Chapter 14: Fill-in-the-blank Computing: The Basics of Spreadsheets

Fluency with Information Technology
Third Edition

by
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Arranging Information

- Organizing textual information into lists
- An *array* of cells
  - Spreadsheets give us cells we fill in to set up our list
  - Entry that is too long for a cell may spill over in appearance, but still only occupies the cell into which it is typed

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Sorting the Data

- Alphabetize or sort, especially when the list is long
  - Say what items to alphabetize by selecting/highlighting the list
  - Sort operation is found under Data menu
    - *Ascending* or *descending* order, as strings or numbers

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Adding More Data to the List

- We can format cell entries
  - Italic, bold, underline, font styles, sizes, justification, color
  - Found under the *Format* menu
- Naming rows and columns
  - Automatic naming scheme—columns are labeled with letters, rows with numbers
  - We can refer to a whole column (column C), whole row (row 4), or single cell (C4)

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Headings

- In addition to cell addresses, it is convenient to name rows and columns meaningfully
- Example:

  Common Name Genus Species

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Table 14.1 Common spreadsheet operations

Operation	Using Excel…	Using Open Office…
Change column width manually	Place cursor at right side of column name, then drag	Place cursor at right side of column name, then drag
Change column width automatically	*Format > Column > Autofit Selection*	*Format > Column > Optimal Width…*
Cut, copy, paste contents	Standard: ^X, ^C, ^V	Standard: ^X, ^C, ^V
Fancy formatting	*Format > Cells…*	*Format > Cells…*
Clear cells	*Edit > Clear > All*	*Edit > Delete Contents…*
Delete columns, rows	*Edit > Delete*	*Edit > Delete Cells…*
Hide a column or row	*Format > Column > Hide*	*Format > Column > Hide*

Note: All spreadsheet applications provide these common operations; explore your system.

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Computing with Spreadsheets

- Most common application is to process numerical data
- Writing a Formula
  - Begin with = sign, define the value for the entry based on the value of the other entries
  - Formulas contain numbers, cell references, and standard arithmetic operations

    =F2*0.621

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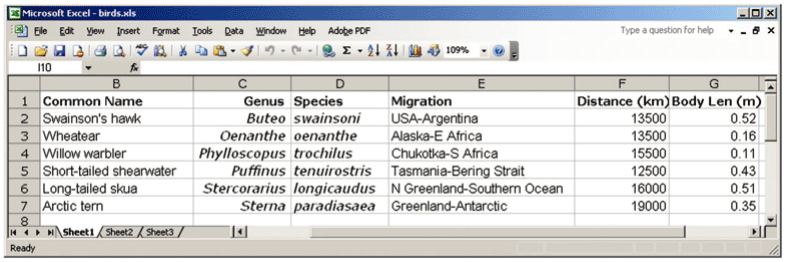

	B	C	D	E	F	G
1	Common Name	Genus	Species	Migration	Distance (km)	Body Len (m)
2	Swainson's hawk	*Buteo*	*swainsoni*	USA-Argentina	13500	0.52
3	Wheatear	*Oenanthe*	*oenanthe*	Alaska-E Africa	13500	0.16
4	Willow warbler	*Phylloscopus*	*trochilus*	Chukotka-S Africa	15500	0.11
5	Short-tailed shearwater	*Puffinus*	*tenuirostris*	Tasmania-Bering Strait	12500	0.43
6	Long-tailed skua	*Stercorarius*	*longicaudus*	N Greenland-Southern Ocean	16000	0.51
7	Arctic tern	*Sterna*	*paradisaea*	Greenland-Antarctic	19000	0.35
8						

Figure 14.1 Bird migration spreadsheet.

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Computing with Spreadsheets (cont'd)

- Repeating a Formula
  - *Copy/Paste*
    - Replicates equation to other cells
    - Software automatically adjusts references
  - *Filling*
    - Small box or tab beyond the cell's lower right corner (*fill handle*)
    - Grab with cursor and pull to other cells
    - Automated copy/paste

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Transforming Formulas: Relative versus Absolute

- Relative means "relative position from a cell"
  - If we're copying a formula to a cell two columns to the right of the original, the formula adjusts all cell references two columns right
- Absolute means unchanging—denoted by using $ in front of the part of the cell address that does not change
  - $C3
  - C$3
  - C3

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Cell Formats

- Control over the format of information displayed
  - *Format* > *Cells* > *Number*
  - We can control number of decimal places, setting of 1000's separators, and how to display negative numbers

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Functions

- Give the function name, and specify the cell range to be summarized in parentheses

  =max(J2:J7) finds highest value in range

  : denotes a range
- Available function names are listed in the f_x symbol and in *Insert* > *Function…* menu

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Filling Hidden Columns

- If columns are hidden, but we have copied formula across all columns, formula operates on hidden column also

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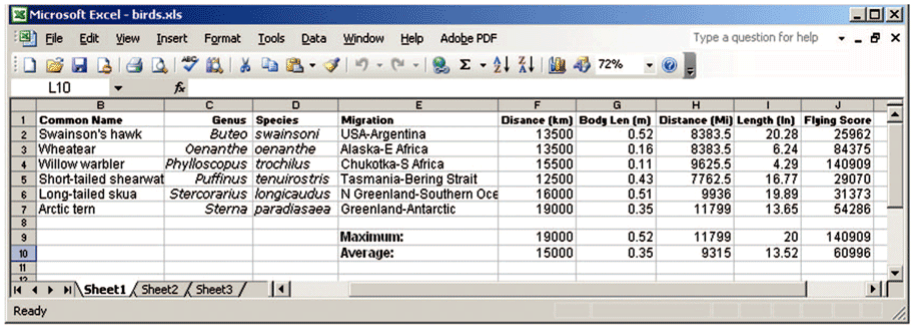

	B	C	D	E	F	G	H	I	J
1	Common Name	Genus	Species	Migration	Distance (km)	Body Len (m)	Distance (Mi)	Length (In)	Flying Score
2	Swainson's hawk	*Buteo*	*swainsoni*	USA-Argentina	13500	0.52	8383.5	20.28	25962
3	Wheatear	*Oenanthe*	*oenanthe*	Alaska-E Africa	13500	0.16	8383.5	6.24	84375
4	Willow warbler	*Phylloscopus*	*trochilus*	Chukotka-S Africa	15500	0.11	9625.5	4.29	140909
5	Short-tailed shearwat	*Puffinus*	*tenuirostris*	Tasmania-Bering Strait	12500	0.43	7762.5	16.77	29070
6	Long-tailed skua	*Stercorarius*	*longicaudus*	N Greenland-Southern Oce	16000	0.51	9936	19.89	31373
7	Arctic tern	*Sterna*	*paradisaea*	Greenland-Antarctic	19000	0.35	11799	13.65	54286
8									
9				**Maximum:**	19000	0.52	11799	20	140909
10				**Average:**	15000	0.35	9315	13.52	60996

Figure 14.2 Final spreadsheet for the migratory birds.

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Charts

- Graphical representation of spreadsheet data
  - Select values to be plotted/charted, then *Insert* > *Chart*…(Chart Wizard)
  - The Chart Wizard walks us through the graphing process
  - Can see a preview of different graphs with our data

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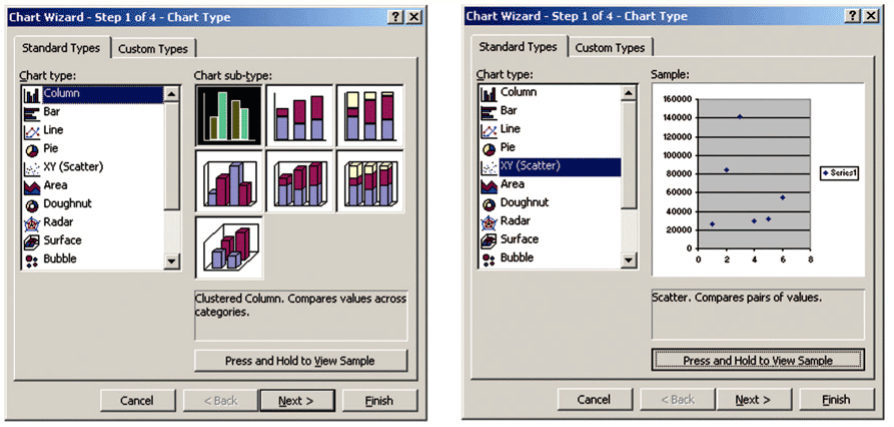

(a) (b)

Figure 14.3 GUI from the Excel charting wizard: (a) initial display; (b) the preview of a scatter plot graph.

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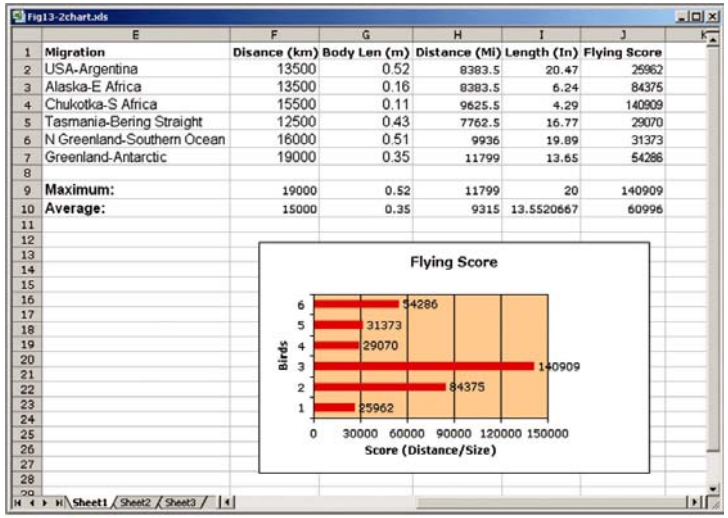

	Migration	Distance (km)	Body Len (m)	Distance (Mi)	Length (In)	Flying Score
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3	Alaska-E Africa	13500	0.16	8383.5	6.24	84375
4	Chukotka-S Africa	15500	0.11	9625.5	4.29	140909
5	Tasmania-Bering Straight	12500	0.43	7762.5	16.77	29070
6	N Greenland-Southern Ocean	16000	0.51	9936	19.89	31373
7	Greenland-Antarctic	19000	0.35	11799	13.65	54286
9	**Maximum:**	19000	0.52	11799	20	140909
10	**Average:**	15000	0.35	9315	13.5520667	60996

Figure 14.4 The horizontal bar chart displaying the Flying Score.

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Daily Spreadsheets

- Spreadsheets can organize personal information
  - Track exercise performance
  - Set up expense budget
  - Keep lists of books and CD's we've lent out
  - Follow a team's successes
  - Record flight hours after each flying lesson
  - Document expenses or income
  - Save records generated by online banking

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Calendar

- To make a custom calendar with spreadsheet software:
  - Enter first day of week (Sunday) and fill across next six columns (list of days completes automatically)
  - Below Sunday, enter date and fill across
  - Enter first two times going down a column on left side (format to taste) and fill down

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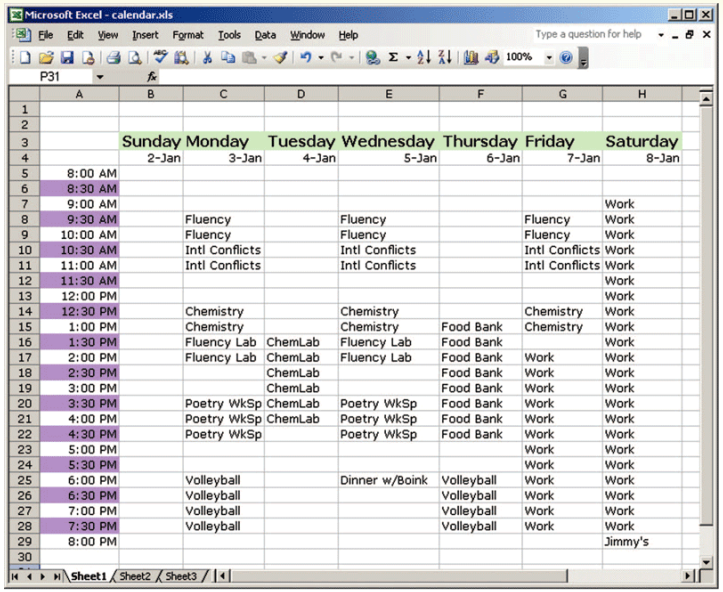

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
4		2-Jan	3-Jan	4-Jan	5-Jan	6-Jan	7-Jan	8-Jan
5	8:00 AM							
6	8:30 AM							
7	9:00 AM							Work
8	9:30 AM		Fluency		Fluency		Fluency	Work
9	10:00 AM		Fluency		Fluency		Fluency	Work
10	10:30 AM		Intl Conflicts		Intl Conflicts		Intl Conflicts	Work
11	11:00 AM		Intl Conflicts		Intl Conflicts		Intl Conflicts	Work
12	11:30 AM							Work
13	12:00 PM							Work
14	12:30 PM		Chemistry		Chemistry		Chemistry	Work
15	1:00 PM		Chemistry		Chemistry	Food Bank	Chemistry	Work
16	1:30 PM		Fluency Lab	ChemLab	Fluency Lab	Food Bank		Work
17	2:00 PM		Fluency Lab	ChemLab	Fluency Lab	Food Bank	Work	Work
18	2:30 PM			ChemLab		Food Bank	Work	Work
19	3:00 PM			ChemLab		Food Bank	Work	Work
20	3:30 PM		Poetry WkSp	ChemLab	Poetry WkSp	Food Bank	Work	Work
21	4:00 PM		Poetry WkSp	ChemLab	Poetry WkSp	Food Bank	Work	Work
22	4:30 PM		Poetry WkSp		Poetry WkSp	Food Bank	Work	Work
23	5:00 PM						Work	Work
24	5:30 PM						Work	Work
25	6:00 PM		Volleyball		Dinner w/Boink	Volleyball	Work	Work
26	6:30 PM		Volleyball			Volleyball	Work	Work
27	7:00 PM		Volleyball			Volleyball	Work	Work
28	7:30 PM		Volleyball			Volleyball	Work	Work
29	8:00 PM							Jimmy's

Figure 14.5 Calendar spreadsheet with entries added.

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Discount Table

- Suppose a store offers
  - $1.00 store credit for each $10.00 spent plus
  - $3.00 store credit for every two CD's purchased (one CD earns only one $1.00 credit)
- Construct a table to figure your credits
  - Left column is dollars spent, in $10 increments
  - Top row is CDs Purchased, in 1 CD increments
  - These are the axes of the table
  - Table entries: Formulas to calculate the correct credits, remembering some references have to be absolute
    - Get first cell formula correct then fill across and down to fill the table

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Paying Off a Loan

- Suppose you are considering a large purchase
  - You have been offered a loan at 5% interest
  - Create a table of the monthly payments required for different amounts borrowed for different times
  - Fill a row across the top with different numbers of payments; fill a column with different amounts

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Paying Off a Loan (cont'd)

- Use the "payment" function PMT
  - *Inputs* are
    - Interest RATE
    - Number of payments (Nper)
    - Present value—amount of loan (Pv)
  - The result is negative; the payment is a cost to you
  - Use *conditional formatting* to display entries in two colors
    - All cells with a certain value or range can be formatted automatically

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Importing Data

- *Foreign data*—data from another application we want to import into a spreadsheet
- Spreadsheets prefer to import foreign data as *tab-delimited text*
  - ASCII text files
  - Each cell's entry ends with a tab
  - Each row ends with a carriage return (ENTER)
  - Spreadsheets can output as tab-delimited
  - If list is in some other form, **Search/Replace** can often convert to tab-delimited
  - Some browsers can automatically re-format HTML tables for importing into spreadsheets

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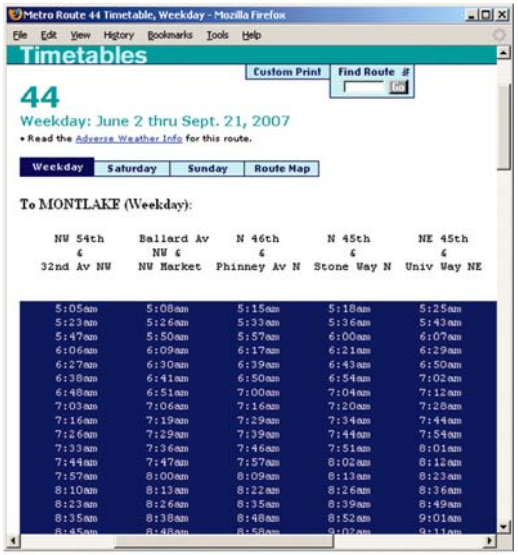

Figure 14.6 Bus schedule from the Web selected for copying.

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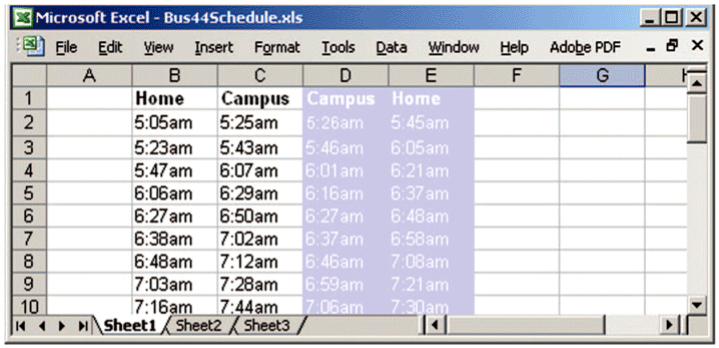

	A	B	C	D	E	F	G
1		Home	Campus	Campus	Home		
2		5:05am	5:25am	5:26am	5:45am		
3		5:23am	5:43am	5:46am	6:05am		
4		5:47am	6:07am	6:01am	6:21am		
5		6:06am	6:29am	6:16am	6:37am		
6		6:27am	6:50am	6:27am	6:48am		
7		6:38am	7:02am	6:37am	6:58am		
8		6:48am	7:12am	6:46am	7:08am		
9		7:03am	7:28am	6:59am	7:21am		
10		7:16am	7:44am	7:06am	7:30am		

Figure 14.7 Customized schedule with "to campus" in white, "from campus" in purple.

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Arranging Columns

- Data in other applications, like word processors, is hard to manipulate by column
- Solve problem by importing into spreadsheet
  - First create consistently delimited text file of data
- We can rearrange order of columns, then export as text file and re-import back to original application

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