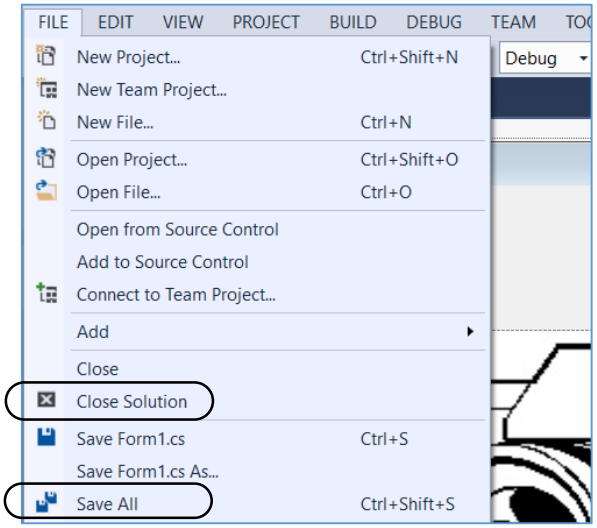
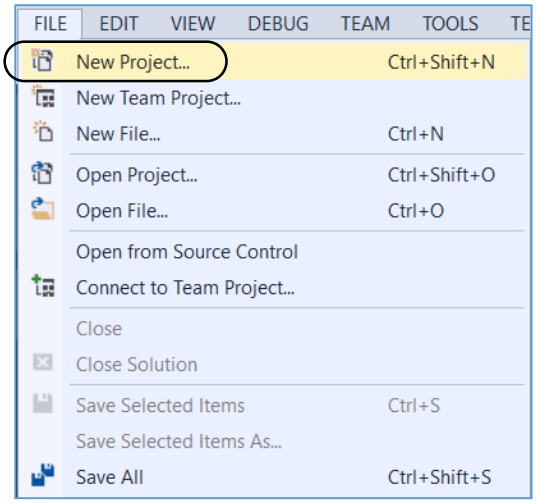
2 Calculator

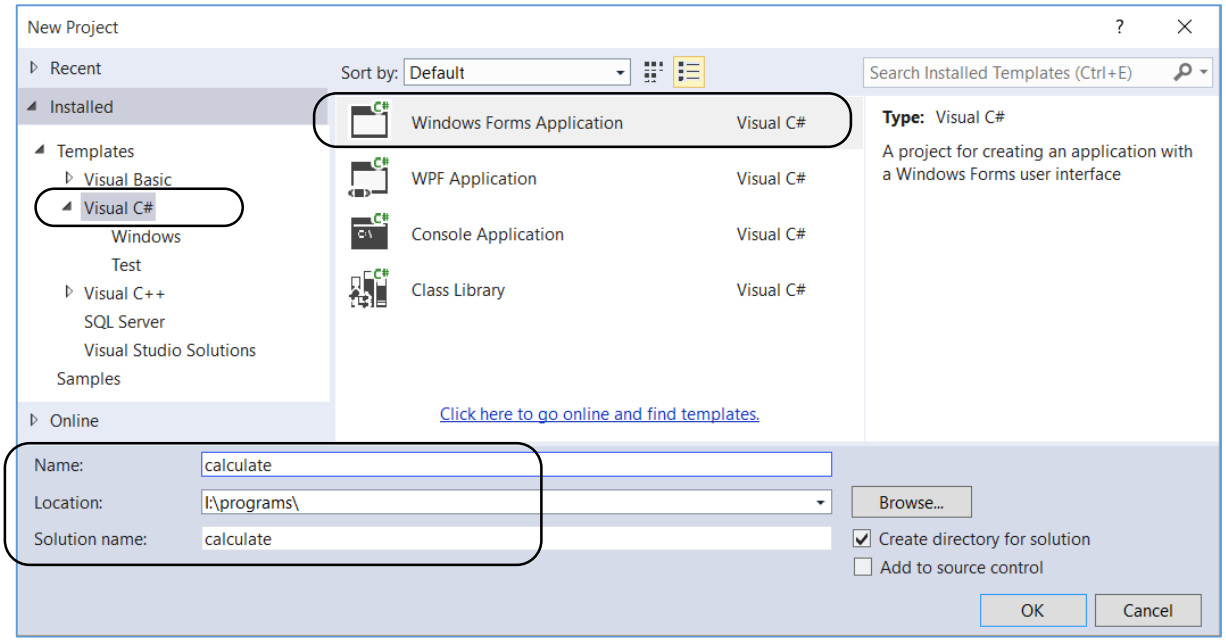
Our next program will allow the user to input two numbers, then carry out basic arithmetic calculations.

Start a new project. If you have just completed the previous program, go to the ***File*** menu and select '***Save All***', then '***Close Solution***'. You can now select '***New*** / ***Project***':





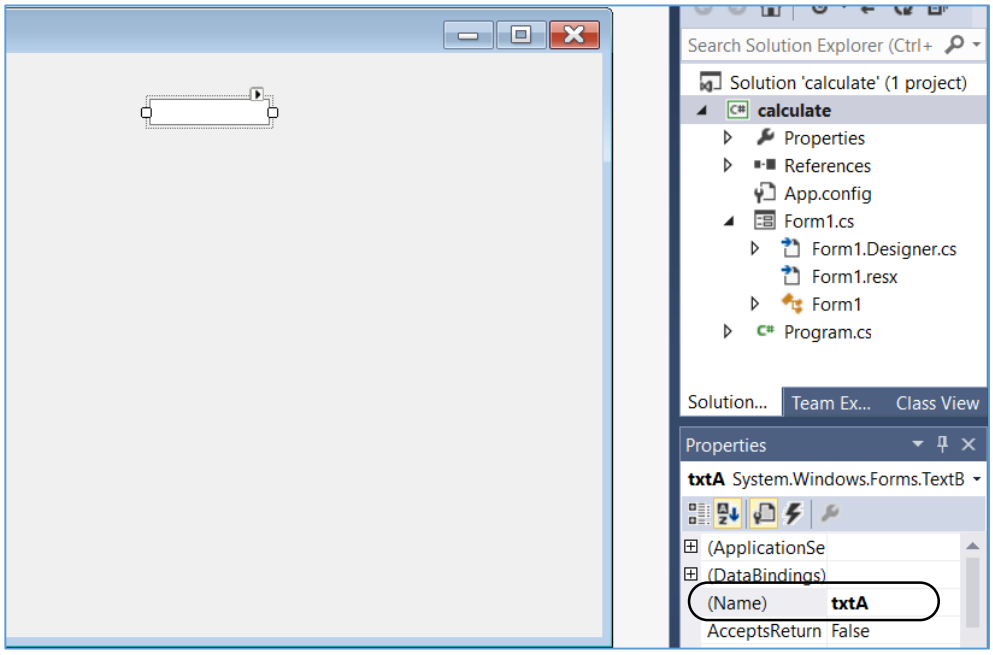
Select '***Visual C#*** / ***Windows Forms Application***' and give the name '***calculate***' for the program:



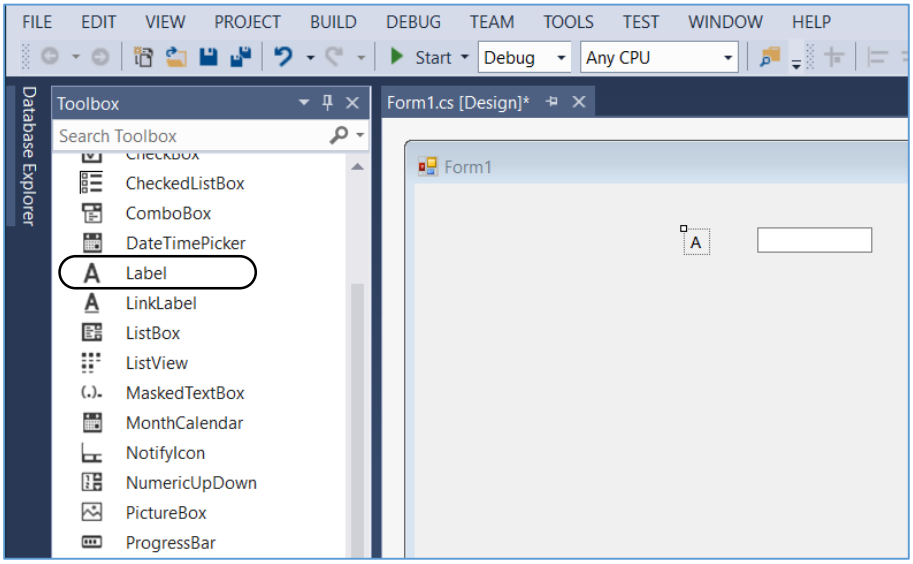
Click '***OK***' and a blank ***Form1*** screen will appear. Drag the edges of the form to fill the program window.

Select the ***TextBox*** component in the Toolbox. Drag the mouse to create a TextBox on Form1. When the program runs, the user will be able to type a number into this box.

Go to the ***Properties*** window, and change the name of the TextBox to ***txtA***. This will help to remind us that the number entered into this box is to be stored as the number variable '***A***'.

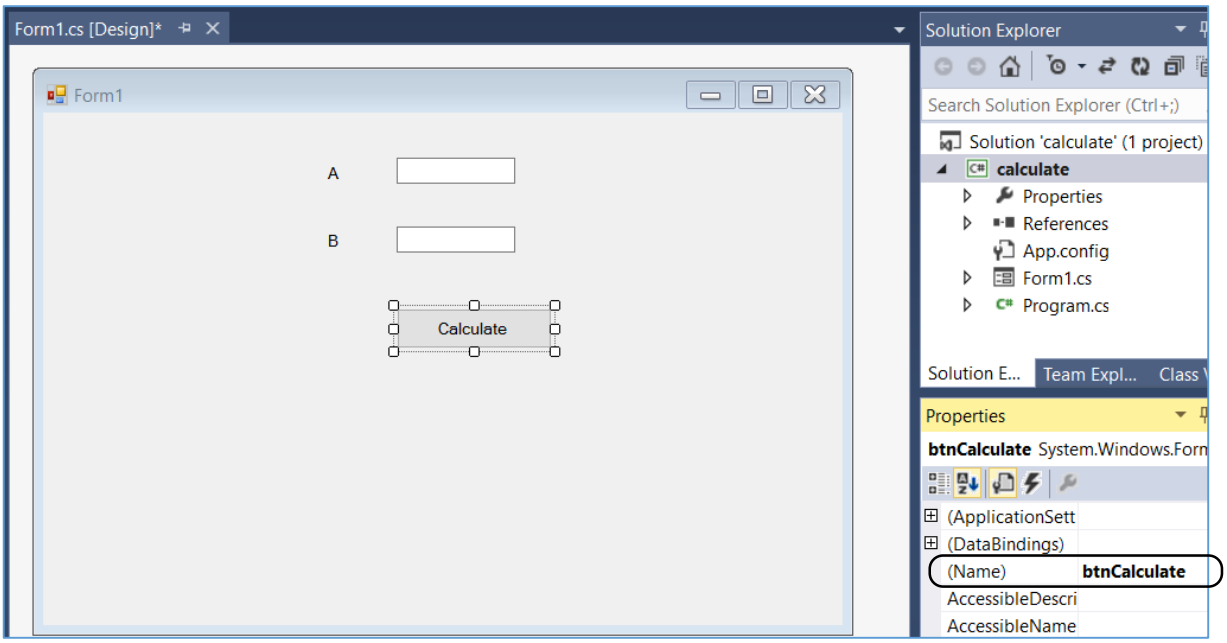


Select the ***Label*** component in the Toolbox, and drag the mouse to add a label alongside the text box. Change the ***Text property*** of the label to '***A***'.



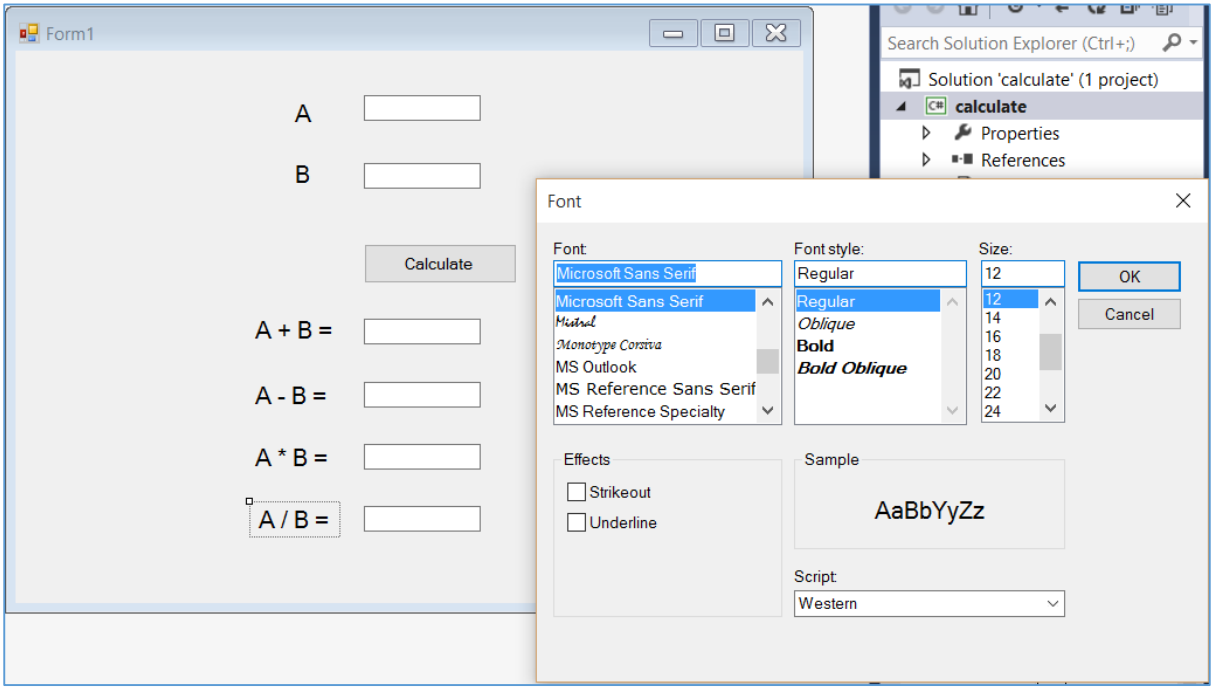
Add a second ***TextBox*** and ***Label*** component in the same way. Give the second TextBox the name ***txtB***, and set the Text property of the second label to '***B***'.

Add a ***Button***. Set the ***Text*** property to '***Calculate***', and change the name to ***btnCalculate***.



Continue in the same way to add TextBoxes which will display the results when the two numbers ***A*** and ***B*** are added, subtracted, multiplied and divided. Set the names of the TextBoxes to be:

txtAdd, ***txtSubtract***, ***txtMultiply***, ***txtDivide***



You may find that the label text is too small. You can adjust the font size by selecting each label and clicking on the '***Font***' property. A font selection window will open.

That completes the user interface design. We are now going to add the program code to carry out the calculations.

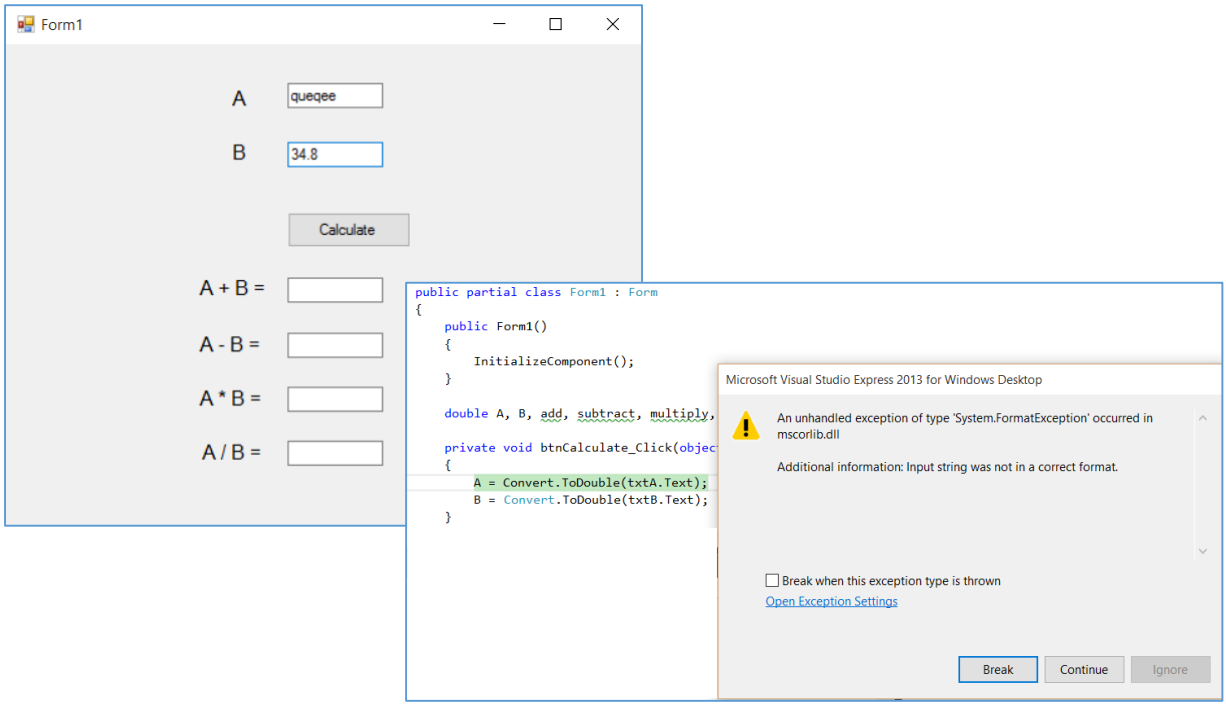
Double-click the '***Calculate***' button. The program code window will open, with an empty button-click method created for you. Add the lines of code outlined below:

```
namespace calculate
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
        }

        double A, B, add,subtract, multiply, divide;

        private void btnCalculate_Click(object sender, EventArgs e)
        {
            A = Convert.ToDouble(txtA.Text);
            B = Convert.ToDouble(txtB.Text);
        }
    }
}
```

We begin by setting up some '***double***' variables to hold decimal numbers. ***A*** and ***B*** will be the input numbers, and the other variables '***add***', '***subtract***', '***multiply***' and '***divide***' will hold the answers to the calculations.

Inside the ***btnCalculate_click*** procedure, add the lines of code which will take the text typed into the TextBoxes and convert these into the decimal number format required for our variables A and B.

Build the program and run it. If correct decimal numbers are typed into A and B and the '***Calculate***' button is clicked, nothing yet happens. However, if an incorrect number format is entered, you will find that the program crashes:

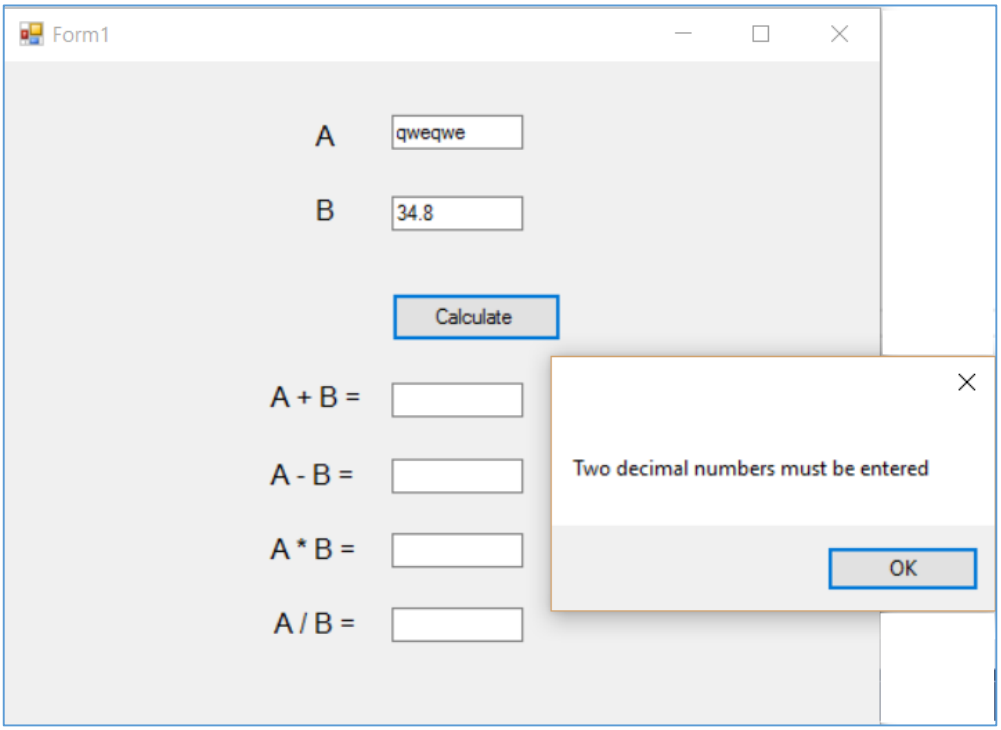


We want our program to be more helpful, and give the user a chance to correct their mistake and continue with the calculation. To do this, we add a ***TRY … CATCH*** structure to the program.

```
    double A, B, add,subtract, multiply, divide;

     private void btnCalculate_Click(object sender, EventArgs e)
     {
        try
        {
            A = Convert.ToDouble(txtA.Text);
            B = Convert.ToDouble(txtB.Text);
        }
        catch
        {
            MessageBox.Show("Two decimal numbers must be entered");
        }
     }
}
```

The program will attempt to convert the TextBox entries into decimal numbers, but if it cannot do this then we will let the program display a message: '***Two decimal numbers must be entered***'.

Add lines of program to the ***btnCalculate_click*** procedure, as shown above, then run the program.



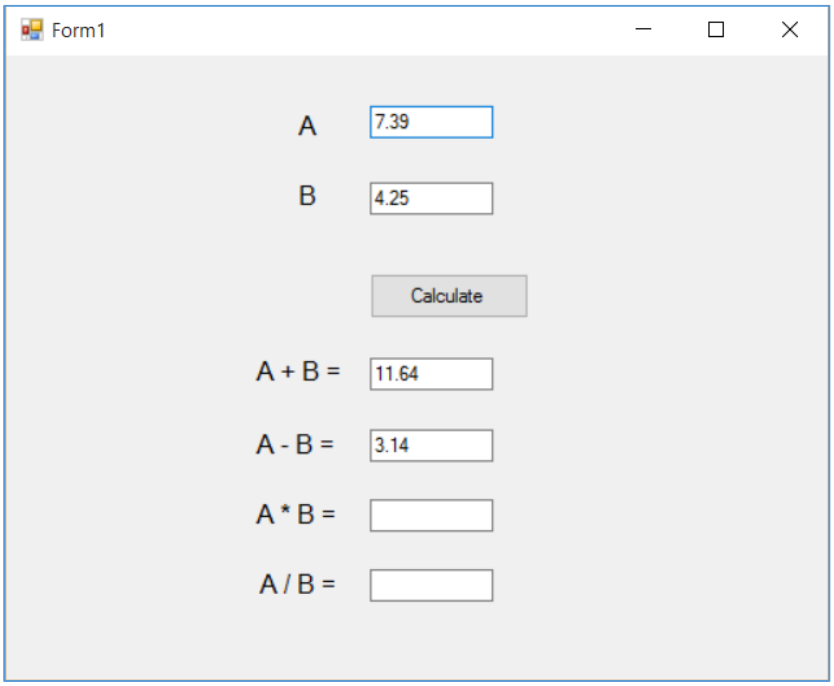
An incorrect entry will now cause the more helpful message to appear, and the user will be able to edit the incorrect data without needing to restart the program.

The only thing left to do now is to calculate and display the results.

Add lines to the ***btnCalculate_click*** procedure to calculate the variables '***add***' and '***subtract***', and display these in the TextBoxes '***txtAdd***' and '***txtSubtract***'.

```
private void btnCalculate_Click(object sender, EventArgs e)
{
    try
    {
        A = Convert.ToDouble(txtA.Text);
        B = Convert.ToDouble(txtB.Text);
        add = A + B;
        txtAdd.Text = Convert.ToString(add);
        subtract = A - B;
        txtSubtract.Text = Convert.ToString(subtract);
    }
    catch
    {
        MessageBox.Show("Two decimal numbers must be entered");
    }
}
```

Run the program, and check that correct results are obtained for adding and subtracting the numbers input.



Complete the program by adding lines of code to carry out multiplication and division.