

The Bottom Line

An Introduction To Spreadsheets

by Vahé Guzelimian

Every night after his restaurant closes, Mr. Luciano goes to his office, turns on his Amiga and runs a spreadsheet. He types the day's sales numbers, the changes in price of his ingredients, and his new expenses. The numbers go into a grid of cells. The columns of the grid represent time periods, such as months and quarters; the rows represent revenues and expenses. Moments later he examines a printout that shows how much profit he made that day, so far for this quarter and so far for this year. Since it is the end of the quarter, he gets a summary printout of the quarter's results (as shown in Figure 1).

Pasta and Profits

"Let's look into the future," he says. "If the price of all my supplies goes up about 14 percent for the rest of the year, my employees' salaries go up 7 percent, and I keep prices the same, what will my profit be?" Moments later, the answer appears on the screen.

He wonders how much more profit he would make each quarter if he raised the price of his most popular dish, Pasta el Pesto, by 22 percent. After a few more entries, he gets the answer—\$2,100. Confident that demand will remain unaffected by the increase in price, he makes a note to inform the print shop to include the change in the next printing of his menus.

Mr. Luciano was able to perform these tasks with his Amiga and a spreadsheet program that he decided was the best suited for his business. He had quite a choice of spreadsheet programs: Calcraft, an "entry level" spreadsheet; Enable/Calc, a more advanced package; Symphony, Framework and 1-2-3—famous IBM PC programs which he could run on his Amiga with the IBM PC emulator software disk. With a little checking and some good advice, he made his choice. (*We'll review these products in later issues—Eds.*)

He isn't an accountant, and he's never studied business or finance, and he's certainly not a computer programmer. But with a little study, he mastered spreadsheeting."

His accountant used to handle every aspect of his business accounting. Whenever he wanted to find out how things were doing, he would call his accountant. Several days later, he would receive his answer, and at

the end of the month, an invoice. Today, the accountant is Mr. Luciano's consultant. Once a month the accountant has a complimentary meal at the restaurant; once a year, he helps Mr. Luciano with his taxes to return the favor.

What is a Spreadsheet?

A spreadsheet is an environment very similar to the ledger sheets traditionally used by accountants and bookkeepers. It is made up of cells on a grid of rows and columns. When you start a spreadsheet program, all you have is empty cells. By determining what those cells are to contain, you create a "template" that will carry out a specific task for you. A cell can contain a label, such as the heading "Gross Profits," a number, a formula, or a reference to the contents of another cell. By making entries into the cells, you can build a model for your particular business; each factor affecting the business is entered into the spreadsheet to create a financial simulation of the business. This model can imitate the financial responses of a business so well that it can make predictions and projections of future business activity.

Flexibility and Power

One very important aspect of spreadsheets is their flexibility. They can be used for any task that requires calculations based on relationships between numbers. Adaptable to any particular or unique business, they offer limitless potential for managers and people who run small businesses.

A spreadsheet program's main strength is its ability to carry out automatic recalculations of your data. Suppose you enter the accounting for your business for 1985. If you later make changes to any of the numbers, your spreadsheet will automatically recalculate all totals and any other mathematical functions in the sheet that use those numbers. You never have to touch a calculator.

	1	2	3	4	5
1	Luciano's Ristorante, 1985				
2	=====				
3		January	February	March	Quarter
4	=====				
5	Food Sales	\$8,765.00	\$9,234.00	\$9,021.00	\$27,020.00
6	Bar Sales	\$7,555.00	\$9,443.00	\$9,783.00	\$26,781.00
7	Total Revenues	\$16,320.00	\$18,677.00	\$18,804.00	\$53,801.00
8					
9	Supplies	\$2,251.00	\$3,588.00	\$3,432.00	\$9,271.00
10	Bar	\$1,621.00	\$1,893.00	\$2,040.00	\$5,554.00
11	Salaries	\$3,244.00	\$3,500.00	\$3,750.00	\$10,494.00
12	Rent/Utilities	\$980.00	\$980.00	\$980.00	\$2,940.00
13	Insurance	\$130.00	\$130.00	\$130.00	\$390.00
14	Misc. Expenses	\$453.00	\$398.00	\$489.00	\$1,340.00
15					
16	Total Costs	\$8,679.00	\$10,489.00	\$10,821.00	\$29,989.00
17	=====				
18	Net Profit	7,641	8,188	\$7,983	\$23,812
19	=====				
20					
21					

Figure 1. A sample spreadsheet from Luciano's Ristorante.

	1	2	3	4	5
1	Luciano's Ristorante, 1985				
2	=====				
3		January	February	March	Quarter
4	=====				
5	Food Sales	8765	9234	9021	= SUM(RC[-3]:RC[-1])
6	Bar Sales	7555	9443	9783	= SUM(RC[-3]:RC[-1])
7	Total Revenues	= SUM(R[-2]C:R[-1]C)	= SUM(R[-2]C:R[-1]C)	= SUM(R[-2]C:R[-1]C)	= SUM(RC[-3]:RC[-1])
8					
9	Supplies	2251	3588	3432	= SUM(RC[-3]:RC[-1])
10	Bar	1621	1893	2040	= SUM(RC[-3]:RC[-1])
11	Salaries	3244	3500	3750	= SUM(RC[-3]:RC[-1])
12	Rent/Utilities	980	980	980	= SUM(RC[-3]:RC[-1])
13	Insurance	130	130	130	= SUM(RC[-3]:RC[-1])
14	Misc. Expenses	453	398	489	= SUM(RC[-3]:RC[-1])
15					
16	Total Costs	= SUM(R[-7]C:R[-2]C)	= SUM(R[-7]C:R[-2]C)	= SUM(R[-7]C:R[-2]C)	= SUM(RC[-3]:RC[-1])
17	=====				
18	Net Profit	= R[-11]C-R[-2]C	= R[-11]C-R[-2]C	= R[-11]C-R[-2]C	= R[-11]C-R[-2]C
19	=====				
20					
21					

Figure 2. The same spreadsheet with formulas included.

Once you enter a model of your business into the spreadsheet, you can do "what if" tests. By estimating an increase in your gross sales for 1985, you can see instantly what your profits and tax liabilities will be and make projections.

Possibilities

Spreadsheets are only empty cells until you enter labels, values and formulas to tap their potential power. Because of their flexibility, they can be used as tools for performing a wide variety of tasks. Here are some common uses for spreadsheets in the office and the home.

Business Applications

- ▶ general ledger
- ▶ accounts receivable/accounts payable
- ▶ inventory management
- ▶ auto expense or telephone logs
- ▶ advertising expense analyses
- ▶ loan amortizations
- ▶ job costing
- ▶ product planning
- ▶ new business budgeting
- ▶ balance sheets
- ▶ income statements

Home Applications

- ▶ home budgeting
- ▶ managing bank accounts
- ▶ completing State and Federal tax forms
- ▶ managing home inventory for insurance purposes
- ▶ tracking such investments as stocks, options, bonds and mutual funds
- ▶ managing collectibles such as stamps, coins and books
- ▶ completing statements of net worth

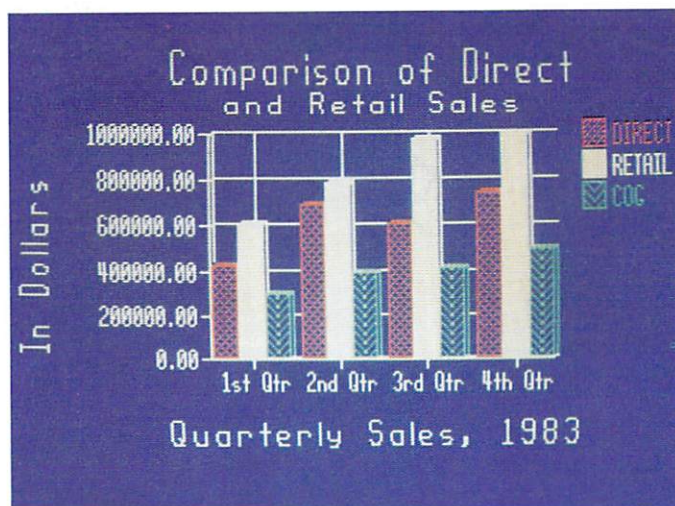
Features

Spreadsheets aren't just cells that can hold numbers and make calculations. The evolution of spreadsheets from their first appearance in 1978 has resulted in the development of a multitude of features that make them very powerful and easy to use.

Automatic Formulas. Most of the better spreadsheet programs offer a menu of formulas commonly used in business and finance. Instead of typing in each formula from memory, you can simply choose the one you want and the formula appears in the cell of your choice. Most programs offer the following types of formulas:

- ▶ Mathematical formulas, from sum and absolute value to rounding and logarithmic formulas.
- ▶ Trigonometric formulas such as sine and tangent.
- ▶ Logical formulas such as if, false and true.
- ▶ Financial formulas, such as the present value of a series of payments or effect of periodic interest rate.
- ▶ Statistical formulas such as mean, standard deviation and standard error.
- ▶ Special functions that allow you to look up numbers stored in tables in separate parts of the spreadsheet.

Of course, you're not limited to available formulas. You can build any formula you want. Some spreadsheets even let you add your custom formula to the menu, so you never have to type it in again.



AL (L) ASSUMPTIONS: 1=1000000 2=511127 3=1000000 4=2047031 5=4095015 6=1270511

ALLOW spreadsheet maximum size of 255 rows and 255 columns

ASSUMPTIONS:		INCOME STATEMENT				
		1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	TOTAL
1	Sales					
2	Direct	426300	694630	616625	747163	2484818
3	Retail	617500	795000	800000	999000	3211500
4	Cost of Goods	300000	400000	420000	500000	1620000
5	Gross Income	744800	1009630	1179125	1247851	4259986
6	Operating Costs					
7	Salaries	122,400	154,661	170,000	195,666	642,727
8	Commissions	119,614	129,750	116,046	151,110	536,520
9	Benefits	40,000	55,000	61,712	68,495	225,207
10	Rent/Workspace	30,000	35,000	35,000	50,000	150,000
11	Utilities	4974	5515	5530	6271	22293
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						

Absolute or Relative Cell References. Spreadsheets can refer to a cell in two ways. By naming the row and column number of a cell, you make an *absolute* reference to it. Or, you can refer to a cell by its position *relative* to the currently selected cell. For example, if you want to refer to a cell that is 21 rows up and two columns to the left of the selected cell, you can refer to it in a code such as R[-21]C[-2]. Formulas made up of relative cell references can be copied from place to place in the spreadsheet while maintaining the validity of the formula. In the sample spreadsheet in Figure 2, all the totals for the quarter were calculated with the same relative formula: SUM(RC[-3]RC[-1]). As soon as the first one is calculated, all you have to do is copy the formula in all the other cells to get the correct formulas for the other sums.

Many programs give you the freedom of not having to type in the cell reference by its column and row number. When you want to enter a reference to a cell into a given cell, you can just point to the cell you want to refer to and click the mouse button. The cell's relative reference is then entered into the selected cell. You can even mark a range of numbers—for adding a column of numbers, for example—by dragging the mouse cursor across the range. The relative range reference is automatically entered into your formula.

F12: 3
Highlight all cells with formulas that refer to a given cell
Enter cell whose related cells are to be highlighted: F12

PER PERSON TOUR EXPENSES							
Group:	Hawaiian Haven	MON	TUES	WED	THURS	FRI	Dates: Jun 2-9
City	Boston	Honolulu	Lahaina	Kona	Honolulu	Totals	
1 Air fare	\$456.00	\$35.00	\$32.00	\$38.00	\$29.00	\$590.00	
2 Bus, Taxi		\$3.00		\$12.00		\$15.00	
3 Cruise						\$14.99	
4 Entertainment	\$69.00	\$19.00	\$9.00			\$97.00	
5 Lodging		\$55.00	\$38.00	\$62.00	\$55.00	\$210.00	
6 Meals: Breakfast		\$9.00	\$9.00	\$9.00	\$5.00	\$32.00	
7 Lunch		\$6.00		\$4.50		\$10.50	
8 Dinner	\$18.00	\$14.00	\$25.00			\$57.00	
9 Miscellaneous		\$3.00		\$7.99	\$12.00	\$22.99	
10 Totals	\$540.00	\$140.00	\$107.50	\$137.49	\$115.99	\$1,044.83	
TOTAL PER PERSON EXPENSES						\$1,044.83	

1 Cell has 3 related cells F12

Alt: (P) Air fare
Disallow changes to a range
Enter range to protect: B7..B16

PER PERSON TOUR EXPENSES							
Group:	Hawaiian Haven	MON	TUES	WED	THURS	FRI	Dates: Jun 2-9
City	Boston	Honolulu	Lahaina	Kona	Honolulu	Totals	
1 Air fare	\$456.00	\$35.00	\$32.00	\$38.00	\$29.00	\$590.00	
2 Bus, Taxi		\$3.00		\$12.00		\$15.00	
3 Cruise						\$14.99	
4 Entertainment	\$69.00	\$19.00	\$9.00			\$97.00	
5 Lodging		\$55.00	\$38.00	\$62.00	\$55.00	\$210.00	
6 Meals: Breakfast		\$9.00	\$9.00	\$9.00	\$5.00	\$32.00	
7 Lunch		\$6.00		\$4.50		\$10.50	
8 Dinner	\$18.00	\$14.00	\$25.00			\$57.00	
9 Miscellaneous		\$3.00		\$7.99	\$12.00	\$22.99	
10 Totals	\$540.00	\$140.00	\$107.50	\$137.49	\$115.99	\$1,044.83	
TOTAL PER PERSON EXPENSES						\$1,044.83	

Alt: B3C..B37

Linking Spreadsheets. Some spreadsheet programs offer a great deal of power by allowing the user to make links between several spreadsheets. For example, a number generated in one spreadsheet can be entered automatically into a cell in a second spreadsheet. If a cell value changes in the original spreadsheet, the cells that depend on this cell's value in the second spreadsheet are automatically updated.

"Macros." Once you become proficient at using spreadsheet programs, you'll find that there will be times when you will want to carry out an operation that involves entering a long string of commands. Some spreadsheet programs allow you to make the press of one or two keys represent a long string of commands. These "macros" can save you a great deal of time.

Working with Other Programs. Spreadsheet data can be transported to other applications such as charting or word processing programs. A chart program, for example, allows you to create colorful business graphics from the generated data. With a camera, you can create effective slides of pie charts and scatter diagrams for your next slide presentation.

You can also use spreadsheet programs to collect current stock market quotations over the phone. These programs link with the spreadsheet you've designed and automatically dial the number of the quotation service, get the information you require and analyze it with your spreadsheet. If the spreadsheet model is well designed, you may be able to spot trends and act quickly to make a profit. This can help you become independent of brokers for making investment decisions, saving you money on brokerage commissions and giving you greater control of your investments.

Integration. Some spreadsheets go even further by providing the word processor and charting capabilities within the spreadsheet itself. In this way, you can use your model to get calculations, and then, at the click of the mouse button, view your data in chart form, without having to exit the program to start a separate charting program.

The larger integrated packages offer up to five components that can work in harmony to satisfy most of your business needs. The components are usually a spreadsheet, graphics program, word processor, database manager and telecommunications package. An application of their combined use might be:

- ▶ The spreadsheet is used to analyze financial data.
- ▶ The graphics component charts the data from the spreadsheet.
- ▶ The database program tracks lists and creates reports that may include data from the spreadsheet.
- ▶ The word processor prepares letters containing ranges of numbers from the spreadsheet and a chart that represents this data from the graphics component.
- ▶ The telecommunications component zaps the letter to an associate.

Protection. Once created, a model has cells in which numbers must be entered. All other cells that make up the model are labels or formulas and should not be altered. Most spreadsheet programs offer a protection feature to let you protect the cells containing labels and formulas so they can't be accidentally changed. A password is required to reverse the protection. A protected document usually doesn't display cell division marks or row and column numbers. When a number is entered into a data entry cell, pressing the Enter key will take the cursor to the next data entry cell, prompting the user to enter another value or to press Enter to go on to the next unprotected cell.

Ready-Mades

You don't have to spend hours developing models for the dozens of practical applications you may find for your spreadsheet program. There are a number of books available with sample spreadsheet models for home and business use. By entering these models, you'll learn a lot more about how spreadsheets work. If you don't have the time or desire to enter your own models, you can purchase ready-to-use models on disk from many software manufacturers. These models can then be customized for your specific needs.

Before he bought his Amiga, Mr. Luciano thought a spreadsheet was something you put on a bed. Now he speaks of his business as having two stages—before and after spreadsheets.

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To satisfy your business needs, integrated spreadsheet packages offer components that work in harmony, such as a spreadsheet, graphics, word processing, database management and telecommunications.