ECONOMIC PROGRAMMING

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SOME MONTHS ago I bought a small computer to use as a hobby. Because I knew that sooner or later I would tire of it, expenses were kept to a minimum.

The equipment acquired was a Radio Shack TRS-80 Color Computer, with extended Basic. It is hooked up to an old 10″ black and white TV.

It has a Motorola 6809E 8 bit chip with a programmable clock speed of 0.894 MHz and up and a video display of sixteen lines of 32 upper case characters. The somewhat poor display can nevertheless be arranged to output a great amount of data.

It soon became apparent that if any worthwhile programming was to be done, then a tape recorder and a printer would also be needed. At today's prices, and not including the TV, it would cost about $440 to replace this equipment.

After some weeks of familiarisation and teaching it to play blackjack, poker, craps, etc. etc. and the usual maze games, a more substantial project was required.

At this time, it was decided to rewrite the survey programs previously written for the TI59 and the HP41C. While they are still not one hundred percent complete (will they ever be?), they are in working order, including rotating sideshots and the combination of hardware/software makes for a very powerful surveying tool.

Two hundred pairs of co-ordinates can be stored at any one time and these can be saved to or loaded from cassette tapes.

Speed of operation is very quick, much quicker than that delivered by the handheld programmable calculators. Most calculations are complete before the eye can switch from the keyboard to the display. No single calculation takes longer than one second.

The problem of storing computed data in the computer during the program operation caused some concern. Disk storage was out of the question for reasons of economy and to store any values in a dimensioned array would also be unsatisfactory. If the program was to crash for any reason, such as trying to work with a pair of non-existant co-ordinates, then all data in an array would be immediately lost.

The present method of storing and retrieving these single precision, nine significant digit, values may be of interest.

A numeric value, or numeric variable, occupies five bytes of memory in this particular machine. The location, or address of the floating-point value is allocated by Basic whenever a variable is defined. The address of the first byte of any variable can be ascertained using VARPTR(n), the variable pointer function, where 'n' is the variable.

As each value, or co-ordinate, uses up five bytes, and because it was required to store 200 pairs of these values, then two thousand bytes must be reserved in memory for this purpose.

Top of memory in this computer is at address 16383, so the statement CLEAR 200, 14380 reserves random access memory beginning at 14381, thus saving the required amount and leaving three bytes over for luck.

In the routine in Figure 1, ST is the station number and NG and EG the northing and easting to be stored or recalled:

If you want to key the program into your own micro, then lines 2, 10 and 38 will probably have to be amended depending upon the address of the topmost byte of its memory. Otherwise, I think the statements, functions and syntax are pretty well standard.

After starting up the program with RUN (ENTER), key in as many station numbers and co-ordinate values as necessary to prove the routine.

Press BREAK and start again with RUN 30 (ENTER) and by inputing the same station numbers see if the values are not only still there but have been accurately stored and recalled.

Buying a computer that is far too sophisticated and expensive to do the work required is akin to laying out a house with a Wild T2 or setting up a ten foot offset line with a costly EDM.

Besides, when it comes time to upgrade, it is far easier to write off or replace a $600 investment than one costing twenty times as much. ●

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 2 CLEAR 200, 14380
 4 INPUT ST, NG, EG
 6 X = VARPTR(NG)-1
 8 Y = VARPTR(EG)-1
10 Z = 14370+10*ST
12 FOR J = 1 TO 5:
14 N = PEEK(X + J)
16 POKEZ+J,N: NEXT
18 FOR J = 1 TO 5:
20 N = PEEK(Y + J)
22 POKE Z+ 5 +J, N
24 NEXT:PRINT"DONE
26 GOTO 4
30 INPUT STATION'#
32 NG=9999.9:EG=NG
34 X =VARPTR(NG)-1
36 Y =VARPTR(EG)-1
38 Z = 14370+10*ST
40 FOR J = 1 TO 5:
42 N = PEEK(Z + J)
44 POKEX+J,N: NEXT
46 FOR J = 1 TO 5:
48 N = PEEK(Z+5+J)
50 POKE Y+J,N:NEXT
52 PRINT ST; NG;EG
54 GOTO 30
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There is a great future ahead for surveyors. Examples include the implementation of the concept of the expanded role of the surveyor, occupying key roles in the Land Registration Information Systems of the future and the involvement with enormous projects needed to serve the demands of our life-style and the opportunities afforded by technology. These projects can best be served by consortia, which will form groups of truly equal professionals, each capable of addressing areas of particular expertise which will be required to adequately serve the needs of the public in the performance of these tasks. There will be little opportunity for the "lone-wolf", the movement being towards amalgamation rather than fragmentation.

The future is here and we must move quickly to maintain our field of expertise and expand into those areas now opened by technology. We must repair or remove the weakest links in our chain. ●