

user the ability to pass information from the spreadsheet to word processing or database management packages, and there are many complementary programs available to allow output to be in a variety of graphic forms: pie-charts, for example, or bar charts.

We have already mentioned one possible application of spreadsheets to the home computer user: analysing domestic expenses and budgeting. Another very appropriate use in the home might be in the installation of central heating, where there are a large number of variables to be taken into consideration: the type of fuel to be used, number and type of radiators, boiler output, etc. In fact, any decision-making process can be helped considerably by the use of a spreadsheet, not least because the user is almost forced to cover any and all possibilities.

Perhaps the most impressive feature of a business oriented spreadsheet run on an appropriate machine is the sheer speed of its operation. This is a function of machine code programming, and, not surprisingly, the speed of a package written in BASIC for a small home computer might, in contrast, give some cause for alarm.

It is perhaps worth considering some of the problems that one would encounter if one were to attempt to write such a program in BASIC, if only as an indication of the complexity of the task.

To start with, each cell must be defined in three ways. It must be capable of holding 'string variable' data, like 'January' or 'Rates'; it must be

capable of holding numeric data for use in arithmetic operations, the amount of rates paid in January, for instance; and it may be required to hold a formula which is, in essence, a line of programming code, like 'annual rates/12' to give the monthly rate. Then, each cell must be expandable and contractable in size, but without losing the least significant part, so they must all be duplicated: one to appear on the screen, the other to always hold all the data, hidden away inside the program.

As you can see, the data handling alone is a very complex task — and remember that the more sophisticated packages may have up to 16,000 individual cells! The techniques used in writing such software are very much akin to the writing of interpreters for languages such as BASIC or FORTH, and similar techniques are also used in database management software.

All this goes some way towards explaining the high cost of such purpose-written business software. A package like Visicalc or Supercalc may cost hundreds of pounds, but one should perhaps bear in mind the savings that its use can bring about. The fairly simple application that we considered earlier, that of a manager compiling budgets, for instance, can lead to savings of perhaps 15 or 20 per cent in a year. The cost of the software is a very insignificant part of such an economy, even before one starts to think about the savings in time and energy. Indeed, the Visicalc package has probably been the Apple salesman's best friend.

Windows On The World

Just as we can move the cursor around the screen, left or right, up or down, under keyboard control, in a spreadsheet we can move the screen around the sheet. This sophistication allows an area much larger than that of the screen to be displayed.

Some portable computers with limited screen size, like the Epson HX-20 and the Osborne-1, use this same system in all their operations

	A	B	C	D	E	F	G	H	I
1: TITLES	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	
2: RENT	180.00	180.00	180.00	192.00	192.00	192.00	192.00	192.00	192.00
3: RATES	42.85	42.85						51.90	51.90
4: INSURANCE									
5: TOTAL									
6: HOUSEHOLD	222.85	222.85	222.85	222.85	222.85	222.85	222.85	222.85	222.85
7: TRANSPORT	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
8: MEALS	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
9: CLOTHES	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50
10: BOOKS	.00	.00	.00	.00	.00	.00	.00	.00	.00
11: TOTAL									
12: SCHOOL	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
13: FUEL	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00
14: SERVICE	.00	.00	.00	.00	.00	.00	.00	.00	.00
15: REPAIRS	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00	26.00
16: TAX	.00	.00	.00	.00	.00	.00	.00	.00	.00
17: INSURANCE	.00	.00	.00	.00	.00	.00	.00	.00	.00
18: MILEAGE	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
19: TOTAL									
20: CAR	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00
21: C.P.M	.07	.07	.07	.07	.07	.07	.07	.07	.07
22: FARES	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00	190.00
23: ACCOMODAT	86.00	86.00	86.00	86.00	86.00	86.00	86.00	86.00	86.00
24: MEALS	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
25: ENTERTAIN	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
26: TOTAL									
27: LEISURE	310.07	310.07	310.07	310.07	310.07	310.07	310.07	310.07	310.07

	D	E	F	G	H
8:	8.00	5.20	8.00	8.00	4.00
9:	6.30	2.25	.00	18.00	3.40
10:	.00	.00	14.50	.00	6.35
11:					
12:	16.00	8.95	25.70	29.20	15.95
13:	34.00	41.00	48.00	35.00	39.00
14:	.00	112.00	.00	.00	44.00
15:	.00	.00	.00	.00	.00
16:	.00	.00	.00	.00	.00
17:	.00	.00	.00	.00	182.00
18:	600.00	950.00	1200.00	620.00	820.00
19:					
20:	34.00	153.00	48.00	35.00	265.00
21:	.06	.16	.04	.06	.32
22:	.00	.00	.00	.00	.00
23:	.00	.00	.00	.00	.00
24:	72.00	36.00	41.00	18.00	46.00
25:	13.00	22.00	14.00	13.00	22.00
26:					
27:	85.06	58.16	55.04	31.06	68.32

H12 Form=H7+H8+H9+H10
Width: 9 Memory: 20 Last Col/Row:027 ? for HEL
1>