

VBA Data Types

| | |
|---------|--|
| Variant | any data type |
| Integer | (2 bytes) integer |
| Long | (4 bytes) integer |
| Single | (4 bytes) floating point |
| Double | (8 bytes) floating point |
| String | non-numeric data (declared with quotes) |
| Object | any object reference |
| Date | a date |
| Boolean | True / False |
| Byte | 0-255 |

Operators (Syntax)

| | |
|----------------------|---|
| Comparison | =, <> (not equal to), >, <, >=, <= |
| Logical (Boolean) | NOT (opposite), AND (if all <i>true</i> then returns true), OR (at least 1 <i>true</i> returns true) |
| Mathematical | +, -, *, /, \ (integer division), Mod (remainder), ^ (remember to put space) |
| String Concatenation | & |

The concatenate operator eg. "A" & "B" becomes "AB".

Operators (Precedence)

| | |
|---|----------------------|
| 1 | ^ |
| 2 | * OR / (division) |
| 3 | \ (integer division) |
| 4 | Mod |
| 5 | + OR - |

Declarations

| | |
|------------------|--|
| Variables | Dim [varname] As [type] |
| Arrays | Dim [arrayname(index)] As [type] |
| Re-declare Array | ReDim [arrayname(newindex?)] As [newtype?] |

Declarations (cont)

ReDim Preserve [arrayname(newindex?)] **As** [newtype?]
and
keep
values

Option Explicit is used to require declarations of all variables. **Option Base 1** makes the index of all arrays starts from 1. If declared array has no numeral *index* provided, then it is dynamic in size.

Data Functions (Conversions)

| | |
|-----------------------|----------------------|
| ...value to a boolean | CBool (value) |
| ...value to a integer | CInt (value) |
| ...value to a double | Cdbl (value) |
| ...value to a string | CStr (value) |

Val function accepts a string as input and returns the numbers found in that string.

Math Functions

| | |
|---------------------------|---|
| Absolute | Abs ([numeric value]) |
| Square root | Sqr ([numeric value]) |
| Exponential, e | Exp ([numeric value]) |
| Natural log, ln | Log ([numeric value]) |
| Is it a number (boolean)? | IsNumeric ([numeric value]) |
| Truncate to integer | Int ([numeric value]) |
| (Num1 / Num2) remainder? | [Num2] Mod [Num2] |
| Round to a decimal place | Round ([numeric value], [# of digits]) |

[**Sin**/**Cos**/**Tan**] (x) for trigonometric functions,
[**ASin**/**ACos**/**ATan**] (x) for inverse trig functions.

String Functions

| | |
|------------------------------|--------------------------------|
| All upper case | UCase ([string value]) |
| All lower case | LCase ([string value]) |
| Length of string (integer) | Len ([string value]) |
| Filters a string to a double | Val ([string value]) |
| Convert number to string | Str ([numeric value]) |

Val function accepts a string as input and returns the numbers found in that string.

User Interaction and Cell Selection

A popup dialogue box `MsgBox "dialogue" [& variable etc.]`

Prompt user for input `InputBox ("dialogue")`

...a single cell **A1** `Range ("A1").Select`

...an active cell `ActiveCell.Select`

...a contiguous range `Range ("A1:G5").Select`

...offset and select `[ActiveCell/Range(#)].Offset(1,0).Select`

...set a cell's value `[ActiveCell/Range(#)].Value = [varname]`

Use **Range** to select specific cells or group of cells. Use **ActiveCell** to select highlighted cell in excel.

Array Functions

Highest element number `UBound(ArrayName [, Dimension])`

Lowest element number `LBound(ArrayName [, Dimension])`

Highest element number is the size of possible entries a array can hold.

Array Iteration

```
Function MinIntegerofArray(TheArray As Variant) As Integer
Dim i As Integer, placeholder As Integer
placeholder = 0
For i = 1 To UBound(TheArray)
    If TheArray(i) < TheArray(placeholder) Then
        placeholder = i
    End If
Next
'index of min value is at placeholder
MinIntegerofArray = TheArray(placeholder)
End Function
```

Error Handling with GoTo & Labels

```
...
tempstudentName = InputBox("Please enter student name
(type exit to end): ")
'error check and force reentry of input
    If IsText(tempstudentName) = False Then
checker1:
        tempstudentName = InputBox("Please enter a
valid student name [not blank and letter] (type exit
to end): ")
    End If

    If tempstudentName = "exit" Then
        End '(the program)
    ElseIf IsText(tempstudentName) = False Then
        GoTo checker1 'label
    Else
        studentName = tempstudentName
    End If
...
'checker1:' is a label: labels only include the next line
```

IsText, Case Statements, For loop

```
Function IsText(streng As Variant) As Boolean
Dim i As Integer
For i = 1 To Len(streng)
    'checks if the text follows the ASCII numerals (a-
z AND A-Z)

    Select Case Asc(Mid(streng, i, 1))
        Case 65 To 90, 97 To 122
            IsText = True
        Case Else
            IsText = False
    End Select
Exit For
Next
End Function
```

