



VBA Fundamentals

Data Types

Integer	Whole numbers between -32,768 and 32,767.
Long	Whole numbers between -2,147,483,648 and 2,147,483,647.
Single	Single-precision floating-point numbers.
Double	Double-precision floating-point numbers.
String	Sequence of characters.
Boolean	<code>True</code> or <code>False</code> .
Date	Represents dates and times.
Variant	Can store any data type. Default if no type is specified.

Variable Declaration

```
Dim variableName As DataType

Example:

Dim myInteger As Integer
Dim myString As String

Variables must be declared before use. Use Option Explicit at the beginning of a module to enforce declaration.
```

Operators

Arithmetic	<code>+</code> (Addition), <code>-</code> (Subtraction), <code>*</code> (Multiplication), <code>/</code> (Division), <code>^</code> (Exponentiation), <code>Mod</code> (Modulo)
Comparison	<code>=</code> (Equal to), <code><></code> (Not equal to), <code><</code> (Less than), <code>></code> (Greater than), <code><=</code> (Less than or equal to), <code>>=</code> (Greater than or equal to)
Logical	<code>And</code> , <code>Or</code> , <code>Not</code>
String Concatenation	<code>&</code>

Control Structures

Conditional Statements

```
If...Then...Else
    If condition Then
        ' Code to execute if condition is true
    ElseIf condition2 Then
        ' Code to execute if condition2 is true
    Else
        ' Code to execute if all conditions are false
    End If

Select Case
    Select Case expression
        Case value1
            ' Code to execute if expression = value1
        Case value2
            ' Code to execute if expression = value2
        Case Else
            ' Code to execute if expression does not match any case
    End Select
```

Looping Structures

```
For...Next
    For i = start To end [Step increment]
        ' Code to execute
    Next i

For Each...Next
    For Each element In group
        ' Code to execute
    Next element

Do While...Loop
    Do While condition
        ' Code to execute
    Loop

Do...Loop While
    Do
        ' Code to execute
    Loop While condition

Do Until...Loop
    Do Until condition
        ' Code to execute
    Loop

Do...Loop Until
    Do
        ' Code to execute
    Loop Until condition
```

Working with Objects

Object References

Excel Application	<code>Application</code>
Workbook	<code>ThisWorkbook</code> , <code>Workbooks(name)</code> , <code>Workbooks(index)</code>
Worksheet	<code>Worksheets(name)</code> , <code>Worksheets(index)</code> , <code>ActiveSheet</code>
Range	<code>Range("A1")</code> , <code>Range("A1:B10")</code> , <code>Cells(row, column)</code>

Object Properties & Methods

Objects have properties (attributes) and methods (actions).

Syntax: `object.Property`, `object.Method argument1, argument2`

Example:

```
Worksheets("Sheet1").Name = "DataSheet" ' Set the name property
Worksheets("DataSheet").Activate ' Call the Activate method
Range("A1").Value = 100 ' Set the value property
MsgBox Range("A1").Value ' Display the value using the MsgBox method/function
```

Procedures and Functions

Sub Procedures

```
Sub ProcedureName(ByVal parameter1 As  
DataType, ...)  
    ' Code to execute  
End Sub
```

Subs do not return a value.

Example:

```
Sub Greet(ByVal name As String)  
    MsgBox "Hello, " & name  
End Sub  
  
'Call the sub  
Greet "World"
```

Function Procedures

```
Function FunctionName(ByVal parameter1 As  
DataType, ...) As DataType  
    ' Code to execute  
    FunctionName = returnValue  
End Function
```

Functions return a value.

Example:

```
Function Add(ByVal a As Integer, ByVal b As  
Integer) As Integer  
    Add = a + b  
End Function  
  
'Call the function  
Dim sum As Integer  
sum = Add(5, 3) ' sum will be 8  
MsgBox sum
```

Built-in Functions

MsgBox	Displays a message box. <code>MsgBox("Hello, world!")</code>
InputBox	Displays an input box. <code>InputBox("Enter your name:")</code>
Len	Returns the length of a string. <code>Len("VBA")</code> (returns 3)
Left, Right, Mid	Extracts a substring. <code>Left("VBA", 1)</code> (returns "V"), <code>Right("VBA", 1)</code> (returns "A"), <code>Mid("VBA", 2, 1)</code> (returns "B")
UCase, LCase	Converts string to upper/lower case. <code>UCase("vba")</code> (returns "VBA"), <code>LCase("VBA")</code> (returns "vba")
Date, Time	Returns the current date/time. <code>Date</code> , <code>Time</code>