C# .Net Programming: A graphical approach
Class 2

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Flow control structures

- If … else
- while

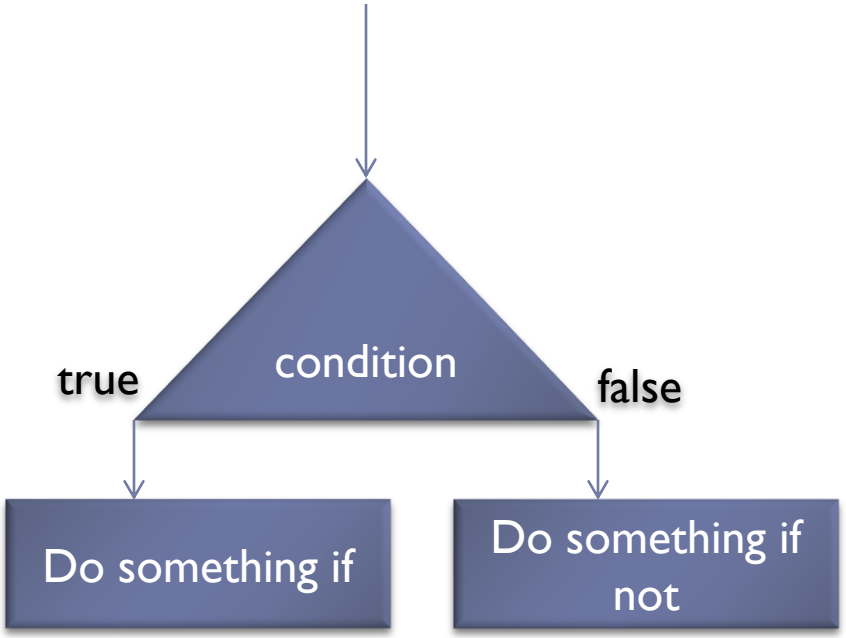
Flow control structures: **if…else**

The flow control structure **if…else** allow the programmer to execute some instructions while others are skipped according to the evaluation of a condition.

The syntax for the if…else in C# is as follows:

```
 if (condition)
{
 //Do something if
}

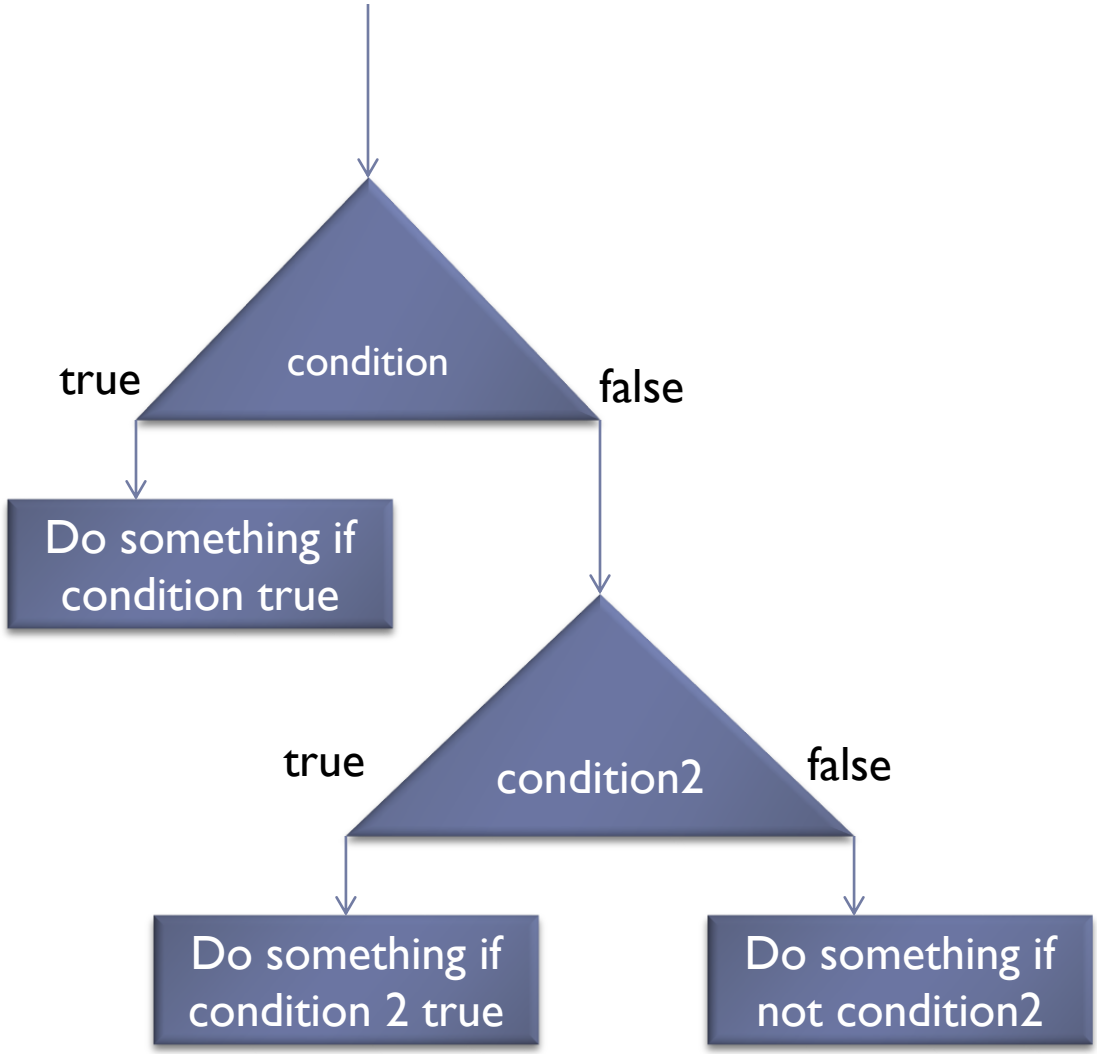
if (condition)
{
//Do something if
}
else
{
  //Do something if not
}
```



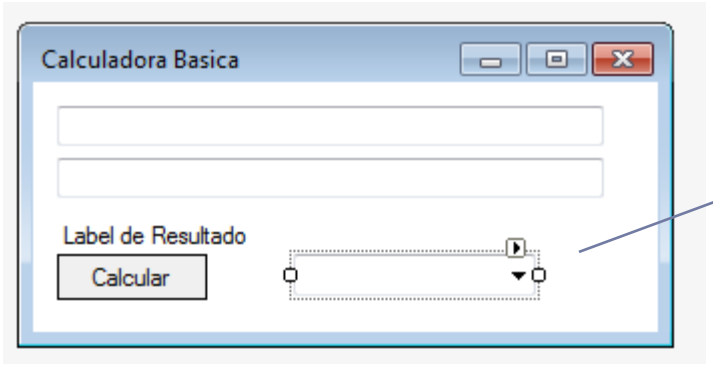
Nested If…else

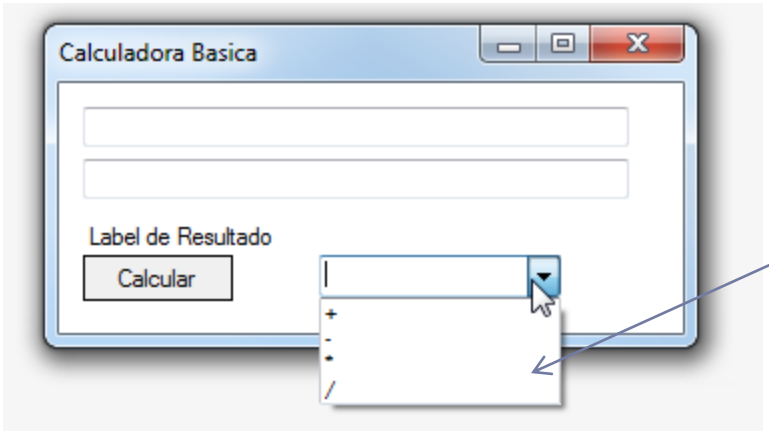
```
 if (condition)
{
    //Do something if condition true
}
else
{
    if (condicion2)
    {
        //Do something if condition2 true
    }
    else
    {
        //Do something if not condition and not condition2
    }
}
```

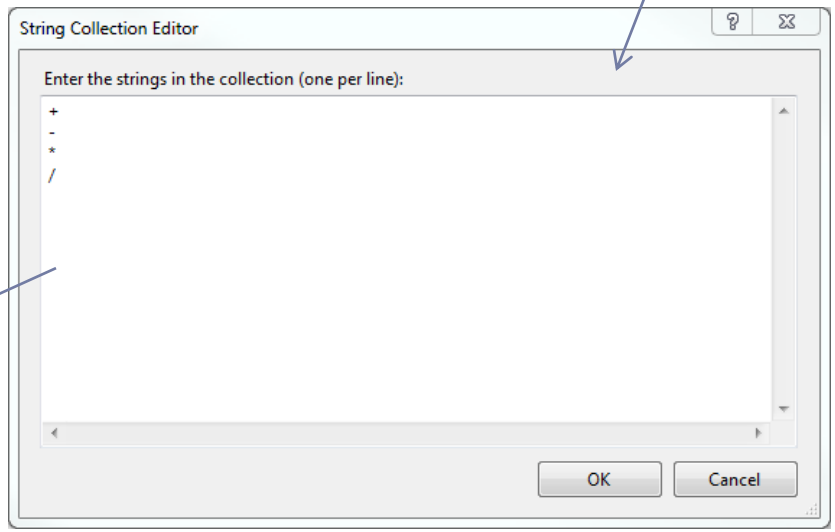
```
if (condition)
{
    //Do something if condition true
}
else if (condition2)
{
    //Do something if condition2 true
}
else
{
 //Do something if not condition and not condition2
}
```


condition
true
false
Do something if condition true
condition2
true
false
Do something if condition 2 true
Do something if not condition2

Using the project we already have add a **ComboBox,** Now add some items inside it. This combobox will help us understand how the conditional works **if…else**







Add this code to the click event of the button

```
private void button_Calcular_Click(object sender, EventArgs e)
{
      //Usamos la propiedad Text de la instancia comboBox1 de la clase ComboBox
      //para accesar al valor seleccionado (esto no es robusto pero sirve para nuestro ejemplo)
      String operador = this.comboBox1.Text;
      int resultado = 0;
      int valor1 = 0;
      int valor2 = 0;

      //Obtenemos los valores de los TextBox's
      valor1 = Convert.ToInt32(this.textBox_Val1.Text);
      valor2 = Convert.ToInt32(this.textBox_Val2.Text);

      if (operador == "+")
      {//SUMA
       resultado = valor1 + valor2;
      }
      else if (operador == "-")
      {//RESTA
       resultado = valor1 - valor2;
      }
      else if (operador == "*")
      {//MULTIPLICACION
       resultado = valor1 * valor2;
      }
      else if (operador == "/")
      {//DIVISION
       resultado = valor1 / valor2;
      }
      else
      {//SIN OPERADOR
       MessageBox.Show("Selecciona un operador");
      }

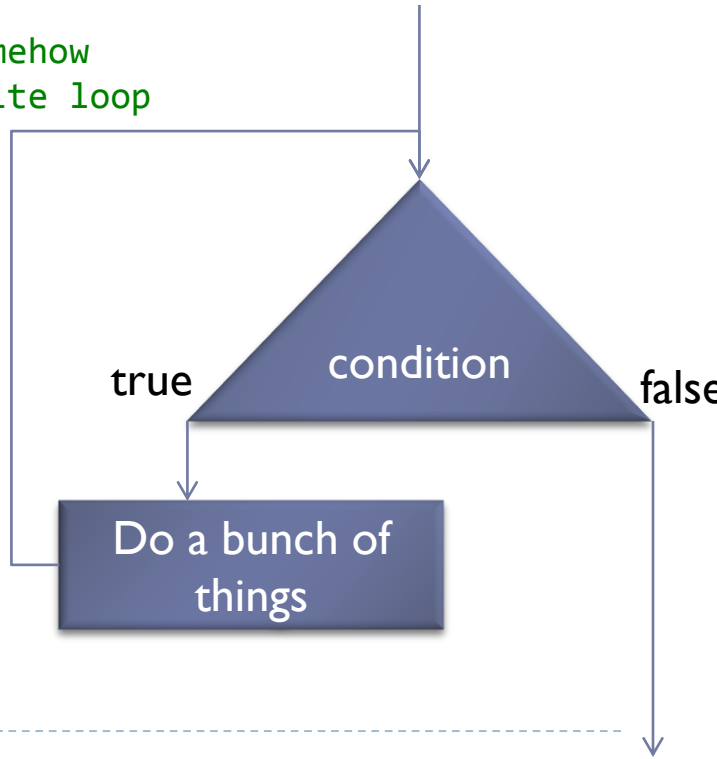
      //Colocamos el resultado en el Label
      this.label_Resultado.Text = resultado.ToString();
}
```

2.1-CalculadoraBasica

Flow control structure: **while**

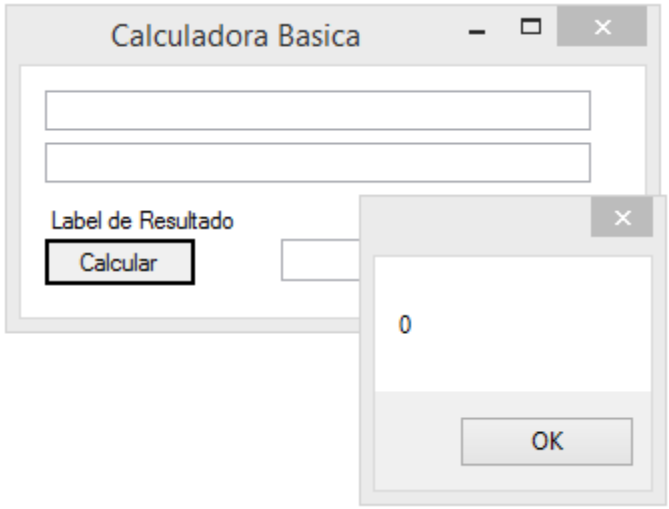
The flow control structure **while** is used to repeat a set of code sentences while the scape condition remains true.
The syntax is as follows:

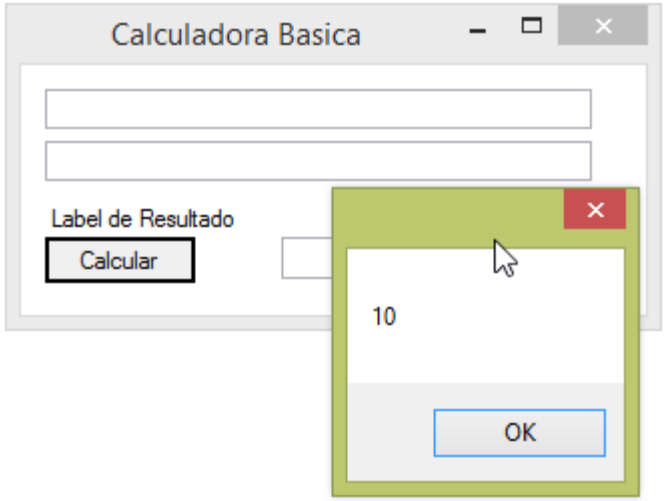
```
 while (condition)
{
   //Do something while the conditions remains true
   //WATC OUT: The condition must change to false somehow
   //in the future, otherwise you will have an infinite loop
}
```



Using the project we already have, add the next block of code to the Click event

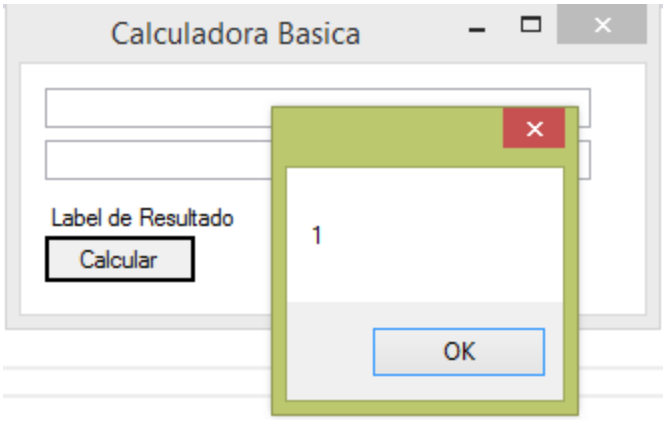
```
int i = 0;
MessageBox.Show(i.ToString());
while (i < 10)
{
   i++;
}
MessageBox.Show(i.ToString());
```

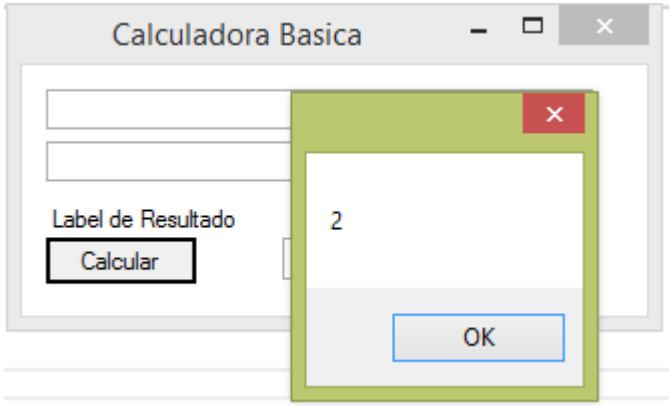




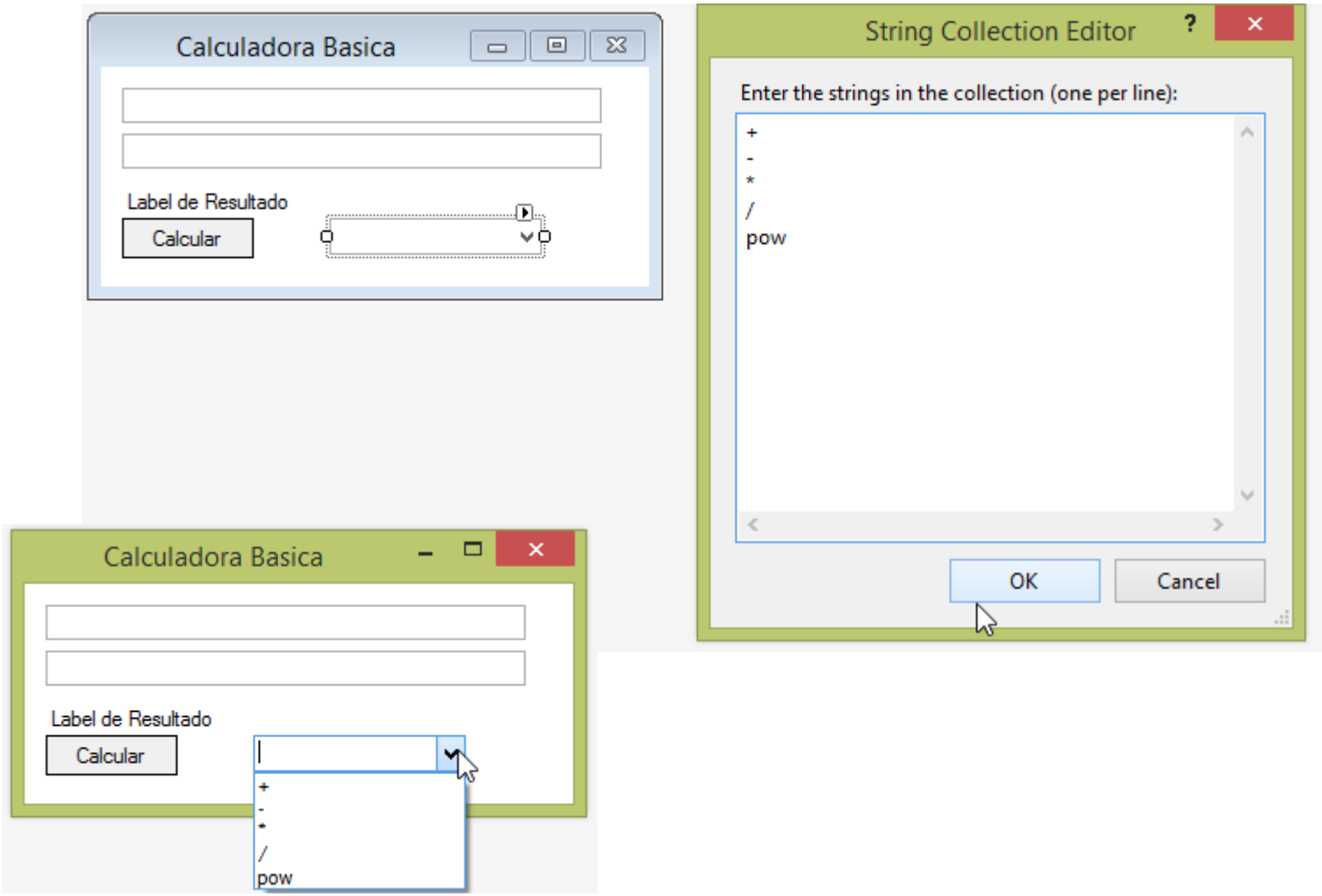
The block of code inside the next while loop will be executed twice according to the condition

```
int i = 0;
while (i < 2)
{
   i++;
   MessageBox.Show(i.ToString());
}
```



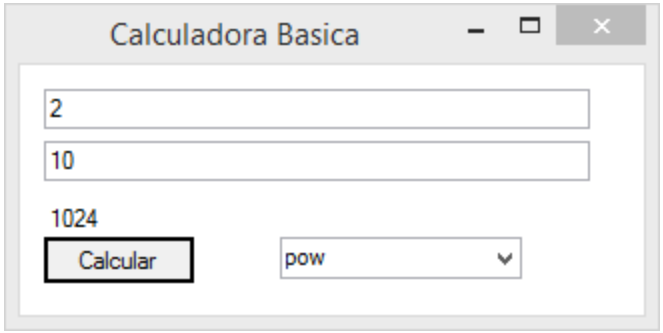


Add the **pow** item to the items collection in the ComboBox



Using the code we already have, now add the next block to the series of else…if sentences. You should be able to perform multiplications.

```
else if(operador == "pow")
{//POTENCIA
    int i = 1;
    resultado = valor1;
    while(i < valor2)
    {//Repetir tantas veces como valor2
        resultado = resultado * valor1;
        i++;
    }
}
```



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            if (operador == "+")
            {//SUMA
                resultado = valor1 + valor2;
            }
            else if (operador == "-")
            {//RESTA
                resultado = valor1 - valor2;
            }
            else if (operador == "*")
            {//MULTIPLICACION
                resultado = valor1 * valor2;
            }
            else if (operador == "/")
            {//DIVISION
                resultado = valor1 / valor2;
            }
            else if(operador == "pow")
            {//POTENCIA
                int i = 1;
                resultado = valor1;
                while(i < valor2)
                {//Repetir tantas veces como valor2
                    resultado = resultado * valor1;
                    i++;
                }
            }
            else
            {//SIN OPERADOR
                MessageBox.Show("Selecciona un operador");
            }

            //Colocamos el resultado en el Label
            this.label_Resultado.Text = resultado.ToString();
}
```

2.2-CalculadoraBasica

Homework

1. When the user press a button make a while loop to be executed 10 times, perform a sum inside this loop in order to get something like
   1 + 2 + 3 + 4 + ….. + 10 = 55
   Display the results in a Label of MessageBox
2. Same as the previous bullet, but now multiplying instead of adding.
3. The user should be able to enter a number N and in the same way as the previous bullet, but now multiplying all the numbers until you reach N iterations. If what the user enters is not a number then pop up an error.
4. In the previous bullet, maybe without knowing about it, you developed an operation called factorial, now add a new item named "!" to the ComboBox and update the code to perform this new operation.
5. As the first bullet says, prove that the next formula is correct.

$$\sum_{k=1}^{n} k = 1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}$$

   This is that the **sum from 1 to n** is the same as $\frac{n(n+1)}{2}$. You can easily program a while loop to perform the sum, a block of code to perform the formula and then compare the results.