

Spreadsheets

4 sheets to the wind

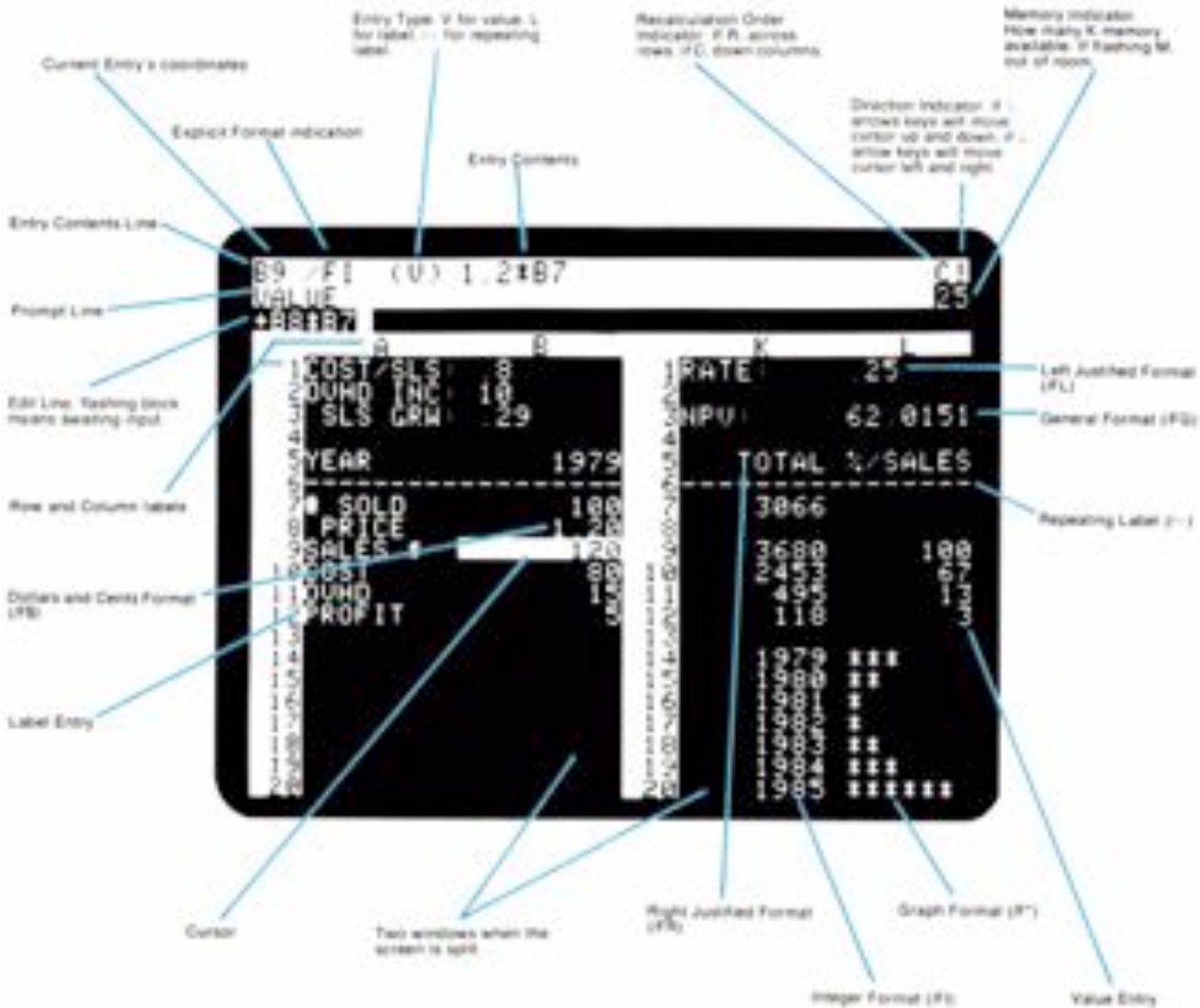


1979
World's 1st
Electronic
Spreadsheet

VISICALC

Written to run
on an Apple II, 3
years before
there was an
IBM computer!

A VISICALC™ Screen:



A last bit of history...

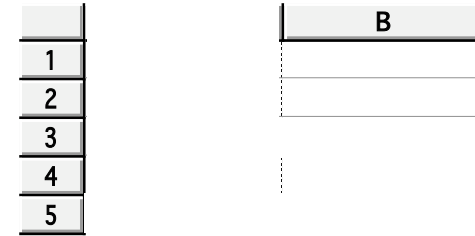
- Unfortunately MS has swamped the market with Excel.
- Excel is not the best spreadsheet - this was most likely Quattro-Pro which is now part of WordPerfect Office.
- Excel started its life as Multiplan - the first Macintosh spreadsheet and the first spreadsheet for a GUI. Later MS changed the name to Excel.

Spreadsheets

- Most spreadsheets are 2 dimensional (Row, Column).
- A few spreadsheets are 3 dimensional (Row, Column, Sheet).
- The main 'power' of a spreadsheet is in the recalculating equations that are triggered when the contents of referenced cells are changed.

Spreadsheets

- Row/Column metaphor
- Made of cells
- Cells contain text, numbers, equations
- Numbers can be dates, times, floating point numbers, etc.
- Cells can be formatted individually or in groups
- Each cell has an address
 - Relative - B1
 - Absolute - \$B\$1



The diagram illustrates a spreadsheet grid. On the left, a vertical column of five cells is shown, with the numbers 1, 2, 3, 4, and 5 in each cell from top to bottom. On the right, a horizontal row of three cells is shown, with the letter 'B' in the top cell. The intersection of the first row and the 'B' column is highlighted, representing the cell address B1.

Spreadsheets

- Column Address - A1:A12, A1..A12
- Row Address - A1:Z1, A1..Z1
- Matrix Address - A1:Z12, A1..Z12
- Columns, Rows and Matrices may also be named and referred to by name.
- You may also use absolute addresses.

Equations

	A		A
1	1	1	1
2	2	2	=1+A1

- Equations start with an '=' sign.
- Equations can refer to individual cells, cell rows, cell columns or matrices
- Equations may also link to different sheets or different programs
- In addition to standard arithmetic functions, spreadsheets support a wide variety of logical, text and math functions (check with the spreadsheet).
- Equations are solved in a linear chain based on the order and sequence of cell references.

Equations

- Equations follow the same rules of operation precedence that are followed in regular programming languages. Multiplication and division have higher precedence than addition and subtraction.
- NO $=A1-2*B4$
- YES $=(A1-2)*B4$

Equations

	A
1	1
2	2
3	3
4	=AVERAGE(A1..A3)

	A	B
1	1	
2	2	
3	3	
4	=SUM(A1..A3)/COUNT(A1..A3)	

It is usually possible to carry out operations several different ways. For example, above are two different (but not exclusive) ways to calculate the average of a column of numbers. The first uses the built-in average function, the second calculates the average by dividing the sum of the numbers by the number of numbers in the column.

Conditionals

- =IF(test,true,false)
- =IF(A1<A3,"Yup","Nope")
- =IF(A1>A3,IF(A1<10,"*",A1),"LT or EQ")

'Filling'

- Filling from a cell with an equation will normally cause the relative cell addresses to adjust in each copy. If you copied $=A1+1$ to the next cell down the equation in the next cell would be $=A2+1$ and so on.
- To keep equation cell addresses from changing use absolute addresses.
- Spreadsheets will also allow you to fill in numeric, date or text sequences into selected space.

Functions

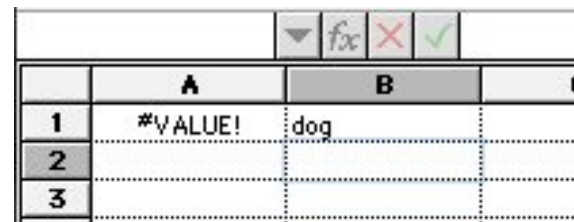
- Spreadsheets contain a wide variety of mathematical, trigonometric, text, business and scientific functions.
- Trigonometric functions usually expect arguments in radians rather than degrees.
- There are functions to convert from degrees to radians to help with this problem.

Trigonometric

- `=SIN(RADIAN(45))` returns the sine of 45°
- `=SIN(45)` returns sine of 45 radians
- `=DEGREE(ARCSIN(SIN(RADIAN(45))))` should return 45 or close to it (rounding error)
- Should be two tangent functions, one for 0-90 (1 parameter) and one for angles >90 (2 parameters).

Spreadsheets

- Inserting or deleting rows or columns or single cells will cause a shift in relative addresses to take the change into consideration.
- Errors are shown as, sometimes, cryptic messages in the cell.



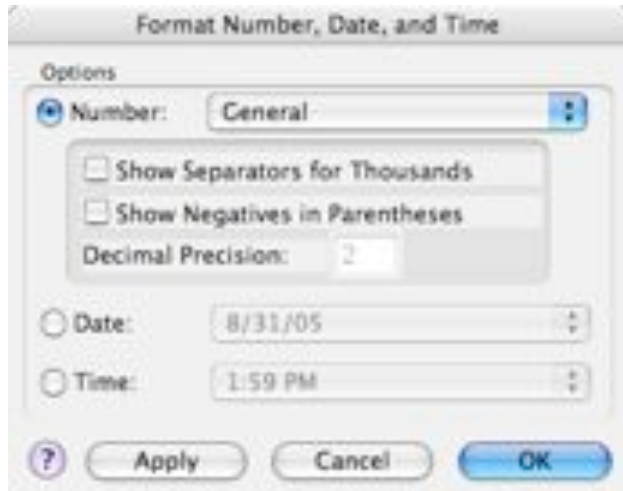
A screenshot of a spreadsheet interface. The top row shows a dropdown menu with a downward arrow, followed by a cell containing the text 'fx', a red 'X' icon, and a green checkmark icon. Below this is a grid with three columns labeled 'A', 'B', and 'C' at the top. The first row of the grid has three cells: the first cell (A1) contains the error message '#VALUE!', the second cell (B1) contains the text 'dog', and the third cell (C1) is empty. The second and third rows of the grid are empty.

	A	B	C
1	#VALUE!	dog	
2			
3			

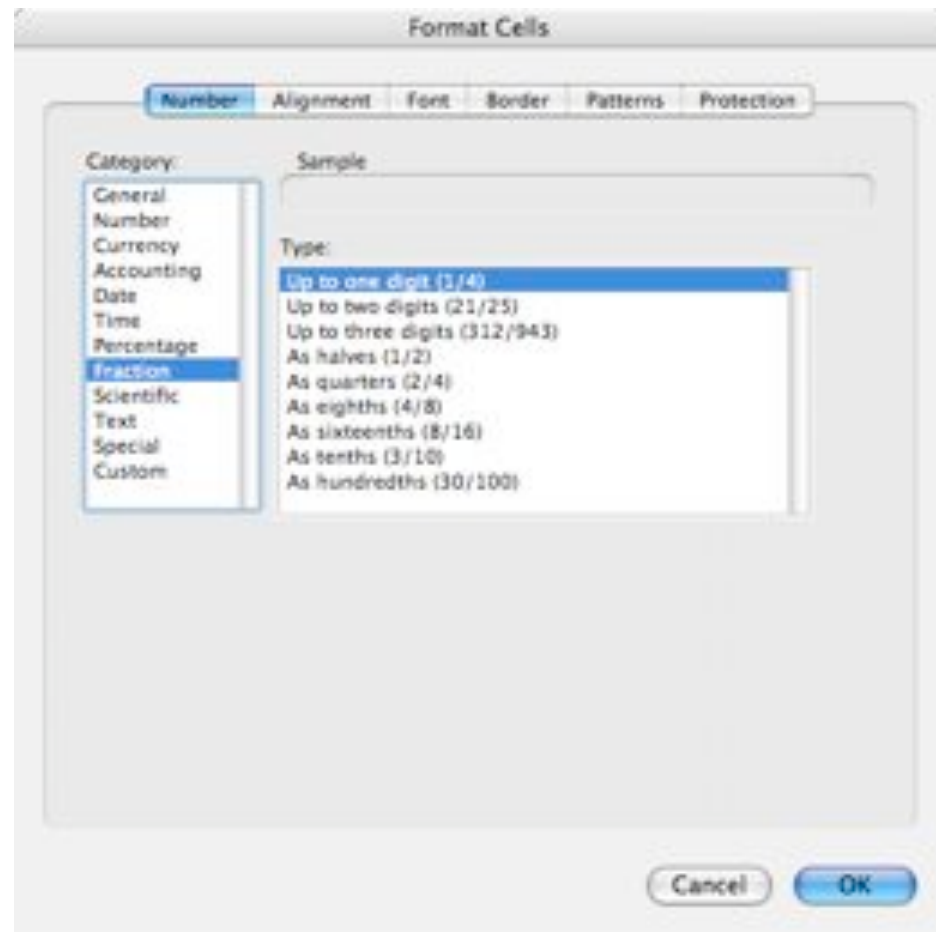
Formatting Cells

- In Appleworks you can double-click on a cell to bring up a formatting box, in Excel select a cell and choose Format>Cells....
- To format a range of cells select them and then look for a menu or tool bar choice for cell formatting.
- Excel also has nice auto-formatting and conditional formatting choices.

Formatting Cells



Appleworks



Excel

Add-ons

- Excel, like Quattro Pro before it, has a vast variety of programatic 'add-ons'.
- These include routines for handling matrices, solving complicated equations, performing statistics, access to external data bases, and a programming language that allows total customization.

Alternatives

- Many users of so-called productivity packages (word processing, spreadsheets and presentation) rail at the thought of continuing to support history's largest monopoly (Micro\$oft).
- So there is a major open-source effort on to replace Microsoft Office with free software duplicating the applications of Office and, at the same time, making it easy to read and write the document formats of office components.
- OpenOffice is the primary product and runs on a vast array of platforms and operating systems - check it out!