Applications Programming

Introduction to VBA (Visual Basic for Applications)
Part I

General

- VBA is a high level programming language.

- VBA is an interpreted programming language.

- VBA is general purpose programming language.

- VBA is a script language

- Programs are executed in sequence.

- Edit a VBA program.

VBA General

- One statement is placed in one line.
  Exception:

  - if a statement is too long, use " _" (space underscore) to indicate that the next line is a continuation of this line logically

  - a compound statement can be placed in multiple lines

- One line contains (at most) one statement

- Some words in a VBA program are called keywords because they have built-in meanings.

- VBA code (and Excel data) must be saved to "Excel Macro-enabled Workbook" with the extension name .xlsm

Modules and Procedures

- A module is a container for procedures.

- A procedure is a unit of code enclosed either between the Sub and End Sub statement or between the Function and End Function statements. (Sub, Function and End are keywords.)

- Example (Note the comment lines):

```
Sub FirstProgram()

    ' My very first VBA program — comment line

    MsgBox "Hello, World!"

End Sub
```

Comments

Comments are sentences ignored by the computers. Comments can be used to

- identify author of a program.

- briefly describe the purpose of each procedure.

- keep track of changes made to a procedure

- remind fellow programmers/reviewers anything you want them to know.

Literal Values

A literal represents a fixed value in a program.

The following lists some common value types and their corresponding syntax:

- whole numbers, such as 42, -105

- floating point numbers, such as 3.14, -2.7, 7.1e9

- text strings, such as "Hello!", "Error! 404 Not Found."

- dates, such as #09/14/2015#, #10:30:00#

- boolean, such as True, False

Variables

- A variable is a storage location in computer memory that holds data while a program is running.

- What you can do with variables:

  - store and retrieve values

  - perform operations to get new values

  - test values to determine whether they meet some condition

- Option Explicit — declare variables before using them.

- Variable declaration syntax: (Dim and As are keywords)
  Dim variable_name As variable_type

Variable Naming Rules

- It can only contain letters, digits and underscore

- It must begin with a letter

- It must be less than 255 characters

- Some words (such as all the keywords) can not be used as variable names

- Variables in VBA are case insensitive

Data Types

- Data type determines how the computer will interpret the data

- Numerical Data Types

  - Integer (-32768 to 32767)

  - Long (-2 billion to 2 billion)

  - Single

  - Double

- Non-numeric Data Types

  - String

  - Date

  - Boolean

  - Object

  - Variant

Use Variables

- Assign a value to a variable

  ```
  Dim my_name As String
  Dim temperature As Single

  my_name = "John Smith"
  temperature = 24.31
  ```

- Retrieve the value stored in a variable and use the value in an expression

  ```
  distance = speed * time
  area = Pi * radius * radius

  If temperature > 30 Then
      MsgBox "Hot"
  End If
  ```