PPX Exchange

Vol. 4, Number 6, Copyright 1980 November/December 1980

Important Notice

Due to the inescapable incursions of inflation, PPX must unfortunately announce, effective January 1, 1981, a series of price increases.

Membership and membership renewal will rise to $20 annually for members residing in the US, Canada, and Mexico. Overseas membership, which has only recently been resumed, will remain $30 per year.

Programs will increase from $3 to $4. The charge for mailing and handling of orders will rise to $2 per order. Last but not least, new members joining after January 1, 1981, will no longer receive three free programs.

Current members who have not used their "3 Free" order forms may, of course, still use them.

The PPX office in Lubbock, Texas, will be closed for the holiday season beginning Monday, December 22. We'll be back at our desks on Monday, January 5. All of us here at PPX would like to wish you a happy holiday season. See you in 1981!

TI-59 BACKGAMMON?

Tim Janes - PPX Newsletter Editor

They said it couldn't be done. I thought it couldn't be done. But, since PPX members sometimes do the impossible, we went ahead and put a request in the September, 1979, issue of the Exchange for a Backgammon program to be written. We received no responses to the challenge. Must be impossible, I thought.

Months went by and thoughts of receiving a Backgammon program faded into the I-sure-do-wish drawer.

Then, in June 1980, PPX received a Backgammon program from J. B. Sladen. I was somewhat skeptical at first. After seeing the beautiful documentation (10 typed pages, not counting example, user instructions and listing), I thought there was a chance. I had to play the game. Pushing other work aside, I pulled out my TI-59 and Backgammon board (standard equipment for a newsletter editor wanting a Backgammon program).

continued on page 2

TI-59 APPLICATIONS:

Computer Science Education

By Robert Sutliff

At one university, at least, the TI-59 has found a niche in the mathematics and computer science curriculum. At present, there is a tremendous desire on the part of students to acquire computer science skills, yet there are several barriers. Most colleges require a calculus background before beginning a computer science sequence, yet many students enter college deficient in math skills and so must wait up to 1½ years before they can begin a computer course. Once in such a course, they are faced with learning computer concepts, a language, and coping with computer hardware. This puts a strain on both the teacher and the computer equipment/time available. The TI 58/59 can cost-effectively reduce this strain.

At Herbert H. Lehman College, a division of City University of New York in New York City, a mini-course entitled "Usage of the Texas Instruments TI 58/59" has been offered since Fall 1979. Students are admitted with no prerequisite background in mathematics, and through many computed examples, much experience with machine and software operation is accrued. This often leads to exploration of a topic in mathematics, science, or business. Often, the formulas and techniques used to obtain quantitative solutions are unwieldy, complex, or involve decisions and many iterations, thus "blurring" the concept to be explored. But with a TI-59 handling the computations, the class becomes free to explore the topic; for example, how does the changing of several of the variables in the compound interest problem affect the others? By using the TI-59 in mathematical exploration, the basics of programming and computer operation "rub off" on the student. The goals of the mini-course have become:

1. Creative exploration of the topics chosed from mathematics, science, and business, with no prior theoretical knowledge of the topics involved; and
2. Obtaining a working knowledge of a "computer", to become familiar with the concepts of a computer language, flowcharting, and computer operation.

The second goal is for those students who are "afraid yet enticed" by the idea of operating a computer, and are hesitant about enrolling in a full-fledged computer science

continued on page 3

BACKGAMMON

After playing a few games, I realized that Mr. Sladen had done what previously had been impossible. He had written a program that not only plays a good game, but also fits on only two magnetic cards (720 steps). The run time per move is reasonable at one to four minutes per move.

We had to know more about Mr. Sladen. So Linda Hart of the PPX staff gave him a call. Their phone conversation turned up the following information:

Mr. Sladen started working on the program during December, 1979. He wrote the basic program in a week but revised and condensed it several times before submitting it to PPX. Since he submitted it in June, he's revised it at lease four times, each time speeding run time or making it more competitive.

Although this was his first submission to PPX, he is an experienced programmer who has written several business programs for himself. His experience in programming, as well as game theory, is shown in the program.

One unique feature of the program is that he designed it to be more human: it has a built-in "nervousness factor". This factor causes the program to try and keep its pieces from getting stranded on the opponent's inner table. It will also "hit" if the opportunity is given.

The program has other features which are really too numerous to mention (for example, you can set the level of play: beginner, intermediate or advanced). Those members looking for a challenging game to play may find it in this one. The abstract can be found under the Precis column in this issue.

Our thanks goes to Mr. Sladen for his very fine program.

potpourri

• **Please** be sure to write your PPX membership number on your renewal application and check when sending in a renewal. If you do not know your number, please indicate that this is a renewal or a new membership.

We continually receive checks without either membership numbers or instructions.

• If you are planning to give PPX software, books, or accessories for Christmas, please place your order early. This will insure that your order arrives in time.

• In checking many of the orders received for programs and accessories through the PPX Department, we find that many members are failing to include the necessary state taxes.

Taxes must be paid for every state with the exception of the following five states which are exempt because the law has not been passed in these states: Alaska, Montana, New Hampshire, Oregon and Delaware.

As Texas Instruments is responsible to pay these taxes back to each member's state, we are asking that the tax be included with all orders. We have been instructed to return any orders on which tax is not included. So, to insure prompt delivery of your requests, do not overlook this important item.

COMPUTER SCIENCE EDUCATION

course. It is also for those students who do not have the background necessary for computer science and yet want a taste of computer experience.

In the course at HHLC, TI58Cs and TI59/PC100Cs are supplied to the students for classroom use, with assignments to be done in a laboratory. Usually, there are two students per machine. Using a set of notes specially designed for the course, the students first become acquainted with TI 58/59 operation, and then begin executing Library Module 1 programs, since these are the simplest to run. Programs 7, 11, 12, 13, 16, 17, 18, 20, 21, 24, and 25 are explored over a period of 3 sessions. Magnetic cards are then introduced, and programs which include text and diagrams are run. Programs in math and science are selected based on the average math level of the particular section. PPX and tailor-made programs entitled BANNERS, ALPHA MESSAGES, ARITHMETIC TESTER, CRAPS, BLACKJACK, FRACTIONS, NUMBER THEORY, CARTESIAN GRAPH, STRAIGHT LINES, LINEAR EQUATIONS and THE NUMBER LINE are explored during the next 5 sessions. Finally, short but revealing programs are keyed in by the students, such as A SMALL BUSINESS, CIRCLES, SORTING, GRADE AVERAGE AND INDEX, and FACTORING, during the remaining 3 sessions. Throughout the course, the ideas of program, subroutine, looping, testing, the program and data registers, partitioning, printing, tracing, listing, debugging, and software operation are introduced in a "hands-on" fashion. Students already familiar with computer science are invited to probe more deeply into the programming aspects of the TI-58/59. The course is not meant to be a programming course, but rather a usuage course; thus its mini-course status. The course is offered 1-1½ hours per week for fifteen weeks, for one unit of credit. Many students from various disciplines have been attracted to the course in the last year, mostly due to the lack of prerequisites and the promise of "hands-on" operation and application. Graduates of the course have requested a second course on the TI-58/59, exploring its programming aspects, and/or a similar course using a full-scale microcomputer (the latter course has been developed and is now in operation). Many students now feel more confident as they approach their first computer science course, and the low cost of the TI equipment has not posed the budgetary problems inherent in most computer science enterprises. Several students were motivated enough to purchase their own equipment! Several others reported that the TI-58/59 has appeared at their place of employment, and that the course has made them the "TI expert" at work! (This course was supported in part by NSF Grant #79-07428).

ADDRESS CHANGES

In order to ensure uninterrupted service, please submit address changes to PPX at lease six weeks prior to the effective date of the change. Send your name, membership number, old and new addresses to:

PPX
P.O. Box 53
Lubbock, TX 79408

from the Analyst's Desk

• PPX member, **Mr. Walter A. Koziarz**, sent PPX an extension to the Complex Keyboard program presented in the July/August 1980 issue of the Exchange. With the addition of the 27 steps given below and use of the Electrical Engineering module, the program will have the following additional capabilities: (1) numbers can be entered in polar notation; and (2) the final output can be displayed in polar notation.

The additions which must be made to the user instructions are:

(1) To enter a number in polar form, first enter the modulus (magnitude) of X, press x:t, enter the argument (angle) of X in degrees and press A'. The number is ready to be used in calculations.

(2) To obtain a final answer in polar form after the completion of the last SBR = instruction, press SBR Deg, this will return the modulus of X. Press x:t to view the argument of X in degrees.

610	76	LBL	619	71	SBR	628	42	STO
611	16	A'	620	37	P/R	629	01	01
612	42	STO	621	36	PGM	630	32	X:T
613	02	02	622	05	05	631	42	STO
614	32	X:T	623	19	D'	632	02	02
615	42	STO	624	32	X:T	633	36	PGM
616	01	01	625	11	A	634	05	05
617	36	PGM	626	76	LBL	635	12	B
618	05	05	627	60	DEG	636	91	R/S

• **Mr. Milton F. Cragg** of Fort Wayne, Indiana, sent PPX the following subroutine which will round numbers to whole numbers or to a decimal of up to nine places in length:

000	76	LBL	009	95	=	018	32	X:T
001	11	A	010	65	×	019	95	=
002	99	PRT	011	32	X:T	020	99	PRT
003	32	X:T	012	85	+	021	98	ADV
004	98	ADV	013	93	.	022	98	ADV
005	01	1	014	05	5	023	98	ADV
006	00	0	015	95	=	024	91	R/S
007	45	Y^X	016	59	INT			
008	91	R/S	017	55	÷			

First, enter the number to be rounded and press LblA. Then enter the number of decimal places desired (0-9) and press R/S.

The program moves the decimal point of the entered number to the right as many places as you are rounding and then adds a .5 to the remaining decimal. If the remaining decimal was .5 or greater, a 1.0 is thereby carried to the whole portion of the number. The "Int" function then drops the decimal portion of the number and the decimal point is moved left to its original position. VOILA! Your number has been rounded.

• The listing of the "Custom Diet Planner" program, presented in the September/October 1980 issue, has an error. The error appears in the listing where the person's age is converted from a YY.MM format to the decimal equivalent. Steps 051 to 053 should read .12 instead of 1.2. This listing error becomes apparent when the number of months is 10 or 11.

The reason the sample worked correctly was because the man's age was also entered incorrectly. The man's age was 26 years and 2 months. It should have been entered as 26.02 instead of 26.2. Our thanks goes to **Bradford Morgan** for pointing out this error.

If you had trouble entering steps 582 and 583, our apologies. These key strokes are entered by pressing Dsz 1n*x*. It will appear in program memory as Dsz 23 (23 is the code for 1n*x*).

• PPX member David R. Goben has revised the Memo Pad Program (PPX #908016 or Leisure Library Program 10) to allow for printing of special characters via the usual memo pad data entry format. To accomplish this, the following expanded memo pad table is used in conjunction with the substitution of 83 new program steps.

; . -	ABC	DEF	GHI	JKL
0	1	2	3	4
MNO	PQR	STU	VWX	YZ+
5	6	7	8	9
×÷×	÷Γπ	e()	,×*	↑%:
10	11	12	13	14
/='	×x̄²	?≥?	÷!Π	ΔΠΣ
15	16	17	18	19

Using this table the special characters can be entered in the regular manner.

Alternatively, a routine for entering the alphanumeric keycode directly has also been included. To use this other routine, enter the key code and press E'.

The revised program section (steps 035-117, shown below) should be keyed in over the existing program. (Le-10 must be downloaded if the Leisure Library is used.) Care should be taken when using the Del and Ins edit functions to insure that remaining part of the original program stays in the proper locations. For example, when entering HIR 34 use this key sequence: STO, 82, BST, BST, 2nd, Del, SST, STO, 34, BST, BST, 2nd, Del, SST, 2nd, Ins, 2nd, Ins.

035	32	X:T	056	02	2	077	24	24	098	00	0
036	85	+	057	82	HIR	078	76	LBL	099	00	0
037	09	9	058	34	34	079	14	D	100	00	0
038	54	)	059	03	3	080	32	X:T	101	00	0
039	32	X:T	060	02	2	081	09	9	102	00	0
040	00	0	061	77	GE	082	32	X:T	103	00	0
041	82	HIR	062	00	00	083	22	INV	104	00	0
042	04	04	063	67	67	084	77	GE	105	00	0
043	01	1	064	03	3	085	00	00	106	05	5
044	07	7	065	82	HIR	086	89	89	107	07	7
045	77	GE	066	34	34	087	01	1	108	61	GTO
046	00	00	067	53	(	088	01	1	109	01	01
047	67	67	068	82	HIR	089	85	+	110	24	24
048	03	3	069	14	14	090	01	1	111	04	4
049	82	HIR	070	85	+	091	95	=	112	00	0
050	34	34	071	32	X:T	092	61	GTO	113	61	GTO
051	02	2	072	54	)	093	01	01	114	01	01
052	04	4	073	76	LBL	094	24	24	115	24	24
053	77	GE	074	10	E'	095	00	0	116	02	2
054	00	00	075	61	GTO	096	00	0	117	00	0
055	67	67	076	01	01	097	00	0			

Letters to the Editor

Do you have comments, compliments or (shudder) complaints about PPX-59? We have always welcomed letters from our membership, and, therefore, we are providing space in each newsletter to share your views on PPX with your fellow members. Approximately 3-5 letters dealing with issues of general interest will be featured in each issue. Letters will be edited to fit the space available.

Dear Sir:

I find that a program in a module runs much faster than the same program in memory. My questions are: (1) Why is this so? (2) Is there by any chance a way to obtain comparably fast running time from a program in memory?

To illustrate, if I run Program 20 in Module 2 (statistics) using a sample proportion of 8/20 and a population proportion of .5, running time is 8 seconds (with a point probability of .1201 . . . as the result of pressing C). If I load this into memory by pressing Op 9 and dismiss Program 20 by pressing Pgm 00, running time is 17 seconds—more than twice as long!

Herman Burstein
Wantagh, N.Y.

Dear Mr. Burstein:

The reason a program runs faster in a module when compared to the same program in memory is because of the pause feature of the TI-59 and the trace feature of the PC-100A/C. These features work only for the programs that are in program memory. They slow down execution because the TI-59 uses scientific notation when executing program steps. Since the calculator displays in floating point format each executing step (in scientific notation) must be converted to floating point for the pause and trace features to display/print.

A way to speed execution was mentioned in TI PPC NOTES (v5n6), the newsletter of the TI Personal Programmable Calculator Club (see Vol. 4, No. 2 of the PPX Exchange for information on this club). However, Texas Instruments does not promote its use.

Dear PPX Editor:

In the Sept/Oct PPX Exchange I noticed a letter that claimed to have used the guard digits as early as June of '79. As a historical note, I submitted a program 'DISK COMPARISON' which used guard digits on the SR-52 to store data on 4/15/77. I have used the technique on the TI-59 which I bought as soon as they were announced.

Don L. Texeira
San Jose, CA

Thank you PPX members!

Last issue we published a letter from Bill Barker in Houston, Texas. He was wanting help from experienced 59 programmers who might help him get started programming his 59. Since then, we have received several cards from members who said they would be willing to help. We offer a special thanks to these members.

If you need beginning programming help, or are willing to help someone, send us your name and address. We are maintaining a file of members who are willing to help. A copy of this list will be sent upon request.

Tim Janes
Editor, PPX Exchange

Psychology and the Programmable Calculator

By Jose Miguel Gallego Garcia

During the past few years I have met a lot of Programmable Calculator (PC) owners and have noticed different groups of personalities. In this article I will try to briefly describe some of these groups.

The PC owners are divided, first, into two major categories: the RPN (Reverse Polish Notation) users and the AOS (Algebraic Operating System) users. They both say their programming language is the best, more logical, their calculator is faster, uses less memory steps, has more programming steps, better software, better price, and better everything! I know a hard-headed RPN user and this type of friendly discussion was common since I am a hard-headed AOS user. The day I showed him my RPN simulator program, our friendship ended.

Under these two major categories, I have met PC owners who can be labeled as follows:

LBL A. The person who has everything and so the latest in electronics. Wears a digital-alarm-chronometer-calculator-watch, has an answering phone, an electronic sound synthesizer, an all-electronic car, video television and a TI-59 with the PC-100C, but he does not know how to use all of them. The first time I encountered one of these persons was back in 1977 in Guadalajara, Mexico. He was showing me his TI-59. Although he knew how to add, subtract and multiply, he was having a dreadful problem trying to learn how to divide.

LBL B. This group is for the people that love to collect as many programs as they can lay their hands on. They own a very large collection of programs from all the available sources (clubs, magazines, and journals), but they use them only once and never again since they have no time because they are busy filing new ones. They are very helpful when you need a program that might be hard to find and will gladly let you copy it.

PSYCHOLOGY AND THE PROGRAMMABLE CALCULATOR

LBL C. Another type I have met are those who own a TI-59 and like to use it, but can't do any programming of their own. They prefer to buy the software and trust the original programmer.

LBL D. Is for those who use their TI-59 to play games. I am one of these. I really love to play games with my TI-59, especially Baseball (PPX #918012A) and Dallas Love Field Aircraft Approach (PPX #918152E). (I have not yet tried Baseball III, PPX #918185F.)

LBL E. Also, there is a group that tries to wear out their PC. An MBA friend from San Diego, California, uses his TI-59 at work an average of five hours and then persists in wearing it out at home playing games. He bought it in January 1978. After almost 3 years, it still works excellently. That is durability!

LBL A'. A very large and interesting group is composed of intelligent people who do excellent programming in their field, but are very shy and do not publish them. Are you one one of these? If you are, stand up and publish it through PPX. We are waiting for you and your programs.

LBL B'. A very small group, compared to A', are those who like to publish very good programs with "anwenderfreundlichkeit" (translated "friendliness towards the user —see PPX-Exchange, Vol. 3, No. 5, Page 4, 1979). They have combined a good program with excellent documentation. This is the group we all like.

LBL C'. A group that likes to push all the keys of their PC at the same time or to follow illogical steps to see what turns up. To their amazement, nothing important usually happens. The origin of this "technique" is due to the astounding discoveries made by our German colleagues of the "Display" newsletter. Some of their ideas have been translated and published in "TI-PPC Notes" (see "PPX Exchange", Vol. 4, No. 2, Page 2, 1980).

LBL D'. The students who, to my envy, can learn more about their mathematics and statistics (just to mention some) and still have time to have a lot of fun. Do you remember the old faithful slide rule? It was the fastest way to make a calculation, but it didn't save you enough time to let you go out with that lovely girl!

LBL E'. Is a group not very well recognized, but deserving of special mention. Those who we sometimes forget in our moments of inspiration with our TI-59. Those who let us now share our free time between them and our PC: our wives and girlfriends (or, as the case may be, husbands and boyfriends).

We all have something in common with these groups. Into which group do you fit? As you might have noticed, I have not named these groups. If you care to name them, please send them to me. I will put the best names given to each group into an article to be submitted to PPX. Please do not write PPX, but write to me:

Jose Miguel Gallego G.
Ave. Popocatepetl #700
Fracc. La Sierra
Tijuana, B.CFA., MEXICO

Subroutine Calling

Program Steps v. Execution Time

By Gregory L. Stark

There are three ways to call a subroutine—by using a user-defined label, a common label, or a direct address. With respect to program steps, the three ways differ in the number of steps used for both labeling a subroutine and calling for it. Suppose a subroutine begins at step 123. The three ways for labeling and calling for it are given below.

	Subroutine	**Called by:**
User defined label	LBL D	D
Common label	LBL y^x	SBR y^x
Direct address		SBR 01 23

It is a matter of simple multiplication and addition to show that if a subroutine is called for at n program locations, the total number of steps used for labeling and calling for the subroutine is given by:

(a) 2+n for the User-Defined Label

(b) 2+2n for the Common Label

(c) 3n for the Direct Address

The user defined label is the most economical way, in terms of program steps, to call for a subroutine. This is particularly true if it is called for at many program locations. In that case it should be placed at the beginning of the program, since the calculator always starts searching for the label from there. This will optimize both the use of program steps and the execution time.

The direct address takes more steps than the user-defined label if the subroutine is called for at more than one program location. It takes more steps than the common label if it is called for at more than two program locations. However, it offers the advantage that the pointer is sent directly to the subroutine location, saving execution time.

The common label operates in the same manner as the user-defined label, except that it requires one additional step at each program location where the subroutine is called. But it may be useful if the user-defined labels have been assigned to keyboard operations.

Now that the pluses and minuses of direct and indirect labeled addresses have been covered, consider the following example of how to choose between the two:

Suppose the most called subroutines, which are rather lengthy, have been placed at the beginning of the program. They are called by using labels. Further into the program there is a loop to be executed many times in the program, and a subroutine to be called twice each time through the loop (therefore n=2). In this case it makes sense to use a direct address subroutine because the subroutine will be called only at two program locations. In terms of program steps, only six are used. This is two more than the user defined label would require. However, since the subroutine is called many times during program execution, run time is saved. Label addressing would also require the program to spend time searching for the label each time the subroutine is called.

POLYNOMIAL REGRESSION

By Thomas H. Wysmuller

This program performs polynomial curve fit for up to 7th degree equations of the form $Y = a_0 + a_1X^1 + a_2X^2 \ldots a_7X^7$, where a_0 through a_7 are the polynomial coefficients. It computes all coefficients for the selected regression and calculates Y′ values for user X′ entries either one at a time or in a series if the user supplies an interval between X′ values. All statistical functions of the TI-59 (Ops 11-15) can be used after data entry.

Added features include an easy data entry correction routine. If a PC-100A/C is used, the Y and X values are printed.

USER INSTRUCTIONS:

1. Enter program and store the following constants into data memory. Do this by entering the constant, then pressing STO XX, where XX is the register number.

Constant	Register	Constant	Register
31000000	00	3517223517	37
44000000	05	3636243231	38
45000000	06	35	39
27133637	07	20	40
33132435	08	7	41
16172717	09	2324222317	42
3717160000	10	3637003317	43
1617223517	35	3530243636	44
1700322100	36	2414271700	45

2. **Optional!** Enter highest expected limit of polynomial size. This entry, though optional, slightly reduces time needed for data entry and regression solution.

3. Enter X value, press A.

4. Enter Y value, press B.

5. Repeat steps 3 and 4 for all data pairs.

6. Error correction routines:
   a. To delete last pair entered, press C.
   b. To delete a prior pair, first enter the unwanted X, press A, then enter the unwanted Y, press B. Then press C twice.

7. **Optional!** If it is desired to use the TI-59 statistical functions, press D after data entry is completed.

8. Enter degree P of desired regression ($P \leq 7$), press E. The number of data pairs entered should exceed P. Points of inflection plus two is the best method for first try. In cases where Polynomial Regression produces terms of extremely low value, especially if the highest coefficient is small, try a regression of one power less after E is pressed, a_0 will be displayed/printed.

9. Obtain a_1 and subsequent a_2 through a_7 by pressing R/S. Repeat for P+1 times or until zeros are obtained.

10. To compute, estimate Y′ from regression equation, enter X and press A′.

11a. Calculate a series of estimates by first entering an increment for X (can be positive or negative), then pressing B′ once and R/S as many times as necessary to obtain the desired number of estimates. **(Step 10 must be performed before this step.)**

11b. **If a printer is used,** enter the increment and press C′. **(Step 10 must be performed before this step.)** This automatically prints out Y′ with increments of X′. Stop by pressing RST.

EXAMPLE:

A company records the following data over a period of time on workforce level associated with module production. Modules produced per day equals X and the assigned work force equals Y.

X	Y	X	Y
0.0	78	4.5	379
0.5	120	5.0	426
1.0	220	5.5	485
1.5	307	6.0	538
2.0	355	6.5	573
2.5	368	7.0	588
3.0	358	7.5	606
3.5	348	8.0	690
4.0	352		

Calculate the work force needed for production rates of 7 to 9 modules per day in increments of .5.

Enter	Press	Output	Comment
6	E′	6.	P
0	A	0.	X_1
78	B	1.	Y_1
.5	A	0.5	X_2
120	B	2.	Y_2
1	A	1.	X_3
222	B	3.	Y_3

Continue entering data until last point is entered. Remember that there is a data correction routine explained in the user instructions.

8	A	8.	X_{17}
690	B	17.	Y_{17}
6	E	77.94846004	Displays a_0. If printer is used, prints matrix loading, determinant, $\sum_{i=1}^{n} x^P y$ load.

	R/S	-48.04012643	a_1
	R/S	364.2118956	a_2
	R/S	-224.3016888	a_3
	R/S	55.81573596	a_4
	R/S	6.188233556	a_5
	R/S	.2543793996	a_6
	R/S	0	Regression Complete

To find the needed manpower for production rates of 7 to 9:

Without printer:

Enter	Press	Display	Comments
7	A′	587.9820825	Manpower for Y′=7.0
.5	B′	606.1358674	Y′=7.5
	R/S	689.9485458	Y′=8.0
	R/S	960.0916563	Y′=8.5
	R/S	1616.449481	Y′=9

With printer:

Enter	Press	Display	Comments
7	A′	587.9820825	Y′=7
.5	C′		Prints Y′ values given above.
	RST	(Display varies)	Stop printing.

Comments:

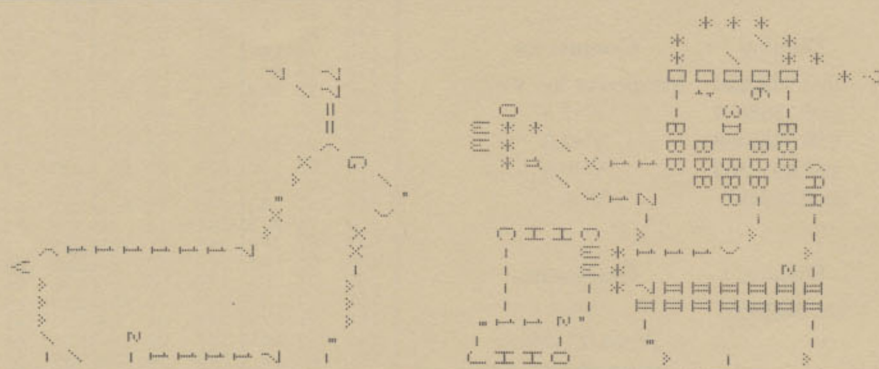
With large values of X, accuracy diminishes somewhat in the higher power regressions as these values are taken up to the 14th power and then summed to load the matrix. It is possible to overload the matrix so that the determinant overflows (only evident if the PC-100A/C is used). Even then, with X and Y values on the order of 10^6 and 10^7, the resulting polynomial produces a close fit to the data entered.

000	01	1	033	71	SBR	066	07	07	099	69	DP
001	00	0	034	00	00	067	42	STO	100	31	31
002	69	DP	035	97	97	068	00	00	101	36	PGM
003	17	17	036	01	1	069	73	RC*	102	02	02
004	09	9	037	22	INV	070	99	99	103	71	SBR
005	00	0	038	44	SUM	071	36	PGM	104	05	05
006	42	STO	039	99	99	072	02	02	105	29	29
007	99	99	040	97	DSZ	073	71	SBR	106	72	ST*
008	73	RC*	041	00	00	074	03	03	107	88	88
009	01	01	042	00	00	075	55	55	108	91	R/S
010	72	ST*	043	29	29	076	01	1	109	01	1
011	00	00	044	43	RCL	077	22	INV	110	44	SUM
012	69	DP	045	07	07	078	44	SUM	111	88	88
013	21	21	046	75	-	079	99	99	112	97	DSZ
014	69	DP	047	01	1	080	97	DSZ	113	00	00
015	30	30	048	95	=	081	00	00	114	01	01
016	43	RCL	049	44	SUM	082	00	00	115	01	01
017	01	01	050	99	99	083	69	69	116	44	SUM
018	22	INV	051	97	DSZ	084	43	RCL	117	00	00
019	67	EQ	052	05	05	085	07	07	118	43	RCL
020	00	00	053	00	00	086	42	STO	119	99	99
021	08	08	054	25	25	087	00	00	120	75	-
022	07	7	055	36	PGM	088	42	STO	121	01	1
023	42	STO	056	02	02	089	99	99	122	95	=
024	01	01	057	13	C	090	05	5	123	42	STO
025	43	RCL	058	01	1	091	42	STO	124	04	04
026	07	07	059	42	STO	092	88	88	125	00	0
027	42	STO	060	05	05	093	36	PGM	126	61	GTO
028	00	00	061	09	9	094	02	02	127	01	01
029	73	RC*	062	08	8	095	15	E	128	06	06
030	99	99	063	42	STO	096	36	PGM	129	76	LBL
031	36	PGM	064	99	99	097	02	02	130	18	C′
032	02	02	065	43	RCL	098	16	A′	131	86	STF
132	02	02	219	69	DP	306	76	LBL	393	02	02
133	76	LBL	220	04	04	307	10	E′	394	43	RCL
134	17	B′	221	43	RCL	308	98	ADV	395	37	37
135	42	STO	222	01	01	309	98	ADV	396	69	DP
136	99	99	223	69	DP	310	42	STO	397	03	03
137	43	RCL	224	06	06	311	41	41	398	43	RCL
138	99	99	225	91	R/S	312	43	RCL	399	38	38
139	85	+	226	76	LBL	313	42	42	400	69	DP
140	43	RCL	227	13	C	314	69	DP	401	04	04
141	03	03	228	43	RCL	315	01	01	402	69	DP
142	95	=	229	07	07	316	43	RCL	403	05	05
143	86	STF	230	69	DP	317	43	43	404	92	RTN
144	01	01	231	01	01	318	69	DP	405	43	RCL
145	76	LBL	232	43	RCL	319	02	02	406	40	40
146	16	A′	233	08	08	320	43	RCL	407	32	X:T
147	36	PGM	234	69	DP	321	44	44	408	01	1
148	07	07	235	02	02	322	69	DP	409	03	3
149	13	C	236	43	RCL	323	03	03	410	42	STO
150	87	IFF	237	09	09	324	43	RCL	411	02	02
151	02	02	238	69	DP	325	45	45	412	01	1
152	01	01	239	03	03	326	71	SBR	413	65	×
153	37	37	240	43	RCL	327	04	04	414	43	RCL
154	91	R/S	241	10	10	328	00	00	415	01	01
155	87	IFF	242	71	SBR	329	71	SBR	416	95	=
156	01	01	243	04	04	330	03	03	417	42	STO
157	01	01	244	00	00	331	86	86	418	03	03
158	37	37	245	43	RCL	332	43	RCL	419	65	×
159	91	R/S	246	04	04	333	41	41	420	43	RCL
160	76	LBL	247	22	INV	334	65	×	421	04	04
161	12	B	248	44	SUM	335	02	2	422	95	=
162	42	STO	249	12	12	336	85	+	423	22	INV
163	04	04	250	33	X^2	337	02	2	424	87	IFF
164	43	RCL	251	22	INV	338	01	1	425	01	01
165	06	06	252	44	SUM	339	95	=	426	04	04
166	69	DP	253	11	11	340	42	STO	427	29	29
167	04	04	254	02	2	341	39	39	428	94	+/-
168	43	RCL	255	22	INV	342	85	+	429	74	SM*
169	04	04	256	44	SUM	343	05	5	430	02	02
170	69	DP	257	20	20	344	95	=	431	69	DP
171	06	06	258	86	STF	345	55	÷	432	22	22
172	44	SUM	259	01	01	346	02	2	433	43	RCL
173	12	12	260	61	GTO	347	95	=	434	02	02
174	33	X^2	261	01	01	348	42	STO	435	77	GE
175	44	SUM	262	77	77	349	40	40	436	04	04
176	11	11	263	76	LBL	350	43	RCL	437	43	43
177	02	2	264	15	E	351	41	41	438	43	RCL
178	01	1	265	98	ADV	352	99	PRT	439	03	03
179	42	STO	266	42	STO	353	98	ADV	440	61	GTO
180	02	02	267	46	46	354	98	ADV	441	04	04
181	43	RCL	268	32	X:T	355	91	R/S	442	13	13
182	39	39	269	43	RCL	356	76	LBL	443	22	INV
183	32	X:T	270	41	41	357	14	D	444	86	STF
184	01	1	271	77	GE	358	43	RCL	445	01	01
185	44	SUM	272	02	02	359	12	12	446	43	RCL
186	20	20	273	79	79	360	42	STO	447	00	00
187	65	×	274	00	0	361	01	01	448	69	DP
188	43	RCL	275	35	1/X	362	43	RCL	449	04	04
189	01	01	276	95	=	363	11	11	450	43	RCL
190	95	=	277	99	PRT	364	42	STO	451	20	20
191	42	STO	278	91	R/S	365	02	02	452	69	DP
192	03	03	279	98	ADV	366	43	RCL	453	06	06
193	22	INV	280	71	SBR	367	20	20	454	98	ADV
194	87	IFF	281	03	03	368	42	STO	455	91	R/S
195	01	01	282	86	86	369	03	03			
196	01	01	283	32	X:T	370	43	RCL			
197	99	99	284	99	PRT	371	21	21			
198	94	+/-	285	98	ADV	372	42	STO			
199	74	SM*	286	98	ADV	373	04	04			
200	02	02	287	85	+	374	43	RCL			
201	69	DP	288	01	1	375	22	22			
202	22	22	289	95	=	376	42	STO			
203	43	RCL	290	42	STO	377	05	05			
204	02	02	291	07	07	378	43	RCL			
205	77	GE	292	42	STO	379	13	13			
206	04	04	293	05	05	380	42	STO			
207	05	05	294	09	9	381	06	06			
208	43	RCL	295	08	8	382	00	0			
209	03	03	296	42	STO	383	42	STO			
210	61	GTO	297	00	00	384	00	00			
211	01	01	298	01	1	385	91	R/S			
212	87	87	299	02	2	386	43	RCL			
213	76	LBL	300	42	STO	387	35	35			
214	11	A	301	01	01	388	69	DP			
215	42	STO	302	43	RCL	389	01	01			
216	01	01	303	39	39	390	43	RCL			
217	43	RCL	304	32	X:T	391	36	36			
218	05	05	305	81	RST	392	69	DP			

MERRY CHRISTMAS!

from PPX

Santa checking his list while his reindeer is looking on can be printed by loading the program below and by pressing RST, R/S. (First partition your TI-59 to 719.29 by pressing 3 Op 17.)



000	69	OP
001	00	00
002	07	7
003	01	1
004	00	0
005	00	0
006	69	OP
007	01	01
008	69	OP
009	05	05
010	05	5
011	01	1
012	00	0
013	00	0
014	69	OP
015	01	01
016	69	OP
017	05	05
018	05	5
019	01	1
020	00	0
021	00	0
022	00	0
023	00	0
024	69	OP
025	01	01
026	05	5
027	05	5
028	01	1
029	03	3
030	69	OP
031	02	02
032	01	1
033	03	3
034	02	2
035	00	0
036	02	2
037	00	0
038	07	7
039	05	5
040	02	2
041	00	0
042	69	OP
043	03	03
044	07	7
045	04	4
046	07	7
047	04	4
048	02	2
049	00	0
050	02	2
051	00	0
052	07	7
053	05	5
054	69	OP
055	04	04
056	69	OP
057	05	05
058	05	5
059	01	1
060	05	5
061	01	1
062	03	3
063	02	2
064	02	2

065	00	0
066	69	OP
067	01	01
068	02	2
069	00	0
070	01	1
071	04	4
072	01	1
073	04	4
074	01	1
075	04	4
076	00	0
077	00	0
078	69	OP
079	02	02
080	07	7
081	00	0
082	69	OP
083	03	03
084	07	7
085	04	4
086	07	7
087	04	4
088	00	0
089	00	0
090	00	0
091	00	0
092	00	0
093	00	0
094	69	OP
095	04	04
096	69	OP
097	05	05
098	05	5
099	01	1
100	06	6
101	03	3
102	00	0
103	00	0
104	03	3
105	02	2
106	00	0
107	07	7
108	69	OP
109	01	01
110	01	1
111	04	4
112	01	1
113	04	4
114	01	1
115	04	4
116	69	OP
117	02	02
118	02	2
119	00	0
120	02	2
121	00	0
122	07	7
123	05	5
124	00	0
125	00	0
126	00	0
127	00	0
128	69	OP
129	03	03

130	69	OP
131	05	05
132	05	5
133	01	1
134	00	0
135	00	0
136	06	6
137	03	3
138	03	3
139	02	2
140	00	0
141	00	0
142	69	OP
143	01	01
144	04	4
145	01	1
146	06	6
147	00	0
148	00	0
149	01	1
150	04	4
151	01	1
152	04	4
153	69	OP
154	02	02
155	01	1
156	04	4
157	00	0
158	00	0
159	00	0
160	00	0
161	05	5
162	06	6
163	00	0
164	00	0
165	69	OP
166	03	03
167	07	7
168	04	4
169	07	7
170	04	4
171	00	0
172	00	0
173	00	0
174	00	0
175	02	2
176	00	0
177	69	OP
178	04	04
179	69	OP
180	05	05
181	05	5
182	01	1
183	00	0
184	00	0
185	00	0
186	00	0
187	03	3
188	02	2
189	06	6
190	02	2
191	69	OP
192	01	01
193	01	1
194	04	4

195	01	1
196	04	4
197	01	1
198	04	4
199	69	OP
200	02	02
201	02	2
202	00	0
203	00	0
204	69	OP
205	03	03
206	07	7
207	04	4
208	07	7
209	04	4
210	00	0
211	00	0
212	00	0
213	00	0
214	00	0
215	00	0
216	69	OP
217	04	04
218	69	OP
219	05	05
220	05	5
221	01	1
222	05	5
223	01	1
224	03	3
225	02	2
226	02	2
227	00	0
228	69	OP
229	01	01
230	02	2
231	00	0
232	01	1
233	04	4
234	01	1
235	04	4
236	01	1
237	04	4
238	00	0
239	00	0
240	69	OP
241	02	02
242	07	7
243	04	4
244	07	7
245	04	4
246	00	0
247	00	0
248	00	0
249	00	0
250	07	7
251	05	5
252	69	OP
253	04	04
254	69	OP
255	05	05
256	69	OP
257	00	00
258	02	2
259	00	0

260	00	0
261	69	OP
262	02	02
263	04	4
264	06	6
265	02	2
266	00	0
267	07	7
268	05	5
269	00	0
270	02	2
271	00	0
272	00	0
273	69	OP
274	03	03
275	01	1
276	00	0
277	07	7
278	04	4
279	02	2
280	00	0
281	06	6
282	05	5
283	00	0
284	00	0
285	69	OP
286	04	04
287	69	OP
288	05	05
289	02	2
290	00	0
291	00	0
292	00	0
293	00	0
294	05	5
295	01	1
296	05	5
297	01	1
298	69	OP
299	03	03
300	05	5
301	01	1
302	00	0
303	00	0
304	00	0
305	00	0
306	00	0
307	00	0
308	00	0
309	00	0
310	69	OP
311	04	04
312	69	OP
313	05	05
314	05	5
315	00	0
316	00	0
317	00	0
318	69	OP
319	02	02
320	05	5
321	06	6
322	00	0
323	00	0
324	01	1

325	05	5
326	04	4
327	03	3
328	04	4
329	03	3
330	69	OP
331	03	03
332	02	2
333	00	0
334	02	2
335	00	0
336	04	4
337	00	0
338	00	0
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340	00	0
341	00	0
342	69	OP
343	04	04
344	69	OP
345	05	05
346	06	6
347	03	3
348	00	0
349	00	0
350	06	6
351	03	3
352	69	OP
353	02	02
354	02	2
355	03	3
356	00	0
357	00	0
358	00	0
359	00	0
360	69	OP
361	03	03
362	07	7
363	00	0
364	02	2
365	00	0
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367	01	1
368	69	OP
369	04	04
370	69	OP
371	05	05
372	05	5
373	01	1
374	00	0
375	00	0
376	05	5
377	03	3
378	00	0
379	00	0
380	69	OP
381	02	02
382	02	2
383	00	0
384	00	0
385	02	2
386	03	3
387	69	OP
388	04	04
389	69	OP

390	05	05
391	01	1
392	05	5
393	01	1
394	05	5
395	01	1
396	05	5
397	01	1
398	00	0
399	00	0
400	69	OP
401	02	02
402	01	1
403	05	5
404	02	2
405	00	0
406	02	2
407	00	0
408	69	OP
409	03	03
410	02	2
411	00	0
412	02	2
413	00	0
414	00	0
415	02	2
416	00	0
417	00	0
418	02	2
419	03	3
420	69	OP
421	04	04
422	69	OP
423	05	05
424	69	OP
425	00	00
426	04	4
427	03	3
428	04	4
429	03	3
430	00	0
431	00	0
432	00	0
433	00	0
434	69	OP
435	02	02
436	06	6
437	05	5
438	02	2
439	00	0
440	02	2
441	05	5
442	69	OP
443	04	04
444	69	OP
445	05	05
446	98	ADV
447	69	OP
448	00	00
449	04	4
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452	00	0
453	00	0
454	00	0

455	00	0
456	00	0
457	00	0
458	00	0
459	69	OP
460	03	03
461	69	OP
462	05	05
463	06	6
464	03	3
465	69	OP
466	02	02
467	00	0
468	00	0
469	05	5
470	06	6
471	00	0
472	00	0
473	00	0
474	00	0
475	00	0
476	00	0
477	69	OP
478	03	03
479	69	OP
480	05	05
481	02	2
482	02	2
483	00	0
484	00	0
485	69	OP
486	02	02
487	06	6
488	06	6
489	05	5
490	00	0
491	02	2
492	00	0
493	69	OP
494	03	03
495	07	7
496	05	5
497	07	7
498	05	5
499	07	7
500	05	5
501	00	0
502	00	0
503	00	0
504	00	0
505	69	OP
506	04	04
507	69	OP
508	05	05
509	69	OP
510	00	00
511	01	1
512	00	0
513	01	1
514	00	0
515	69	OP
516	01	01
517	06	6
518	04	4
519	06	6

520	04	4
521	05	5
522	05	5
523	00	0
524	00	0
525	00	0
526	00	0
527	69	OP
528	02	02
529	06	6
530	05	5
531	02	2
532	00	0
533	69	OP
534	04	04
535	69	OP
536	05	05
537	69	OP
538	00	00
539	06	6
540	03	3
541	69	OP
542	01	01
543	06	6
544	06	6
545	07	7
546	05	5
547	69	OP
548	02	02
549	69	OP
550	05	05
551	69	OP
552	00	00
553	01	1
554	00	0
555	00	0
556	00	0
557	69	OP
558	01	01
559	06	6
560	05	5
561	06	6
562	06	6
563	07	7
564	05	5
565	00	0
566	00	0
567	00	0
568	00	0
569	69	OP
570	03	03
571	01	1
572	00	0
573	69	OP
574	04	04
575	69	OP
576	05	05
577	69	OP
578	00	00
579	01	1
580	00	0
581	00	0
582	00	0
583	69	OP
584	03	03

585	02	2
586	69	OP
587	04	04
588	69	OP
589	05	05
590	02	2
591	00	0
592	00	0
593	69	OP
594	03	03
595	69	OP
596	05	05
597	69	OP
598	05	05
599	69	OP
600	05	05
601	07	7
602	00	0
603	02	2
604	00	0
605	69	OP
606	04	04
607	69	OP
608	05	05
609	00	0
610	69	OP
611	04	04
612	69	OP
613	05	05
614	06	6
615	03	3
616	69	OP
617	04	04
618	69	OP
619	05	05
620	05	5
621	05	5
622	00	0
623	00	0
624	69	OP
625	03	03
626	07	7
627	05	5
628	07	7
629	05	5
630	07	7
631	05	5
632	06	6
633	03	3
634	02	2
635	00	0
636	69	OP
637	04	04
638	69	OP
639	05	05
640	69	OP
641	00	00
642	04	4
643	02	2
644	69	OP
645	03	03
646	69	OP
647	05	05
648	00	0
649	91	R/S

Précis

This column presents some of the new PPX programs which have been recently accepted. The abstracts here are from programs that the analysts thought would be of special interest to members. You can purchase these programs at a cost of $4.00 each ($3.00 each if your order is postmarked before January 1, 1981. See the "Important Notice" column in this issue). Send your order to: Texas Instruments; C/O PPX Department; P.O. Box 109; Lubbock, TX 79408. Include an additional $2.00 to cover postage and handling.

If you have a need for a specific program, send a note to PPX. There is a chance that the program may have already been written. If it has, we will put the abstract in the next issue of the Exchange. Requests for programs not yet written will be placed in the "Programming Corner" column.

048007G Advertising: Multi - R/F
Takes output from "Advertising Reach/Frequency Analysis" (PPX #048005F) for schedules from two or more media vehicles and combines them into a "net delivered" taking actual (non-random) duplication of readership into account. The net reach of one insertion in each medium should be known from survey research.
Jeremy D. Sprague, New York, NY
287 Steps

188036G Security Values and Gains/Loses
Prints current market value and the gain or loss for each current share price entered. The market value and gain or loss for the entire portfolio is also printed. Can handle up to 38 individual stocks.
W. W. Buechner, Arlington, MA
240 Steps, PC-100A

208061G Forecasting User Linear Transformation
After the data points are stored in the registers the program rapidly "fits" the data points to numerous curves and determines the best correlation coefficient. Linear transformation techniques can then be used to determine future trends.
Robert A. Owen, Milpitas, CA
154 Steps, Mod 1

218044G Two-Factor Anova
Analysis of variance of a two-factor randomized complete block experimental design. Outputs are: all pertinent sum of squares, degrees of freedom, F values, coefficient of variation, least significant digit and RP for Duncan's multiple range grouping.
Peter Heiss, Wilmington, DE
458 Steps

218045G Randomized Complete Block Analysis Of Variance
Performs complete analysis of variance of a randomized complete block experimental design for up to eight replicates and unlimited treatments. Outputs are treatment total, treatment mean, all pertinent degrees of freedom, sum of squares, mean squares, F values, coefficient of variation, RP for Duncan's multiple range test, and least significant digit.
Peter Heiss, Wilmington, DE
460 Steps

268040G Two Constant Weibull Distribution
Calculates the two constants for the Weibull Distribution given two points on the curve. Then extrapolation is made to other points. There is no provision for a threshold parameter.
Gregory L. Stark, Hawthorne, CA
268 Steps, PC-100A, Mod 1

358021G List and Plot Differential Equation Solutions
The program uses MU-18 to solve differential equations. The inputs and outputs are printed and up to 3 of these can be stored for each solution. These stored quantities are then plotted, using MU-05. Multitape plots can be made and there is provision for using two different scales on the same graph.
W. W. Beuchner, Arlington, MA
555 Steps, PC-100A, Mod 10

408049G Hydrogen-like Atomic Orbitals
Using a numerical representation of the electron density around the nucleus, this program makes the necessary calculations to produce the phi squares contours of the 1S, 2PY, 3DYZ, or 3DZ square.
Jose M. Gallego Garcia, Tijuana, Mexico
325 Steps, PC-100A, Mod 1

418097G Thermodynamic Parameters
The change in enthalpy and entropy are calculated by linear regression of an inputted set of data. This data consists of equilibrium constrants and temperatures.
Jose M. Gallego Garcia, Tijuana, Mexico
177 Steps, PC-100A

508059 Radiotherapy: Isocentric Treatment Setting
Calculates treatment time (decimal minutes) for given inputs of isocentre depth, field area at isocentre, and required treatment dose. It incorporates automatic corrections for field elongation effects, shadow tray attenuation on leaded fields, and selectable wedge filter corrections, with built-in wedge number selections. A hard copy is generated for inclusion in patient treatment sheets. The program was designed for use with an Atomic Energy of Canada Limited Theratron 80 (or 780) unit, but may be modified for other cobalt units.
Michael A. Gribble, London, Ontario
480 Steps, PC-100A

508060G Clinical Decisions: Test, Test-Treatment Threshold
Decision tree analysis is used to derive a test threshold and a test-treatment threshold for a clinical problem. Data avail-

Précis

able in the medical literature or derived from personal experience are the input parameters.
Hershel Goren, Cleveland, OH
200 Steps, PC-100A

568008G Pharmacokinetics of Phenytoin
This program calculates best-fit values of Vmax and Km from input data that consists of at least two pairs of Steady-State plasma concentration (Cp_{ss}) versus dose (Ro) data. Once these parameters have been determined, predictions of required Ro to produce a desired Cp_{ss}, or the Expected Cp_{ss} from a selected Ro are readily made by this program.
John P. Toscano, Minneapolis, MN
317 Steps, Mod 1 or 2

568009G Steady State Level and Multiple Elimination
This program determines the steady state level of drugs eliminated by one or more apparent first order process plus one or two Michaelis-Menten processes in parallel.
Raymond E. Galinsky, Amhearst, NY
431 Steps, PC-100A

628157G Finite Beam on an Elastic Foundation
This program will calculate deflection, moment and shear at any number of points on a beam supported by an elastic foundation for a single concentrated load at any position on the beam.
Michael Chandler, Forest Hills, NY
475 Steps

628159G Dynamic Loading - 3 Degrees of Freedom
This program computes a time-history of the elasto-plastic responses of a three degree of freedom close coupled system, subjected to three different impulsive loads, one at each mass point. Results consist of simultaneous deflection, forces and resistances for each time station at each of the three mass points.
Paul Fischer, Birmingham, AL
453 Steps

628160G Dynamic Analysis - 3 Degrees of Freedom
Computes natural frequencies and characteristic shapes for three degrees of freedom, close coupled system. Sample problem uses a three story shear building frame.
Paul Fischer, Birmingham, AL
335 Steps

658146G Radio Path: Intermediate Points
Calculates the azimuths of the radio path between two station sites defined by their geographic coordinates of Lattitude and Longitude together with the length of the radio path between the sites. The program also calculates the coordinates of intermediate points located on the path.
John H. Brundage, West Caldwell, NJ
422 Steps

678010G Neutron Flux-To-Dose Rate Factors
Given the energy of the neutrons in MeV, this program will calculate neutron flux-to-dose rate conversion factors, in mRem/hour per neutron cm^2 for neutron energies 2.49 x 10^{-8} to 20 per MeV.
Paraschos, Karahalios, Dracut, MA
472 Steps

678011G Gamma-Ray Flux-To-Dose Rate Factors
Given the energy of the gamma-rays in MeV, this program will calculate the corresponding gamma-ray for flux-to-date rate conversion factors for gamma-ray energies from 0.01 to 15.0 MeV.
Paraschos, Karahalios, Dracut, MA
411 Steps, PC-100A

698021G Hole Counter—For Tray or Collandria Plates
Given the basic input variables of shell O.D., hole diameter, X and Y diameter, minimum clearance from edge of shell, void or no void. This program will then calculate for and count the maximum quantity of holes in plate. If there is a segmental void area the program will calculate the quality of holes lost and indicate the balance.
Kenneth A. Cook, Wichita, KS
491 Steps, PC-100A

748033G Bifocal Lens Layout Program
By entering the eye size and DBL of a particular frame and the pupilary distance and the requested height of the bifocal segment, this program will tell the user, by means of the PC-100A, how many millimeters of decentration are needed and in what direction the lens should be moved. It also tells the user what direction and the amount in millimeters the segment should be moved in order to attain the correct height of the segment.
Robert M. Doline, Virginia Beach, VA
489 Steps, PC-100A

778025G Unsymmetrical Vertical Curve Design
Computes the stationing and elevation of stations along an unsymmetrical vertical curve, given the starting and ending grades, and the first and second curve lengths (of the first and second rates of change of grade per station). Also computed are the two rates of change of grade per station (or the two curve lengths) and the stationing and elevation of the High/Low point. Unlike PPX #778909, this program outputs tangent elevation, curve ordinate and curve elevation.
Ronald E. Sherard, Hays, KS
385 Steps

778026G Passing a Curve Through a Point
Computes all the key elements of a curve that is required to pass through a fixed point given the deflection angle of the tangent lines and the angle and distance of the fixed point from the point of intersection of the lines.
Woody Bargar, Stillwater, OK
180 Steps

Précis

788047G Horizontal Sundial
Calculates design parameters for a horizontal sundial for any latitude and longitude. Prints a table of hour angle vs time for a given time increment. A longitute correction from local suntime to zone suntime is optional.
R. T. Bailey, Port Elgin, Ontario
617 Steps

798039G Mercator to Geographic
Program converts state plane coordinates into geographic coordinates (Latitude and Longitude) for regions using transverse Mercator Projections. Scale factor and convergence are also calculated. Constants must be entered into program in learn mode for other than Florida West Zone.
Maxwell J. Cherbonneaux, Tampa, FL
724 Steps, PC-100A

798040G Lambert to Geographic
Program converts state plan coordinates into geographic coordinates (latitude and longitude) for regions using Lambert Conformal Sonic Porjections. Scale factor and convergence are also calculated. Constants must be entered into programs in learn mode for other than Florida North Zone.
Maxwell J. Cherbonneaux, Tampa, FL
717 Steps, PC-100A

788048G Apparent Angular Diameter of Stars
Calculates the apparent angular diameter of a star when provided only with its apparent magnitude and spectrial class. With the printer, the magnitude, the spectrial class code, the effective temperature and the apparent angular diameter are printed under appropriate headings. The program can also be used with any chosen stelliar temperature if the spectrial class is not available.
Rudy E. Kokick, Flushing, NJ
397 Steps

788049G Physical Properties of Stars
When provided with the apparent visual magnitude, absolute visual magnitude and temperature of the photospher in °K, the program calculates and prints out under appropriate headings the following information: distance in cm; distance in parsecs; luminosity in ergs/sec.; luminosity in terms of solar luminosity; diameter in cm; diameter in terms of solar diameters; volume in cm^3; volume in terms of solar volume; mass in grams; mass in terms of solar mass; density (mean) in grams/cm^3; density in terms of solar density and; apparent angular diameter in seconds of arc.
Rudy E. Kokick, Flushing, NY
720 Steps, PC-100A

908177G 2 to 12 Cell Vertical Bar Graph
Provides hard copy output for Applies Statistics (Module 2) Programs ST-07 Histogram Data and STO-29, Histogram Construction. Inputs: 1. Number of Cells: 2 to 12; 2. Low of Data Points; 3. High of Data Points, computes and prints Cell Width and 4. Data Points, Xn. Outputs: 1. N, Average, and Standard Deviation for all data points, 2. The Count, % of Total Data Point Count, and Cell Upper Limit for each cell, and 3. Distribution Plot in a vertical bar graph format with a numeric side scale and a alpha letter designation for each cell.
Stephen H. Stillerman, Maryland Heights, MO
640 Steps, Mod 2

908178G Register Roll
Simulates Inv List without the printer; all 100 registers can be shown sequentially on the display to check their contents. Any register can be selected to start the dump. Other options include: display only the registers containing zero/non-zero numbers; register numbers, register contents, or both may be displayed and integer, decimal, or both portions may be displayed (handling packed 13 digit registers).
Terrence V. O'Brien, Manhattan, KS
222 Steps

918217 Backgammon
The TI-59 will play backgammon against the operator. When it is his turn to play, the operator can ask what move the TI-59 would make if their roles were reversed. He can also reverse roles and play on from there. No illegal move can be made by the TI-59 at any time. By changing a constant in the program, the operator can make the TI-59 play at beginner's, intermediate or advanced level. Suggestions are included for altering the scoring subroutine to play different styles of the game.
J. Brian Sladen, Memphis, TN
720 Steps

918218 4-D Lunar Lander
A four-dimensional version of the classic Lunar Lander game. Players must pilot their craft through three-dimensional space to a safe landing site, and compete against an internal clock, which simulates constant movement over elapsed time. Players may start from any latitude and longitude and may compete for best score using the same or different setups.
Wayne A. Lemmon, Washington, DC
551 Steps

988047G Speed Ratings for Race Horses
Computes the speed ratings of any or all horses in a race using a method developed by Tom Ainslie, author of *The Complete Horseplayer.*
Cary Allen Cusumano, Raytown, MO
286 Steps

998039G TABEX Swimming Pool Water Test
This program will tell the user how much of certain TABEX chemicals to use after making tests of the water. This program is ideal for swimming pool dealers who sell TABEX chemicals.
William B. Mentzel, Jr., Huntington, MD
846 Steps, PC-100A

TI-59 Programming Seminar

The TI-59 Seminar schedule is empty through February 1981. As soon as we can get the 1981 schedule, we will put it in the Exchange. Until then, if you wish to attend a seminar, send your name, mailing address, and telephone number to: TI-59 Seminar; P.O. Box 10508, M/S 5873; Lubbock, Texas 79408 or phone (806) 741-2202. If several requests are received from one area, a seminar could be planned.

For those who are unfamiliar with the Texas Instruments Programming Seminars, the seminars provide beginning and intermediate programming training on the TI-59. Classes consist of two 8-hour days of hands-on training that begin at 8:30 A.M. and last until 4:30 P.M. A luncheon will be served daily. You must provide your own TI-59 and it is highly recommended that you also bring your PC-100 A/C Printer.

There is a tuition fee of $150 per person.

MEMBERSHIP RENEWALS

Is your membership about to expire? To ensure that you will miss no newsletters, catalogs, or ordering privileges, check the renewal table to find out if your membership will soon expire.

A renewal card and reminder will be sent to each member in ample time to renew. Return the card to PPX with your check or money order for $18 (if sent before January 1, 1981), or $20 after January 1, 1981. Be sure to include your membership number on both your card and your check and mail to Texas Instruments, PPX Department, P.O. Box 109, Lubbock, Texas, 79408.

Membership Number	Renewal Due:
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912878-914241	February 15
921781-922653	December 15
922654-923237	January 15
923238-923837	February 15

PROGRAMMING CORNER

For those of you who may be new to this column, we will briefly review its function. Since PPX is not staffed to produce custom software, we offer special incentives for those PPX members who fill user-submitted program requests. Complimentary Solid State Software™ Modules and Specialty Pakettes are the incentives offered. For instance, Mr. Wayne Lemmon has just received a complimentary module for his program, "Lunar Lander (Four-Dimensional)." See the "Precis" column in this issue for details on this excellent program.

The program requests for this month are listed below. All programs submitted to fill these requests should be accompanied by a brief note so stating. Please submit all such programs before February 28, 1981.

- An estimating program for use in the printing business.
- A program for nozzle loadings based on WELD Research Council Bulletin 107.
- A program to calculate activity end data given the start date and a period of time for the activity. Such a program should be designed to aid in the solving of "critical path method" problems.

The PPX Exchange is published bimonthly and is the only newsletter published by Texas Instruments for TI-59 owners. Members are invited to contribute articles and items of general interest to other TI-59 users. Please limit your submissions to four double-spaced typed pages, and forward them to:

PPX
P.O. Box 53
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Attn: PPX Exchange Editor

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