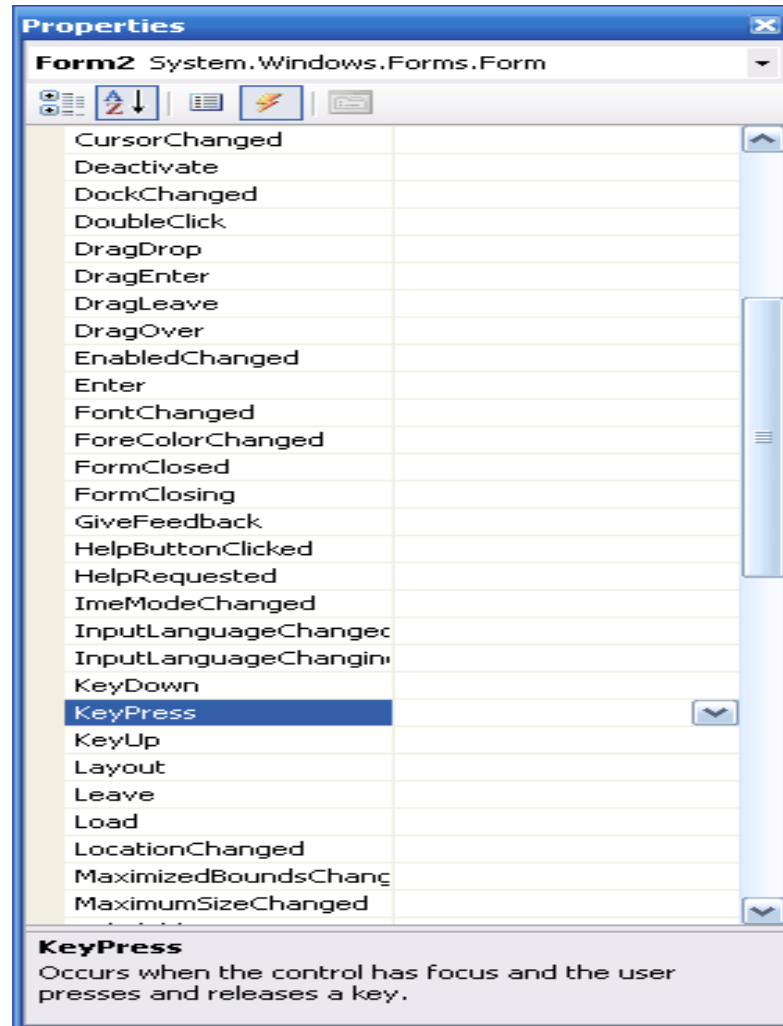
GUI creation in Visual Studio

- Most of the time you will use Visual Studio to automatically generate the code for a GUI.
- This way, all the boilerplate code is generated automatically.
- Only the worker code, such as event handlers, needs to be written explicitly.
- The best way to learn this is by familiarising yourself with Visual Studio, creating some simple forms.
- Here is just a small example, demonstrating the structure of the automatically generated code.

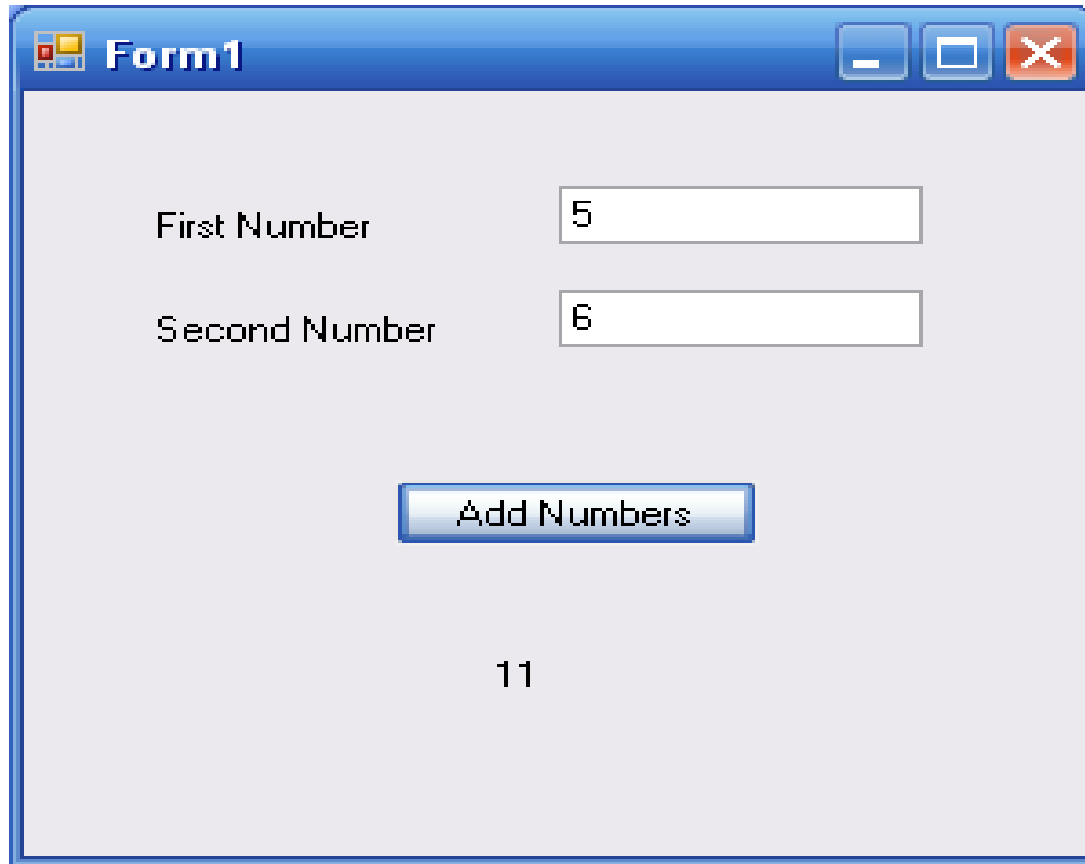
Form Properties



Form Events



Adding Numbers



Form1

First Number 5

Second Number 6

Add Numbers

11

Generated Code

```
using System;
using System.Drawing;
using System.Windows.Forms;

namespace WindowsFormsApplication1
{
    partial class Form1 : Form
    {
        private System.ComponentModel.IContainer
            components = null;

        protected override void Dispose(bool disposing)
        {
            if (disposing && (components != null))
            {
                components.Dispose();
            }
            base.Dispose(disposing);
        }
    }
}
```

Generated Code (cont'd)

```
public Form1 ()
{
    this.label1 = new System.Windows.Forms.Label();
    this.label2 = new System.Windows.Forms.Label();
    this.textBox1 = new System.Windows.Forms.TextBox();
    this.textBox2 = new System.Windows.Forms.TextBox();
    this.button1 = new System.Windows.Forms.Button();
    this.label3 = new System.Windows.Forms.Label();
    this.SuspendLayout();
    //
    // label1
    //
    this.label1.AutoSize = true;
    this.label1.Location = new System.Drawing.Point(33, 40);
    this.label1.Name = "label1";
    this.label1.Size = new System.Drawing.Size(78, 13);
    this.label1.TabIndex = 0;
    this.label1.Text = "First Number    ";
    //
    // label2
    //
    this.label2.AutoSize = true;
    this.label2.Location = new System.Drawing.Point(33, 76);
    this.label2.Name = "label2";
    this.label2.Size = new System.Drawing.Size(84, 13);
    this.label2.TabIndex = 1;
    this.label2.Text = "Second Number";
}
```


Generated Code (cont'd)

```
// textBox1
this.textBox1.Location = new System.Drawing.Point(147, 33);
this.textBox1.Name = "textBox1";
this.textBox1.Size = new System.Drawing.Size(100, 20);
this.textBox1.TabIndex = 2;
//
// textBox2
//
this.textBox2.Location = new System.Drawing.Point(147, 69);
this.textBox2.Name = "textBox2";
this.textBox2.Size = new System.Drawing.Size(100, 20);
this.textBox2.TabIndex = 3;
//
// button1
//
this.button1.Location = new System.Drawing.Point(102, 135);
this.button1.Name = "button1";
this.button1.Size = new System.Drawing.Size(100, 23);
this.button1.TabIndex = 4;
this.button1.Text = "Add Numbers";
this.button1.UseVisualStyleBackColor = true;
this.button1.Click += new System.EventHandler(this.button1_Click);
//
// label3
//
this.label3.AutoSize = true;
this.label3.Location = new System.Drawing.Point(126, 196);
this.label3.Name = "label3";
this.label3.Size = new System.Drawing.Size(35, 13);
this.label3.TabIndex = 5;
this.label3.Text = "";
```

Generated Code (cont'd)

```
// Form1
//
this.AutoScaleDimensions = new System.Drawing.SizeF(6F, 13F);
this.AutoScaleMode = System.Windows.Forms.AutoScaleMode.Font;
this.ClientSize = new System.Drawing.Size(292, 266);
this.Controls.Add(this.label3);
this.Controls.Add(this.button1);
this.Controls.Add(this.textBox2);
this.Controls.Add(this.textBox1);
this.Controls.Add(this.label2);
this.Controls.Add(this.label1);
this.Name = "Form1";
this.Text = "Form1";
this.Load += new System.EventHandler(this.InitializeComponent);
this.ResumeLayout(false);
this.PerformLayout();

}
```

Generated Code (cont'd)

```
private System.Windows.Forms.Label label1;  
private System.Windows.Forms.Label label2;  
private System.Windows.Forms.TextBox textBox1;  
private System.Windows.Forms.TextBox textBox2;  
private System.Windows.Forms.Button button1;  
private System.Windows.Forms.Label label3;  
  
// event handlers  
private void InitializeComponent(object sender, EventArgs e)  
{  
    // put initialization code here  
}  
  
private void button1_Click(object sender, EventArgs e)  
{  
    string inValue1, inValue2;  
    double val1, val2, result;  
  
    inValue1 = textBox1.Text;  
    inValue2 = textBox2.Text;  
    val1 = double.Parse(inValue1);  
    val2 = double.Parse(inValue2);  
  
    result = val1 + val2;  
    label3.Text = result.ToString();  
}  
}
```

Generated Code (cont'd)

```
public class MainClass {  
    static public void Main ()  
    {  
        Application.Run (new Form1());  
    }  
}
```

Code Generated by Visual Studio

```
namespace WindowsFormsApplication1
{
    partial class Form1 : Form
    {
        /// <summary>
        /// Required designer variable.
        /// </summary>
        private System.ComponentModel.IContainer components = null;

        /// <summary>
        /// Clean up any resources being used.
        /// </summary>
        /// <param name="disposing">>true if managed resources should be disposed; otherwise, false.</param>
        protected override void Dispose(bool disposing)
        {
            if (disposing && (components != null))
            {
                components.Dispose();
            }
            base.Dispose(disposing);
        }

        #region Windows Form Designer generated code

        /// <summary>
        /// Required method for Designer support - do not modify
        /// the contents of this method with the code editor.
        /// </summary>
```

Cont. Code Generated by Visual Studio

```
private void InitializeComponent()
{
    this.label1 = new System.Windows.Forms.Label();
    this.label2 = new System.Windows.Forms.Label();
    this.textBox1 = new System.Windows.Forms.TextBox();
    this.textBox2 = new System.Windows.Forms.TextBox();
    this.button1 = new System.Windows.Forms.Button();
    this.label3 = new System.Windows.Forms.Label();
    this.SuspendLayout();
    //
    // label1
    //
    this.label1.AutoSize = true;
    this.label1.Location = new System.Drawing.Point(33, 40);
    this.label1.Name = "label1";
    this.label1.Size = new System.Drawing.Size(78, 13);
    this.label1.TabIndex = 0;
    this.label1.Text = "First Number    ";
}
```

Cont. Code Generated by Visual Studio

```
//  
// label2  
//  
this.label2.AutoSize = true;  
this.label2.Location = new System.Drawing.Point(33, 76);  
this.label2.Name = "label2";  
this.label2.Size = new System.Drawing.Size(84, 13);  
this.label2.TabIndex = 1;  
this.label2.Text = "Second Number";  
//  
// textBox1  
//  
this.textBox1.Location = new System.Drawing.Point(147, 33);  
this.textBox1.Name = "textBox1";  
this.textBox1.Size = new System.Drawing.Size(100, 20);  
this.textBox1.TabIndex = 2;  
//  
// textBox2  
//  
this.textBox2.Location = new System.Drawing.Point(147, 69);  
this.textBox2.Name = "textBox2";  
this.textBox2.Size = new System.Drawing.Size(100, 20);  
this.textBox2.TabIndex = 3;
```

Cont. Code Generated by Visual Studio

```
//  
// button1  
//  
this.button1.Location = new System.Drawing.Point(102, 135);  
this.button1.Name = "button1";  
this.button1.Size = new System.Drawing.Size(100, 23);  
this.button1.TabIndex = 4;  
this.button1.Text = "Add Numbers";  
this.button1.UseVisualStyleBackColor = true;  
this.button1.Click += new  
System.EventHandler(this.button1_Click);  
//  
// label3  
//  
this.label3.AutoSize = true;  
this.label3.Location = new System.Drawing.Point(126, 196);  
this.label3.Name = "label3";  
this.label3.Size = new System.Drawing.Size(35, 13);  
this.label3.TabIndex = 5;  
this.label3.Text = "label3";
```


Cont. Code Generated by Visual Studio

```
// Form1
//
this.AutoScaleDimensions = new System.Drawing.SizeF(6F, 13F);
this.AutoScaleMode = System.Windows.Forms.AutoScaleMode.Font;
this.ClientSize = new System.Drawing.Size(292, 266);
this.Controls.Add(this.label3);
this.Controls.Add(this.button1);
this.Controls.Add(this.textBox2);
this.Controls.Add(this.textBox1);
this.Controls.Add(this.label2);
this.Controls.Add(this.label1);
this.Name = "Form1";
this.Text = "Form1";
this.Load += new System.EventHandler(this.Form1_Load);
this.ResumeLayout(false);
this.PerformLayout();

}

#endregion

private System.Windows.Forms.Label label1;
private System.Windows.Forms.Label label2;
private System.Windows.Forms.TextBox textBox1;
private System.Windows.Forms.TextBox textBox2;
private System.Windows.Forms.Button button1;
private System.Windows.Forms.Label label3;
}
}
```

Event Handler

```
private void button1_Click(object sender, EventArgs e)
{
    string inValue1, inValue2;
    double val1, val2, result;

    inValue1 = textBox1.Text;
    inValue2 = textBox2.Text;
    val1 = double.Parse(inValue1);
    val2 = double.Parse(inValue2);

    result = val1 + val2;
    label3.Text = result.ToString();
}
```

Code

Since you use Visual C# to develop this form, Visual Studio will generate the basic coding for all the items that you place in the form.

You have to write your own code when you want to perform any *operations* on the items, i.e. to handle any events, change the properties etc.

Exercise

- Create a form with several buttons, text boxes, change the properties and define different events associated with the buttons.

Useful Links

Various C# tutorials:

www.functionx.com/vcsharp/index.htm

- Mono C# Winforms Tutorial:

<http://zetcode.com/tutorials/monowinformstutorial/>