Improving Productivity Using Visual Basic for Applications

IV&V Workshop

September 13-15, 2011

Tom Marshall

Purpose

- To provide an overview of *Visual Basic for Applications* (VBA) so analysts can recognize useful applications to IV&V activities
  - Provide relevant examples of VBA use with IV&V activities
- It is ***not*** intended to be a programming or VBA tutorial
  - Syntax is fairly easy to pick up
  - A Demonstration to be held later will provide a closer look at VBA

What is VBA?

As defined by Wikipedia

> *Visual Basic for Applications (VBA) is an implementation of Microsoft's event-driven programming language Visual Basic 6 and its associated integrated development environment (IDE), which are built into most Microsoft Office applications, such as Word, Excel, PowerPoint, Access.*

- It can be used to control many aspects of an application, including manipulating data contained within the application and working with custom user forms or dialog boxes
- It can be used to control one application from another, e.g. creating a report in Word using data from Excel

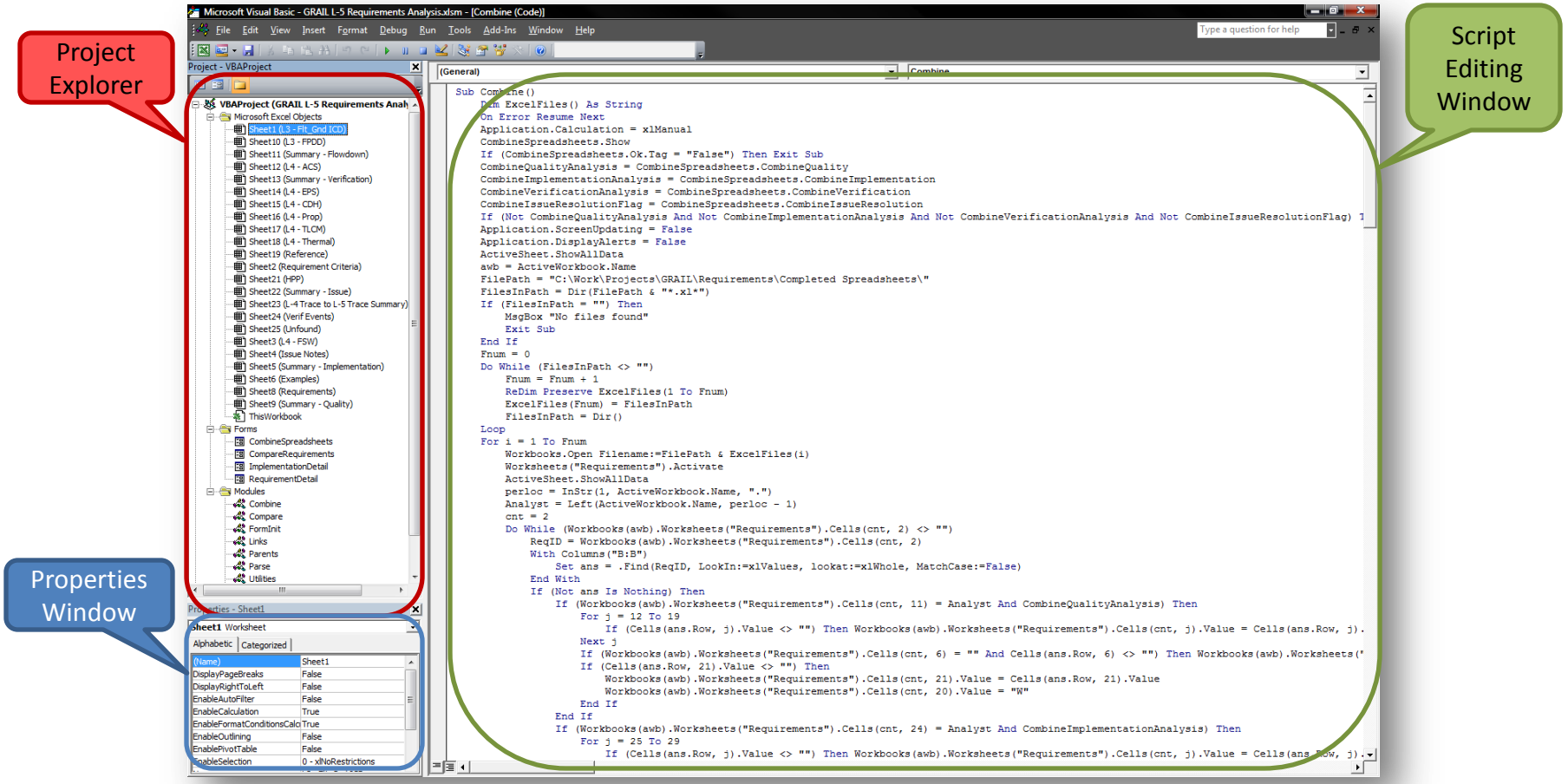
But What is VBA Really?

Every part of a MS Office application is made up of 'Objects', and these Objects have 'Properties' that can be manipulated

- In Word, for example, the whole document, individual pages, a paragraph, a sentence, a word, even individual characters are objects
- In Excel, worksheets and cells, among other things, are objects
  - Some object properties are Boolean (TRUE/FALSE). For example, a selection of text can have its BOLD property set to TRUE.
  - In Excel, a range of cells has a ‘Merged’ property that can be TRUE or FALSE
  - Other properties have 'numerical' or ‘text’ values

VBA facilitates interaction with an application’s Objects, Properties and Data

VB Editor



The VB Editor is accessed from the ‘Developer‘ Tab (or Alt-F11)

VBA Application to IV&V

- VBA saves time by automating repetitive IV&V tasks
- VBA improves accuracy by automating tedious tasks
- It is only a tool and is not a substitute for engineering knowledge and judgment applied by an analyst
- When to apply VBA rather than engaging the Software Assurance Tools (SWAT) Group for help?
  - Quick turnaround; need it done right now
  - Straightforward solution
  - Narrow application
  - Something routinely encountered

Example Uses of VBA

- Dealing with software development artifacts
  - Parsing documents into a more useable form, e.g. SRS in PDF
  - Delta artifact analysis, e.g. identifying added, deleted and modified requirements
  - Test script/results “prettifier”
- Correlating data
  - Integrate data from multiple sources, e.g. integrate analysts spreadsheets
  - Merge data, e.g. requirements and verification documentation
  - Identify and display parent/child requirement relationships
- Processing large amounts of data
  - Lint Processor
  - Data post-processing, e.g. telemetry data from tests
  - 1553 Message interpreter
- Extracting and manipulating data from other sources
  - Extract schedule data from MS Project and manipulate using Excel’s rich formulae suite
- Others?

Parting Thoughts

- You don't have to be a highly experienced programmer to effectively use VBA
- One way to learn the keywords, syntax and object properties is to use the macro recorder to record an action
  - The VB code generated by the recorder can be viewed and often customized to suit other needs
- Use the internet
  - Many online tutorials available
  - microsoft.public.excel.programming in Google Groups
- Build up a code/script "toolbox"

Always be alert for situations where VBA may be useful