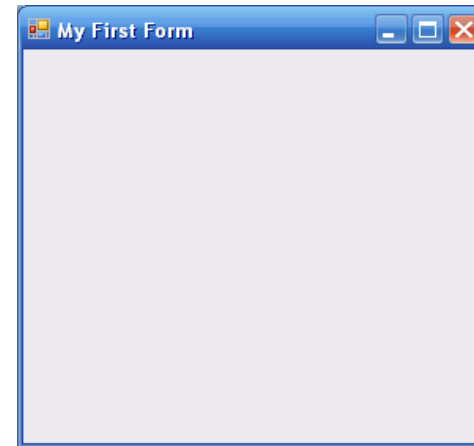# Industrial Programming

Lecture 8: 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.

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.
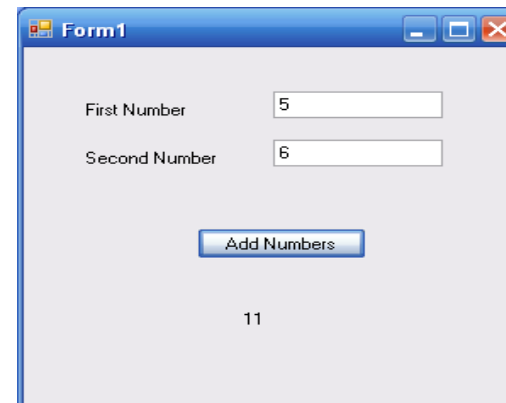
Form Properties
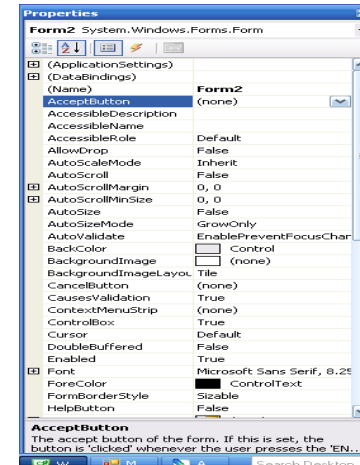
Form Events
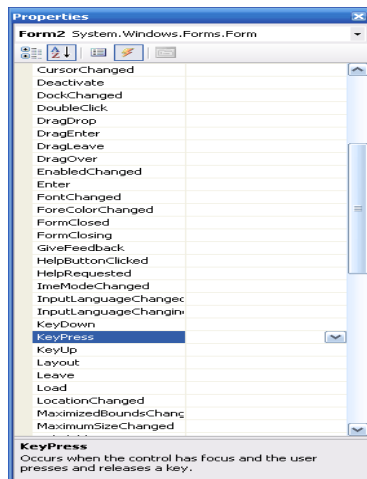
Adding Numbers

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 intialization 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

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/