

# Excel Basics

Steve Grant—Presentation Notes  
CSLA Conference Fall 2005

## Basic principle of a spreadsheet program

- **Calculate... number-crunching tool**
- ***“Spreadsheet” used to be large paper pre-ruled into grid, used by accountants***
  - ✓ All calculation performed “on the side” with calculator or on separate paper
- ***(Don’t use Excel just because you want to type stuff into a pre-made grid... Use a table in Word instead)***
  - ✓ Better formatting & control
- ***Spreadsheet was the “killer app” that launched the microcomputer—especially IBM PC***
- ***Dan Bricklin...***
  - ✓ Accounting class doing “what-if” scenarios: Everyone doing same string of calculations all over again every time one of the numbers changed.
  - ✓ Hobbyist, messed with writing programs for his computer at home (kit? Apple II?)
  - ✓ Realized formulas—what calculations to perform in what order—could be written into a program so user just plugged in the beginning numbers and computer did the rest.
    - New scenario which is different only because one (or several) user-input numbers have changed? All user has to do is type in the new numbers.
  - ✓ Real genius was in interface/layout
    - Realized no one was going to...
      - Write lines of computer program code to create & store formulas, and...

- Edit those lines every time one/more of the numbers changed
- Thought to make display mimic spreadsheet accountants already familiar with
- Store formula for a set of calculations in a cell but have cell display results of those calculations!
- ✓ Called his program Visicalc, ran on Apple II
- ✓ Accountants started buying Apple IIs just to run Visicalc
- ✓ Apple IIs took off
- ✓ IBM saw this, developed IBM PC
  - More powerful
  - By long-time friend of business IBM, after all
- ✓ Bricklin wrote Lotus 1-2-3 for PC
- ✓ PCs took off
- ✓ Spreadsheet program—first Visicalc, then Lotus 1-2-3—was “killer app” that really got PCs going
- ✓ Ever wonder why Apples (now Macs) label big key on the right “Return” and Windows (etc.) label it “Enter”?
  - Apple II invented for people mostly using it to type programs, like a typewriter
    - At end of a line of code, you hit “Return”
  - IBM PC invented mostly for businesspeople using it to run Visicalc or Lotus 1-2-3
    - To “enter” a number or formula into a cell, locate cursor in that cell, type what you want in there, and hit... “Return”? No! “Enter”!
- ***So... Basic principle of a spreadsheet program is twofold***
  - ✓ Grid to lay out numbers so you can see them all at the same time & arrange to show relationships.
  - ✓ “Magic calculator” which uses formulas you create and enter into the

grid to perform calculations on numbers you enter elsewhere on the grid... and shows answers right on the grid.

“I have to create formulas? I’m not a mathematician!”

- *Enter: =2+2*
  - ✓ Beginning w/ equals sign tells Excel rest of what you type is a formula, not text
  - ✓ Instantly calculates and displays “solution”—answer—to your formula
- *Enter: 2+2*
  - ✓ Displays what you typed, as a label
- *This kind of formula isn’t very useful*
  - ✓ Stores and calculates formula, but doesn’t show numbers it’s using
  - ✓ Have to edit formula itself if numbers change... Gets ugly fast
  - ✓ Scenario: Income – expenses = money left over
  - ✓ Enter: =1000[income]-450[rent]-250[food]-100[gas]-82.49[insurance]

Here’s where interface/layout feature is so useful

- *Enter numbers to be used in formula into separate cells*
  - ✓ Numbers to be used in calculations called values
  - ✓ Put labels next to these value cells so you’ll know what those values represent
- *Write your formula so it refers to those cells instead of numbers themselves*
- *Enter:*
  - ✓ **Income: 1000**
  - ✓ **Rent: 450**

- ✓ **Food: 250**
- ✓ **Gas: 100**
- ✓ **Insurance: 82.49**
- ✓ **\$ left over:**
- **Formula for “\$ left over” (Demo: Enter, and enter cell references by typing by hand, e.g. “C-1-0”)**
- **Now all the numbers our formula uses are visible and labeled.**
- **Change one or several... New result instantly calculated and displayed (Demo).**

**Essentially, cells can contain one of three kinds of content**

- **Formula... Start by typing equals-sign**
  - ✓ **Arithmetic operations**
- **Value... Type digits**
  - ✓ **Or decimal (period)... or minus-sign (hyphen)**
- **Label... Type label**
  - ✓ **If starts with digit but has non-numeric characters at any point after that (other than decimal), Excel will assume it's a label.**
  - ✓ **→ Gotcha! Label that's just digits but starts with a zero... Excel drops the leading zero! (Demo: 012345)**
  - ✓ **To enter label which starts with a zero, type apostrophe first. (Demo: '012345)**
  - ✓ **Start typing digits but continue with non-numeric characters, Excel assumes it's a label. (Demo: 2005 average)**

## **Writing formulas**

- **Remember: Start with equals sign**

- *Hyphen = “minus”; Asterisk = “times”; Slash = “divided by”*
  - ✓ Use parentheses to specify calculation priority
    - $(25+50)/2$  is different from  $25+50/2$
- *Can point and click on a cell instead of typing its coordinates!*
  - ✓ **Demo: Rewrite “\$ left over” formula in previous example using pointing technique**
- *Formula can simply “clone” what’s in another cell... label, value, or calculated result of that other cell’s formula (what’s displayed) **Demo...***
  - ✓ = [point to label-cell]
  - ✓ = [point to value-cell]
  - ✓ = [point to “\$ left over” formula cell]
- *“Functions”... Do a lot of heavy lifting for you*
  - ✓ Excel has several hundred of them... I use 3
  - ✓ **SUM**
    - Concept of range: Contiguous block of cells a function operates on
    - Syntax: (firstcell:lastcell) (**Demo: Rewrite formula using SUM and typing it all**)
      - Parentheses required!
    - Can type it all, but why bother when you can...
    - Drag from first to last cell (**Demo: Rewrite formula using SUM but dragging instead of typing coordinates**)
      - Don’t forget closing parenthesis!
    - Can also use <Shift> with arrowkey (**Demo**)
  - ✓ Syntax of a function: Start with equals sign, then name of function, then parentheses around what the function operates on
  - ✓ **AVERAGE**

- Only time I've used is in calculating average copyright of 629s for annual CA Libr. Act report
  - Demo: Open Avg copyright 629s 2\_05 and show
  - Close that file
- ✓ IF
- Can bend your brain at first, but surprisingly useful
  - Perform one of two different calculations based on what it finds in a particular cell
  - Demo: Open All Courses 2\_05... Bring up "Prices" sheet... Click in a "Lowest Price" cell
  - Syntax: =IF(Logical\_test,Value\_if\_true,Value\_if\_false)
    - I.e. "IF (condition,THENDOthis,ELSEdothis)
  - Note how you can have multiple spreadsheets (Excel: "worksheets") in a single file
  - Can also "nest" IF functions
    - Demo: Open Budget Master LMC.xlt and show "Requisition", "Encumbrance", and "Expenditure" cells
- *Formula in one sheet can reference cells in another*
- ✓ Demo: Switch back to All Courses 2\_05, bring up "Totals" sheet & show formula in "Price per set" cell
- Note that all this cell does is display value in another cell (Demo simple case such as C10=D10)
- *Copy-Paste formula*
- ✓ Copy command same as in Word (Edit | Copy or <Control>-<C>), but to Paste you use <Enter> key instead of Paste command
- ✓ Excel will adjust—"move"—cell references according to location of cell you're pasting into
- Usually this is what you want... but not always

- To make cell reference in a formula “absolute”—doesn’t change when you copy the formula to somewhere else—use dollar signs before column and row designations (**Demo**)
- ✓ “One-to-many” capability: Can copy formula in one cell into multiple other cells
- ✓ Good example...
- *Formula for a running total*
  - ✓ **Demo: Show “Running total for all courses” cells**
  - ✓ **Demo: Switch to scratch file, demo by creating simple 5-item order file with...**
    - **Description**
    - **Quantity**
    - **Item total**
    - **Running total**
  - ✓ **Explain running-total formula**
    - **Top cell formula different from 2<sup>nd</sup>-and-subsequent cells**
    - **Write 2<sup>nd</sup>-cell formula**
  - ✓ **Save as a time-saving tool for later! (**Demo...**)**
    - **Copy formulas down to row 40**
    - **Make “Order Total” cell at top which points to last running-total cell)**

## Formatting

- *First, how to select multiple cells...*
  - ✓ **Contiguous**
    - **Drag across (**Demo**)**

- <Shift>-<Arrowkey> (Demo)
  - My favorite: Select one, scroll, <Shift>-click (Demo)
- ✓ Noncontiguous
  - <Control>-click each cell (Demo)
- *Select entire rows or columns: Click grey “button” at beginning (Demo)*
- *Shortcut: Right-click, “Format Cells...” (Demo)*
- *General*
  - ✓ Will display as scientific notation if column too narrow... (Demo: Enter 123456789 and drag column narrower)
  - ✓ ...Or will display as ### if column too narrow for scientific notation! (Demo: Drag column even narrower)
- *Number*
  - ✓ Allows specifying # of decimal places, different ways of displaying negative numbers
- *Currency*
  - ✓ Specify 0 decimal places and it rounds to nearest dollar
- *Date*
  - ✓ Quite a variety of display options
  - ✓ Just type in typical “slashes” format and Excel assumes it’s a date, formats that cell accordingly (Demo: enter 3/5/05, then change date format)
- *Alignment*
  - ✓ Left/center/right (Demo: show Toolbar buttons)
  - ✓ Right-click dialog box...
  - ✓ Wrap text (Demo: enter “A Rather Wide Column Label” then use Wrap

text)

- ✓ Merge cells ([Demo: shrink that column, select that label-filled cell and the one next to it, merge them](#))
- ✓ Shrink to fit ([Demo: apply to that merged cell](#))
- *Fonts & Colors*
  - ✓ Fonts: Toolbar...Typeface, Size, Bold/Italic/Underline, Color, just like Word
  - ✓ Fill Color
    - Fills entire cell
    - Some colors make it hard to read cell contents
- *Cell borders that print*
  - ✓ Can border entire cell or just one/several sides quickly w/ Toolbar button ([Demo](#))
  - ✓ More border options with dialog box ([Demo: Show dialog box](#))
  - ✓ Several different line styles, thicknesses, colors
  - ✓ If you want all cell borders on the worksheet to show automatically—i.e. entire “grey grid” you see on the computer—do it elsewhere ([Demo: \) File | Page Setup... “Sheet” tab: In “Print” area, check “Gridlines”](#))
- *Patterns: Fill cells with...*
  - ✓ Color ([Demo](#))
  - ✓ Pattern ([Demo](#))
    - Careful... easy to obscure cell’s contents
- *Comments*
  - ✓ Annotate individual cells
  - ✓ Appear as small red corners in cells; hover cursor to view

- ✓ Add: Insert | Comment
- ✓ Edit: Insert | Edit Comment
- ✓ Delete: Edit | Clear | Comments
- ✓ Right-click is way easier to add, edit, or delete
  - (Demo: Add “This is a comment”. Click outside box to finish.)
  - (Demo: Edit to “This is now a somewhat longer comment”. Resize.)
  - (Demo: Delete that comment)
- *Text Box*
  - ✓ Makes a “floating label” which sits “on top / in front of” cells
  - ✓ Not a Format | Border tool/technique
  - ✓ Use Toolbar button
    - If not there, add it yourself (Demo: Tools | Customize... Commands tab, select AutoShapes, click Text Box icon, drag to toolbar)
  - ✓ Demo by making a Text Box
- *Adjust column width*
  - ✓ Go to top of column & drag column border (Demo on column with “A Rather Wide Column Label”)
  - ✓ Automatically fit column width to widest cell contents... 2 ways:
    - Select entire column... Format | Column | AutoFit Selection (Demo)
    - Way easier: Double-click right border of column at top (Demo)
- *Inserting & deleting rows*
  - ✓ Inserting/deleting columns works the same; I’ll only demo rows here
  - ✓ Insert: Select entire row(s)... Insert | Row (Demo)

- Note it inserts above row you select
  - Insert | Column inserts to left
- Wait a minute... What if you had cell references to cells in row which has now moved because of your insert? Excel adjusts them automatically... Whew!
- ✓ Delete: Select row(s)... Edit | Delete (**Demo**)
  - Be careful: No “Do you really mean it?”!
  - What about references to cells in moved rows? “Whew” again!
  - Running Total formula: Watch out... a “GOTCHA!”
  - If you delete rows with “running total” formulas, all rows below deleted show error “#REF!” (**Demo: Switch to All Courses 2\_05, “Totals” sheet, delete a row at/below “Senior Art Studio”**)
  - Trick to fix: Copy cell still working correctly above to first of the messed-up ones below (**Demo**)
  - **WARNING**: If you delete 2<sup>nd</sup> row, you won’t have a good one to copy—Remember, 1<sup>st</sup> row’s formula is different.
    - Not such a big deal: Rewrite formula for 2<sup>nd</sup> row & Copy down to all beneath it. (**Demo**) Now all the others work again!

## Split window

- *Problem: Scroll down or to the right too far, you lose sight of the column or row labels.*
- *Window | Split (**Demo: Split only horizontally**)*
- *Now scroll only in lower half... Upper half keeps column labels visible*
- ✓ Note that scrolling horizontally, lower and upper-half views stay in sync
- ✓ If upper half view changes, you accidentally used upper half’s scrollbar... Use it to scroll it back again
- *Remove with Window | Remove Split (**Demo**)*
- *Can also split into quarters, so can keep some columns visible on left as*

*you scroll to the right*

- ✓ (Demo: Switch to Budget Master LMC... Remove & re-enable quadrants split)
- *Note you're not limited to top rows- or far-left columns*
  - ✓ Can use their scrollbars to position on any portion (Demo)
  - ✓ Can drag split-bars to resize panes (Demo)

## Multiple worksheets in single file (Excel calls “workbook”)

- *New file has three by default (Demo: Switch to scratch)*
  - ✓ Each worksheet has own tab, bottom left
  - ✓ Buttons to left of tabs are for scrolling the tabs when you can't see them all (Demo: Drag scrollbar boundary to left to cover two tabs, then use buttons)
  - ✓ Any formula can reference cells in other worksheets
    - (Demo: Enter value in “Sheet 2”, switch to “Sheet 1”, enter formula that simply references that cell in “Sheet 2”)
- *Add with Insert | Worksheet (Demo)*
- *Delete with Edit | Delete Worksheet (Demo)*
- *Rename: Format | Sheet | Rename. Or right-click on tab | Rename... Type new name, <Enter> (Demo: Rename “Sheet 1” --> “Fred”; rename “Sheet 2 -> “Wilma”)*
  - ✓ Suggest you keep worksheet names short
  - ✓ Note that cell reference to “Sheet 2” in that formula we created has now adjusted to refer to “Wilma” (Demo: select & inspect formula)... “Whew!” again
- *Why would you need more than one worksheet?*
  - ✓ Allow different layouts & storage/documentation schemes to use each other's data

- ✓ Keep all related data in one easily-managed place: a single file
- ✓ (Demo: [Switch to All Courses 2\\_05](#), “Totals” sheet)
  - At first I created just this, but then realized...
    - Might be able to find some titles used=cheaper
    - Some courses need more than one title, so needed easy way to lay out book titles and both new and used prices
- ✓ (Demo: [Bring up “Prices” sheet](#))
  - Courses with multiple titles have course names non-bolded and flush right in the cell
    - Course names repeated with “Set total” flush left and bold—just like single-title courses.
    - “Lowest price” figures used by “Totals” sheet are bolded
    - Multiple-title courses still have places to enter each title’s price—new and used—but this sheet adds them together and gives total in a single cell to be used by “Totals” sheet
  - Using IF function allows “Lowest Price” to display new price if not available used, but used price if used is available
- ✓ (Demo: [Switch to Budget Master LMC](#))
  - Each budget category (number) has own sheet
  - Allows Summary sheet for single view of all balances
  - Saves time if searching for particular order and not sure what budget I used... Don’t have to open each budget’s file individually
    - Sorry... Find command (Edit | Find or <Control>/<Command>-<F>) only searches single worksheet

## Excel as tool for manipulating “delimited” text files

- *Some applications—especially database (like your circulation system) will offer to output to a file instead of printing directly*
- ✓ Usually a “delimited” text file
  - Tab, comma, or other character used as delimiter
- ✓ Direct printing from database app. sometimes ugly and wastes paper

(Demo: [Send Horizon Report-Sample to Notepad](#))

- All our copies text for regular biology and each copy's barcode number, status, checkout date, and name of who it's out to
- Direct printing winds up taking two or three lines for every student, and doesn't look any better than this
- *Excel can import ("Open") file like this*
  - ✓ Sort and manipulate it as you like
  - ✓ Email to file to someone who requests it (administrator, or counselor, teacher)
    - They're likely to have Excel so can open it—they don't have your circulation system
    - Save yourself a lot of time and paper
- *Must open from inside Excel... Can't just double-click it from folder view (Demo: [File | Open... point to Horizon Report-Sample](#))*

[IF NO TIME TO DEMO PROCESS, OPEN [HORIZON REPORT-SAMPLE.XLS](#) TO SHOW IMPORTED-AND-CLEANED-UP VERSION]

- *Excel has to know some things... fires up "Text Import Wizard"*
  - ✓ Step 1
    - "Original data type"... "Delimited" (default) correct
    - "File origin"... Leave at "Windows (ANSI)" unless file was saved by a Macintosh application (Winnebago?)
  - ✓ Step 2
    - Use preview in lower area to be sure selected delimiter creates...
      - Vertical column lines
      - Correct column headings w/ no weird characters
    - (Demo: [Select different delimiters & show preview](#))

### ✓ Step 3

- All columns default to “General”
- OK except columns with large numbers (e.g. barcode numbers) should be set to “Text”
- (Demo: Leave “Barcode” as “General”... Show some cells w/ scientific notation... Close & re-open choosing “Text” this time)

## Sort

- *Select entire block to include all cells with data... including column headings (Demo)*
- *Data | Sort (Demo)*
- *“My list has”... Select “Header row” (Demo)*
- *“Sort by”... (Demo: “Item Status”)*
- *“Then by”... (Demo: “Name”... then “OK” and show results)*
- *Now we can clean it up a little (Demo ...*
  - ✓ **Remove not-checked-out rows...**
    - “Checked In” at top
    - “In Cataloging” at bottom
  - ✓ **Insert 2 columns before A, use Cut-Paste to move Names & Last CKO Dates to them**
  - ✓ **Add rows at top and enter book title as title of the worksheet**
  - ✓ **Delete column with title in it**
  - ✓ **Bold-and-center headings as necessary)**