Debugging in the Visual Basic Integrated Development Environment (VB IDE)

Elizabeth (Liz) Dobbins
Jan. 21, 2009

What is Debugging?

• Debugging is a methodical process of finding and reducing the number of bugs, or defects, in a computer program or a piece of electronic hardware thus making it behave as expected. (Wikipedia, 1/16/2009)
• Successful debugging depends on the skill of the programmer.
Types of Errors

• Compile Time (syntax)
  • VB error scanning detects errors made on a single line.

• Run Time
  • Failure during run time (eg. divide by zero)
  • IDE gives an error message and highlights offending line.

• Logical
  • Program doesn’t behave as expected.

Steps in Debugging

1) Reproduce the bug, and identify conditions which produce it.
2) Simplify the program to isolate the bug.
3) Investigate program’s execution.
   a) Use tracing (i.e. print statements)
   b) Use debugger tools provided by IDE
Tracing - Print & Assert

Syntax:  Debug.Print expression
Behavior: Prints values of variables or expressions as text in the “Immediate” window.

Syntax:  Debug.Assert (expression)
Behavior: Forces a design-time break at the Assert statement when the expression evaluates to False. If the expression evaluates as True, program operation continues.

Debugger Tools

• Control the program’s execution:
  • Step Into/Over/Out
  • Breakpoints
  • Drag yellow highlight bar in code
• Investigate the values of variables and expressions:
  • Watch Window
  • Local Window
  • Report over cursor
• All available through menu, toolbar, keyboard shortcuts, right-click menu
Step Into/Over/Out

• Step Into starts program then stops before 1st executable, or steps line by line. Enters subroutines and functions.
• Step Over skips current line (but not its execution). Doesn’t enter subroutines or functions.
• Step Out leaves current subroutine and pauses at next expression in the calling code.

Breakpoints

• Internal stopping or pausing place in a program
• Run to breakpoint, then examine variable values. Easier than stepping.
• Multiple ways to “toggle” on/off
Watches

- Real-time report of a variable or value of an expression
- Local window shows all variables in subroutine.
- If that’s too many, add select variables to Watch window.
- Quick Watch adds variables quickly to Watch window.

Sources of Information

- VB IDE help [F1] (Print and Assert)
- Web based tutorials
  - [http://www.virtualsplat.com/tips/visual-basic-debugging.asp](http://www.virtualsplat.com/tips/visual-basic-debugging.asp)
- Microsoft Support
  - Overview of Visual Basic Editor Debugging Tools ([http://support.microsoft.com/kb/165517](http://support.microsoft.com/kb/165517))
- ESRI Support