April 1979

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SoftSide™

"your BASIC software magazine"

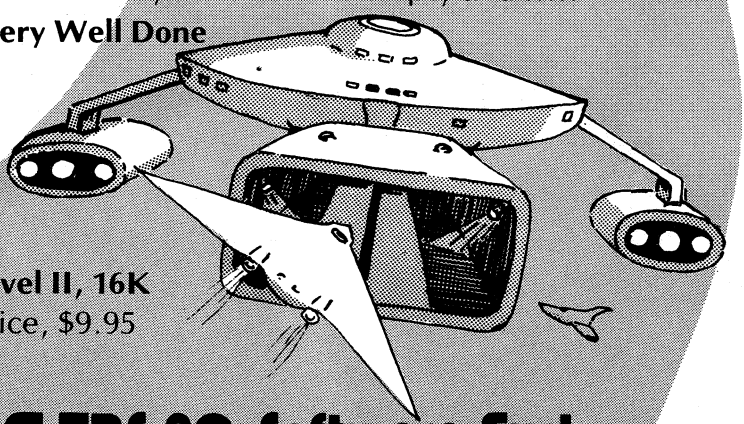
SAFARI

DOG STAR ADVENTURE

by Lance Micklus

Adventure programs are computer equivalents to novels, and as with novels, we can't tell you the ending ... BUT ... you see, there's this princess, and a pile of gold, and a freedom fighting force, and watch out for the guards and your tanks are empty and .....

Very Well Done



Level II, 16K
Price, $9.95

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April 1979

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For uniformity, we have adopted the Radio Shack TRS-80 Level II BASIC as the BASIC dialect used within the pages of this magazine. It was chosen because it stands to become the most commonly used dialect among microcomputer users and because it shares a common heritage with the many microcomputer languages produced by Microsoft.

SoftSide is published monthly by SoftSide Publications, 17 Briar Cliff Dr. Milford, NH 03055 Telephone: 603-673-5144. Subscription rates: USA bulk rate-$15 per year. USA first class, APO FPO, Canada, Mexico, overseas surface mail-$22 per year. Overseas airmail-$27 per year. **All remittances must be in U.S. funds**. Mail subscription inquiries to: **SoftSide Subscriptions**, PO Box 68, Milford, NH 03055. Entire contents copyright 1979 SoftSide Publications. All Rights Reserved.

Just to let you know...

Outgoing Mail

People often ask for my opinion of the Radio Shack computer. Most likely whenever someone parts with nearly a month's salary for something, they expect perfection, and I'm probably as guilty of that as anyone. I'm greatly troubled by the lack of lower case, the double letter problem and the lack of reliability in tape and diskette input/output routines. I would like to see better graphics, preferably in color. It looks like highway robbery when Radio Shack offers memory chips for $200 while others are selling them for a mere $75.

Despite all this, I feel the TRS-80 is a bargain. These days, you could spend $600 for a college course in BASIC programming and not learn as much as you can with your own TRS-80 (and the college doesn't give you a computer). The challenge of designing a program to conform to a particular application, or writing a game from your own imagination, is more fun for me than any other hobby I've had — and I have had quite a few. It's also the most profitable hobby I've ever had, because it's easy to sell decent programs.

I'm delighted by the service I have received, especially the high quality customer support that my local store manager, Carle Smith, has provided from the time I ordered my original 4K Level I TRS-80. Repairs have been prompt and the policy of renewing the warranty period for an additional 30 days whenever a computer is serviced or a new part is installed is fantastic.

The Shack is certainly imaginative and creative in marketing and salesmanship. By the time you read this, their store managers will have contacted nearly every school in the country to explain how to obtain computers complete with courses in BASIC programming and algebra, with the Federal government footing the bill. They even provide the exact wording for the funding applications. It wouldn't surprise me to see the schools purchase a million TRS-80 computers! So, that means our readers will have to contact every high school student in the country to tell them about **SoftSide**, the best magazine for TRS-80 computerists!

The computer is even useful in some serious business applications. Not far from my home there's an analytical

laboratory that uses a TRS-80 computer to analyze coal samples from the mines. It does so much work that they have to buy ribbons for their printer by the case. As I was working my way through college, I once spent two weeks performing a matrix multiplicaton on a Friden mechanical calculator. When I think of that time ten years ago, I'm horrified that I endured that agony when a TRS-80 would have done the problem in seconds. (Of course, it would have taken me an hour to enter the matrix, but I wouldn't have had to enter each figure over fifty times!)

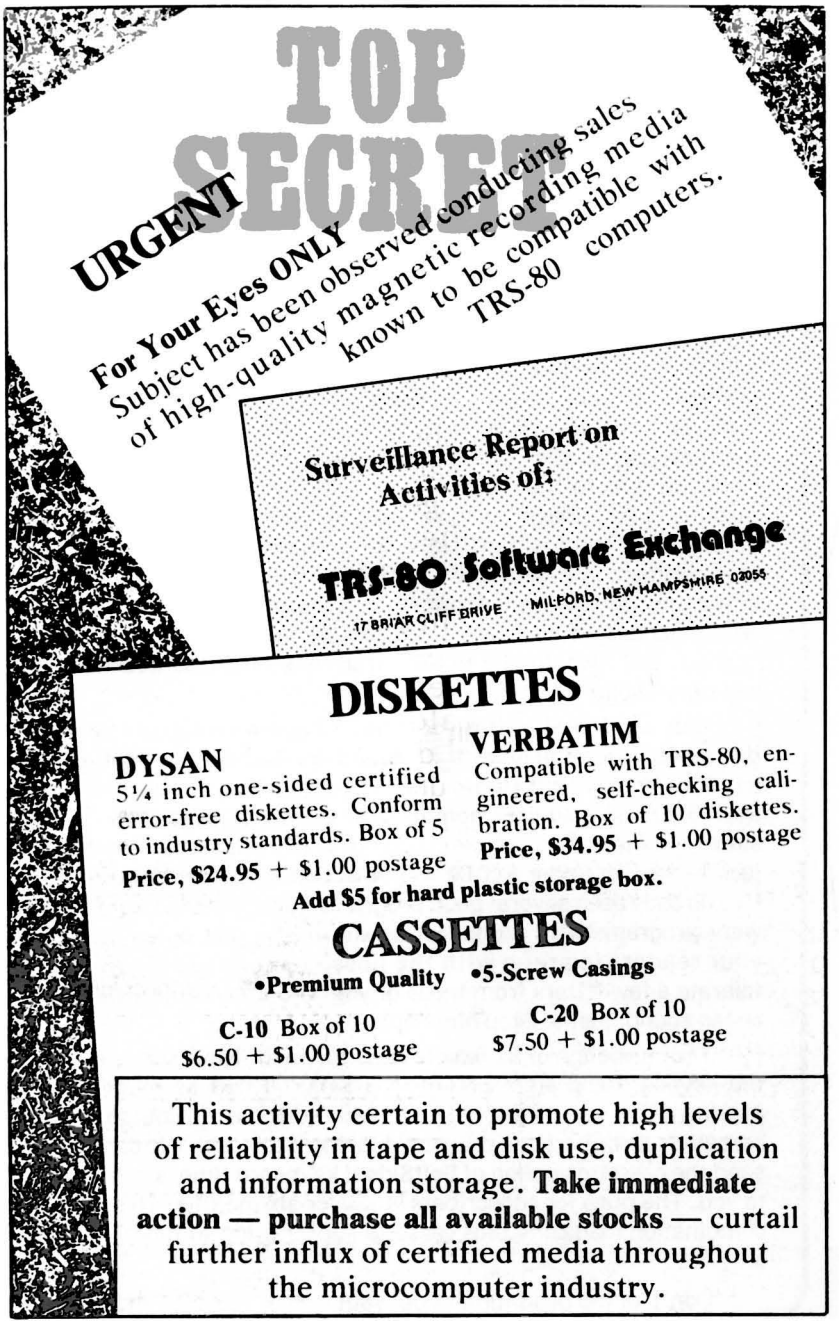
The one flaw in TRS-80 applications is in commercial use. Decent business software isn't available yet, although BIZ-80 will help to solve that problem. The lack of lower case is a major stumbling block, as word processing is one of the most important business uses for small computers. Potentially even more serious is the lack of disk reliability, especially since a common disk failure can irretrievably wipe out the data in memory. I have been personally recommending the TRS-80 for educational and scientific applications, games, and to programmers in BASIC and FORTRAN and people who want to make money writing programs at home. I haven't been recommending it for commercial use. Frankly, I hope that will change, and I would like to hear from any business users who can report solid success.

Our publisher and myself have been having a running discussion over the merits of sound in TRS-80 applications, especially now that Radio Shack has decided to support its $10.95 200 mW audio amplifier with computer programs. You simply connect the amp by plugging it into the cassette output jack — for just under $11.00 you've added a decent sound unit. I've already seen several good programs using the device. If you want programs with sound, let us know! (Isn 't it unfair to ask your readers to argue with the boss? I suppose I'll have to tolerate a few letters from those of you who aren't interested in cheap sound, just to keep him happy.)

That's enough of a break to read the mail. Now, get back to the keyboard and start ENTERING **Safari**. I had so much fun playing it that you almost didn't get this editorial. Of course, you cassette subscribers are probably playing it already. We can still send the cassette version of **SoftSide** if keyboard time is precious to you. The price for subscribers is $30 for six months. To start a combination magazine plus cassette subscription (6 months), is only $38.

Don't let the headhunters get you!

GWB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No, it's not a game, but it CAN make renumbering your programs seem like child's play!

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If you find yourself renumbering to provide room for additional lines, or just to make things neater, this program has got what it takes to make life easier ... it can renumber a 12K program in just 32 seconds.

User has complete control over which lines are renumbered — and how — including all GOTO's and GOSUB's. You can even renumber the middle and leave the beginning and end alone! If an undefined line is found, the program will display both the line which caused the error and the unfound line number, thereby making corrections much simpler.

You may have seen other renumbering programs, but NONE with this many features: no external tables are used, runs in 1300 bytes of high memory regardless of program size, loads from and operates on **either** disk- **or** tape- based programs.

Versions available for 4K, 16K, 32K and 48K machines. (Unless specified otherwise, 16K tape automatically supplied) Also available on disk or as source listing

Level II tape (specify version) — $15.00
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Source Listing — $20.00

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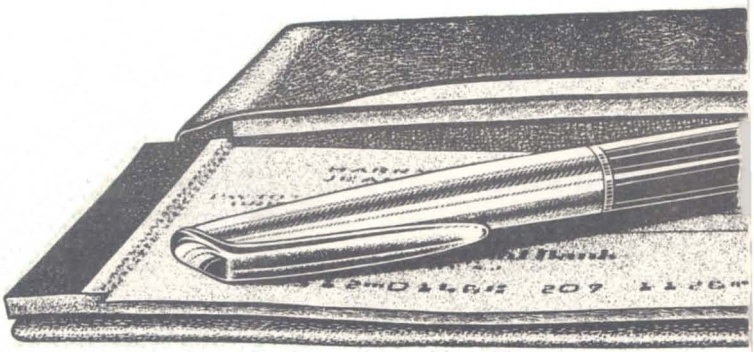


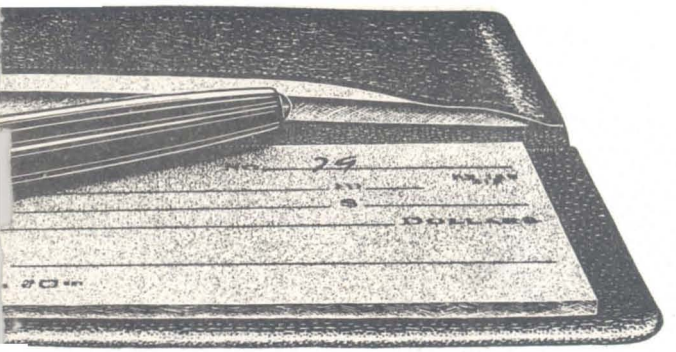
PERSONAL

by Lance

Part Two - CH

Checkfinder is the second part of the Personal Finance program. It maintains a file of all your cancelled checks by using the data from the first part of the program, **Checkbook**, on the CANCELLED CHECKS TAPE. Several tapes may be read into memory at the same time to create a combined file in memory. This combined file may then be saved on tape at the end of the program. By combining the latest batch of cancelled checks with previous ones saved on checks in memory, you can build a CHECK FILE of all your cancelled checks. Up to 900 checks can be filed on a 16K machine. Please note that tapes created by this portion of the program are written in a different format than the CANCELLED CHECKS TAPE. The difference is that CHECK FILE tapes use a blocking factor of 8 to speed up the reading and writing of the tape file to and from memory.

Besides merging the tape files, **Checkfinder** performs two other operations: it contains a modified bubble sort to rearrange the order of the checks in memory, plus it locates a check or group of checks. When locating checks, it will print



FINANCE

nicklus

ECKFINDER

a total of the amount of all the checks it finds. A negative amount means expense, and a positive amount means income, since some of your account should be for deposits. You can even have the program locate all your paychecks — hopefully, the amount will be positive, indicating income. If not, you should probably seek new employment.

By keeping a CHECK FILE tape for the entire year, you can use the program to locate all your alimony payments (or any other category) and get the total amount paid for the year to file in your income tax.

Good procedures dictate that you test this program very carefully, then run it in parallel with your current system of checkbook maintenance. **We can assume no responsibility for consequences resulting from the use of this program.** I have used the complete Personal Finance program) both **Checkbook** and **Checkfinder** to maintain my own personal account for several months and have found it to be reliable and valuable in managing my family's money.

```
10 REM  :  CHECK FINDER BY LANCE MICKLUS, WINOOSKI, VERMONT
20 REM  :  COPYRIGHT 1978
30 REM  :  TRS-80 16K / LEVEL II   VERSION 2.1
40 REM  : . . . . . .
50 REM
100 CLEAR 20
120 DIM A(2500)
140 DEFINT F-Z
160 CLS
180 PRINT:PRINTTAB(22)"CHECK FINDER"
200 PRINTTAB(21)"--------------"
220 PRINT:PRINT"THIS PROGRAM WILL LOCATE YOUR CANCELLED CHECKS.
IT WILL"
240 PRINT"ALSO SORT YOUR CHECKS AND LET YOU BUILD A SINGLE PERMI
NATE"
260 PRINT"FILE OF CANCELLED CHECKS."
280 PRINT:PRINT"THE PROGRAM USES THE CANCELLED CHECKS TAPE(S) FR
OM THE"
300 PRINT"CHECK BALANCE PROGRAM, AND/OR CHECK FILE TAPE(S)"
320 PRINT"GENERATED BY THIS PROGRAM FROM PREVIOUS RUNS."
340 PRINT:PRINT"LOAD TAPE AND WHEN READY TO :READ:"
360 PRINT"OR TYPE '0' IF NO CHECK FILE TAPE."
380 INPUT"TYPE THE CASSETTE # (1 OR 2) OR 0";TAPE
400 IF TAPE=0 THEN 700
420 IF TAPE<>1 AND TAPE<>2 THEN 380
440 CLS:PRINTCHR$(23):PRINTTAB(9)"";:PRINTUSING ":READING##:";TA
PE
460 REM >>>READ TAPE<<<
480 INPUT#-TAPE,N
500 FOR I=PT TO PT+N-3 STEP 24
520 GOSUB 9320
540 INPUT#-TAPE,A(I),A(I+1),A(I+2),A(I+3),A(I+4),A(I+5),A(I+6),A
(I+7),A(I+8),A(I+9),A(I+10),A(I+11),A(I+12),A(I+13),A(I+14),A(I+
15),A(I+16),A(I+17),A(I+18),A(I+19),A(I+20),A(I+21),A(I+22),A(I+
23)
560 NEXT I
580 GOSUB 9320:INPUT#-TAPE,B$:IF B$<>"EOF" PRINT:PRINT"BAD FILE
DATA":STOP
600 PT=PT+N
620 CLS:PRINT@973,"NUMBER OF CHECKS IN MEMORY";PT/3;
```

```
640 PRINT@128," "
660 INPUT"ANYMORE TAPES";A$:IFLEFT$(A$,1)<>"Y"ANDLEFT$(A$,1)<>"N
"THEN 660
680 IF LEFT$(A$,1)="Y" THEN 340
700 CLS
720 PRINT@ 320,"TO LOAD ANY CANCELLED CHECKS TAPES FROM THE CHEC
K"
740 PRINT"BALANCE PROGRAM, TYPE THE CASSETTE # TO :READ:. ELSE T
YPE '0'
760 PRINT
780 INPUT"TYPE CASSETTE # (1 OR 2) OR TYPE 0";TAPE
800 IF TAPE=0 THEN 980
820 CLS:PRINT CHR$(23):PRINT@ 340,":READING";STR$(TAPE);":"
840 GOSUB 9320 : INPUT#-TAPE,A(PT),A(PT+1),A(PT+2)
860 IF A(PT)<>9999 LET PT=PT+3 : GOTO 840
880 CLS : PRINT@ 973,"NUMBER OF CHECKS IN MEMORY:";PT/3
900 PRINT@ 320,"";
920 INPUT"ANY MORE CANCELLED CHECKS TAPES (Y/N)";A$
940 IF LEFT$(A$,1)="Y" THEN 760
960 REM *** M A I N   P R O G R A M ***
980 CLS
1000 PRINT@320,"";
1020 PRINTTAB(20)"0 TO END PROGRAM"
1040 PRINTTAB(20)"1 TO SORT TRANSACTIONS"
1060 PRINTTAB(20)"2 TO FIND CHECKS"
1080 PRINT:PRINTTAB(19)" ";
1100 INPUT"ENTER 0, 1, OR 2";J
1120 IF J<>0 AND J<>1 AND J<>2 THEN 1080
1140 ON J+1 GOTO 1160, 1480, 1680
1160 CLS
1180 PRINT@320,"DO YOU WISH TO SAVE THE CURRENT CANCELLED CHECKS
 FILE":PRINT"IN MEMORY";
1200 INPUT A$:IFLEFT$(A$,1)<>"Y"ANDLEFT$(A$,1)<>"N"THEN1160
1220 IF LEFT$(A$,1)="N" THEN 1420
1240 INPUT"TYPE CASSETTE # (1 OR 2) WHEN READY TO *WRITE*";TAPE
1260 IF TAPE<>1 AND TAPE<>2 THEN 1240
1280 CLS:PRINTCHR$(23):PRINTTAB(9)" ";:PRINTUSING"*WRITING##*";T
APE%
1300 PRINT#-TAPE, PT
1320 FOR N=0 TO PT-3 STEP 24
```

```
1340 GOSUB 9320
1360 PRINT#-TAPE,A(N),A(N+1),A(N+2),A(N+3),A(N+4),A(N+5),A(N+6),
A(N+7),A(N+8),A(N+9),A(N+10),A(N+11),A(N+12),A(N+13),A(N+14),A(N
+15),A(N+16),A(N+17),A(N+18),A(N+19),A(N+20),A(N+21),A(N+22),A(N
+23)
1380 NEXT N
1400 GOSUB 9320:PRINT#-TAPE,"EOF"
1420 CLS
1440 PRINT@471,"END OF SESSION"
1460 END
1480 CLS
1500 PRINT@330,"0 = SORT BY TRANSACTION NUMBER"
1520 PRINTTAB(10)"1 = SORT BY AMOUNT"
1540 PRINTTAB(10)"2 = SORT BY ACCOUNT NUMBER"
1560 PRINT:PRINTTAB(9)" ";
1580 INPUT"HOW SHALL FILE BE SORTED";Q
1600 IF Q<>0 AND Q<>1 AND Q<>2 THEN 980
1620 CLS
1640 PRINT@471,">> SORTING <<"
1660 GOTO 2360
1680 CLS
1700 PRINT@320,"";
1720 PRINT"SEPARATE EACH VALUE WITH COMMAS"
1740 INPUT"LOW & HIGH RANGE OF TRANSACTION NUMBERS";B,C
1760 IF B>C PRINT"LOW VALUE GREATER THAN HIGH ???" : GOTO 1740
1780 INPUT"LOW & HIGH RANGE OF DOLLAR AMOUNTS";D,E
1800 IF D>E PRINT"LOW VALUE GREATER THAN HIGH ???" : GOTO 1780
1820 GOSUB 9020
1840 PRINT:INPUT"ENTER LOW & HIGH BUDGET NUMBER";F,G
1860 IF F>G OR F<0 OR G>32 OR INT(F)<>F OR INT(G)<>G THEN 1840
1880 M# = 0
1900 CLS : H = 0
1920 PRINT"TRANSACTION #","   AMOUNT","BUDGET","TYPE"
1940 FOR N=0 TO PT-3 STEP 3
1960 IF A(N)<B OR A(N)>C THEN 2240
1980 IF ABS(A(N+1))<D OR ABS(A(N+1))>E THEN 2240
2000 IF A(N+2)<F OR A(N+2)>G THEN 2240
2020 Z=A(N+2):GOSUB 9240
2040 B$="DEPOSIT"
2060 IF A(N+1) <=0 THEN B$="CHECK"
```

```
2080 PRINTTAB(2) A(N),:PRINTUSING"$###,###.##";ABS(A(N+1)),:PRIN
TTAB(32)A$,B$
2100 M# = M# + A(N+1)
2120 H = H + 1
2140 IF H < 12 THEN 2240
2160 PRINT:INPUT"TYPE 1 TO CONTINUE, OR 2 TO QUIT";J
2180 IF J = 2 THEN 980
2200 CLS:PRINT"TRANSACTION #","   AMOUNT","BUDGET","TYPE"
2220 H = 0
2240 NEXT N
2260 PRINTTAB(16)"-----------":PRINT"TOTAL",
2280 PRINTUSING"$###,###.##";M#,:PRINTTAB(48)"CREDIT/DEBIT"
2300 INPUT"END OF LISTING. HIT ''ENTER'' KEY TO CONTINUE";B$
2320 GOTO 980
2340 REM *** S O R T ***
2360 K = 1.: SW = 0
2380 X = 0 : Y = PT - 6 : Z = 3
2400 P = 0
2420 FOR N = X TO Y STEP Z
2440 IF ABS(A(N+3+Q)) < ABS(A(N+Q)) LET A(PT)=A(N):A(N)=A(N+3):A
(N+3)=A(PT):A(PT)=A(N+1):A(N+1)=A(N+4):A(N+4)=A(PT):A(PT)=A(N+2)
:A(N+2)=A(N+5):A(N+5)=A(PT):P=P+1
2460 NEXT N
2480 N = X : X = Y : Y = N : Z = - Z : SW = SW + P
2500 PRINT@0,"PASSES COMPLETED:";K,"SWAPS THIS PASS:";P
2520 PRINT"RECORD COUNT:";PT/3,"TOTAL NUMBER OF SWAPS:";SW
2540 IF P <> 0 THEN K = K + 1 : GOTO 2400
2560 PRINTTAB(32)"SORT COMPLETE"
2580 GOTO 1000
9000 REM *** BUDGET NUMBER LIST ROUTINE ***
9020 RESTORE
9040 CLS
9060 Z = 0
9080 FORY=0TO32
9100 PRINT@Z,Y;:READA$:PRINT@Z+3,"-";A$;
9120 Z=Z+64:IFZ=704THENZ=21
9140 IFZ=725THENZ=42
9160 NEXT Y
9180 PRINT@704,"";
9200 RETURN
```

```
9220 REM *** GET BUDGET STRING NAME ***
9240 IFZ<0ORZ>32ORINT(Z)<>ZLETZ=32
9260 RESTORE
9280 FORY=0TOZ:READA$:NEXTY:RETURN
9300 REM *** BLINKING STAR ***
9320 IF PEEK(15360)=32 THEN POKE 15360,42 ELSE POKE 15360,32
9340 RETURN
9996 REM *** BUDGET NAMES ***
10000 DATA CHILD CARE, TONY MISC., MAJOR TONY, ITEM 3
10004 DATA ITEM 4, HOBBIES, HOUSEHOLD, GROCERIES
10008 DATA ENTERTAINMENT, MISC. EXPENSES, CASH, UTILITIES
10012 DATA MONTHLY EXP., REV. CHARGE, ITEM 14, ITEM 15
10016 DATA RENT, ITEM 17, AUTO OPERATE, AUTO REPAIR
10020 DATA MAJOR BILLS, INSURANCE, T.D. INSURANCE, SALES TAX
10024 DATA TAXES, DRUGS, DOCTOR, DENTIST
10028 DATA ITEM 28, CHK ] ^ SAVINGS, SALARY, MISC. DEPOSITES
10032 DATA CHK ] ^ CASH
```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```
910 L=V:GOSUB50:L=R:GOSUB60
920 PRINT@409,"DON'T IT MAKE MY BROWN EY
ES BLUE. . .";:PRINT@831,;
930 L=W:GOSUB110:L=V:GOSUB110:L=W:GOSUB5
0:L=V:GOSUB50
940 L=V:GOSUB110:L=R:GOSUB110:L=U:GOSUB1
10:GOSUB110:GOSUB120
950 L=Y:GOSUB110
```

TRS-80 PROGRAMMING HINTS

To simulate in INPUT statement with INKEY$, after printing a question (using the question mark), print a prompt. The method is to print CHR$(95) for the prompt and then a backspace to erase it CHR$(8), followed by a space. A sample program would look like this:

```
10 PRINT"WOULD YOU LIKE TO PLAY A GAME (Y/N) ?";
   CHR$(95)
20 I$=INKEY$: IF I$=" " THEN 20 ELSE PRINT CHR$(8);
   " ";I$
30 IF I$="Y" THEN 100 ELSE END
```

If you want your remark statements to stand out and be easy to find, type a line feed (lower case down arrow) and 5 spaces right after the line number. You could even follow your first remark with another line feed and spaces. This doesn't use a lot of memory, but prints nicely:

```
10
        REM*PROGRAM        *
        *BY A. PROGRAMMER*
20 PRINT"THIS IS THE NEXT LINE."
```

Been searching for an easy way to get into machine language?

SIMPLE SIMON

by Rev. George Blank

SIMPLE SIMON, published in the March 1979 issue of PROG/80, comes to your rescue. Features included are:

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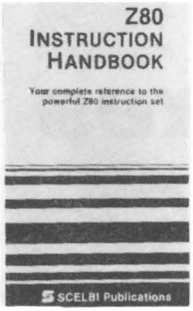

Z80 Instruction Handbook
Scelbi Publications
Convenient pocket-size manual describes Z80 capabilites in easy-to-understand terminology. Designed as a practical reference to mnemonics, machine codings and usage — for programmers of every level, from beginner to professional ... anyone working in Z80 machine or assembler language. **Price, $4.95**

The BASIC Handbook
Dr. David A. Lien
Definitive reference work explaining over 50 versions of the language in detail. All you need to know about the major statements, functions, operators, and commands pertaining to use in micro, mini and mainframe computers. **Price, $14.95**

Sargon: A Computer Chess Program
Dan & Kathe Spracklen
Documentation covering all algorithms in Sargon can be found in this comprehensive guide book. Contains table of contents, block diagram, 4 part introduction, Z80 listing and index to subroutines. **Price, $14.95**

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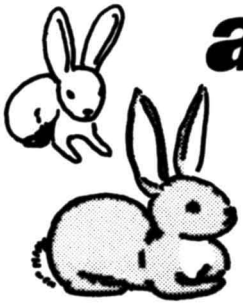
Rabbits and Foxes



by Russell Starkey

As spring planting time approaches, here's a program to warm the hearts of gardeners everywhere: a simulation of how the proper ecological system could protect gardens from those pesky rabbits.

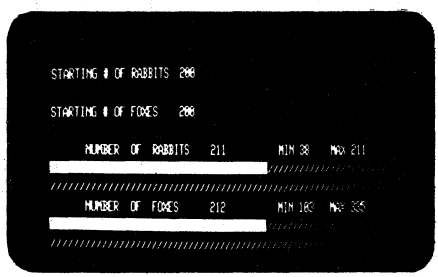
Now, if only garden supply stores could sell foxes!

Russell Starkey has given us a fine demonstration of what a BASIC program should look like when you LIST it, and his bar graph routine is very attractive as well.

```
10  REM   IDEA FROM HP 25 CALCULATOR INFORMATION
EDITED BY: RUSSELL STARKEY
REV  B     855 EISENHOWER
           JASPER IN 47546
12  REM ------  R A B B I T S   &   F O X E S  ------
14  REM
15  REM       A =  ENCOUNTER  FACTOR  <<< .01  >>>
16  REM       B =  H  <<<  STEP  SIZE  >>>
17  REM       C =  NUMBER  OF  FOXES
18  REM       D =  NUMBER  OF  RABBITS
19  REM       E =  NUMBER  OF  ENCOUNTERS
20  REM       R =  INTEGER  PART  OF  C
22  REM       S =  INTEGER  PART  OF  D
24  REM       T =  PRINT CONTROL
```

```
25 REM   J1 = ST # OF RABBITS
         J2 = ST # OF FOXES
         J3 = MAX # OF RABBITS
         J4 = MAX # OF FOXES
         J5 = MIN # OF RABBITS
         J6 = MIN # OF FOXES
26 REM   JA = START POINT
         JD = DELTA # OF XX
         JL = LIMIT ( 4* MAX INPUT )
         JP = % OF BAR
         JX = USED
         JC = # OF BARS CONTROL
32 CLEAR50:CLS:DEFINT J,X,R,S:PRINT
35 PRINT"T H E    R A B B I T S    V S    T H E    F O X E S "
36 PRINT"A SIMPLE ECOLOGICAL MODEL OF INTERACTING POPULATIONS"
38 PRINT"CONSISTS OF RABBITS WITH AN INFINITE FOOD SUPPLY AND "
40 PRINT"FOXES THAT PREY ON THEM.  "
42 PRINT
44 PRINT"<RABBITS>  D = D + B  *  ( 2 * D - A * D * C ) "
46 PRINT"< FOXES >  C = C + B  *  ( A * D * C - C )"
48 PRINT"WHERE : D IS CURRENT # OF RABBITS, C  FOR # OF FOXES "
52 PRINT"        B IS STEP SIZE , A IS THE ENCONTER FACTOR"
54 PRINT"        B = .02      A = .01 "
72 PRINT:PRINT:PRINT
75 INPUT"PRESS ENTER TO CONT.";S$
100  CLS : T=0
105  PRINT:PRINT:PRINT : A=.01 : B=.02
110  INPUT"INPUT NUMBER OF RABBITS  ( 25 - 400 )   ";D:J1=D:J5=D
120  INPUT"INPUT NUMBER OF  FOXES   ( 25 - 400 )   ";C:J2=C:J6=C
:IF J1>J2 THEN JL=J1*3 ELSE JL=J2*3
130 INPUT"ENTER  0,1,2  FOR # OF BARS  ( 1 )   ";JC:IF JC<>0 AND
 JC <>1 AND JC<>2 THEN 130 ELSE IF JC=1 THEN JC=63 ELSE IF JC =2
 THEN JC=127:JL=1.1*JL
135 CLS:PRINT@128,"STARTING # OF RABBITS ";J1;:PRINT@256,"STARTI
NG # OF FOXES   ";J2;
140  REM   MATH START ALSO COME BACK POINT...
150  E = A * D * C
160  C = C + B * ( E - C )
180  D = D + B * ( 2 * D - E )
190  REM                PRINT  CONTROL  SECTION
```

```
200  R =INT(C) : S =INT(D)
210  T = T + 1
220  IF T = 5 THEN T=0 : GOTO 600
250  GOTO 140
600 REM PRINT COME POINT
640 IFJ3<S THEN J3=S
645 IFJ4<R THEN J4=R
650 IFJ5>S THEN J5=S
655 IFJ6>R THEN J6=R
1010  PRINT@390,"NUMBER  OF  RABBITS   ";S;:PRINT@426,"MIN";J5;:
PRINT@436,"MAX";J3 ;"  ";
1015 JA=15808:JD=S:GOSUB7000
1020  PRINT@582,"NUMBER  OF  FOXES     ";R;:PRINT@618,"MIN";J6;:
PRINT@628,"MAX";J4;"  ";
1025 JA=16000:JD=R:GOSUB7000
1040  IF R = 1 OR S = 1  THEN 5000
1050  GOTO 140
5000  GOTO5000
7000 REM BAR PRINT SUB
7050 IF JC=0 THEN RETURN
7100 IF JD>JL THEN FOR X=JA TO JA+JC :POKE X,143:NEXT:RETURN ELS
E  JP=CSNG(JC*JD/JL)+JA
7140 FOR X=JA TO JP-1:POKE X,143:NEXT: FOR X=JP TO JA+JC:POKE X,
47:NEXT:RETURN
```



"MESSAGE"

Owners of the TRS-80 computer game STARTREK III, version 3.3, written by Lance Micklus, should be aware of an error in the program.

The problem occurs in the quadrant display of the ships computer. To correct the error and update the program, make the following changes:

1. Change line 15 in the program to read "Version 3.3A", and change the copyright date to February 1979.

2. In line 1655, change it to read as follows fixing A(263) and A(264).

1655 PRINT " ", "Stars:"; A(264), "Planets :";A(265)

The use of lower case characters in making the above corrections is optional, but users should be aware that upper and lower case letters are used in all PRINT statements in the program.

The author wishes to thank Mr. Victor C.Solomon, of Rochester, New York, for calling attention to the error.

SINK 'UM!

by Rev. George Blank

"Man the torpedoes...enemy ships approaching...fire!" Sorry, captain, the tubes are being reloaded.

And so it goes, in this action simulation of battleship warfare. Shrewd maneuvers and keen timing are required by the ship's captain, otherwise, who always goes down with the ship? Level II,
4K-$4.95

TSE TRS-80 Software Exchange
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HAM RADIO

by M. Kelleher

If you're into Amateur Radio, whether tickling your neighbor on QRP or rocking Gibralter with a "California Kilowat", this powerful Level II 16K program can put a lot more fun into your hobby — and that's what it's all about, isn't it?

Here are a few of the features:

•Amateur Frequency Allocations

Frequency, Mode, and Licensing requirements for 80, 40, 20, 15, 10, 6 and 2 meter bands

•ID Timer

Counts down to next station ID and issues prompt using manual reset or automatic timer functions

•Q Signal File

Complete Q Signal file at your fingertips

•Propagation Forecasting

Computes radio wave propagation conditions when given current Solar Flux Index and current K-index

•Amateur Log Routine

Stores to tape log of station activity by Callsign, Date, RST, Mode, QTH and other information, and permits review of previously recorded Log tapes

Available for Level II, 16K — $9.95

SPECIAL DISK-ENHANCED VERSION — $19.95

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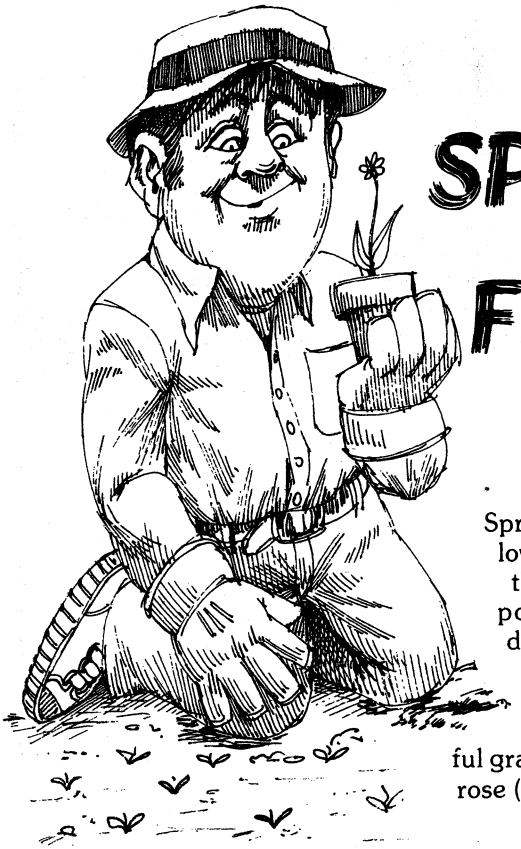


SPRING Flowers

by David A. Eide

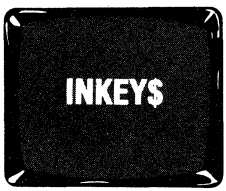
Springtime is the season for love, growth and flowers ... the favorite time of year to poets, romantics and gardeners everywhere.

Welcome the warm weather with this delightful graphic display of a four-petal rose (without any April showers).

```
1000 CLS
1010 PRINT@ 64, "GRAPHIC DISPLAY OF A FOUR LEAF ROSE"
1020 FOR I=0 TO 6.28319 STEP 1.74533E-02
1030 R=35*SIN(2*I)
1040 X=(R*COS(I))+64
1050 Y=(R*SIN(I))+47
1060 SET (X,47-(Y/2))
1070 NEXT I
1080 PRINT@ 896, "PROGRAM TERMINATED";
1090 END
```

SoftSide™ Presents:

A Page from The BASIC Handbook by David A. Lien



Function

The INKEY$ function is used in the TRS-80 Level II BASIC to read a character from the keyboard each time INKEY$ is executed. Unlike the INPUT statement, INKEY$ does not halt execution waiting for the ENTER key to be pressed. The computer just keeps "circling" until it receives a message from the keyboard. Until a key on the keyboard is pressed, INKEY$ simply reads an "empty" string (ASCII code of Ø).

Since INKEY$ doesn't wait for you to enter a character from the keyboard and "ENTER", it usually is placed in a program loop to repeatedly scan the keyboard looking for a pressed key.

For example:

```
1Ø IF INKEY$="X" GOTO 1ØØ
2Ø GOTO 1Ø
1ØØ PRINT "YOU HIT 'X' DIDN'T YOU!"
```

The INKEY$ function repeatedly looks for the letter X at the keyboard to meet the condition of the IF-THEN statement. When the letter X is entered, the condition of the IF-THEN statement is met and the computer branches to line 1ØØ.

TEST PROGRAM

```
1Ø REM 'INKEY$' TEST PROGRAM
2Ø CLS
3Ø PRINT "PRESS ANY KEY ON THE KEYBOARD"
4Ø A$=INKEY$
5Ø IF A$=""GOTO 4Ø
6Ø PRINT "YOU HAVE JUST PRESSED THE ";A$;" KEY"
7Ø PRINT: PRINT "PRESS THE ";A$;" KEY AGAIN TO START OVER"
8Ø IF INKEY$=A$ GOTO 2Ø
9Ø GOTO 8Ø
99 END
```

SAMPLE RUN *(using R)*

```
PRESS ANY KEY ON THE KEYBOARD
YOU HAVE JUST PRESSED THE R KEY

PRESS THE R KEY AGAIN TO START OVER
```

VARIATIONS IN USAGE

None known.

ALSO SEE

INPUT, IF-THEN

HUNGRY FOR MORE?
See page 23, this issue

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Each player (or Bwana) is in charge of a safari camp and must organize filming parties including camera crews and bearers, to search the vast 169-region safari country for wild animals. Scoring is accomplished when you successfully film in a region containing an animal. The player with the most film contract points at the end of the game gets the big movie contract and along with that, the usual fame and fortune. When only one person plays the object of the game is to score as many points as possible.

To begin play, you indicate the difficulty level you want (beginner, average or expert). This determines the number of disasters and hardships you will encounter in safari country (30 to 45 % of the regions). After the names of the players have been entered, a map of the entire country will be displayed to give you an indication of the number of animals in all the regions. Even though the locations of the base camps are displayed, you won't know which one is yours unless you are playing alone.

SAFARI

by David J. Bohlke

Base Camp

At the start of the game, each player is located in his base camp. In yours, you have four scouts, six cameramen, twenty bearers, three cameras and five thousand pounds of supplies. When you're at base camp, you must prepare a safari party to venture through safari country by selecting men and material to take along with you.

First, enter the number of scouts you'll need. Each of the four scouts can 'look ahead'' only in his specific direction (North, South, East, or West). For example, if the North scout is in your safari party, he will report to you whether or not there's an animal in the region located directly to your North. You may use none, some or all of the scouts for your party.

Next, enter the number of cameras you want to take. For each camera, you get three reels of film (you can shoot one picture for each reel). Each camera requires two cameramen to operate it. These men will be included in your party.

Finally, you must enter the number of bearers you will need. Each bearer must carry one hundred pounds of supplies, so the more bearers you take, the further you can venture from your

TRS-80 HOTLINE

If you ever find yourself in need of some fast answers, an easy solution or just a sympathetic ear, call **SoftSide's TRS-80 HOTLINE**. From 7 to 9:30, every Tuesday evening (EST), our resident programmers will be "on line" to offer BASIC programming assistance to Level I and II TRS-80 users in need of a fix.

HOTLINE **603-673-5144**

TRS-80 Programming Hint

If your programs fail to run due to syntax errors, even though they come from reliable sources such as **SoftSide**, perhaps the puzzle can be solved by being careful not to hit the SHIFT key out of habit at the start of a line. With this type of syntax problem, the video display appears normal, but apparently, the letter goes onto the screen normally but the CPU doesn't get the message. Retyping the line containing the syntax error (taking care not to hit the SHIFT key) cures the problem.

base camp. But, the larger your party, the sooner your supplies will be depleted. When you run out of supplies, your bearers and cameramen will begin to starve.

On Safari

After you've organized your safari party, you're ready to begin exploration. During each bwana's turn at play, he need enter only the direction of movement for that day. One day's journey will move your safari party one region (North, South, East or West) from your present location.

Before you move, check your scout's report. This is the map in the upper left of the video screen. A path consisting of six blocks indicates that there's an animal in that adjacent region. A path of four blocks means the scout has nothing to report; and a path of three blocks indicates that you don't have a scout in your party for that specific direction. A solid path indicates a base camp is directly ahead (not necessarily yours), and no path means no passage. Unfortunately, scouts are unable to report any possible dangers ahead.

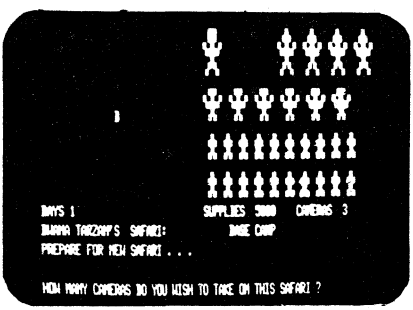
The scoring takes place when you journey into a region that contains a wild animal. At that time, the video screen will display a camera lens and the animal. You must position the lens so the animal is inside the viewfinder, then shoot the film. To move the camera lens, press the arrow on the keyboard which corresponds to the direction you want to go. In order to expose the film, press ENTER.

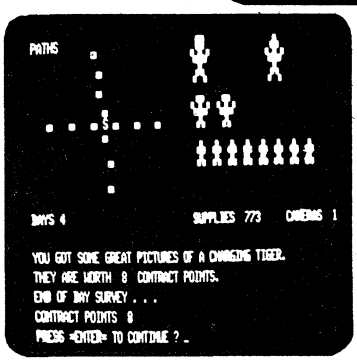
If you are the first to film in a given region, you will receive an

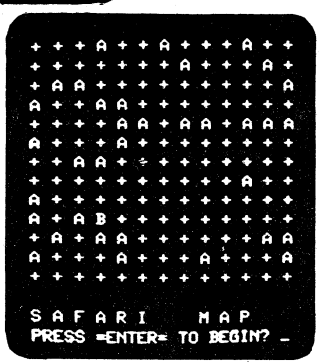
initial eighty contract points; the next bwana to film there will get fifty points, and the third to film in that same region earns thirty points. All others will be too late to get any points. These initial points are decreased according to the time it takes to position the camera and film the animal. However, since movie producers place higher values on remote locations, the contract value is increased by ten points for each day's journey it takes to reach the filming location.

In the safari country, you will also encounter many dangers and hardships. It's even possible to lose your entire safari party while exploring for animals. Should you become lost (or your scouts disoriented) you may send one of your scouts to search for the base camp, and he will return with a map. To order a scout to look for your base camp, press **L** for lost when asked for direction. The scouts may also bring you a map without your request if they feel you are, indeed, lost in safari country. The map will show your location **S** with respect to your base camp. Maps are extremely hard to come by — to get one, your scout will forfeit his life! You must decide between starving your bearers and wandering about lost, or finding a passage to base camp by sacrificing a scout.

During each player's turn to move, a base camp or safari party survey will be displayed in the upper right corner of the video screen. This will show you the number of scouts in your party, the number of cameramen and cameras, the bearers you have taken along, the pounds of







supplies remaining, and the number of contract points you have earned to date. Although the number of days (turns at play) is also displayed, it has no significance in game play. An updated end-of-the-day survey will be shown after each player's move. When you press ENTER to continue, the next bwana's turn will begin.

Strategy

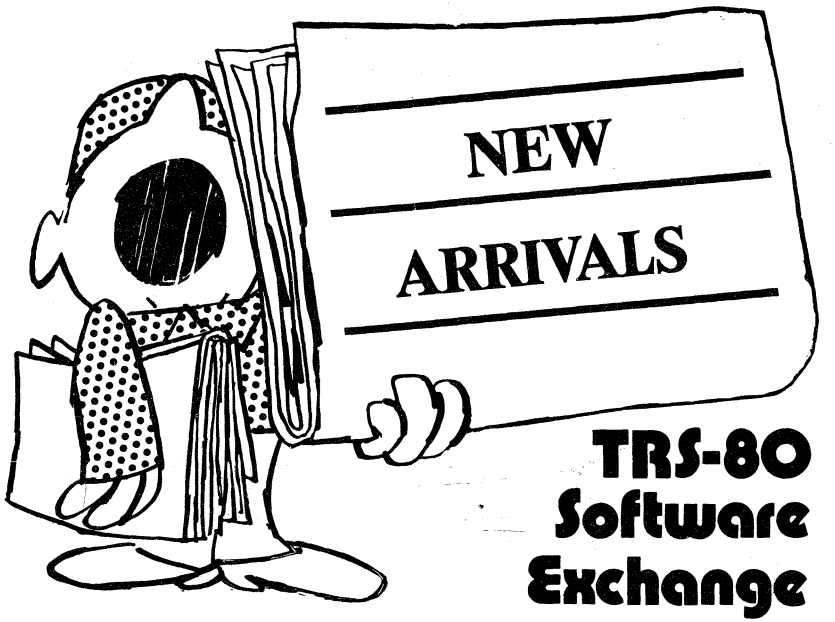
It's always important to remember the location of your base camp with respect to your present location, as well as the numbe of films remaining in your safari party's cameras. When you return to base camp, you will be able to resupply and prepare for another filming expedition. Each camera you take from base will have three rolls of film. You may also wish to use different scouts when you explore in another direction.

In the early stages of the game, it would be wise to take just one or two cameras, one or two scouts, and six to twelve bearers. These can economically be used to search the regions adjacent to your base camp for wild animals. The best time to use all your scouts and cameras is towards the end of the game when your supplies are low; or, maybe earlier, if you find safe passage to an area where several animals are located. When you're out of film, it's best to return to base camp as soon as possible, so your supplies won't be wasted.

One possibility is to shoot your film in a given region, leave the location, and immediately return to film again (for fifty or thirty points). However, while you're wasting time and supplies in one region, the other players may be exploring distant areas containing several animals. Since the point value is increased by ten for each day's journey from base camp, a filming region several days distance away has significantly higher point potential. It might be better to keep on searching after you get the eighty or more points, then on your way back to camp travel through that region again. These strategies will vary depending on whether your base camp is adjacent to regions containing several animals, or whether you have to search for several days before you find and film them.

Your turn ends when you don't have the minimum amount of supplies needed to equip a new safari party: two cameramen, one camera, three bearers, and two hundred pounds of supplies at base camp. Also, if your last camera is destroyed while on safari, your turn at play will end.

Since the winner is the player with the most contract points, it's possible you could be eliminated from the game before the others and still end up as the winner. The game ends and final scores are displayed when every player has either lost all his cameras or has insufficient supplies to begin another safari.



TRS-80 Software Exchange

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Dog Star Adventure **by Lance Micklus** You're trapped aboard an enemy battlestar, can you rescue the princess, find the gold and plans, and escape? Level II, 16K $9.95

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RPN Calculator **by Russell Starkey** A self-documenting calculator program. Uses "Reverse Polish Notation" — with 4 level stack, 100 memories, scientific functions. Level II, 16K $9.95

```
1                                        REM * INITIALIZE PLAYERS *
2 RANDOM:CLEAR1000
4 CLS:PRINTCHR$(23)
10 DEFINTA-Z:DIMA(12,12)
15 PRINT"S A F A R I":PRINT
22 PRINT"=ENTER= # OF PLAYERS (1-6)";:INPUTPL
24 IFPL<>ABS(PL) OR PL>6 RUN
25 PRINT:PRINT"=ENTER= DIFFICULTY LEVEL . . .":PRINT"1 = BEGINNE
R":PRINT"2 = AVERAGE":PRINT"3 = EXPERT ":INPUTDL:IFDL<1ORDL>3RUN
 ELSE CLS:PRINTCHR$(23)
26 PRINT:PRINT"=ENTER= NAMES OF PLAYERS":PRINT
28 FORI=1TOPL:PRINT"BOSS #";I;" ";:INPUT P$(I):NEXT
29                                                    REM * MAP *
30 CLS:PRINTCHR$(23)
40 PRINT@896,"S A F A R I     M A P"
42 PRINT@960,"B = BASE      A = ANIMALS";
49                       REM * DETERMINE LOCATION OF BASE CAMPS *
50 FORB=1TOPL
52 R=RND(10)+1:C=RND(10)+1:IFA(R,C)<>0GOTO52
53 IFA(R+1,C)<>00RA(R-1,C)<>00RA(R,C+1)<>00RA(R,C-1)<>0GOTO52
54 A(R,C)=B+100:PRINT@R*64+C*4,"B";:R(B)=R:C(B)=C:L(B)=100+B
55 R1(B)=R:C1(B)=C
56 NEXT
59                       REM * DETERMINE LOCATION OF ANIMALS *
60 FOR R=0TO12:FOR C=0TO12
65 IFA(R,C)<>0GOTO85
70 IFRND(5)=1 AND C<6THENA(R,C)=1
75 IFRND(5)=1 AND C>5THENA(R,C)=1
80 IF A(R,C)=1PRINT@64*R+C*4,"A";
82 IFA(R,C)=0PRINT@R*64+C*4,"+";
83 IFA(R,C)<>0THENA=A+1:PRINT@1012,A;
85 NEXT C
90 NEXT R
99                                    REM * DETERMINE ANIMAL TYPES *
100 A=0:FORR=0TO12:FORC=0TO12:IFA(R,C)<>1GOTO125
110 A=A+1:IFA=10THENA=1
120 A(R,C)=10*A
125 NEXT:NEXT
130 FORA=1TO9:READA$(A):NEXT
132 DATA"LION","CHARGING TIGER","BULL ELEPHANT","BABOON","RHINO"
,"FLEETING IMPALA","LEOPARD","GIRAFFE","MUDDY HIPPO"
```

```
135 DL=DL*2
140 FORI=1TO1+DL:GOSUB190:A(R,C)=1:NEXT
145 FORI=1TO5+DL:GOSUB190:A(R,C)=3:GOSUB190:A(R,C)=6:NEXT
150 FORI=1TO6+DL:GOSUB190:A(R,C)=2:GOSUB190:A(R,C)=7:NEXT
155 FORI=1TO12+DL:GOSUB190:A(R,C)=4:GOSUB190:A(R,C)=5:NEXT
160 FORZ=1TOPL:M(Z,1)=6:B(Z,1)=20:P(Z,1)=3:W(Z,1)=5000
162 FORD=1TO4:D(Z,D)=1:NEXT:D(Z,0)=6
165 NEXT
179                              REM * SET UP GRAPHIC STRINGS *
180 GOSUB7000
185 PRINT@960,CHR$(30);:GOTO195
190 R=RND(13)-1:C=RND(13)-1:IFA(R,C)<>0GOTO190ELSERETURN
195 PRINT@960,"PRESS =ENTER= TO BEGIN";:INPUTC$
199 REM * DISPLAY EVENTS OF DAY *
200 FOR Z = 1 TO PL:CLS:IFE(Z)>0GOTO399
205 TD(Z)=TD(Z)+1:PRINT@576,"DAYS";TD(Z);
207 IFW(Z,0)<100THENX(Z)=X(Z)+1 ELSE X(Z)=0
210 PRINT@640,"BWANA ";P$(Z);"'S  SAFARI:";
220 IFA(R(Z),C(Z))=L(Z)GOSUB950:L=1:PRINT@675,"BASE CAMP";
230 IFA(R(Z),C(Z))<>L(Z)THEN L=0:PRINT@675,"SAFARI CAMP";:PRINT@
269,"S";
235 GOSUB940
240 IFM(Z,0)+M(Z,1)<2 OR P(Z,0)+P(Z,1)<1PRINT@896,"YOU HAVE NO C
AMERAS (OR CAMERAMEN) TO TAKE PICTURES.";:PRINT@960,"YOU CAN NO
LONGER PLAY.";:FORI=1TO5000:NEXT:E(Z)=1:GOTO399
245 PRINT@606,"SUPPLIES ";W(Z,L);"   CAMERAS ";P(Z,L);
250 IFA(R(Z),C(Z))=L(Z)PRINT@269,"B";:XX=0:GOSUB800
255 IFE(Z)>0GOTO399
260 GOSUB700
270 GOSUB500
399 FORI=1TOPL:IFE(I)<1GOTO410
400 NEXT:GOTO9000
410 NEXT Z
420 GOTO200
449                            REM * CONVERT ARROWS TO NUMBERS *
450 IF ASC(C$)=91 THEN D=1:GOTO455
451 IF ASC(C$)=10 THEN C$=CHR$(92):D=3:GOTO 455
452 IF ASC(C$)=8 THEN C$=CHR$(93):D=4:GOTO 455
453 IF ASC(C$)=9 THEN C$=CHR$(94):D=2:GOTO 455
454 IF C$="S"THEN D=5 ELSE IF C$="L" THEN D=6
455 RETURN
```

```
499                                          REM * INPUT DIRECTIONS *
500 PRINT@925,"                          ";
505 D=0:PRINT@925,"WHICH   W A Y ? ";
510 C$=INKEY$:IFC$=""THEN510ELSEGOSUB450:PRINTC$;
515 IFD<10RD>6GOTO500
516 IFX(Z)>7THENXX=9:GOSUB3000:GOTO650
520 IFD=5PRINT@832,CHR$(31);:GOTO650
521 IFD=6GOSUB3000:GOTO650                          :REM * LOST *
525 R=R(Z):C=C(Z):GOSUB790
530 IFR<0 OR R>12 OR C<0 OR C>12 THENR=R(Z):C=C(Z):GOTO500
540 R(Z)=R:C(Z)=C
550 IFA(R,C)=0PRINT@704,CHR$(31);:D=RND(9):GOSUB3500:PRINT@704,D
$;:GOTO650
555 PRINT@640,CHR$(31);
560 IFA(R,C)=L(Z)PRINT@640,"YOU MADE IT TO YOUR BASE CAMP !";:GO
TO600
565 IFA(R,C)>99PRINT@704,"YOU'RE AT A BASE CAMP, BUT IT IS NOT Y
OURS !";:PRINT@768,"SUPPLIES ARE GUARDED, SO DON'T GET ANY FUNNY
 IDEAS.";:GOTO600
570 IF A(R,C)<9 OR A(R,C)>99 GOTO600
572 IFPT(Z)<1PRINT@704,"THERE'S A ";A$(A(R,C)/10);"!";:PRINT@768
,"TOO BAD YOU HAVE NO FILM LEFT.";:GOTO600
574 IFM(Z,0)<2PRINT@704,"THERE'S A ";A$(A(R,C)/10);"!";:PRINT@76
8,"TOO BAD YOU'RE SHORT ON CAMERAMEN !";:GOTO600
577 X=A(R,C)-INT(A(R,C)/10)*10
581 IFX>2PRINT@768,"TOO BAD YOU'RE TOO LATE TO GET ANY CONTRACT
POINTS.";:PRINT@704,CHR$(30);:PRINT@704,"THERE'S A ";A$(A(R,C)/1
0);" !";:GOTO650
590 GOSUB7150:CLS
600 IF A(R,C)<1 OR A(R,C)>7 GOTO 650
602 ON A(R,C) GOTO604,610,615,620,625,630,635
604 IFM(Z,0)<2 AND B(Z,0)<2 GOTO650
606 PRINT@704,"DISASTER !!! MOST OF YOUR PARTY CAPTURED BY HEAD
HUNTERS.";:PRINT@768,"YOU'LL HAVE A TOUGH TIME SURVIVING.";
607 FORD=1TO4:IFD(Z,D)=0THEND(Z,D)=2
608 NEXT:M(Z,0)=0:B(Z,0)=0:P(Z,0)=0:W(Z,0)=0
609 GOTO650
610 FORD=1TO4:IFD(Z,D)=0GOTO612
611 NEXT:PRINT@704,"A WEARY DAY.";:GOTO650
612 D=RND(9):GOSUB690:FORD=1TO4:IFD(Z,D)=0THEND(Z,D)=2:GOTO614
613 NEXT:GOTO650
```

```
614 PRINT@768,"SCOUT LOST ";D$;:GOTO650
615 IFM(Z,0)<1GOTO650
616 M(Z,0)=M(Z,0)-1:D=RND(4)+5:GOSUB690:PT(Z)=PT(Z)-3:IFPT(Z)<0T
HENPT(Z)=0
617 PRINT@768,"CAMERA CREWMAN AND FILM LOST ";D$;:GOTO650
620 IFB(Z,0)<2GOTO650
621 B(Z,0)=B(Z,0)-1:D=RND(9):GOSUB690
622 PRINT@768,"BEARER LOST ";D$;:GOTO650
625 D=RND(4)+5:GOSUB690:IFW(Z,0)<10GOTO650
626 LS=50+RND(100):W(Z,0)=W(Z,0)-LS:IFW(Z,0)<0THENW(Z,0)=0
628 PRINT@768,LS;" POUNDS OF SUPPLIES LOST ";D$;:GOTO650
630 IFP(Z,0)<1GOTO650
631 P(Z,0)=P(Z,0)-1:D=RND(4)+5:GOSUB690:PT(Z)=PT(Z)-3:IFPT(Z)<0T
HENPT(Z)=0
632 PRINT@768,"CAMERA DESTROYED ";D$;:GOTO650
635 PRINT@704,"YOUR SCOUTS ARE COMPLETELY DISORIENTATED...";
636 PRINT@768,"YOU PROBABLY WON'T FIND YOUR WAY BACK TO BASE.";
637 GOSUB190:R(Z)=R:C(Z)=C
650 PRINT@832,"END OF DAY SURVEY . . .";
652 DS=0:FORD=1TO4:IFD(Z,D)=0THENDS=DS+1
653 NEXT
655 W(Z,0)=W(Z,0)-10-6*M(Z,0)-10*DS-3*B(Z,0)
660 FORI=29TO605STEP64:PRINT@I,STRING$(34," ");:NEXT
662 IFW(Z,0)<0THENW(Z,0)=0
665 IFA(R,C)=L(Z)GOTO680
667 IFW(Z,0)<100ANDB(Z,0)>1THENB(Z,0)=B(Z,0)-1:PRINT@862,"ONE BE
ARER STARVED.";:GOTO670
668 IFW(Z,0)<100ANDB(Z,0)<2ANDM(Z,0)>0THENM(Z,0)=M(Z,0)-1:PRINT@
862,"ONE CAMERAMAN STARVED.";
670 L=0:GOSUB940:PRINT@606,"SUPPLIES ";W(Z,0);"    ";
672 PRINT"CAMERAS ";P(Z,L);:PRINT@896,"CONTRACT POINTS ";T(Z);
675 PRINT@960,"PRESS =ENTER= TO CONTINUE ";:INPUTD$
676 RETURN
680 PRINT@832,"BASE SURVEY . . .";:GOSUB950
682 L=1:GOSUB940:X(Z)=0
684 PRINT@606,"SUPPLIES ";W(Z,1);"     ";
685 GOTO672
689                                          REM * DISASTERS *
690 ON D GOTO 691,692,693,694,695,696,697,698,699
691 D$="IN QUICKSAND.":RETURN
692 D$="TO WILD ANIMALS.":RETURN
```

```
693 D$="BY SNAKE BITE.":RETURN
694 D$="BY EXHAUSTION.":RETURN
695 D$="TO FEVER.":RETURN
696 D$="IN STAMPEDE.":RETURN
697 D$="IN BRUSH FIRE.":RETURN
698 D$="IN FLASH FLOOD.":RETURN
699 D$="TO WARING NATIVES.":RETURN
                                        :REM * DIRECTIONS *
700 PRINT@704,CHR$(31);
702 PRINT@832,CHR$(91);"=NORTH   ";CHR$(94);"=EAST";:PRINT@896,C
HR$(92);"=SOUTH   ";CHR$(93);"=WEST";
703 PRINT@960,"S=STAY    L=LOST";
705 PRINT@790,"S C O U T    R E P O R T  (SEE MAP)";
707 FORD=1TO4:R=R(Z):C=C(Z):GOSUB790
710 IFD(Z,D)<>0 THEN Q=4:GOSUB960:GOTO730
715 IFR<0 OR R>12 OR C<0 OR C>12 GOTO730
720 IFA(R,C)>9ANDA(R,C)<99THEN Q=2:GOSUB960
725 IFA(R,C)>100 THEN Q=1:GOSUB960
727 IFA(R,C)<9 THEN Q=3:GOSUB960
730 NEXT
750 RETURN
790 ON D GOTO 791,793,795,797
791 R=R-1:D$="1 NORTH - ":RETURN
793 C=C+1:D$="2 EAST  - ":RETURN
795 R=R+1:D$="3 SOUTH - ":RETURN
797 C=C-1:D$="4 WEST  - ":RETURN
799 REM * SELECT EQUIPMENT FOR SAFARI *
800 IFM(Z,1)<20RB(Z,1)<40RP(Z,1)<10RW(Z,1)<200PRINT@896,"YOU DO
NOT HAVE ENOUGH MINIMAL EQUIPMENT TO GO ON SAFARI.";:FORI=1TO500
0:NEXT:E(Z)=1:RETURN
804 PRINT@704,"PREPARE FOR NEW SAFARI . . .";
805 PRINT@832,"SCOUTS:  1=NORTH  2=EAST  3=SOUTH  4=WEST  5=NO M
ORE";
810 PRINT@896,CHR$(31);
811 PRINT@896,"WHICH SCOUTS WILL YOU TAKE ? ";
812 FORD=1TO4:IFD(Z,D)<>2GOTO815
813 NEXT:PRINT@960,"YOU HAVE NO SCOUTS AVAILABLE !";:FORI=1TO100
0:NEXT:X=5:GOTO822
815 C$=INKEY$:IFC$=""THEN815ELSEPRINTC$;
820 X=VAL(C$):IFX<10RX>5GOTO810
822 IFX=5PRINT@768,CHR$(31);:GOTO830
```

```
823 IFD(Z,X)=2PRINT@960,"HE IS NO LONGER IN YOUR PARTY !";:FORI=
1TO1000:NEXT:GOTO810
824 IFD(Z,X)=0PRINT@960,"YOU ALREADY PICKED HIM ! ";:FORI=1TO100
0:NEXT:GOTO810
825 D(Z,X)=0:GOTO810
830 PRINT@832,"HOW MANY CAMERAS DO YOU WISH TO TAKE ON THIS SAFA
RI ? ";
835 C$=INKEY$:IFC$=""THEN835ELSEPRINTC$;
840 X=VAL(C$):IFX>P(Z,1)OR X*2>M(Z,1)PRINT@960,"YOU DO NOT HAVE
THE NECESSARY EQUIPMENT OR MEN.";:FORI=1TO1000:NEXT:PRINT@768,CH
R$(31);:GOTO830
845 P(Z,1)=P(Z,1)-X:P(Z,0)=X:M(Z,1)=M(Z,1)-2*X:M(Z,0)=2*X
846 PT(Z)=3*X
850 PRINT@768,CHR$(31);:PRINT@832,"HOW MANY BEARERS DO YOU WISH
TO TAKE ON THIS SAFARI ?";
852 PRINT@896,"YOU WILL HAVE 100 LBS OF SUPPLIES PER BEARER.";
855 PRINT@960,"REM: PRESS TWO DIGITS (06=SIX) ";
860 C$=INKEY$:IFC$=""THEN860ELSEPRINTC$;:X=VAL(C$)
862 C$=INKEY$:IFC$=""THEN862ELSEPRINTC$;:Y=VAL(C$)
864 IF10*X+Y>B(Z,1)PRINT@960,"YOU DO NOT HAVE THAT MANY MEN !";:
FORI=1TO1000:NEXT:GOTO850
865 IF10*X+Y<3PRINT@960,"YOU MUST TAKE AT LEAST 3 BEARERS.";:FOR
I=1TO1000:NEXT:GOTO850
866 B(Z,1)=B(Z,1)-10*X-Y:B(Z,0)=10*X+Y
870 IF100*B(Z,0)>W(Z,1)THENW(Z,0)=W(Z,1):W(Z,1)=0:GOTO899
875 W(Z,1)=W(Z,1)-100*B(Z,0):W(Z,0)=100*B(Z,0)
899 PRINT@704,CHR$(31);:RETURN
900 SET(X,Y):SET(X+2,Y):SET(X+1,Y-1):SET(X,Y-2):SET(X+1,Y-2)
902 SET(X+2,Y-2):SET(X+1,Y-3):RETURN
909 REM * DRAW MEMBERS OF PARTY *
910 GOSUB900:SET(X-1,Y-2):SET(X-2,Y-3):SET(X+3,Y-2)
911 SET(X+4,Y-3)
912 SET(X,Y-4):SET(X+1,Y-4):SET(X+2,Y-4):RETURN
920 GOSUB910:SET(X-1,Y+1):SET(X+3,Y+1):SET(X+1,Y-5):RETURN
930 GOSUB920:SET(X,Y-5):SET(X+2,Y-5):RETURN
940 X=62:Y=5:GOSUB930
941 X=91:FOR D=1TO4:IFD(Z,D)=L GOSUB920:X=X+10
942 NEXT:IFM(Z,L)<1GOTO944
943 X=62:Y=13:FORI=1TOM(Z,L):GOSUB910:X=X+10:NEXT
944 X=62:Y=19:FORI=1TOB(Z,L):GOSUB900:X=X+6
945 IFI=10THENY=25:X=62
```

```
946 NEXT
948 RETURN
950 FORD=1TO4:IFD(Z,D)<>2THEND(Z,D)=1
951 NEXT
952 M(Z,1)=M(Z,1)+M(Z,0):B(Z,1)=B(Z,1)+B(Z,0)
953 P(Z,1)=P(Z,1)+P(Z,0):W(Z,1)=W(Z,1)+W(Z,0)
954 M(Z,0)=0:B(Z,0)=0:P(Z,0)=0:W(Z,0)=0:PT(Z)=0
955 RETURN
960 PRINT@0,"PATHS";
965 I=D:DV=(-1)[(RND(2))
970 ON I GOTO 975,980,985,990
975 IFR(Z)=0RETURN
976 X=26:FORY=11TO0STEP-Q:SET(X,Y):SET(X+1,Y)
978 X=X+2*DV*(RND(2)-1):NEXT:RETURN
980 IFC(Z)=12RETURN
981 Y=13:FORX=30TO52STEP2*Q:SET(X,Y):SET(X+1,Y)
983 Y=Y+DV*(RND(2)-1):NEXT:RETURN
985 IFR(Z)=12RETURN
986 X=26:FORY=15TO26STEPQ:SET(X,Y):SET(X+1,Y)
988 X=X+2*DV*(RND(2)-1):NEXT:RETURN
990 IFC(Z)=0RETURN
991 Y=13:FORX=22TO0STEP-2*Q:SET(X,Y):SET(X+1,Y)
993 Y=Y+DV*(RND(2)-1):NEXT:RETURN
2999                                  REM * MAP TO BASE CAMP *
3000 FORD=1TO4:IFD(Z,D)=0THEND(Z,D)=2:A$=" SCOUT ":GOTO3045
3002 IFD(Z,D)=1THEND(Z,D)=2:A$=" SCOUT FROM BASE ":GOTO3045
3005 NEXT
3010 IFM(Z,0)>0THENM(Z,0)=M(Z,0)-1:A$=" CAMERAMAN ":GOTO3045
3020 IFM(Z,1)>0THENM(Z,1)=M(Z,1)-1:A$=" CAMERAMAN FROM BASE ":GO
TO3045
3030 CLS:PRINT@896,"FROM A HIGH PEAK, YOU'VE MADE THIS MAP TO YO
UR BASE CAMP.";:GOTO3070
3045 CLS:IFXX=9THENXX=0:PRINT@832,"YOU ACT AS IF YOU ARE LOST, S
O . . . ";
3060 PRINT@896,"YOUR";A$;"GAVE HIS LIFE TO GET THIS MAP !";
3070 X(Z)=0:FORM=0TO12:FORN=0TO12
3080 PRINT@M*64+N*4,"+";
3090 IFA(M,N)=L(Z)PRINT@M*64+N*4,"B";
3100 IFM=R(Z)ANDN=C(Z)PRINT@M*64+N*4,"S";
3110 NEXT:NEXT
3120 PRINT@960,"PRESS =ENTER= TO CONTINUE ";:INPUTA$:CLS
```

```
3150 D=6:RETURN
3500 ON D GOTO 3501,3502,3503,3504,3505,3506,3507,3508,3509
3501 D$="NO EXCITEMENT TODAY.":RETURN
3502 D$="A WEARY DAY.":RETURN
3503 D$="NO ACTION TODAY.":RETURN
3504 D$="BETTER LUCK TOMORROW.":RETURN
3505 D$="MAYBE YOU'LL FIND SOMETHING TOMORROW.":RETURN
3506 D$="IS IT REALLY WORTH IT ?":RETURN
3507 D$="NO LUCK AGAIN.":RETURN
3508 D$="THOSE SCOUTS ARE LOUSY.":RETURN
3509 D$="I WONDER HOW THE OTHERS ARE DOING.":RETURN
4999 REM * INSTRUCTIONS *
6999 REM * ANIMAL PICTURES *
7000 S$=CHR$(26)+STRING$(6,24)
7020 AN$(1)=CHR$(185)+CHR$(140)+CHR$(140)+CHR$(140)+CHR$(140)+CH
R$(182)+S$+CHR$(143)+CHR$(146)+CHR$(188)+CHR$(188)+CHR$(161)+CHR
$(143)
7025 AN$(2)=CHR$(163)+CHR$(140)+CHR$(156)+CHR$(172)+CHR$(140)+CH
R$(147)+S$+CHR$(128)+CHR$(165)+CHR$(182)+CHR$(185)+CHR$(154):AN$
(7)=AN$(2)
7030 AN$(3)="   "+CHR$(184)+CHR$(188)+CHR$(144)+S$+STRING$(4,191
)+CHR$(129)+CHR$(134)+S$+CHR$(143)+"  "+CHR$(143):AN$(7)=AN$(2)
7040 AN$(4)=" "+CHR$(160)+CHR$(174)+CHR$(157)+CHR$(144)+" "+S$+"
 "+CHR$(160)+CHR$(134)+CHR$(137)+CHR$(144)
7050 AN$(5)=CHR$(171)+CHR$(159)+CHR$(143)+CHR$(175)+CHR$(159)+CH
R$(142)
7055 AN$(9)=LEFT$(AN$(5),4)+CHR$(151)+CHR$(143)
7060 AN$(6)="   "+CHR$(160)+CHR$(140)+" "+S$+CHR$(162)+CHR$(135)
+CHR$(131)+CHR$(155)
7070 AN$(8)="    "+CHR$(160)+CHR$(135)+S$+CHR$(160)+CHR$(176)+CH
R$(176)+CHR$(184)+CHR$(129)+" "+S$+CHR$(129)+CHR$(149)+" "+CHR$(
170)
7099 REM * CAMERA VIEWFINDER *
7100 L1$=CHR$(26)+STRING$(23,24)+CHR$(191)+STRING$(21,128)+CHR$(
191)
7110 F$=STRING$(23,176)+L1$+L1$+L1$+L1$
7120 F1$=L1$+L1$+L1$+CHR$(26)+STRING$(23,24)+STRING$(23,131)
7130 RETURN
7149 REM * PICTURE TAKING ROUTINE *
7150 CLS:P1=RND(40):P2=RND(7):P=P1+64*P2
7160 A1=RND(50):A2=RND(13):A=A1+A2:PP=0
```

```
7170 IFX=0THENPP=80
7172 IFX=1THENPP=50
7174 IFX=2THENPP=30
7176 PP=PP+(ABS(R(Z)-R1(Z))+ABS(C(Z)-C1(Z)))*10
7180 A(R,C)=A(R,C)+1:PT(Z)=PT(Z)-1
7300 PRINT@60,PP;
7310 PRINT@0,"MOVE FRAME:  [=UP  ";CHR$(92);"=DN  ";CHR$(93);"=L
EFT  ";CHR$(94);"=RIGHT  ENTER=SNAP PICTURE";
7320 C$=INKEY$:IFC$="["THENP2=P2-1:IFP2<1THENP2=1
7330 IFC$=CHR$(10)THENP2=P2+1:IFP2>7THENP2=7
7340 IFC$=CHR$(8)THENP1=P1-3-RND(2):IFP1<0THENP1=1
7350 IFC$=CHR$(9)THENP1=P1+3+RND(2):IFP1>40THENP1=40
7360 IFC$=CHR$(13)GOTO7700
7370 PRINT@64,CHR$(31):P=P1+P2*64
7380 PRINT@P,F$;:PRINT@P+267,CHR$(140);:PRINT@P+279,F1$;
7400 A1=A1+(RND(3)-2)*3:IFA1<0THENA1=2ELSEIFA1>50THENA1=50
7410 A2=A2+RND(3)-2:IFA2<2THENA2=2ELSEIFA2>13THENA2=13
7420 A=A1+A2*64:PRINT@A,AN$(A(R,C)/10);
7450 PP=PP-1:IFPP<1GOTO7700
7470 GOTO7300
7700 IFP>256THENPS=64ELSEPS=832
7710 IFPP<1PRINT@PS,"YOU'RE TOO SLOW WITH THE CAMERA !":GOTO7810
7715 P1=P1+11:P2=P2+4
7720 IFABS(P1-A1)<11 AND ABS(P2-A2)<4PRINT@PS,"YOU GOT SOME GOOD
 PICTURES OF A ";A$(A(R,C)/10):PRINT"THEY ARE WORTH ";PP;" CONTR
ACT POINTS.":GOTO7800
7730 PRINT@PS,"SORRY, BUT YOU MISSED THE PICTURE .":GOTO7810
7800 T(Z)=T(Z)+PP
7810 INPUT"PRESS =ENTER= TO CONTINUE ";B$
7820 RETURN
8999                          REM * END OF GAME *
9000 CLS
9010 PRINT"NO ONE HAS CAMERA EQUIPMENT NEEDED TO SCORE POINTS."
9020 PRINT"THE GAME IS OVER.":PRINT
9030 PRINT"FINAL STANDINGS :":PRINT
9040 FORI=1TOPL:PRINTP$(I);"   ";T(I):NEXT:PRINT
9050 INPUT"PRESS =ENTER= FOR ANOTHER GAME ";A$:RUN
```

TAKE A PART: SAFARI

Take A Part is a new feature in SoftSide. One of the best ways to learn new methods is to look at programs that others have written. In this series, we'll take one feature of a program in our current issue and explain how it works.

When playing games (like **Safari** or **X-Wing Fighter**) that call for moving objects around on the screen, it's awkward to remember which particular letters mean to go up, down, left or right. One solution to this problem is to use the arrows on the keyboard to indicate motion.

At first glance this seems difficult, for the arrows already have specific functions. Without a shift, (and in fast action we don't want to press the SHIFT key) the **up arrow** prints an up arrow, the **down arrow** gives us a line feed, the **right arrow** functions as a TAB key, and the **left arrow** is a back space. Of the four, only the up arrow gives us a visually recognizable symbol in an input statement. We can't print a down arrow, or a right or left arrow directly from the keyboard. However, we can print them indirectly, using the CHR$ function (See line 702 of **Safari**) Here are the codes, from page C/2 of the Level II Manual:

CHR$ (91)	Up Arrow
CHR$ (92)	Down Arrow
CHR$ (93)	Left Arrow
CHR$ (94)	Right Arrow

The reason we can't use these directly is that the down, left and right arrows are dedicated to other ASCII codes in lower case, as follows:

Down Arrow	ASC (10)	Linefeed
Left Arrow	ASC (8)	Backspace Cursor
Right Arrow	ASC (9)	Advance Cursor

If we use these keys in an INPUT statement, the line feeds and spaces are printed. If, instead, we use them with the INKEY$ function, we can translate them into printed arrows before we print them, and even use them to set up a variable to control movement on the screen, as is done with Line 510 and the subroutine at 450 to 454 in **Safari**.

The Programming of the FUTURE is here NOW

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Proper inventory management is the backbone of a profitable business, yet it's very difficult to keep current on price increases, shrinkage, low-on-stock items and profitable items versus losers, without an efficient and prompt method of surveying your inventory levels at any given time. **INVENTORY SYSTEM II** can help you to achieve optimal management — it can handle up to 1,000 items on one mini-floppy disk. Each additional disk can handle another 1,000 items.

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MENU CHOICES:

1. Activity Report
2. Minimum Quantity Report
3. Inventory List
4. Class Code List
5. Vendor Code List
6. Update or Video Display Inventory

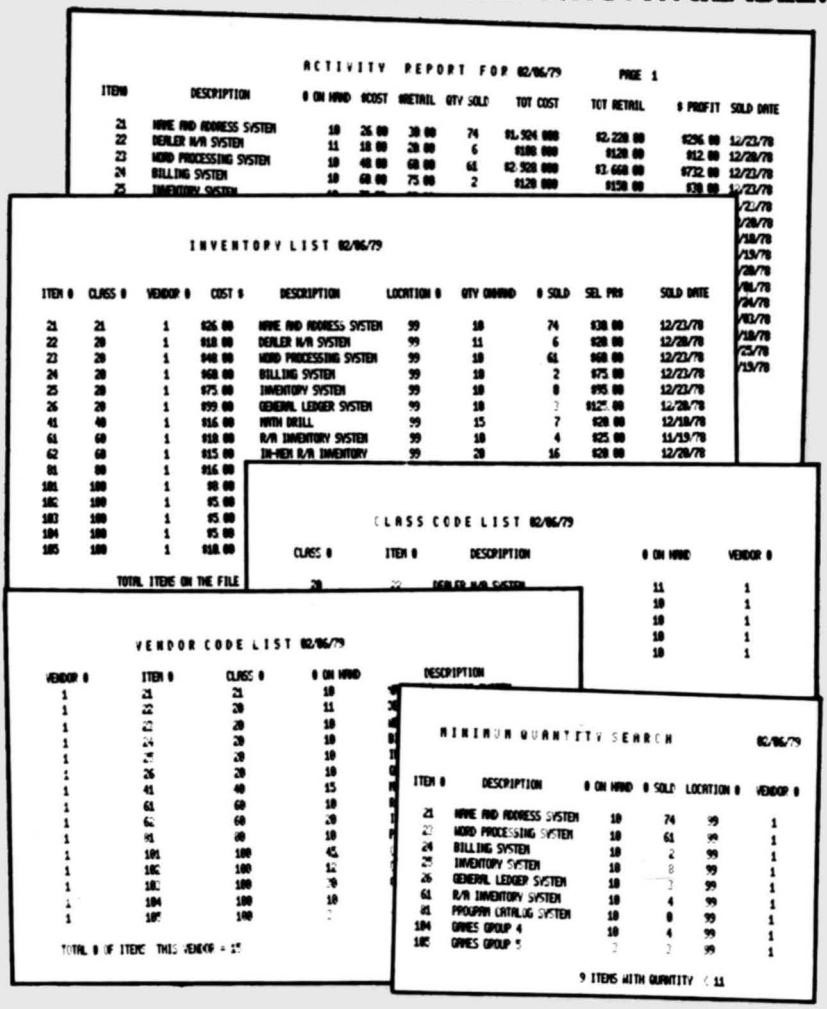
DATA FIELDS AVAILABLE FOR EACH ITEM

— # On Hand
— # Sold This Period
— Date of Last Sale
— Cost $
— Selling Price $
— Description (25 char.)
— Vendor #
— Class #
—Location #

A comprehensive 32-page manual guides you step by step during your first-time run of the system (dummy data is supplied with all BIZ-80 systems). Your conversion of data from a manual system to the computer system, regular run procedures throughout the year — update the file, add or delete items, keep track of activity month by month or week by week, check for low-on-stock items, run inventory control reports for management.

Requires a minimum system configuration of 32K Level II TRS-80 microcomputer with at least one mini-disk and line printer. Two disks are recommended.

EXAMPLES OF REPORTS AVAILABLE:



ACTIVITY REPORT FOR 02/06/79 PAGE 1

ITEM#	DESCRIPTION	# ON HAND	@COST	@RETAIL	QTY SOLD	TOT COST	TOT RETAIL	$ PROFIT	SOLD DATE
21	NAME AND ADDRESS SYSTEM	10	26.00	38.00	74	$1,924.00	$2,220.00	$296.00	12/23/78
22	DEALER R/A SYSTEM	11	18.00	28.00	6	$108.00	$120.00	$12.00	12/28/78
23	WORD PROCESSING SYSTEM	10	48.00	60.00	61	$2,928.00	$3,660.00	$732.00	12/23/78
24	BILLING SYSTEM	10	60.00	75.00	2	$120.00	$150.00	$30.00	12/23/78
25	INVENTORY SYSTEM								

INVENTORY LIST 02/06/79

ITEM #	CLASS #	VENDOR #	COST $	DESCRIPTION	LOCATION #	QTY ONHAND	# SOLD	SEL PRS	SOLD DATE
21	21	1	$26.00	NAME AND ADDRESS SYSTEM	99	10	74	$38.00	12/23/78
22	20	1	$18.00	DEALER R/A SYSTEM	99	11	6	$28.00	12/28/78
23	20	1	$48.00	WORD PROCESSING SYSTEM	99	10	61	$60.00	12/23/78
24	20	1	$60.00	BILLING SYSTEM	99	10	2	$75.00	12/23/78
25	20	1	$75.00	INVENTORY SYSTEM	99	10	0	$95.00	12/23/78
26	20	1	$99.00	GENERAL LEDGER SYSTEM	99	10	3	$125.00	12/28/78
41	40	1	$16.00	MATH DRILL	99	15	7	$20.00	12/18/78
61	60	1	$10.00	R/A INVENTORY SYSTEM	99	10	4	$25.00	11/19/78
62	60	1	$15.00	IN-HEN R/A INVENTORY	99	20	16	$20.00	12/28/78
81	80	1	$16.00						
101	100	1	$8.00						
102	100	1	$5.00						
103	100	1	$5.00						
104	100	1	$5.00						
105	100	1	$10.00						

TOTAL ITEMS ON THE FILE

CLASS CODE LIST 02/06/79

CLASS #	ITEM #	DESCRIPTION	# ON HAND	VENDOR #
20	22	DEALER R/A SYSTEM	11	1
			10	1
			10	1
			10	1
			10	1

VENDOR CODE LIST 02/06/79

VENDOR #	ITEM #	CLASS #	# ON HAND	DESCRIPTION
1	21	21	10	
1	22	20	11	
1	23	20	10	
1	24	20	10	
1	25	20	10	
1	26	20	10	
1	41	40	15	
1	61	60	10	
1	62	60	20	
1	81	80	10	
1	101	100	45	
1	102	100	12	
1	103	100	20	
1	104	100	10	
1	105	100	5	

TOTAL # OF ITEMS THIS VENDOR = 15

MINIMUM QUANTITY SEARCH 02/06/79

ITEM #	DESCRIPTION	# ON HAND	# SOLD	LOCATION #	VENDOR #
21	NAME AND ADDRESS SYSTEM	10	74	99	1
23	WORD PROCESSING SYSTEM	10	61	99	1
24	BILLING SYSTEM	10	2	99	1
25	INVENTORY SYSTEM	10	0	99	1
26	GENERAL LEDGER SYSTEM	10	3	99	1
61	R/A INVENTORY SYSTEM	10	4	99	1
81	PROGRAM CATALOG SYSTEM	10	0	99	1
104	GAMES GROUP 4	10	4	99	1
105	GAMES GROUP 5	10	5	99	1

9 ITEMS WITH QUANTITY < 11

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SERIES CIRCUITS

by Philip Brown

One of the nicest things about a computer is that it never complains about having to figure the same math problems over and over again. We find it a nuisance to have to keep doing problems with different data, as we would in examining the behavior of a series circuit over a range of operating voltages. When you enter the information for this one, the initial voltage must be lower than the final voltage, and you may not have more than one step per volt.

Within those limitations, this is a lot easier than breadboarding the circuit and measuring all the voltage drops and the current while increasing a variable voltage power supply. •

```
1 REM * * * * * * * * * * * * * * * * * * *
      *        SOFTSIDE PRESENTS          *
      *         SERIES CIRCUITS           *
      *        BY: PHILLIP BROWN          *
      * * * * * * * * * * * * * * * * * * *
5  CLS
10  PRINT@459,"THIS PROGRAM DEMONSTRATES SERIES CIRCUITS"
15  FOR I=1 TO 1000:NEXT I
20  CLS
25  INPUT "WHAT IS THE VALUE OF THE FIRST RESISTOR";R
27  IF R<=0 THEN 25
30  INPUT "WHAT IS THE VALUE OF THE SECOND RESISTOR";S
32  IF S<=0 THEN 30
35  INPUT "WHAT IS THE INITIAL VOLTAGE";E
40  INPUT "WHAT IS THE FINAL VOLTAGE";F
45  INPUT "WHAT IS THE INCREMENT";Q
47  LET Z=ABS(Q)
48  IF Z<1 THEN 45
49  LET N=(F-E)/Q
50  IF N<1 THEN 35
55  CLS
60  PRINT "THE CIRCUITS ARE"
65  PRINT "  FROM:"," ","   TO:"
70  PRINT:PRINT "    R1","   R2","    R1","  R2"
75  PRINT "    ";R," ";S,"   ";R," ";S
80  PRINT@651,"PS"," ","          PS"
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```
85  PRINT@714,E," ","           ";F
90  PRINT:PRINT" ","     BY INCREMENTS OF ";Q
95  X=2
100  FOR Y=16 TO 26
105  SET(X,Y):SET(X+1,Y)
110  SET(X+46,Y):SET(X+47,Y)
115  SET(X+64,Y):SET(X+65,Y)
120  SET(X+110,Y):SET(X+111,Y)
125  NEXT Y
130  FOR X=2 TO 49
135  Y=16
140  IF X=7 THEN Y=Y+1
145  IF X=9 THEN Y=Y-1
150  IF X=11 THEN Y=Y+1
155  IF X=13 THEN Y=Y-1
160  IF X=15 THEN Y=Y+1
165  IF X=17 THEN Y=Y-1
170  IF X=35 THEN Y=Y+1
175  IF X=37 THEN Y=Y-1
180  IF X=39 THEN Y=Y+1
185  IF X=41 THEN Y=Y-1
190  IF X=43 THEN Y=Y+1
195  IF X=45 THEN Y=Y-1
200  SET(X,Y):SET(X+64,Y)
205  NEXT X
210  FOR X=2 TO 18:Y=26
215  SET(X,Y):SET(X+64,Y)
220  NEXT X
225  FOR X=30 TO 49
230  SET(X,Y):SET(X+64,Y)
235  NEXT X
240  FOR Y=24 TO 28:X=19
245  IF Y=24 THEN 265
250  IF Y=28 THEN 265
255  SET(X+2,Y):SET(X+6,Y):SET(X+10,Y)
260  SET(X+66,Y):SET(X+70,Y):SET(X+74,Y)
265  SET(X,Y):SET(X+4,Y):SET(X+8,Y)
270  SET(X+64,Y):SET(X+68,Y):SET(X+72,Y)
275  NEXT Y
280  GOSUB1000
295  CLS
```

```
300  FOR Y=0 TO 47
305  SET(32,Y):SET(64,Y):SET(96,Y)
310  NEXT Y
315  FOR X=0 TO 127
320  SET(X,3)
325  NEXT X
330  PRINT " TOTAL VOLTAGE";
335  PRINT@23,"E1";
340  PRINT@39,"E2";
345  PRINT@52,"AMPERAGE";
350  X=66
355  FOR I=E TO F STEP Q
360  X=X+64
365  PRINT@X,I;
370  PRINT@X+16,R/(R+S)*I;
375  PRINT@X+32,S/(R+S)*I;
380  PRINT@X+48,I/(R+S);
385  IF X<>962 THEN 430
390  X=66
395  FOR J=1 TO 3000:NEXT J
400  FOR J=130 TO 962 STEP 64
405  PRINT@J,"           ";
410  PRINT@J+16,"           ";
415  PRINT@J+32,"           ";
420  PRINT@J+48,"           ";
425  NEXT J
430  NEXT I
435  IF X=66 THEN 480
440  X=X+64
445  FOR I=X TO 962 STEP 64
450  PRINT@X,"           ";
455  PRINT@X+16,"           ";
460  PRINT@X+32,"           ";
465  PRINT@X+48,"           ";
470  NEXT I
475  FOR I=1 TO 5000:NEXT I
480  CLS
485  INPUT"DO YOU WANT THIS PROGRAM RUN AGAIN(YES=1)";Z
490  IF Z=1 THEN 20
495  STOP
1000 PRINT@910," ":INPUT"PRESS ENTER TO GO ON";C$:RETURN
```