Programming Excel

Macros, Visual Basic, and Solving Your Problem
Macros

- You’ve seen macros in use.
- They can automate tasks for you, but making them very general is difficult.
- Knowing Visual Basic allows you to make Excel do virtually anything.
Things to know:

- Code
  - How we tell the computer to do things.
- Data storage
  - How we keep information we need.
- Excel’s Object Model
  - How we talk about the parts of Excel.
Code

- We’ll spend several weeks on this.
- Very precise, very picky, very detailed.
Data Storage

- Data can be stored in the program (i.e. In RAM) or in files.
- Data can be stored in Excel
- Data comes in different types.
  - We’ll handle these as needed.
Excel’s Object Model

- What is an Object Model?
  - A formal description of how a computer program is put together and how its various parts can be accessed.

- Using the Object Model
  - Once you understand the Object Model, you can manipulate Excel in your programs.
Objects Have:

- Properties
  - Characteristics of the Object
  - These can frequently be changed

- Methods & Events
  - Actions the object can perform.

- Sub-Objects
  - Objects can contain other objects.
Finding Out about Objects

- Record a Macro
  - This gives you some sample code that manipulates the object.

- Use the Object Browser
  - Requires that you have an idea of what you’re looking for.
Referring to Objects

- Objects and/or properties can be specified by connecting them with periods.
- This works much like a pathname
  - It lets you become more and more specific
  - Example:
    - Workbooks("Sheet1").Cells(1,1)
Workbook

- The workbook is the Object that contains everything else.
- The workbook contains worksheets, charts, and modules
  - Worksheets: What you’ve been using.
  - Charts: Ditto.
  - Modules: What you’ll learn to write, contains code.
Worksheets

- Contain Ranges
- Contain Cells
  - Specified by their row and column
- Identified by Name
  - Worksheets("Sheet1")
Ranges

- Rectangular blocks of cells.
  - The basic unit of the worksheet. (Not the cell, which is weird)
  - These have properties
  - Addressed as you’ve seen earlier.
    - A1:A1 or A1:C3

- Can be combined with others:
  - Worksheet(“Sheet 1”).Range(“A1:A5”)
Cells

- These are individual cells that can be given values.
  - `Worksheets("Sheet 1").Cells(1,2)` is cell B1
  - Row reference, then column (reverse of B1 scheme).

- Cells have properties that can be changed.
Code

- Two kinds of interactions:
  - Functional
  - Sub Program
Functions

- Functions allow you to calculate something that is then returned to the cell.
- Functions should not change the object model.
- Evaluated by the spreadsheet when needed.
- Nice way to encapsulate information.
Sub Programs

- Called “Sub”
- Subs can change the object model.
- Subs are run by the user when they decide to.
- Another way to encapsulate parts of your program.
Other Actions

- **Msgbox**
  - Lets you give a message to the user without disrupting the spreadsheet.
  - Lots of options for this function, see documentation for details.

- **Inputbox**
  - Lets you get information from the user without using a cell on the sheet.