Expressions

CS 021 Computers in Management
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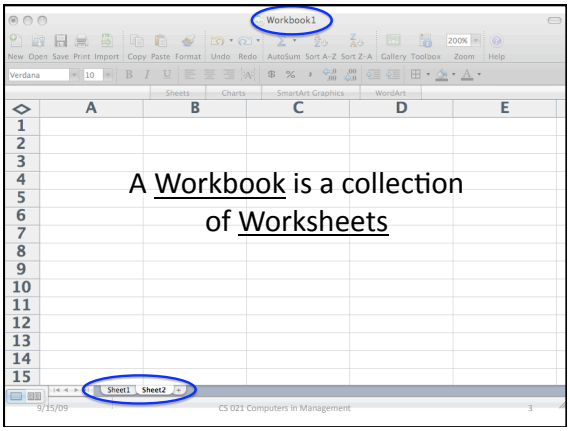
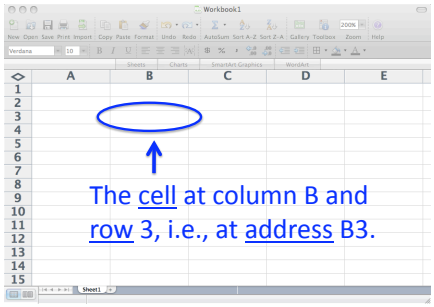
Today

- Worksheets, cells and workbooks.
- What can be typed into a cell.
- Addressing



A Workbook is a collection of Worksheets

Cells



What can we type in a cell?

What can we type in a cell?

- A cell can hold one of two things:

1. Text, e.g., a descriptive label such as Year
2. An Expression such as 2+3
   - Expressions must be preceded by an equal sign "="
   - Lots of different kinds of Expressions
   - We'll often abbreviate Expression as Expr

Atomic Expressions

- Numbers :
  - Integers
  - Floating Point (real) Numbers
- Truth (or Logical) Values : {TRUE, FALSE}
- Strings : "Hello!"
- Dates/Times
- Addresses (more on this later)

Expressions

- When we type an expression in a cell, excel will evaluate the expression and display the value of the expression in the cell.
- The formatting of the displayed value can be adjusted. E.g., = 1 / 2 can be displayed as
  - .5
  - 50%

Expressions

- When evaluating expressions that aren't fully parenthesized, excel follows the customary PEMDAS rules to determine evaluation order.
  - = 2 + 3 * 4 is understood to mean 2 + (3 * 4)
  - = 4 – 1 – 1 is understood to mean (4 – 1) – 1

Functions

- Excel has hundreds of "built-in" functions that perform various tasks.
  - Numeric: SUM, MOD, QUOTIENT, …
  - Statistics: MIN, MAX, AVERAGE, MEDIAN, MODE, STDEV, …
  - Logical: IF, AND, OR, NOT, …
  - Finance: FV, PV, PMT, RATE, NPV, IRR, …
  - Dates/Time: NOW, TODAY, YEAR, HOUR, MINUTE,
  - Utilities: RAND, VLOOKUP, STR, LEN, …

Addresses

- It is often useful to make the value of a cell depend on values found in other cells.
- Example: = A1 * 2

Evaluates to twice twice the value found in the cell at address A1.

Recalculation

- If B1 = A1 * 2 and the value in A1 is altered, then the expression in B1 is re-evaluated.
- And likewise for expressions in cells depending on B1.

Address Ranges

- Many functions accept inputs (aka *arguments*) that specify ranges of cells.
- Example: =MAX(A1:A10)

Evaluates to the largest value found in the first 10 rows of column A.

Copying Expressions

- Expressions can be copied from one cell to another.
- Say cell B1 has an expression that depends on cell A1. Say the expression in B1 is copied to cell B2. What happens to the reference to A1?

Relative and Absolute Addressing

- An address has a column part and a row part. For example, in A3, A is the column part and 3 is the row part.
- Parts can be either relative (e.g., A or 3) or absolute (e.g., $A or $3).

Copying Expressions

- Say cell X has an expression containing an address referring to cell Y.
- E.g., B1 = A1 * 2 or B1 = $A1 * 2
  or B1 = A$1 * 2 or B1 = A1 * 2

What happens if the expression in X is copied to another cell Z?

Copying Expressions – THE RULE

- Expressions are copied verbatim but relative parts of addresses are modified to preserve the displacements to the referenced cell.

Examples