Plotting for your birthday

BY MARTIN HANSON

A sure way to arouse a non-computer user's interest in computers or to provide an easy-to-understand introduction to computing is to combine personal characteristics such as birthdays, horoscopes and biorhythms with a computer application.

HP recognized this natural tie-in and, as part of some early system demos, distributed a Birthday Plot routine to demonstrate plotter capabilities.

On page 77 is a Series 40 version of one of these routines to amaze your friends and to discover whether a computer-generated plot based on a birthday can reveal personality traits.

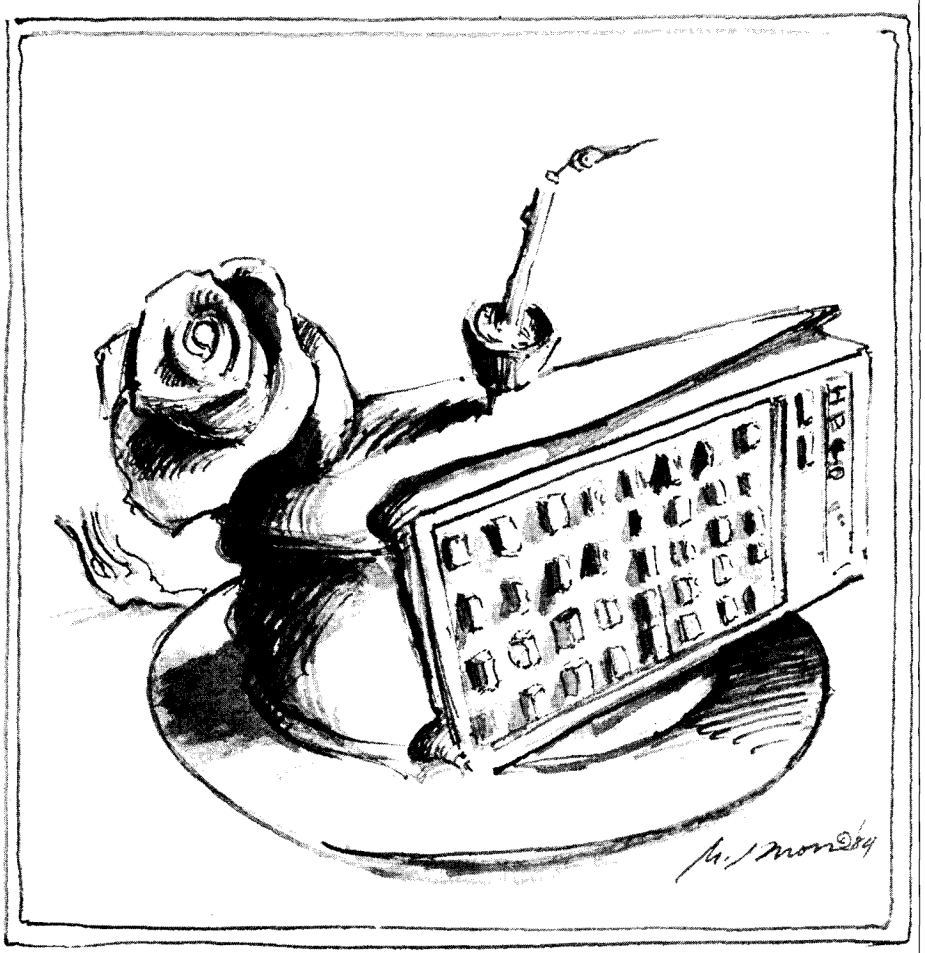
Before dismissing this program as just a showy trick, it may pay to look at the program for ideas on programming techniques. This may not be the optimum version, depending on what constraints you wish to apply, but some areas are worthy of mention.

The first is the random number generator (lines 35 to 41). This is the same routine that is used by HP in its programs in the Standard Application and Games modules. It generates a random number between 0 and 1 from a similar constrained seed. For this application the seed is, of course, a scaled number derived from a numerical birthday input.

A second area of interest is the routine to change pens. The basic technique illustrated here is nested loops. The pen change parameter must be either 1 or 2. This requires a function that oscillates between these two values. The SIN and ABS functions were used in combination to produce a function to meet this criteria (lines 90 to 96).

The program also exhibits several synthetic applications. The first is the short form exponent, as in lines 16, 23, 52 and 55. Notice the leading "1" is missing from the program listing for exponential numbers (EEX). An additional synthetic application is the use of the Alpha register for data registers. These appear as [, \, and] in the program listing and correspond to the M, N and O registers of the Alpha register. The principles of indirect addressing and loop counters are used in their pure form.

To use the program, a plotter ROM and HP 7470 graphics plotter are required. A minimum SIZE of 34 will handle all cases. The input to the "BIRTHDAY?" prompt is, MMDDYYYY.



REGRESSION ANALYSIS

Under the general heading of statistics is regression analysis—the study of a dependent variable and one or more independent variables. The result is a best-fit equation for the sample data that can be used to draw conclusions or predict future results.

The 41 is capable of storing relatively large amounts of data for a calculator, either internally, in extended memory, or in mass memory devices. This makes the 41 an ideal instrument for statistical applications.

New technology continues to lower the cost of data collection and storage while there is little educational emphasis on being able to interpret the data intelligently. Regression analysis is a study area that could be introduced at the high school or junior high level.

Existing programs on regression may be found in several places. The HP Users Library currently lists more than 50 programs on the subject for the 41. HP has produced the *Statistics Application Pac* and *Test Statistics Solution Book*. Each contains information and programs for the 41 on regression analysis. Regression and curve fit application programs have appeared in the *PPC Calculator Journal* several times. *PPC* developed a custom ROM module that contains some interesting and useful routines to analyze data. This ROM also contains some clever histogram plotting routines for either the 82143 or the 82162 thermal printers.

One of the inherent problems in using purchased software for any machine is adapting the program to your specific application. After all, unless it was a custom job, the programmer had little, if any, information on the format and/or type of data you need to process. Regression analysis programs

will generally not have this problem because of the generic nature of the analysis; that is, to take sets of raw data and be able to draw some conclusion to predict some future event.

When evaluating a data analysis program, the specifics to look for are types of regression analyses, maximum number of data points, number of variables, system requirements and, of course, more than adequate documentation.

If you can't find exactly what you need, one or two statistical analysis textbooks should give you enough information and formulas to write your own personal versions. A good reference for regression analysis on programmable calculators is William Kolb's book, *Curve Fitting for Programmable Calculators,* from IMTEC, P.O. Box 1402, Bowie, MD 20716.

HP-IL DISK DRIVES

HP 41 users with mass storage requirements have been looking for a compatible disk drive since shortly after the introduction of the digital cassette drive. One of the features desired for a new mass storage device was a faster file search and access time.

Tape storage peripherals, which have a relatively slow file access time, have always preceded the development of disk storage peripherals, which have a much faster file access time. There should be at least two IL disk drives available by this time.

The first is from HP, which announced the HP 9114A 3.5-inch IL single disk drive ($795) for The Portable. Most of the information released on this peripheral has been related to The Portable, but compatibility with the HP 41 is mentioned. Average access time is listed as .497 seconds.

Peter Steinmetz of Steinmetz & Brown introduced a third party HP-IL disk drive at the June 2 PPC Conference in Chicago. The Series 10160 disk drives have a fast average seek time—preliminary information indicates .25 seconds while the drive is in use and 1.25 seconds from an idle state. As compared to HP's cassette drive average file access time of 13 seconds, the disk offers an enormous improvement in file function execution speeds.

Steinmetz chose the 5.25-inch disk due to its popularity and availability, rather than the 3.5-inch media HP chose. The 5.25-inch disk format is the IBM PC format of 512 bytes/sector, nine sectors/track, 80 tracks/disk, for a total of more than 368k per disk as compared to a total of 270k on a 3.5-inch disk (single-sided).

Not all of this storage is directly available using the 41 as the controller, however. The HP-IL for the 41 can only access 128k, like the cassette drive. A 41 with an extended I/O ROM and special program controls will access the remaining storage area of the disk. The Series 70 machines can access the entire disk without modification.

The disk drive can be addressed and treated exactly as a cassette drive without any additional HP-IL commands. For the dual drive unit, each drive can be treated similar to two unique cassette drives.

Marketing plans had the first shipments scheduled for mid-August. At the time of this writing, the drives are being tested for compliance with FCC regulations. Final prices had not been set, but were estimated at $600 for the single drive and $900 for the dual drives. The case for both units is the same and an upgrade from single to dual will be offered. For information write: Steinmetz & Brown Ltd., 2675 University Ave., Suite 202, St. Paul, MN 55114, (612) 646-2478.

EPROM APPLICATION

Jake Schwartz of Collingswood, NJ presented his work on an order processing application program at the recent PPC Conference in Chicago. The programs were written for salespeople at Quaker Oats.

Basically, the idea was for salespeople without any programming knowledge of the 41 to enter and record supermarket orders. The task was complicated by the addition of error trapping routines to prevent illegal data entries and was further complicated when the shipping orders also were to be processed by the 41.

No shipping vehicle, of which there were several types, would be sent until filled to a minimum capacity. Each shipping vehicle had a maximum capacity as well. The capacities of the shipping vehicles had to be checked for both volume and weight limitations.

Much of the final program code was done in Mcode to increase execution speed. The 41 was SIZEd at 319 for data manipulation and the program code and item data base resided on EPROM chips.

Additional features of the program were order reviews, item additions and deletions to the data base, and menu options for user friendliness.

Development time for the entire application was 600-plus hours. □

```
01LBL "BDPLT"
02 "BIRTHDAY?"
03 PROMPT
04 CLA
05 ENTER^
06 LN
07 7
08 -
09 .005
10 *
11 STO \
12 RDN
13 COS
14 ABS
15 STO [
16  E1
17 *
18 INT
19 5
20 +
21 2
22 *
23 4
24 +
25  E-3
26 *
27 5
28 +
29 STO 01
30 STO 02
31 .002
32 +
33 STO 00
34LBL 00
35 RCL [
36 9821
37 *
38 .211327
39 +
40 FRC
41 STO [
42 STO IND 02
43 ISG 02
44 GTO 00
45 RCL 05
46 STO IND 02
47 1
48 ST+ 02
49 RCL 06
50 STO IND 02
51 PINIT
52 .
53  E
54 .
55  E
56 SCALE
57 .004
58 STO 03
59 .004
60 STO 04
61LBL 01
62 RCL 00
63 PLREGX
64 RCL 01
65 STO 02
66LBL 02
67 RCL IND 02
68 CHS
69 RCL 02
70 2
71 +
72 RCL IND X
73 RCL Z
74 +
75 RCL \
76 *
77 ST+ IND 02
78 ISG 02
79 GTO 02
80 RCL 05
81 STO IND 02
82 1
83 ST+ 02
84 RCL 06
85 STO IND 02
86 ISG 03
87 GTO 01
88 .004
89 STO 03
90 90
91 ST+ ]
92 RCL ]
93 SIN
94 ABS
95 1
96 +
97 PEN
98 ISG 04
99 GTO 01
100 .
101 PEN
102 .END.
```

BIRTHDAY PLOT **for November 20, 1951.**