Test Your Tech

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B. Is covered with food during holiday meals.
C. Helps answer "what-if" questions.

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Announcements

- Thanksgiving Holiday
  - November 27 and 28 (Thursday-Friday)
  - UW classes are canceled
  - TA holiday on Wednesday
  - No lecture or labs on Wednesday
  - CLUE tutoring Tuesday night

Announcements

- Free copy of Access, Vista, etc., for educational/academic use:
  - Links on Computing page on Course Web site
    - Search for CSE or INFO to find the link on the page
    - Username is your full UW email address
    - Password is different!
      - Click on "send a reminder"
      - Check wherever your email forwards to
  - If you are in INFO100, send me an email.

Announcements

- Upcoming readings and lectures
  - Read Ch. 16 for Monday

Day	Lecture Topic	QuickClick Topic
Monday	Data Transfer—XML (ch. 16)	Data Transfer—XML (ch. 16)
Monday	Database Query (ch. 17)	Database Query (ch. 17)
Wednesday	Database Design (ch. 17)	Database Design (ch. 17)

Monday's QuickClick Topics:

QuickClick on XML

- Syntax (Grammar) Rules
  - Case sensitivity
  - Smart quotes vs. straight quotes
  - Tagging
  - Nesting
  - Root
  - Pairing
- Labeling a file as XML
- Affinity Rule
- What programs can understand XML
- Where XML is used and what it's used for

Announcements

- Lab 12: Security
  - Set up your home computer for security
  - For extra credit
  - Due during finals week

Data Storage, Transfer, and Retrieval

Keeping your private information private and secure

D.A. Clements

Unit III: Data

- Storage
  - Format—physical and logical
- Retrieval
  - Getting just the information you need
- Transfer
  - Between people, departments, organizations
  - Media—spreadsheets, databases, XML

Spreadsheets

Spreadsheets are a powerful abstraction for organizing data and computation

An Array of Cells

A spreadsheet is a 2-dimensional array of cells…it's 3D with multiple cells

- The idea is that the rows or columns represent a common type of data
  - They will be operated on similarly, so that's easy to do
  - Adding more data of the same type means adding more rows or columns
  - Often spreadsheets contain numbers, but text-only spreadsheets are useful, too

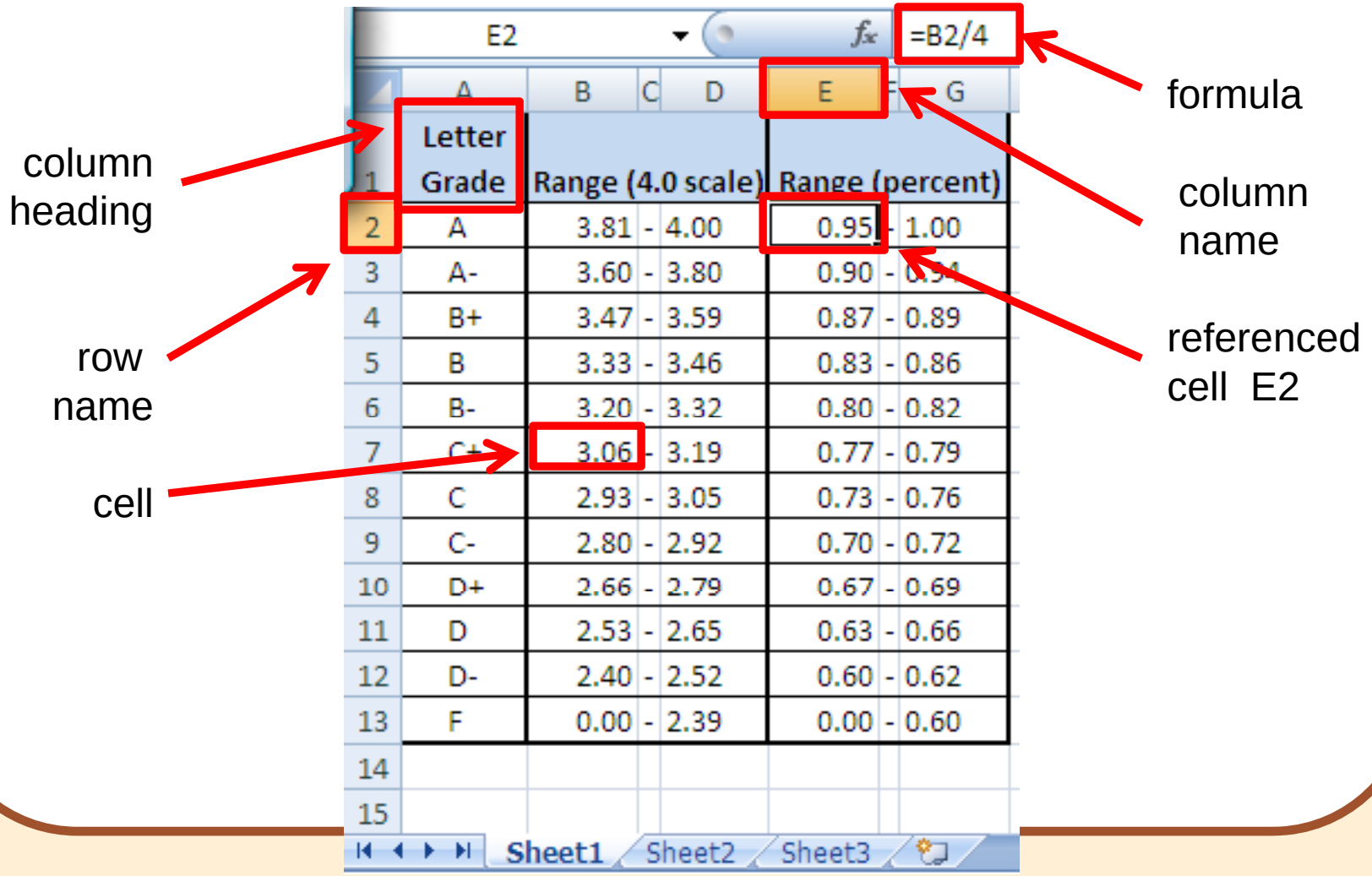
Looking for Similar Ideas

Spreadsheets are not so unusual

- The position (row/column) names the data, as with memory locations, variables, forms, etc.
- Operating on all elements of a column (or row) is an iteration, though not usually a WFI
- Setting a cell to a formula is an (unevaluated) *assignment statement* with cells as variables
- The formula is an expression
- Functions are built-in expressions

Think of spreadsheets as a handier interface for computing than JavaScript

Familiar Terminology



	A	B	C	D	E	F	G
1	Letter Grade	Range (4.0 scale)			Range (percent)		
2	A	3.81	-	4.00	0.95	-	1.00
3	A-	3.60	-	3.80	0.90	-	0.94
4	B+	3.47	-	3.59	0.87	-	0.89
5	B	3.33	-	3.46	0.83	-	0.86
6	B-	3.20	-	3.32	0.80	-	0.82
7	C+	3.06	-	3.19	0.77	-	0.79
8	C	2.93	-	3.05	0.73	-	0.76
9	C-	2.80	-	2.92	0.70	-	0.72
10	D+	2.66	-	2.79	0.67	-	0.69
11	D	2.53	-	2.65	0.63	-	0.66
12	D-	2.40	-	2.52	0.60	-	0.62
13	F	0.00	-	2.39	0.00	-	0.60
14							
15							

Formulas

The data in a spreadsheet can be manipulated using formulas

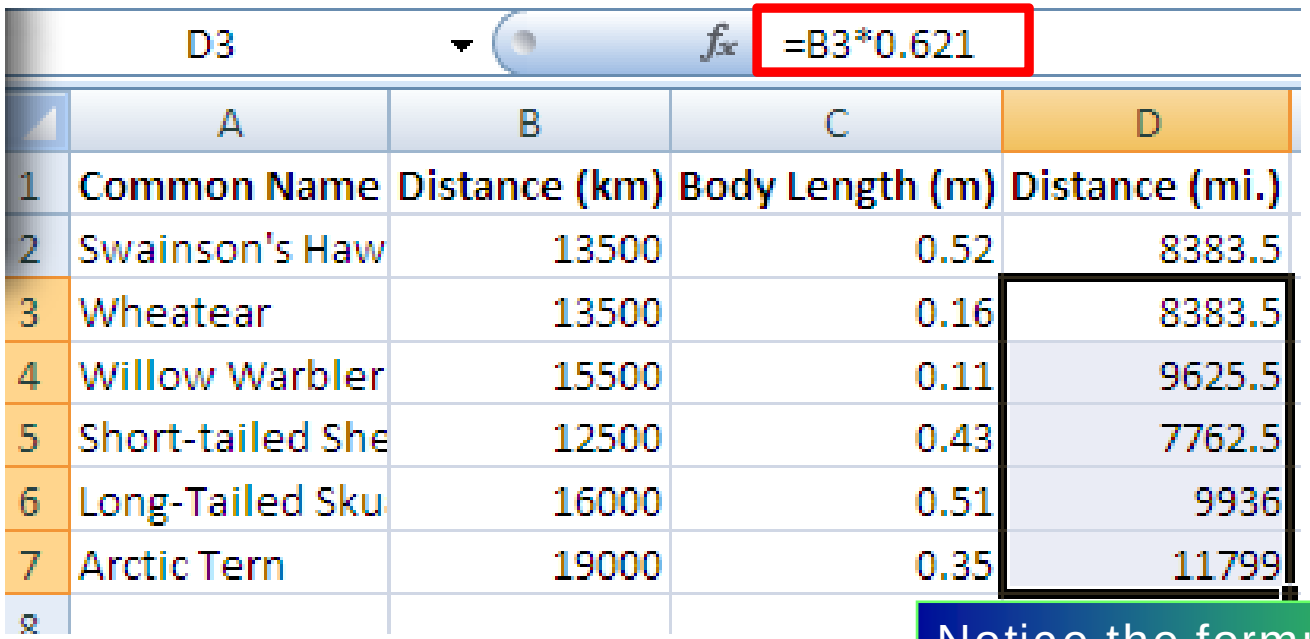
D2 | =B2*0.621

	A	B	C	D
1	Common Name	Distance (km)	Body Length (m)	Distance (mi.)
2	Swainson's Haw	13500	0.52	8383.5
3	Wheatear	13500	0.16	
4	Willow Warbler	15500	0.11	
5	Short-tailed She	12500	0.43	
6	Long-Tailed Sku	16000	0.51	
7	Arctic Tern	19000	0.35	

The value in D2 (selected cell) is the value in B2 times 0.621…the result is shown but the cell has the formula.

Apply Formula Again

The data in a spreadsheet can be manipulated using formulas

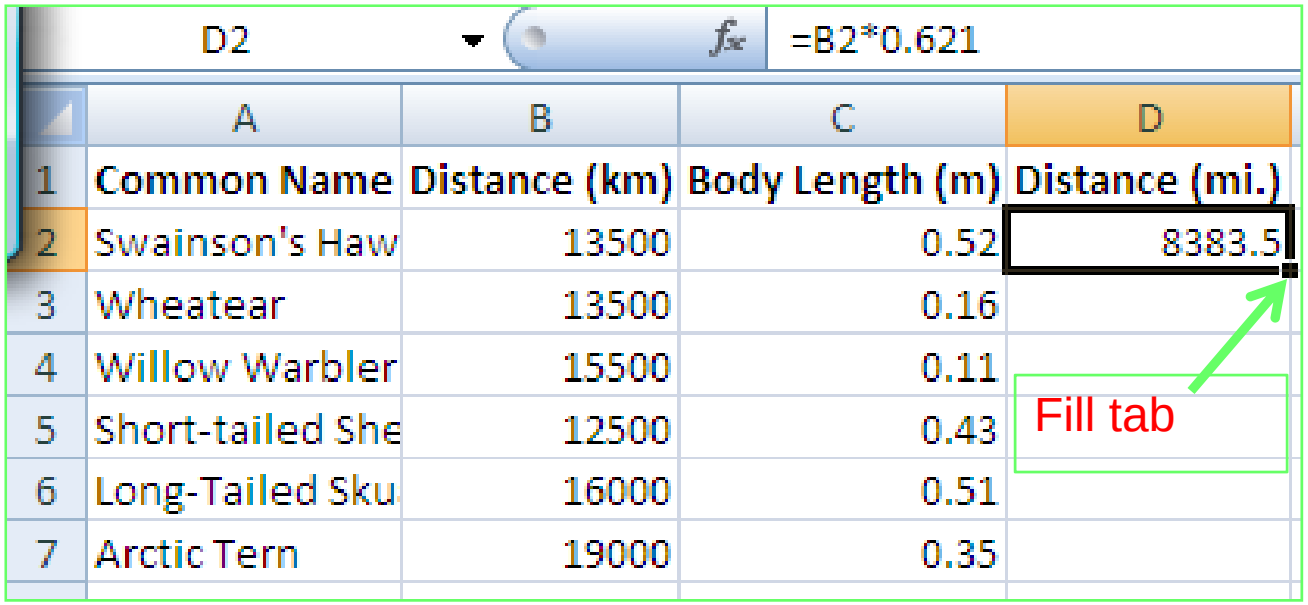


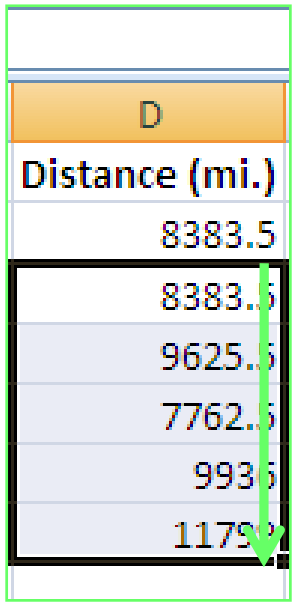
	A	B	C	D
1	Common Name	Distance (km)	Body Length (m)	Distance (mi.)
2	Swainson's Haw	13500	0.52	8383.5
3	Wheatear	13500	0.16	8383.5
4	Willow Warbler	15500	0.11	9625.5
5	Short-tailed She	12500	0.43	7762.5
6	Long-Tailed Sku	16000	0.51	9936
7	Arctic Tern	19000	0.35	11799
8				

Notice the formula.

Filling Replicates Formulas

Fill is a spreadsheet shortcut for copy-and-paste.





Grab the fill tab and pull in the direction to be pasted.

It's magic!

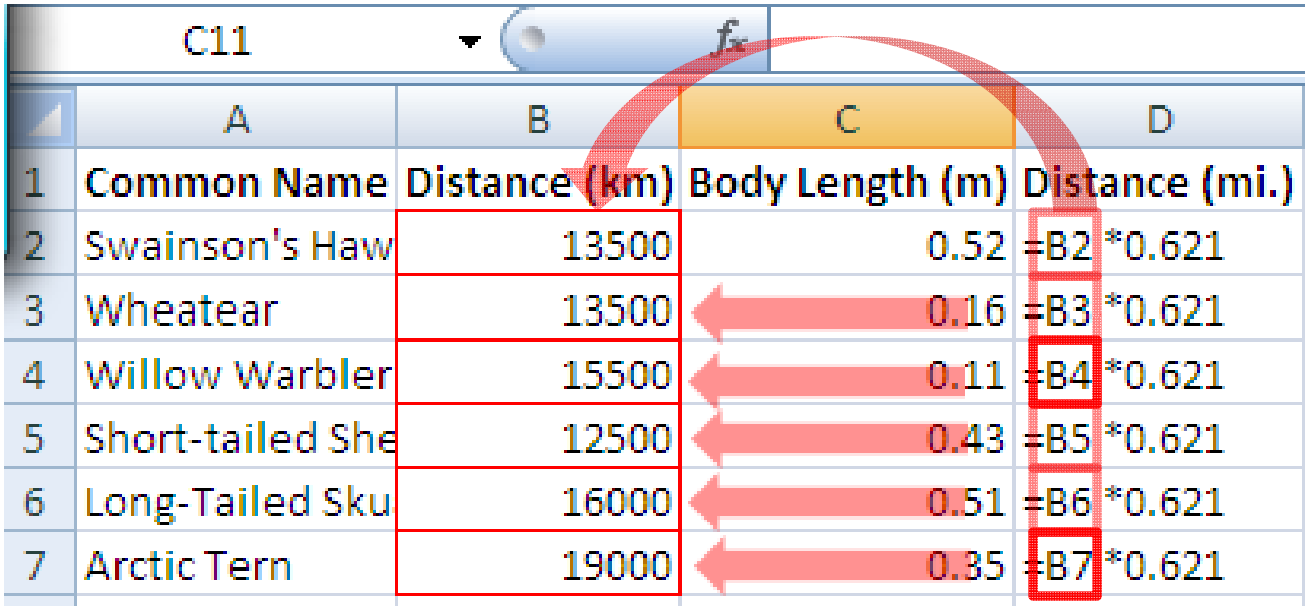
Relative & Absolute Addressing

- References to cells happens in two ways: Relative and Absolute (with $)
  - F2 relative column, relative row
  - F$2 relative column, absolute row
  - $F2 absolute column, relative row
  - F2 absolute column, absolute row

Relative references change when pasted/filled; absolute references do not!

Your intent determines which to pick.

A Powerful Translation



C11

	A	B	C	D
1	Common Name	Distance (km)	Body Length (m)	Distance (mi.)
2	Swainson's Haw	13500	0.52	=B2 *0.621
3	Wheatear	13500	0.16	=B3 *0.621
4	Willow Warbler	15500	0.11	=B4 *0.621
5	Short-tailed She	12500	0.43	=B5 *0.621
6	Long-Tailed Sku	16000	0.51	=B6 *0.621
7	Arctic Tern	19000	0.35	=B7 *0.621

- The graphic shows the equations in the cells with the translation:
- The row changes going down but the column doesn't.

An Example

Creating a discount table is case of using both relative and absolute refs

- Consider store credit of $1 per $10 spent
- $3 store credit for every 2 CDs (1 earns $1)

	CDs Purchased							
Spent	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
$10	$2.00	$4.00	$5.00	$7.00	$8.00	$10.00	$11.00	$13.00
$20	$3.00	$5.00	$6.00	$8.00	$9.00	$11.00	$12.00	$14.00
$30	$4.00	$6.00	$7.00	$9.00	$10.00	$12.00	$13.00	$15.00
$40	$5.00	$7.00	$8.00	$10.00	$11.00	$13.00	$14.00	$16.00
$50	$6.00	$8.00	$9.00	$11.00	$12.00	$14.00	$15.00	$17.00
$60	$7.00	$9.00	$10.00	$12.00	$13.00	$15.00	$16.00	$18.00

A cell is based on first column, top row data *in that row and column*…must mix relative and absolute references

Series

- Another handy property of fill is that it can make a series based on constants
  - Fill Sunday => Monday, Tuesday, Wed…
  - Fill 22 Feb => 23 Feb, 24 Feb, 25 Feb…
- More generally
  - Series fill will even count using a constant
  - Counting by odd sizes: give 1st two items

Demo

- Budgeting…