COMPSCI 111 / 111G

Mastering Cyberspace:
An introduction to practical computing

Spreadsheets

The 1st Killer App. VisiCalc

The idea for the electronic spreadsheet came to me while I was a student at the Harvard Business School, working on my MBA degree, in the spring of 1978. Sitting in Aldrich Hall, room 108, I would daydream. "Imagine if my calculator had a ball in its back, like a mouse..." (I had seen a mouse previously, I think in a demonstration at a conference by Doug Engelbart, and maybe the Alto). And "..imagine if I had a heads-up display, like in a fighter plane, where I could see the virtual image hanging in the air in front of me. I could just move my mouse/keyboard calculator around, punch in a few numbers, circle them to get a sum, do some calculations, and answer '10% will be fine!" (10% was always the answer in those days when we couldn't do very complicated calculations...)





Source: www.bricklin.com/history/intro.htm

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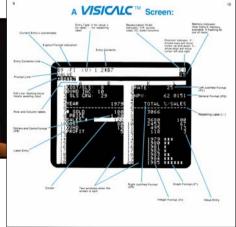
2

Development

Background

• Dan Bricklin and Bob Frankston





Design

Visible Calculator

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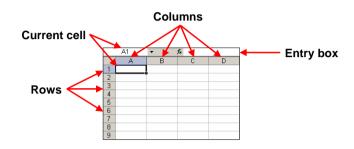
- Organize calculations as we would on paper in columns and rows.
- · Supports automatic updating of calculations.
- Copy formulas so we may apply these to large amounts of data.
- Spreadsheets are applications designed for numeric processing.



Microsoft Excel - Overview

Used to represent a table of data

- Rows (labelled with numbers)
- Columns (labelled with letters)
- Cells



http://en.wikipedia.org/wiki/Microsoft_Excel

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5

Changing appearance of cells

Alter Size

· Click on cell separator and drag

Add Borders

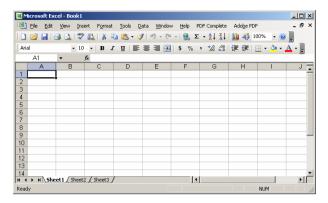
Format Cell

Add Shading

Format Cell

Font

- Style
- Size
- Alignment



Numbers

Decimal points

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Result

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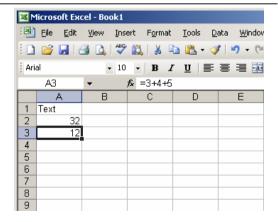
6

Formula

Entering Data

Cells contain

- Text
- Numbers
- Formulae (start with "=")



Entry box

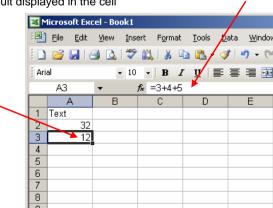
- Type data in entry box
- · Hit Enter key to accept value
- · All formulae are recalculated
- · Results shown in each cell

Formulae

Entering formulae

- Always begin with an equals sign
- Calculation typed into entry box

Result displayed in the cell



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8

Using Cell References

Cell Reference

- · Formulae refer to other cells
- Specify cell location using Row and Column IDs

	D5 ▼ f _x × ✓ =B5+C5				
	٨	В	С	D	E
1					
2		Hours Worked			
3					
4	Name	Monday	Tuesday	Total	
5	Joe	12	6	18	
6	Jenny	23	21		
7	John	4	8		
8	Julia	1	9		
9	[

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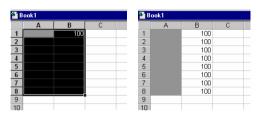
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- Sneadsheets 01

Save time

- · Fill many cells with same contents
- · Select a group of cells
- Fill Right
- Fill Down

Samuel Book 1					
	Α	В	С	D	
1		100			
2					
3					
4					
5					



Sook1				
	Α	В	С	
1		100		
2		100		
3		100		
4				
5		100		
6		100		
7		100		
8		100		
9				
10				

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Filling Down and Filling Right

10

Filling Cells with Formulae

Use Fill Down/ Fill Right on formulae

· Saves us entering new formula for each row

	D5 ▼ f _x × ✓ =B5+C5				
	٨	В	C	D	E
1					
2		Hours Worked			
3					
4	Name	Monday	Tuesday	Total	
5	Joe	12	6	18	
6	Jenny	23	21		
7	John	4	8		
8	Julia	1	9		
9					

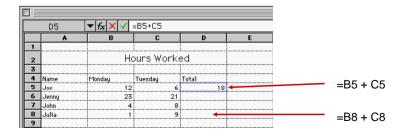
D5 should contain =B5 + C5
 D6 should contain =B6 + C6
 D7 should contain =B7 + C7

• D8 should contain =B8 + C8

Relative References

Cell reference in formula

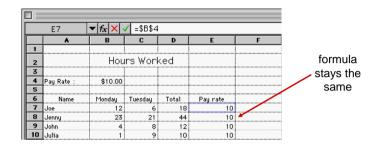
- · Use same formula, different cell references
- · Cell reference is relative to position of formula
- · Spreadsheets adjust formula automatically during fill operation



Cell references that don't change

Absolute references

- · Sometimes the cell reference should not change
 - Eg. for constants
- Use a dollar sign \$ before the row or column



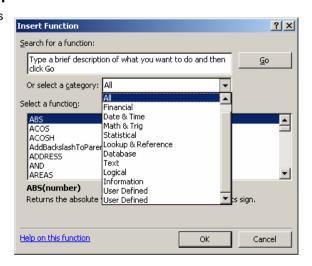
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13

Using built-in functions

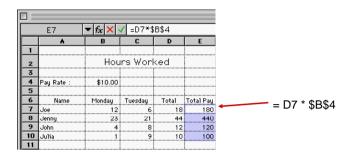
Insert a Function

- · Many categories
- · Help is useful



Relative and Absolute references

Sometimes formulae require a mixture of references that change and references which are fixed



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Functions

Many functions exist

- · Allow us to make more complicated formulae
- Examples
 - SUM
 - MAX
 - MIN
 - AVERAGE

Hours Worked 3 4 Pay Rate Specifying a range of cells Monday 7 Joe 8 Jenny 9 John

В6

▼ f_x × ✓ Monday

440

120

12

- · Top Left cell ·
- · Bottom Right cell
- B6:C10

Boolean Logic

Boolean value

- True or False
- · 2-valued logic

Compare two different values

Example. Are the following true or false?

- =(3=4)
- =(4 < 6)
- =(MAX(5, 6) = 5)
- =(SUM(1,2,3) = 6)

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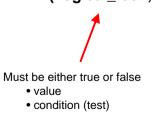
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IF functions

Makes a decision

• Different values used in the cell depending on the logical test

IF(logical_test , value_if_true, value_if_false)



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 boolean function This value appears in the cell if the

This value appears in the cell if the

boolean is false

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boolean is true

Boolean Functions

AND(a,b)

· True only when a and b are both true

OR(a, b)

· True if either a is true or b is true

NOT(a)

• True only when a is false

Are the following formulae TRUE or FALSE?

- =AND(3 = 4, 2 = 2)
- =OR(7 < 5, 3 > 3)
- =NOT(3 = 2)
- =OR(AND(2 = 3, 4 > 3), NOT(2 = 3))

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