

Year 12 : Visual Basic Tutorial.

STUDY THIS

Loops.

A **Loop** is a section of code that needs to be repeated a number of times. The posh term for this repetition is **ITERATION**.

There are two situations...

- A. You know how many times to repeat the loop
(Use a **For...Next** loop)
- B. The loop is repeated until a certain condition is met
(Use a **Do While** or **Do Until** loop)

A : For...Next Loops

An integer variable is needed to count the number of times the loop is run.

The syntax is...

```
For variable = start value to end value
    statements to be repeated
Next [variable]
```

HANDS ON

- [1] Create a new Windows Application project.

Place on the Form a Listbox and a Button.
(Leave them called **Listbox1** and **Button1**)

Add the event handler for the Click event of Button1:

```
Private Sub Button1_Click(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles Button1.Click

    Const Num As Integer = 10

    Dim i As Integer

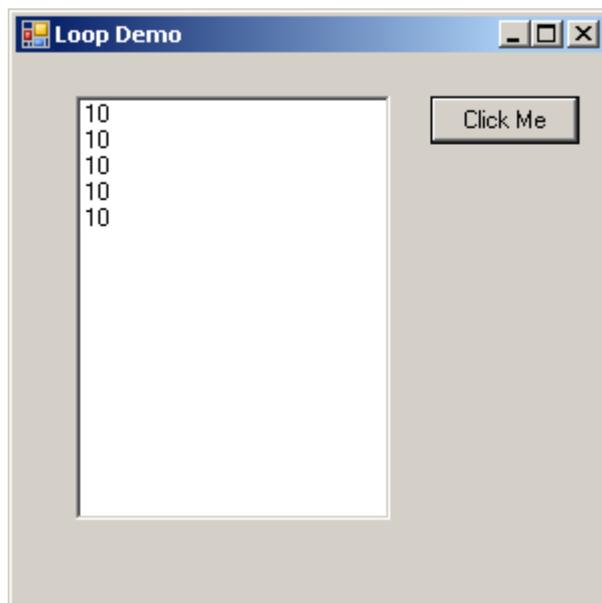
    For i = 1 To 5
        ListBox1.Items.Add(Num)
    Next

End Sub
```

The variable **i** is called the **control variable** for the loop - it **MUST** be an integer variable and, basically it counts from 1 to 5.

The loop adds the number 10 to the Listbox 5 times.

Run the program and click the button to see this.

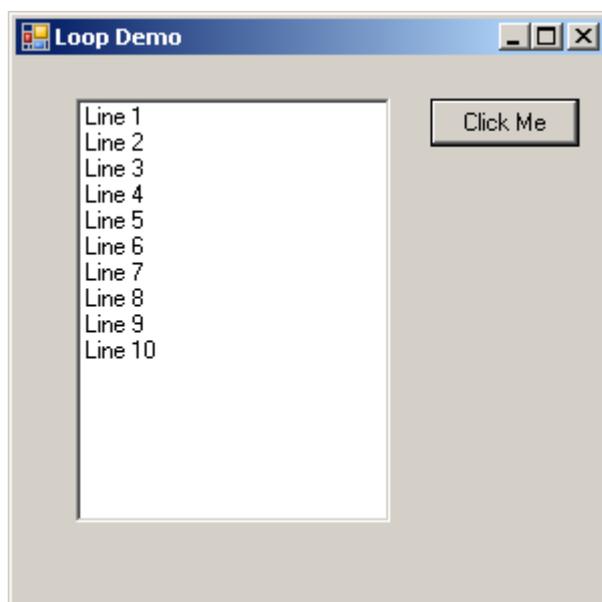


[2] Change the program so the name 'Tom' appears 3 times in the ListBox.

[3] You can also use the value of the **control variable** inside the loop...

...See if you can output all the numbers from 1 to 10 inside the ListBox.

...and you should even be able to output this...



[4] For even more complex loops, try using the **Step** instruction...

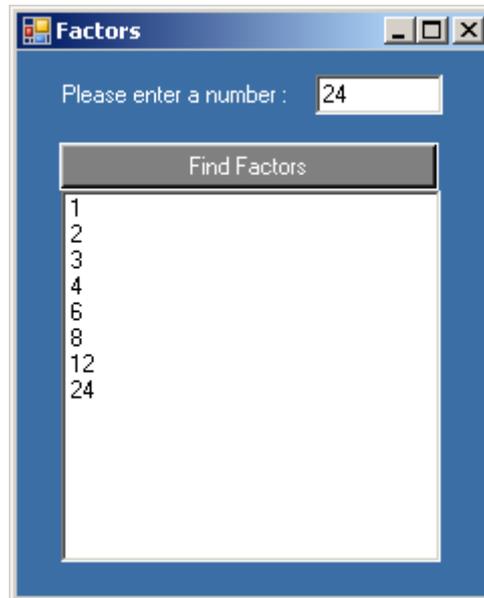
```
Dim i As Integer  
  
For i = 0 To 50 Step 5  
    ListBox1.Items.Add("Line " & i)  
Next
```

HANDS
ON

Visual Basic Challenges 4

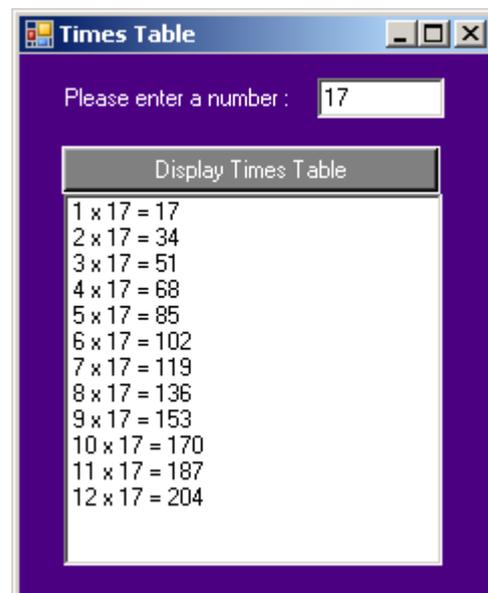
- [1] Create a new Windows Application project called 'Factors'.

Write a program that allows the user to enter an integer, and find all the factors of that integer. You need to do this by checking every number between 1 and the input number to see if there is a remainder when they are divided.

**HINTS :**

- Remember to clear the ListBox of items.
- To find whether **R** is a factor of a number **N**, you need to check there is no remainder when **N** is divided by **R**.
i.e. if $N \text{ Mod } R = 0$ then **R** is a factor of **N**.

- [2] Write an application that allows the user to input a number, and the times table (up to 12) is displayed.



**STUDY
THIS**

Do Loops

(Loops that are repeated until a condition is TRUE)

The syntax is:

```
Do While [condition]
    statements to be repeated
Loop
```

or...

```
Do
    statements to be repeated
Loop Until [condition]
```

In the first case, the condition is checked BEFORE the loop (so the loop may never be executed)...

In the second case, the condition is checked AFTER the loop (so the loop will be executed at least once).

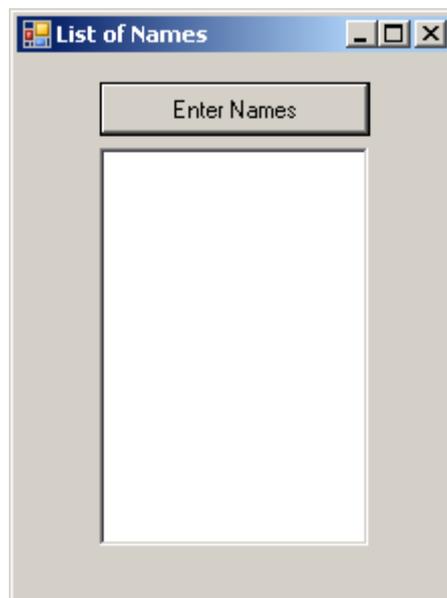
**HANDS
ON**

Example.

You are going to write a program that allows the user to input a list of names, adding each one to a list, until the name 'XXX' is input.

This is an important example of a **ROGUE VALUE** - a data value that tells the computer that a sequence of data input has finished. The rogue value must be a value that would not normally occur.

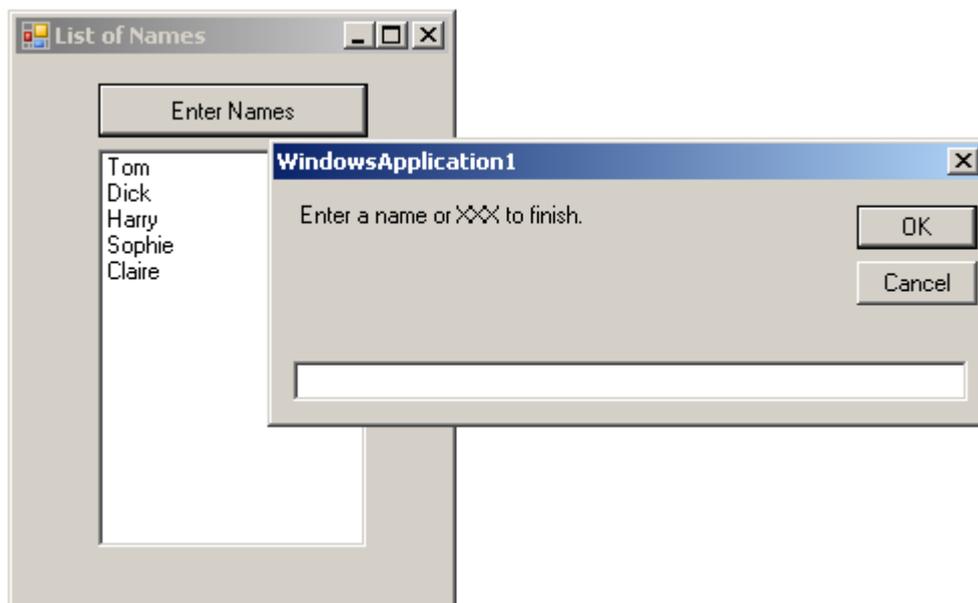
- [1] Create a new application, and place a `ListBox(lstNames)` and a `Button(btnNames)` as shown...



- [2] Enter the Event handler for the Click event of the button btnNames as follows...

```
Private Sub btnNames_Click(ByVal sender As System.Object,  
ByVal e As System.EventArgs) Handles btnNames.Click  
  
    Dim Name As String  
  
    'Make sure the List is empty  
    lstNames.Items.Clear()  
  
    'Enter the names  
    Do While Name <> "XXX"  
        Name = InputBox("Enter a name or XXX to finish.")  
        If Name <> "XXX" Then lstNames.Items.Add(Name)  
    Loop  
End Sub
```

Note that as many names can be input as necessary until the **rogue value** of "XXX" is entered.



- [3] Run the program and add names. Use the rogue value to end the program.

Summary

A **Loop** is a section of program code that is repeated a number of times.

If the number of iterations is known, use a **FOR...NEXT** loop.

If the loop is to be repeated until a condition is TRUE, use a **DO...WHILE** or **DO...UNTIL** loop.

A **Rogue Value** is an item of data that is used to indicate the end of a sequence of data.

HANDS ON

Visual Basic Challenges 4 (cont'd)

[3] Write a program that asks the user to enter a password.



The user can try entering as many passwords as they like, but only when the password "FRED" is entered a message is displayed saying "WELCOME".



RESEARCH NEEDED

[4] Write a program that allows the user to enter a sequence of names. Only those names beginning with the letter 'G' are added to a list. Use a suitable rogue value to end the program.

