Getting Started With Excel

Defining Spreadsheet Software

a spreadsheet
used to organize data, do calculations, make graphs

What-If… **analysis**

3 major parts of *Excel*:

- Worksheets (Chapters A-C, E)
  a grid of rows and columns used to create *formula-based data models*

- Charts (Chapter D)
  graphical presentation of data

- Databases (we won't use)
  organizes data in rows/columns
  sort, search, select data

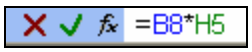
all of these objects are contained in a workbook file (.XLS)

Viewing the Excel Window

many familiar elements
menu bar
toolbars (Standard and Formatting)
Sheet Tabs
3 worksheets per workbook by default (can add/remove sheets)
Status Bar
Mode Indicator

Anatomy of a Worksheet

- columns (A-IV)
- rows (1-65,536)
- cells
  a cell can contain:
  - values
    can be used for calculations
    pure numbers, dates/times
  - text (labels)
    not for calculations!
  - formulas
    specify the *calculations* you want *Excel* to perform
  - functions
    a *predefined* formula that performs an operation and returns a value
    eg: =SUM(*list*)

Formula Bar 

displays the contents of the current cell
Cancel box
Enter box

Opening and Saving an Existing Worksheet

2 main methods (just as in *Word*):

- File | Save As...
- Save button on Standard Toolbar

Excel adds .XLS extension

Entering Labels and Values

entering labels

left aligned by default
what happens when a *label* is too long to fit within its cell?

entering values

right aligned by default
what happens when a *value* is too big to fit within its cell?

Navigating a Worksheet (Clues to Use, pg. 235)

arrow keys

[Ctrl]+[Home] _____ [Ctrl]+[End] _____

[PageDown] _____ [PageUp] _____

[Alt]+[PageDown] _____ [Alt]+[PageUp] _____

Selecting Cells and Ranges

range

a rectangular block of adjacent cells
indicate which cells to include in a range by citing *two diagonally opposite corners*
egs: A7:A12 B3:E3 B8:E12

common range operations: data entry, format, delete, print, copy

how select a range of *adjacent* cells? _____

how select *non-adjacent* cells/ranges? _____

Naming and Moving a Sheet

how rename a sheet?

how rearrange sheets?

how delete a sheet?

Putting Your Name in a Header (nib)

File | Page Setup… | Header/Footer tab | Custom Header… | type contents

please include your name and the date code in a header for each remaining *Excel* assignment

Previewing and Printing a Worksheet

2 main ways to print (just as in *Word*):

- File | Print...
- Print button on Standard Toolbar

how decide which to use?

Displaying and Printing the Formulas in the Worksheet (lib)

2 views of a worksheet:

- Values view
- Formulas view

use Tools | Options... | View | Formulas to *toggle* between these 2 views
can also use [Ctrl]+[`]

class handout

Getting Help

identical to *Word's* Help system

Closing a Workbook and Exiting Excel

click *Excel* window's close button (just as in *Word*)

remember to use *Windows Explorer* to make backup copy of each .XLS file!

Use *Word* to develop a crib sheet and update it after each unit.

Building and Editing Worksheets

Planning, Designing and Creating a Worksheet

1. determine purpose and select meaningful title
2. determine desired results/*outputs*
3. identify *inputs* needed to produce the results
4. determine *calculations* needed to produce the results
5. sketch the layout (labels & values within rows and columns)
6. launch *Excel* and build it!

Editing Cell Entries

sometimes it is easier to type a new entry over the existing entry (nib)

select, then do

3 ways to edit a cell:

- click Formula bar and edit up there
- press [F2] to edit *within* the cell
- double-click the cell to edit *within* the cell

each places you in Edit mode

Entering Formulas

formulas always begin with an =

build formulas by using *cell references*, rather than typing the value contained in each cell

when put a formula in a cell, you see its *answer* displayed, right aligned by default

look in Formula Bar to see actual formula for the current cell

if numbers changed, *Excel recalculates* & displays the new answer

precedence of arithmetic operations: (Clues to Use, page 258)

( ) parentheses

^ exponentiation

* / multiplication & division

+ - addition & subtraction

examples:

=2+3*4

=(2+3)*4

=(2+3*4)^2+3

what formula is needed in B6 to calculate MPG?

	A	B	C
1	**Fuel Economy worksheet**		
2			
3	Starting Odometer	23456	
4	Ending Odometer	23678	
5	Gallons used	12.2	
6	MPG	18.19672	
7			

What-If Analysis (a.k.a. "*sensitivity analysis*")

change a cell's value and the formulas *recalculate* (and charts redraw) to see new answers
makes it *easy* to evaluate alternate sets of assumptions
what if *Gallons Used* was only 8.8?

Entering Formulas Using Point Mode

can use the *mouse* to select cell references
Excel types the cell reference for you!
rather than using your eyes to see and your fingers to type the cell reference in formulas

a more natural way to indicate cell references when building formulas
Point Mode indicator

Introducing Excel Functions

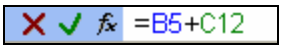
function
a *predefined* formula that receives one or more values, performs an operation, and returns a result

arguments

=SUM(*list*) returns the total of all values in the specified cells
=AVERAGE(*list*) sums the values specified and divides by the number of nonblank cells

AutoSum button
select a cell adjacent to numbers you want to add and click AutoSum button

builds a SUM function and suggests the range of cells to be added
if *Excel* suggests wrong range, you can drag through the range you need

Insert Function button 

displays a list of functions and helps you set values for arguments
an alternative to typing functions and arguments manually
easy way to see all of the available functions

Copying and Moving Cell Entries

review:
Clipboard Cut Copy Paste

drag-and-drop
use drag-and-drop to ***move*** a cell's contents & formatting to another cell
use [Ctrl]+drag-and-drop to ***copy*** a cell's contents & formatting to another cell

when you *copy* a cell, the cell's *formatting* is copied too (nib)

Fill Handle
used to copy a cell's contents to *adjacent* cell(s)

when you *move* a cell to a new location, *Excel* automatically adjusts the formulas to reflect the cell's new location

Copying Formulas with Relative and Absolute Cell References

when formulas/functions are copied to other cells, the resulting formulas depend on the type of ***cell references*** used in the original formula

2 main types of cell references:

- **relative reference**

  Excel interprets the referenced cell as a *location* relative to the original formula's location

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  cell E5 has **=SUM(B5:D5)**. *Excel* interprets as "sum the values *three columns to the left in this same* row through *one column to the left in this same row*"

  this function was copied to cell E15 to give **=SUM(B15:D15)**, which *Excel* interprets as "sum the values *three columns to the left in this same* row through *one column to the left in this same row*"

  cell B9 has **=SUM(B5:B8)** what does *Excel* think?

  when you copy a formula that uses relative references, the cell references in the copies have the *same logical intent*, although different cells are referenced to maintain the logic

  when you copy formula to another ***row***, *Excel* automatically adjusts the ***row*** portion

  when you copy formula to another ***column***, *Excel* automatically adjusts the ***column*** portion

	A	B	C	D	E	F	G	H
1	**Spring and Fall Events**						Change	1.2
2								
3	**Spring**	**March**	**April**	**May**	**Total**		**What If**	
4	Boston	20	13	18	=SUM(B4:D4)		=E4*H1	
5	New York	26	17	19	=SUM(B5:D5)		=E5*H1	
6	Chicago	18	15	13	=SUM(B6:D6)		=E6*H1	
7	San Diego	15	22	16	=SUM(B7:D7)		=E7*H1	
8								
9	Total	=SUM(B4:B7)	=SUM(C4:C7)	=SUM(D4:D7)	=SUM(E4:E7)			
10								
11								
12	**Fall**	**September**	**October**	**November**	**Total**			
13	Boston	22	17	20	=SUM(B13:D13)			
14	New York	28	16	24	=SUM(B14:D14)			
15	Chicago	20	19	19	=SUM(B15:D15)			
16	San Diego	15	25	20	=SUM(B16:D16)			
17								
18		=SUM(B13:B16)	=SUM(C13:C16)	=SUM(D13:D16)	=SUM(E13:E16)			

- **absolute reference**

  Excel interprets the referenced cell in a ***literal*** sense

  used to maintain a reference to a ***specific cell*** when the formula is copied

  indicated by placing a **$** in front of both the column letter and row number

  use [F4] to obtain $ (or type manually)

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  cell G4 has **=E4*H1**. *Excel* thinks "multiply the value *one column to the left in this same row* by the value in *cell H1*"

  this function was copied to cells F5:F7 to yield "multiply the value *one column to the left in this same row* by the value in *cell H1*"

Practice with Relative and Absolute References

	A	B	C	D	E	F	G	H
1	**Pronto Salsa Company**							
2	**Sales Analysis**							
3								
4			Selling	Unit	Units	Total	Total	Share of
5	Product	Cost	Price	Profit	Sold	Sales	Profit	Sales (Units)
6	*Salsa Verde Mild*	1.05	1.89	0.84	62100	117369	52164	0.181260946
7	*Salsa Fresca Medium*	0.95	1.77	0.82	75400	133458	61828	0.220081728
8	*Salsa Mexicana Hot*	0.95	1.77	0.82	75500	133635	61910	0.220373614
9	*Salsa Picante Very Hot!*	1.21	2.09	0.88	54600	114114	48048	0.159369527
10	*Salsa de Chile Guero Medium*	0.78	1.65	0.87	75000	123750	65250	0.218914186
11				**Total**	342600	622326	289200	1

What formula can be placed in cell D6 and copied to cells D7:D10 to calculate *Unit Profit*?

What formula can be placed in cell F6 and copied to cells F7:F10 to calculate *Total Sales*

What formula can be placed in cell G6 and copied to cells G7:G10 to calculate Total Profit?

What formula can be placed in cell E11 and copied to cells F11:G11 to calculate row totals?

What formula can be placed in cell H6 and copied to cells H7:H10 to calculate *Share of Sales*?

	A	B	C
1			
2			
3	Weight on Earth		150
4			
5	Object	Factor	Weight
6	Sun	28.00	4,200.00
7	Moon	0.17	25.00
8	Venus	0.91	136.50
9	Mars	0.38	57.00
10	Jupiter	2.53	379.50
11	Saturn	1.06	159.00

What formula can be placed in cell C6 and copied to cells below to calculate *Weight*?

Formatting a Worksheet

Formatting Values

formatting affects *displayed appearance* only.... it does not affect what's *stored* in the cell
Excel displays a *rounded* result if necessary to comply with your specified formatting
can format an individual cell or a *range* of cells

Currency Style button 

uses Accounting format, provides *fixed* $, commas, 2 decimal digits, parentheses for negative value, $ - for 0, adjusts column width if necessary

can use Format | Cells... | Number | Currency to obtain other variations
control decimal digits, *floating* $, control display of negative values

Comma Style button 

uses Accounting format, provides no $, commas, 2 decimal digits, parentheses for negative value

can use Format | Cells... | Number | Currency to obtain other variations

Percent Style button 

uses Percentage format, multiplies cell value by 100 and adds a % sign, displays no decimal digits

equivalent to Format | Cells... | Number | Percentage

Increase Decimal and Decrease Decimal buttons 

for more convenient control of decimal digits

Formatting Dates
Format | Cells… | Date has several predefined formats

Format Painter

just as in *Word*
use to copy a selected cell's *formatting* to other cell(s)

steps:
1) select cell that already has the desired formatting
2) click Format Painter button
3) select target cell(s)

Using Fonts and Font Sizes

just as in *Word*

2 ways to specify:

- Format | Cells… | Font tab
- Formatting toolbar

Changing Attributes and Alignment

Merge and Center button

combines two or more selected adjacent cells to create a single cell

the resulting merged cell contains only the upper left-most data in the selection, which is centered within the cell

Adjusting Column Widths

what do ###### mean? (nib)

default column width is 8.43 characters (≅ 1")

3 methods used here:

- drag column's right boundary as desired
- double-click column's right boundary to obtain best-fit
- Format | Column | Width… | type value

Applying Colors, Patterns, and Borders

to enhance a worksheet's appearance and improve its readability

Fill Color list box 

adds, modifies, or removes the fill color or fill effect from the selected object

Font Color list box 

formats the selected text with the color you select

Format | Cells | Patterns

Borders list box 

select from several cell border options
top border of first data cell vs. bottom border of column heading cell
can also use Format | Cells | Border…

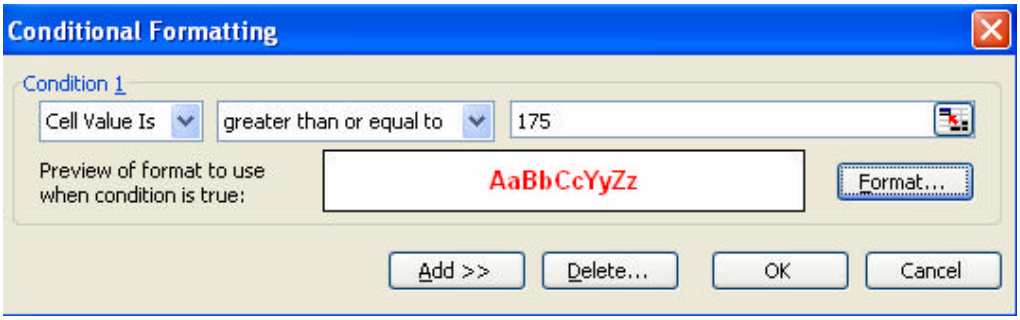
Using Conditional Formatting

conditional formatting

a format, such as cell shading or font color, that *Excel* automatically applies to a cell if a specified condition is true

up to three conditions can be specified

if more than one is true, the formatting for the *first* true condition is applied



Checking Spelling

just as in *Word*

Inserting and Deleting Rows and Columns

Excel automatically adjusts the cell references in formulas to reflect the new locations of cells that were *relocated* after inserting/deleting rows/columns/cells

inserting a row

steps used here:

1) right-click a cell in the row where the new row will be
2) click Insert… | Entire Row

existing rows are pushed down to make room for new row(s)

how could you insert multiple rows?

deleting a row

steps used here:

1) click the row selector for the row to be deleted
2) click Edit | Delete

inserting a column (nib)

steps:

1) right-click a cell in the row where the new column will be
2) click Insert… | Entire Column

existing columns are pushed right to make room for new column(s)

how could you insert multiple columns?

deleting a column

steps used here:

1) click the column selector for the column to be deleted
2) click Edit | Delete

Working with Formulas and Functions

Excel Tutorial

Working with Dates and Functions

Using Names in Formulas

can assign a cell a meaningful name

formulas can then refer to the cell by name rather than using *coordinates*

`=Net_with_Raise/Gross_with_Raise` vs. `=F11/F6`

steps to assign a name to a cell:

1) select the cell to be named
2) type the name in the Name Box

cannot use spaces in the name so use _ to link words

when build you formula using Point Mode, *Excel* will refer to the cell by *name*

Generating Multiple Totals with AutoSum

when you include blank cells to right and/or at the bottom of a selection, AutoSum will generate multiple SUM functions for each blank cell

Using Dates in Calculations

Excel represents dates using serial numbers

egs: January 1, 1900 is serial number 1
January 2, 1900 is serial number 2
_____ is serial number 36,525

Format | Cells… | Number | Date has many formatting options

by representing dates as serial numbers, *Excel* can do *date calculations* and *sort* dates correctly

=TODAY( )

function that returns the current day's *serial number* & automatically *formats* it as a date

=DATE(year, month,day)

function that returns a specified date's *serial number* & automatically *formats* it as a date

in-class practice: Date Calculations tab in *Demo Spreadsheets.xls*

Building a Conditional Formula with the IF Function

IF function

takes one of two actions, depending on a tested condition

=IF(test_condition, *true*_action, *false*_action)

use comparison operators to construct the test condition (pg. EXCEL E-10)

in class example: holiday turkey normally costs $1.29 a pound but if you buy a qualifying amount of groceries it only costs 19¢ per pound. What formula shall we place in cell B9?

= IF(_____ , _____ , _____)

	A	B
1	**Holiday Turkey Worksheet**	
2		
3	Weight of Turkey	22.34
4	Regular Cost of Turkey	$ 1.29
5	Promotional Cost of Turkey	$ 0.19
6	Purchase Requirement	$ 20.00
7		
8	Purchase amount (w/o turkey)	$ 54.67
9	Cost of Turkey	4.24
10	Total Cost	$ 58.91
11		

Using Statistical Functions

=MIN(*cell_list*)
=MAX(*cell_list*)
=AVERAGE(*cell_list*)
=COUNT(*cell_list*)

Calculating Payments with the PMT Function

calculates the periodic payment required to repay a loan

automatically applies Currency format with 2 decimal digits

=PMT(interest rate per period, number of payment periods, amount borrowed)

be consistent with the *time dimensions* for the first two arguments! (QuickTip E-14)

payments will calculate as a *negative* amount, so precede the amount borrowed with a (–) sign

in class example: you're buying a house w/ a 30-year loan at 11.9% & will borrow $150,000

= PMT(_____ , _____ , _____)

	A	B
1	**House Payment Worksheet**	
2		
3	Principal	$ 150,000
4	Term (years)	30
5	APR	11.90%
6	Monthly Payment	$1,531.38
7	Total Payments	$551,297.63
8	Total Interest	$401,297.63

Review: Copying Formulas

when formulas/functions are copied to other cells, the resulting formulas depend on the type of ***cell references*** used in the original formula

- **relative cell reference**

  Excel interprets the referenced cell as a location *relative* to the original formula's location

  when you copy a formula that uses relative references, the resulting formula has the same *logical* intent, although different cells are referenced

  Excel automatically adjusts relative references so the new formulas perform the same calculation logic as the original formula

  when you copy a formula to another ***row***, *Excel* adjusts the ***row*** portion

  when you copy a formula to another ***column***, *Excel* adjusts the ***column*** portion

- **absolute reference**

  Excel interprets the referenced cell in a *literal* sense

  maintains a reference to a *specific cell* when a formula is copied

  indicated by placing a **$** in front of *both* the column letter and the row number

  use [F4] to obtain $ (or type them manually)

More Practice with Functions and Copying Formulas

	A	B	C	D	E	F	G	H
1	**Superior Sails Charter Company - Loan Worksheet**							
2			Annual	Number of	Monthly	Current	Payments	Percent of
3	Boat Type	Loan	Interest	Monthly	Payment	Loan	Due this	Total
4	and Length	Amount	Rate	Payments	Amount	Status	Month	Payments
5	O'Day 34	$37,700.00	11.00%	60	$819.69	Paid	$ -	0.0%
6	Hunter 23.5	12,500.00	11.25%	60	273.34		273.34	3.0%
7	Cape Dory 33	55,000.00	12.00%	120	789.09		789.09	8.8%
8	Endeavour 37	60,987.00	9.75%	60	1,288.30	Paid	-	0.0%
9	Beneteau 51	130,000.00	8.75%	120	1,629.25	Paid	-	0.0%
10	Corbin 39	123,000.00	12.00%	180	1,476.21		1,476.21	16.5%
11	Hunter 35	79,900.00	9.50%	60	1,678.05		1,678.05	18.7%
12	Hunter 30	56,000.00	9.50%	120	724.63		724.63	8.1%
13	CSY Gulfstar 42	183,000.00	9.75%	240	1,735.79		1,735.79	19.4%
14	Beneteau 39	76,000.00	12.00%	120	1,090.38	Paid	-	0.0%
15	Merit 23	15,700.00	8.75%	36	497.43		497.43	5.5%
16	Beneteau 42	126,789.00	11.00%	180	1,441.08	Paid	-	0.0%
17	Hunter 43	155,500.00	11.25%	180	1,791.90		1,791.90	20.0%
18						Total Payments Due	$8,966.43	100.0%

What entry can be placed in cell E5 and copied to cells below to calculate *Monthly Payment*?

What entry can be placed in cell G5 and copied to cells below to calculate *Payments Due this Month*?

What entry can be placed in cell G18 to calculate *Total Payments Due*?

What entry can be placed in cell H5 and copied to cells below to calculate *Percent of Total Payments*?

Displaying and Printing the Formulas in the Worksheet (review)

2 views of a worksheet:

- Values view
- Formulas view

use Tools | Options... | View | Formulas to *toggle* between these 2 views
can also use [Ctrl]+[`]

Working with Charts

Why use Charts?

Planning and Designing a Chart

1. determine purpose and the data relationships it will present
2. determine chart type

   pie chart is the classic way to show how components contribute to a total

   column and line charts are commonly used to show trends over time
3. identify the worksheet data to build chart from
4. sketch the chart and its elements

   data points

   data series

   Legend

   Plot Area

   Chart Area

Creating a Chart

steps:

1) select the data range
2) click ChartWizard 

   guides you through four steps:

   a) select chart type and subtype
   b) confirm data range and whether data series are in rows or columns
   c) specify chart options (titles, gridlines, labels, legend, etc.)
   d) specify placement for new chart

      embedded on worksheet or placed on their own sheet

how can you select an existing chart?

Chart toolbar 

is available when chart is selected

dockable

can use Chart Wizard to help *modify* an existing chart when the chart is selected

Chart menu has same choices corresponding to Chart Wizard's 4 steps

if you print while chart object is selected, only the chart prints and takes the full-page

how delete a chart object?

Moving and Resizing a Chart

how resize a chart object?

how move a chart object?

how move an *element* of a chart (eg: legend or title)?

Editing a Chart

what happens when the values underlying the chart change?

what happens when you point to a data point on the chart?

what happened when you *dragged* one of the chart's columns to make it taller/shorter?

how switch to a different chart type?

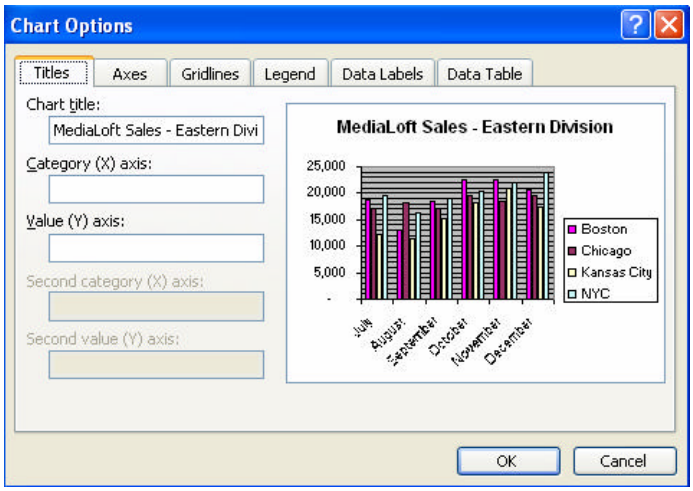
Formatting a Chart

every element of the chart is an individually selectable object with its own properties

Chart | Chart Options…

controlling titles, gridlines, labels, legend, many others

changed color of a series



Enhancing a Chart

Format button 

opens a dialog box with appropriate options for the selected object

Annotating and Drawing on a Chart

how add text in a floating text box?

how reposition a floating text box?

Drawing button 

opens the Drawing toolbar

- Arrow
- Text Box
- Drop shadow
- various shapes