Introduction

‘String Handling’ is the name given to the problem of processing text and characters. Many powerful functions have been built into VB in order to make it easier for programmers to work with text strings. In the next two projects, we will take a brief look at the interesting and challenging task of processing these strings.

Objectives

**Program Purpose**

• Count the number of words and alphabetic characters in a sentence.

**Learning Goals**

• To continue use of simple FOR...NEXT loops
• To use the functions MID, LEN and TRIM
• To introduce the concept of string handling

Design Notes

As usual, when creating the command buttons and other controls, set the font and formatting for the first one, then copy and paste the other controls. Unless you are using an array, answer ‘No’ when asked if you want to create one.

Interface

Create the interface as shown below.
Use 4 command buttons, 1 text box and 5 labels.
Names of Objects

<table>
<thead>
<tr>
<th>Type of Object</th>
<th>Number</th>
<th>Names of Objects</th>
<th>Simple Initial Properties of Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>1</td>
<td>frmTextProcessor</td>
<td>Caption = &quot;Text Processor 1&quot;</td>
</tr>
<tr>
<td>Text Box</td>
<td>1</td>
<td>txtInput</td>
<td>Font = Bold, 10</td>
</tr>
<tr>
<td>Labels</td>
<td>5</td>
<td>Label1, Label2, Label 3, lblCount, lblCharsl</td>
<td>Font = Bold, 12</td>
</tr>
<tr>
<td>Command Buttons</td>
<td>4</td>
<td>cmdCountWords, cmdCountLetters, cmdClear, cmdExit</td>
<td>Font = Bold, 12, Captions = Count &amp;Words, Count &amp;Letters, &amp;Clear, &amp;Exit</td>
</tr>
</tbody>
</table>

Further Initial Properties of Objects

<table>
<thead>
<tr>
<th>Object</th>
<th>Property</th>
<th>Initial Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>frmTextProcessor</td>
<td>Startup Position</td>
<td>2 – Center Screen</td>
</tr>
<tr>
<td>txtInput</td>
<td>Text</td>
<td>&quot;&quot;</td>
</tr>
<tr>
<td></td>
<td>Multiline</td>
<td>True</td>
</tr>
<tr>
<td>Label1</td>
<td>Caption</td>
<td>Type in a Sentence</td>
</tr>
<tr>
<td>Label2</td>
<td>Caption</td>
<td>Number of Words</td>
</tr>
<tr>
<td>Label3</td>
<td>Caption</td>
<td>Number of Characters</td>
</tr>
<tr>
<td>lblCount</td>
<td>Caption</td>
<td>&quot;&quot;</td>
</tr>
<tr>
<td>lblChars</td>
<td>BorderStyle</td>
<td>Fixed Single</td>
</tr>
</tbody>
</table>

Events – Code

```vbnet
Private Sub Form_Load()
    txtInput.Text = "The quick brown fox jumps over the lazy dog"
End Sub

Private Sub cmdCountWords_Click()
    Dim sentence As String
    Dim Count As Integer, Letter As Integer
    Count = 0
    sentence = Trim(txtInput.Text)
    If Len(sentence) > 0 Then
        For Letter = 1 To Len(sentence)
            If Mid(sentence, Letter, 1) = " " Then
                Count = Count + 1
            End If
        Next Letter
        Count = Count + 1
    End If
    lblCount.Caption = Count
End Sub

Private Sub cmdCountLetters_Click()
    'Actually it counts characters.
    Dim sentence As String
    Dim Count As Integer, Letter As Integer
    Count = 0
    sentence = Trim(txtInput.Text)
    If Len(sentence) > 0 Then
        For Letter = 1 To Len(sentence)
            If Mid(sentence, Letter, 1) <> " " Then
                Count = Count + 1
            End If
        Next Letter
        If Mid(sentence, Letter, 1) <> * * Then
            Count = Count + 1
        End If
        lblChars.Caption = Count
    End If
End Sub

Private Sub txtInput_Change()
    cmdCountWords.Value = True
    cmdCountLetters.Value = True
End Sub
```
The functions 'Trim', 'Mid' and 'Len' are useful when writing programs to process text strings. A 'string' refers to a length of text but can include any characters – alphabetic, numeric, punctuation or non-printable characters (such as TAB, ESC).

**Len (string)**  
This function returns an integer value which is the number of characters in a string. As suggested above, the number calculated includes all characters, including numbers, spaces and question marks. e.g.

The string "Hello. How are you today?" contains 25 characters.

**Len("Hello. How are you today?")** will give an output of 25.

In practice, the string would normally be defined elsewhere. e.g.

strHello = "Hello. How are you today?"

Len(strHello) will then give an output of 25.

**Mid (string, start, length)**  
This function returns a portion of a string, starting at numerical position given by the value 'start', with a number of characters given by the value 'length'.

**Mid("Hello. How are you today?", 8, 3)** will give the output "How".

**Trim (string)**  
Removes spaces at the beginning and end of a string.

**Trim("   Hello. How are you today?  ")** will give the output "Hello. How are you today?".

### Suggestions for Consolidation and Extension

1. Modify the program to count punctuation marks, uppercase letters, lowercase letters and numerals. To do this you will need to know Ascii values of all characters and use the Chr and Asc functions of Visual Basic (introduced in the next project). Further information can be found online.

2. Write separate and simple programs that clearly display what the functions Mid, Trim and Len do. Use textboxes, labels and command buttons. Keep it simple.

3. Research and test other string handling functions such as Left, Right, Ltrim, Rtrim.

4. Observe carefully what happens when you type multiple spaces between words in the 'txtInput' textbox. Does it count the correct number of words? Try and explain how the error is occurring here.