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80-NORTHWEST WILL ACCEPT LIMITED, RELEVANT COMMERCIAL ADVERTISING (MUST PERTAIN TO OR FOR USE WITH TRS-80 MICRO-COMPUTER). SPACE IS SOLD BY ONE QUARTER PAGE, HALF PAGE OR FULL PAGE ONLY. PRICE PER INSERTION IS \$25 FOR QUARTER PAGE, \$50 PER HALF PAGE AND \$100 PER FULL PAGE. EACH ADDITIONAL INSERTION OF SAME AD IS REDUCED IN PRICE BY 5%, NOT TO EXCEED A TOTAL DISCOUNT OF 30%. THAT IS, THE SAME AD RUN FOR ONE YEAR, (SIX ISSUES) WOULD BE REDUCED BY 30%.

PLEASE ADDRESS ALL INQUIRIES/CORRESPONDENCE TO THE 80-NORTHWEST JOURNAL  
PO BOX 7112  
TACOMA, WASHINGTON 98407

-ATTENTION USER GROUPS-

TRS-80 USER GROUPS MAY SEND PARTICULARS OF THEIR MEETINGS AND REPORTS OF THEIR ACTIVITIES FOR FREE PUBLICATION IN THE 80-NORTHWEST JOURNAL. SEND TO 80-NORTHWEST  
PO BOX 7112  
TACOMA, WASHINGTON 98407

-WRITERS/CONTRIBUTORS-

THE 80-NORTHWEST JOURNAL IS SEEKING MATERIAL FROM WRITERS. SEND US YOUR TRS-80 RELATED MATERIAL, PROGRAMS, LISTINGS, ARTICLES OR WHAT HAVE YOU (EXCEPTING PREVIOUSLY PUBLISHED). ANY SHORT (OR LONG) PROGRAM, ACCOMPANIED BY A SUITABLE DESCRIPTION WILL BE APPRECIATED. IF YOU THINK YOU CANNOT WRITE SEND IT ANYWAY. WE WILL EDIT AND GIVE YOU CREDIT. YOU MAY SEND PROGRAMS ON CASSETTE (LEVEL I OR II) OR ON DISK. CASSETTES AND DISKS WILL BE RETURNED, PROVIDE RETURN POSTAGE.

HUMOROUS ARTICLES MAY ALSO BE SUBMITTED. DON'T SEND YOUR "PET" PROJECT, RATHER MAKE IT TRS-80! SUBMIT YOUR MATERIAL TO 80-NORTHWEST, PO BOX 7112, TACOMA, WA 98407 -- IF YOU WANT YOUR MATERIAL RETURNED, INCLUDE A SELF ADDRESSED ENVELOPE AND SUFFICIENT POSTAGE.

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-WHAT, ANOTHER COMPUTER MAGAZINE?-

WHY NOT? WE FEEL THERE IS A REAL NEED FOR A VEHICLE TO EXCHANGE TRS-80 INFORMATION. ONE THAT IS DEDICATED EXCLUSIVELY TO THE TRS-80.

FOR EXAMPLE, ONE OF THE BIG NATIONAL PUBLICATIONS JUST GOT AROUND TO TELLING US ABOUT THE REALLY GREAT LEVEL I MANUAL - IN THEIR AUGUST 1978 ISSUE! WELL, WE AGREE THAT THAT MANUAL IS TOPS, BUT MOST OF US ARE A LOT FARTHER DOWN THE ROAD THAN THAT. IT IS EASY TO UNDERSTAND THE LARGE LEAD TIMES REQUIRED BY THE BIG GUYS. IT SORT OF DOES THEM IN, SO TO SPEAK. THIS FIELD IS MOVING SO FAST WE NEED MORE INFORMATION THAN THEY CAN PROVIDE IN A GENERAL COVERAGE PUBLICATION.

SOME OF YOU, WHO ARE STILL WAITING FOR SUCH GOODIES AS LEVEL II, DISKS, PRINTER ETC., HAVE A REAL FUN TIME IN STORE FOR YOU. THERE ARE SOME VERY EXCITING THINGS HAPPENING WITH THESE ADDITIONS TO THE TRS-80. AND WE CERTAINLY PLAN ON BRINGING YOU AS MUCH INFORMATION AS WE CAN, AND AS SOON AS WE CAN.

FOR EXAMPLE, THIS JOURNAL IS BEING FORMATTED AND PRINTED ON A TRS-80 WITH 40K OF MEMORY, WITH TWO DISKS AND THE LINE PRINTER. ALL OF IT IS STOCK TRS-80. THE SOFTWARE TO DO IT (A VERY RUDIMENTARY TEXT EDITOR) WAS GLOMBED TOGETHER IN A WEEKEND, FROM SCRATCH, NO LESS. PERHAPS IT IS NOT TOO ELEGANT, BUT IT WORKS!

THIS IS NOT THE ONLY SUCH SYSTEM AROUND THE AREA. THERE ARE SEVERAL MORE (EVEN MORE EXOTIC) IN OUR NEIGHBORHOOD. THE POINT BEING THAT THERE HAS BEEN A RATHER SHARP "LEARNING CURVE" AND WE CAN PASS ALONG MUCH OF OUR EXPERIENCE VIA THIS JOURNAL. - - WE DO NOT INTEND FOR IT TO BE ALL ONE WAY THOUGH, BECAUSE WITHOUT YOUR SUPPORT AND INPUT WE WILL WITHER ON THE VINE. WE WANT TO KNOW WHAT YOU ARE DOING TOO.

WE WANT TO DESIGN THIS JOURNAL SO THAT YOU WILL FIND AT LEAST ONE GOOD PROGRAM, OR MAYBE A HELPFULL TRICK OR TWO, WHICH WILL REPAY YOU YOUR SUBSCRIPTION PRICE. WE DO NOT REALLY INTEND TO BE A NON-PROFIT ORGANIZATION, AFTER ALL, WHEN YOU PAY NOTHING, YOU GENERALLY GET JUST THAT, NOTHING. OUR PRIMARY GOAL IS TO SPREAD THE INFORMATION, PASS ALONG GOOD SOFTWARE AND HARDWARE ARTICLES AND ACT AS AN INTERCHANGE BETWEEN ALL TRS-80 USERS. OUR SECOND GOAL IS TO HAVE A LOT OF FUN DOING IT!

SO LETS DO IT! THE TRS-80 IS PROBABLY ONE OF THE BIGGEST SELLERS IN THE MICRO-COMPUTER FIELD. THERE HAS TO BE A LOT OF VARIED AND INTERESTING APPLICATION GOING ON OUT THERE. LET US HEAR FROM YOU, AND WE WILL BUST OUR BUNS TO GET YOU A FIRST CLASS, INFORMATIVE AND DEDICATED JOURNAL.

-WHAT TO EXPECT FROM THE 80-NW JOURNAL-

WE WILL NOT SPEND THIS MUCH SPACE FOR EDITORIAL IN FUTURE ISSUES. THE FRONT PAGE WILL CONTAIN AN INDEX AND SOME IDEA OF COMING FEATURES. BUT IN THIS, THE VERY FIRST ISSUE OF 80-NORTHWEST, WE WOULD LIKE TO PRESENT SOME OF OUR IDEAS FOR THINGS TO COME.

FIRST OFF, WE DO NOT LIKE "CONTINUED" ARTICLES OR COLUMNS, SO WE WILL TRY TO HAVE NONE. ARTICLES WILL START FROM THE FRONT AND GO RIGHT ON TILL THEY END. WHENEVER POSSIBLE, WE WILL GIVE COMPLETE LISTINGS OF PROGRAMS IN TRS-80 LEVEL I OR II BASIC. YOU SHOULD BE ABLE TO COPY THEM DIRECTLY. WE WILL DEVOTE CONSIDERABLE SPACE TO LEVEL I, SINCE THERE ARE MANY OF YOU WHO DO NOT YET HAVE LEVEL II. WE WILL ALSO HAVE SOME HARDWARE ARTICLES, BUT BY FAR MORE SOFTWARE AND APPLICATIONS THAN HARDWARE.

YOU "KLINGON KILLERS" WILL NOT BE FORGOTTEN. THERE WILL BE GAMES. (SUBMIT YOURS AND WE WILL PROBABLY PRINT IT). THERE WILL ALSO BE A CLASSIFIED SECTION WHERE YOU MAY BUY, SELL OR SWAP. DISK BASIC FANS WILL FIND ARTICLES OF INTEREST AS WILL THOSE OF YOU WHO ARE CONTEMPLATING MAKING YOUR OWN SELECTRIC INTERFACE. FOR THOSE WHO LIKE MACHINE LANGUAGE WE HAVE A DIS-ASSEMBLER WHICH WILL TAKE APART THE LEVEL I OR II ROM AND PRESENT IT IN ASSEMBLY LISTING, WITH Z100 Z-80 MNEMONICS YET! IT WILL ALSO TAKE APART ANY PROGRAM YOU MAY HAVE IN MEMORY. WE WILL GET INTO THAT. THEN THERE IS THE RS 232 INTERFACE COMING UP. THAT SHOULD BE INTERESTING AND WE HAVE SOMEONE WORKING ON THAT RIGHT NOW AND HE WILL REPORT HIS FINDINGS, LIKELY AS AN ARTICLE. THEN THERE IS A NEAT TRICK FOR PRINTING FROM THE KEYBOARD DIRECTLY TO THE PRINTER, WHICH JUST COMES IN HANDY WHEN USING THE DIS-ASSEMBLER WE MENTIONED ABOVE, SINCE YOU CAN LIST THE CODE DIRECTLY FROM THE SCREEN TO THE LINE PRINTER.

WE WOULD LIKE TO MENTION ALSO THAT WE ARE NOT IN ANY WAY CONNECTED WITH RADIO-SHACK. ALTHOUGH IN A WAY THEY HAVE MADE THIS JOURNAL POSSIBLE OR NECESSARY, HOWEVER YOU LOOK AT IT.

WE HOPE THIS JOURNAL WILL FILL A NEED. WE THINK IT WILL. YOU WILL CERTAINLY WANT TO HAVE EVERY ISSUE, SO GET YOUR SUBSCRIPTION IN NOW! AND THEN CONTRIBUTE! PASS THE GOODIES ALONG! YOU WILL FEEL BETTER IF YOU PASS YOUR "FLASHES OF GENIUS" OR "MAJIK" ALONG FOR OTHERS. SITTING ON IT WILL NOT GET ANYONE FAR - SO - WE HOPE YOU WILL ENJOY OUR FIRST ISSUE-----TRY.

```

10 REM  SLOT MACHINE
20 PRINT"THIS SIMULATES A 50 CENT SLOT MACHINE"
30 PRINT"WINNING COMBINATIONS ARE"
40 PRINT"* 3 BARS * OR * 3 ORANGES * OR * 3 CHERRIES *"
50 PRINT"HOW MANY 50 CENT PIECES DO YOU WANT TO PLAY":INPUT M
55 Z=0
70 M=M*.5
80 PRINT"YOU START WITH $"/M
90 PRINT:INPUT"PULL THE LEVER BY PUSHING 'ENTER'":B#
100 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
115 Z=Z+1
120 B=0:O=0:C=0
150 FOR I=1 TO 3
160 N=INT(3)
170 IF N=2 THEN GOTO 210
175 IF N=3 THEN GOTO 240
180 PRINT"          ***** B A R *****"
190 B=B+1
200 GOTO 260
210 PRINT"          ***** O R A N G E *****"
220 O=O+1
230 GOTO 260
240 PRINT"          ***** C H E R R Y *****"
250 C=C+1
260 NEXT I
270 IF B=3 THEN GOTO 350
280 IF O=3 THEN GOTO 350
290 IF C=3 THEN GOTO 350
300 PRINT:PRINT:PRINT"          Y O U   L O S E"
310 M=M-.5:PRINT
320 IF M=0 THEN GOTO 400
340 GOTO 380
350 PRINT:PRINT:PRINT"          !! YOU JUST WON $ 3.00"
360 M=M+3
370 PRINT
380 PRINT"YOU NOW HAVE $"/M
390 GOTO 90
400 PRINT"YOU HAVE LOST ALL YOUR MONEY"
410 PRINT"BUT YOU GOT TO PULL THE HANDLE" ; Z ; " TIMES!" : STOP

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#### -SLOT PROGRAM - LEVEL I - 4K -

HERE IS A PROGRAM THAT HAS BEEN KICKING AROUND FOR SOME TIME. WE DON'T KNOW FOR SURE WHERE IT CAME FROM, BUT IT IS FUN (FOR AWHILE). ANYHOW, LEVEL I USERS CAN SIMPLY TYPE IT IN AND RUN. TO SAVE SPACE THOUGH, YOU MIGHT WANT TO ABBREVIATE, USING THE STANDARD LEVEL I TYPE ABBREVIATIONS.

THE REASON THE PRINTOUT HAS NO ABBREVIATIONS IS THAT LEVEL II HAS NONE (OR FEW). WE ARE CONVERTING LEVEL I TAPES TO LEVEL II AND THEN SIMPLY PRINTING THEM ON THE LINE PRINTER.

USING THIS METHOD (WHICH IS THE ONLY WAY WE CAN GET A LINE PRINT NOW) GIVES A VALID LEVEL I LISTING. IT MAY OR MAY NOT RUN ON A LEVEL II MACHINE. IF THEY DON'T RUN ON LEVEL II WE HAVE FOUND THAT ONLY MINOR CHANGES NEED BE MADE. FOR FUTURE REFERENCE - LEVEL I USES THE "AT" IN "PRINT AT" STATEMENTS. LEVEL II USES THE "@" IN "PRINT @" STATEMENTS. ALSO, LEVEL I REQUIRED A SEMICOLON AFTER THE "AT". BUT LEVEL II WANTS A COMMA AFTER THE "@". SO - - - WHEN YOU LEVEL I PERSONS FIND AN "@," IN OUR LISTINGS, SIMPLY CHANGE THEM TO "AT;" AND YOU ARE IN BUSINESS!

WE WILL BE REPERTING THIS FROM TIME TO TIME, SINCE MORE OF THIS CONVERSION WILL BE COMING.

## -GHOST SUBMARINE-

LEVEL 1, 3423 BYTES. ALSO WILL WORK WITH SOME CHANGE LEVEL 11. JUST FITS A 4 K MACHINE. WITH A LITTLE EFFORT IT COULD BE MADE SOMEWHAT SMALLER, SINCE THERE ARE SPACES WHICH COULD BE LEFT OUT AFTER MOST OF THE LINE NUMBERS.

LEVEL 1 USERS SHOULD PAY ATTENTION TO THE "PRINT @," AND CHANGE THEM ALL TO "P. AT;" AND WHILE YOU ARE AT IT, MIGHT AS WELL USE ALL THE STANDARD LEVEL 1 ABBREVIATIONS TO SAVE EVEN MORE TIME AND SPACE.

THIS IS ANOTHER OF THOSE "ORIGIN UNKNOWN" PROGRAMS WHICH SEEM TO MAKE THE ROUNDS. IT IS NOT TOO EASY TO BEAT, BUT IT CAN BE DONE.

THERE ARE SEVERAL NICE INNOVATIONS IN IT,

SUCH AS THE FLASHING FEATURE, AND THE GRAPHICS PLOTTING IS REALLY QUITE ADVANCED FOR LEVEL 1 CAPABILITY. THE "PLOT Y/N" IS INTERESTING AND THE PENALTY FOR USING IT IS THE LOSS OF ONE OF YOUR MISSILES! THERE ARE TIMES THOUGH, WHEN YOU JUST DO NOT HAVE MUCH CHOICE BUT TO USE IT.

LEVEL 11 USERS WILL NEED TO PAY ATTENTION TO THE "PRINT@" ALSO, SINCE DURING CONVERSION FROM LEVEL 1 TO 11 SOME CHANGE AND SOME JUST DON'T. USUALLY THE PRINT @ WILL CONVERT FROM A SEMI-COLON TO A COMMA, BUT NOT ALWAYS. ALSO LEVEL 11 USERS WILL NEED TO CHANGE THE STATEMENT IN LINE 28 OR YOU WILL GET A SYNTAX ERROR. SUGGEST YOU USE A STRING VARIABLE THERE AND LET Y="YES" AND N="NO". BE CAREFUL YOU DON'T SHOOT YOURSELF!!

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6 CLS
10 INPUT"HELLO, WHAT IS YOUR NAME";A$
15 PRINT:PRINT"O.K. ";A$; ", WE ARE GOING TO PLAY GHOST-SUB. "
20 PRINT:Y=1:INPUT"DO YOU NEED INSTRUCTIONS Y/N";A
25 IFA=YTHEN38
26 GOTO188
38 CLS:PRINT:PRINTA$; ", THE OBJECT OF GHOST SUB IS TO LOCATE AND DESTROY THE"
35 PRINT"GHOST SUB BEFORE YOU RUN OUT OF MISSILES. "
40 PRINT:PRINT"YOU WILL HAVE 7 SHOTS, AND THE SUB WILL MOVE BETWEEN"
45 PRINT"0 AND 5 MILES PER SHOT. "
50 PRINT:PRINT"AFTER EACH SHOT, YOUR ON-BOARD COMPUTER WILL CALCULATE"
55 PRINT"YOUR ERROR DISTANCE. YOU MUST BE WITHIN 5 MILES. "
60 PRINT"TO SINK THE GHOST SUB. FOR EACH SHOT YOU MUST SPECIFY"
65 PRINT"BOTH THE RANGE (FROM 2 TO 23 MILES)"
70 PRINT"AND THE ANGLE (FROM 0 TO 360 DEGREES)"
75 PRINT"IF YOU CHOOSE TO PLOT THE SUB'S LOCATION, YOU LOOSE ONE MISSLE!"
80 PRINT:INPUT"HIT ENTER WHEN YOU ARE READY";B$
100 FORA=1TO28:CLS:PRINT@212;"C O N D I T I O N"
110 PRINT@464;"A L E R T"
120 PRINT@788;"G H O S T   S U B   I N   R A N G E"
125 C=7
130 FORD=1TO18:NEXTD:NEXTA
140 X=RND(23):IFX<2THEN148
145 Y=RND(360)
148 GOSUB9828
150 GOTO495
165 IFV>23PRINT@175;"OVER-RANGE":GOTO521
168 IF(V=2)THEN175
170 GOSUB8888
172 GOSUB9888
175 F=(X*X)+(Y*Y):B=ABS(Y-W)
180 GOSUB1888
190 H=F-(2*X*Y*P):GOSUB1588
200 GOTO538
220 FORA=1TO258:NEXTA:CLS:GOSUB8888
225 GOSUB9828:CLS:PRINT@212;"GHOST SUB DESTROYED!!"

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240 PRINT:PRINT:PRINT"FINAL SHOT ERROR WAS";@;"MILES"
245 PRINT
250 PRINT"TRUE GHOST SUB LOCATION WAS ";X;" MILES"
260 PRINT"AT AN ANGLE OF ";Y;" DEGREES"
270 GOTO285
280 CLS:PRINT:PRINT
285 PRINT"DO YOU WANT TO PLAY AGAIN. ";A$;"?"
290 PRINT:INPUT"ENTER 1 IF YES, 2 IF NO";K
300 IFK=1THEN100
310 IFK=2THENCLS:END
320 GOTO290
495 CLS
496 PRINT@89;"90":PRINT@512;"180"
497 PRINT@557;"0":PRINT@965;"270"
500 FORJ=1TO47STEP2:SET(47,J):NEXTJ
520 FORK=1TO95STEP4:SET(K,24):NEXTK
521 PRINT@115;"RANGE";:INPUTV
522 PRINT@243;"ANGLE";:INPUTW
523 GOTO165
530 PRINT@387;"MISSLE"
531 PRINT@371;"LAUNCHED:"
540 FORQ=0TOVSTEP2
545 B=W:GOSUB1000
550 B=W:GOSUB2000
560 N=Q*P:O=Q*5
565 N=N*2+47:O=24-O:N=INT(N):O=INT(O)
566 SET(N,O):FORA=1TO50:NEXTR:RESET(N,O)
567 NEXTR:GOSUB9020
568 PRINT@175:PRINT@371
569 PRINT@175:PRINT@387:PRINT@371
570 FORA=1TO5:RESET(N,O):FORR=1TO50:NEXTR:SET(N,O):FORR=1TO50:NEXTR:NEXTR
580 PRINT@48;"RANGE";V;"MILES"
590 PRINT@112;"ANGLE ";W
595 PRINT@176;"DEGREES"
600 PRINT@240;"ERROR DISTANCE"
605 PRINT@304;@;"MILES":IFQ<5THEN220
606 PRINT@368;"PLOT Y/N";:INPUTA:IFA=YTHEN611
610 GOTO630
611 FORJ=0TO350STEP20
612 B=J:GOSUB1000:B=J:GOSUB2000
613 A(1)=Q*P*2+N:A(2)=Q*5+O:A(1)=INT(A(1)):A(2)=INT(A(2))
614 IF(A(1)>94)+(A(1)<1)+(A(2)>47)+(A(2)<1)THENNEXTJ
615 IF(J>360)THEN620
616 SET(A(1),A(2)):NEXTJ
620 C=C-1
630 C=C-1:IFC<1THEN700
640 PRINT@ 496;"YOU HAVE ";C
645 IFC=1THEN660
650 PRINT@560;"MISSLES LEFT":GOTO680
660 PRINT@560;"MISSLE LEFT"
670 FORA=1TO10:PRINT@680;"CONDITION RED"
675 FORZ=1TO50:NEXTZ:PRINT@680:FORZ=1TO50:NEXTZ:NEXTR
680 FORA=1TO1000:NEXTR
690 Z=AND(4):GOSUB6000
695 GOTO150
700 CLS:PRINT@284;"O U T O F M I S S I L E S"
710 PRINT@332;"M I S S I O N A B O R T E D"

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715 GOTO240
720 FORA=1TO2000:NEXT A:END
1000 REM*** COSINE SUBROUTINE
1010 B=B+270:GOSUB2000:P=0-S
1020 RETURN
1500 IFH=0THENG=0:RETURN
1510 IFH<0THENL530
1515 R=1:H=ABS(H)
1530 Q=H/2:D=0
1540 A=(K/Q-Q)/2
1550 IF (A=0)+(R=0)THENL570
1560 G=G+A:D=R:GOTO1540
1570 RETURN
2000 IFB>360THENB=B/360:B=(B-INT(B))*360
2005 IFB>90THENB=B/90:S=INT(B):B=(B-S)*90:GNSGOTO2010,2020,2030
2006 B=B/57.29578:GOTO2040
2010 B=90-B:GOTO2000
2020 B=-B:GOTO2000
2030 B=B-90:GOTO2000
2040 S=B-B*B*B/6+B*B*B*B/120-B*B*B*B*B/5040
2050 S=S+B*B*B*B*B*B/362880:RETURN
6000 IFZ=0THENL50:Z=ABS(5)
6010 IFZ=0THEN6000
6011 GOTO6020,7000,6040,6060,6080
6020 X=X+Z:IFY<23THENX=23-Z
6030 RETURN
6040 Y=Y+Z:RETURN
6060 X=X-Z:IFY<2THENX=1+Z
6070 RETURN
6080 Y=Y-Z:RETURN
7000 RETURN
8000 FORA=1TO300
8005 PRINT"K K K K  A A A  B B B  O O O  O O O  M M M !!!"
8006 NEXTA
8010 RETURN
9000 CLS:PRINT"YOUR MISSILE LANDED TOO CLOSE TO YOUR SHIP!!!"
9010 FORA=1TO2000:NEXTA:CLS:GOTO200
9020 FORA=1TO500:NEXTA:RETURN

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#### -FLASHING DISPLAY-

HERE IS A LITTLE TRICK YOU CAN USE TO GET ATTENTION IN YOUR PROGRAMS. IT CREATES A FLASHING DISPLAY OF SELECTED WORDS AT SPECIFIC LOCATIONS, SUCH AS "DANGER", OR "CONDITION RED". IT COULD ALSO BE USED IN ANY BUSINESS PROGRAM TO CALL ATTENTION TO THE OPERATOR. THE NUMBER OF TIMES TO REPEAT, THE ON TIME, AND OFF TIME, ARE ALL CONTROLLABLE. LEVEL 11 USERS MIGHT WELL ADD A CHR\$(23), FOR EFFECT.

```

12 REM * USE 20,20,20 AND YOUR NAME IF IN DOUBT*
20 CLS:PRINT"FLASHING DISPLAY"
30 INPUT "ENTER # OF TIMES TO REPEAT":L

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40 INPUT "ENTER # FOR OFF TIME":M
50 INPUT "ENTER # FOR ON TIME OF DISPLAY":N
60 INPUT "ENTER MESSAGE TO DISPLAY":A#
65 REM * LINE 70 GIVES # TIMES TO REPEAT *
66 CLS
70 FOR A=1 TO L
72 PRINT AT 475,A#
75 REM * LINE 80 GIVES # FOR OFF TIME *
80 FOR Z=1 TO M
82 PRINT AT 475,"
85 REM * LINE 90 GIVES # FOR ON TIME *
90 FOR Z=1 TO N: NEXT Z: NEXT A: STOP
RUN

```

FOR LEVEL 11, DISK (LEVEL III?) BASIC, WITH OR WITHOUT LINE PRINTER.

HERE IS A COMPLETE FILE MAINTENANCE PROGRAM. IT IS BUILT ON THE MODULAR CONCEPT, SEE LINES 30 TO 90. AS YOU CAN SEE, FILES FROM TAPE MAY BE SAVED ON DISK AND DISK ON TAPE IF DESIRED. THE MODULAR SETUP ALSO ALLOWS YOU TO LEAVE OUT THOSE SECTIONS WHICH MAY NOT APPLY TO YOUR PARTICULAR HARDWARE CONFIGURATION. FOR EXAMPLE, IF YOU DO NOT HAVE DISK, LEAVE 11 AND 12 OUT OF THE MENU, AND OMIT 1100, 1200 FROM THE "ON 0 GOTO" STATEMENT IN LINE 90. THE SAME IDEA WILL APPLY IF YOU DO NOT HAVE A LINE PRINTER. THIS SHOULD NOT AFFECT THE OPERATION OF THE REMAINDER OF THE PROGRAM.

THE PROGRAM IS SET UP TO KEEP A NAME AND PHONE NUMBER LIST. IT CAN BE ADAPTED TO OTHER USES, SUCH AS NAME ADDRESS OR SMALL INVENTORY USES. MORE ON THIS LATER. AS PRESENTLY SET UP THE NAME AND PHONE NUMBER ARE ENTERED TOGETHER, WITH NO COMMAS. THIS SAVES SPACE IN MEMORY AND ON DISK OR TAPE. HOWEVER, WHEN PRINTED OUT ON THE LINE PRINTER IT WILL PRINT LIKE THIS.

PUBLIC JOHN Q-----345-6789

AND ALL THE PHONE NUMBERS IN THE LIST WILL BE IN AN EVEN COLUMN, WITH THE SPACES BETWEEN NAME AND PHONE NUMBER FILLED IN WITH WHATEVER NUMBER OF SPACES IT TAKES, AUTOMATICALLY. IT MAKES A NICE LIST, AND THERE IS NO POINT IN STORING ALL THOSE SPACES IN MEMORY. ALSO, THE LINE PRINTER ROUTINE, STARTING AT LINE 900, PRINTS 50 NAMES AND THEN LINE FEEDS 5 TIMES. THIS IS TO ALLOW FOR BINDING THE PAGES INTO A BOOKLET. THIS MAY BE OMITTED, OR CHANGED TO OTHER VALUES BY CHANGING C1 IN LINE 900 AND/OR THE NUMBER OF "LPRINT"'S IN LINE 900.

IF THE PROGRAM IS TO BE USED WITHOUT DISKS OR DISK BASIC, THEN THE "CMD" IN LINE 9 SHOULD BE OMITTED. AS WITHOUT DISK BASIC THIS WILL BE CAUSE FOR A SYNTAX ERROR. WHAT IT DOES IN DISK BASIC IS TO TURN OFF THE INTERNAL 24 HOUR CLOCK, AS THE CLOCK WILL INTERFERE WITH THE OPERATION OF THE TAPE FUNCTIONS.

LINE 10 - CLEAR 20000 - DIM#(600)-DIMB(600) NEEDS TO BE CHANGED (DEPENDING UPON HOW MUCH FREE MEMORY YOU HAVE IN YOUR SYSTEM. THE ABOVE VALUES WORK OK WITH 40K WITH DISK BASIC. YOU MAY WANT TO ENTER THE PROGRAM WITHOUT THE CLEAR STATEMENT AND THEN SEE HOW MUCH MEMORY YOU HAVE LEFT AND ADJUST THE CLEAR STATEMENT AND THE DIM STATEMENTS TO FIT. LINE 950 WILL HAVE TO BE CHANGED TO MATCH THE DIM STATEMENT ALSO. IF THIS PROGRAM IS TO BE USED ONLY WITH DISK BASIC THEN THE ROUTINE IN LINES 320 TO 350 COULD BE LEFT OUT AND THE DISK BASIC COMMAND "INSTR" CAN BE

USED INSTEAD.

THE SORT ROUTINE STARTING AT LINE 700 IS VERY INTERESTING. PREVIOUS TO PRIOR, WE HAD A STANDARD "BUBBLE SORT" HERE. IT TOOK 4 HOURS AND 32 MINUTES TO SORT 420 NAMES AND PHONE NUMBERS. WITH THE PRESENT SORT ROUTINE, THE SAME NUMBER OF ITEMS SORT IN ABOUT 4 MINUTES AND 13 SECONDS! THE DIFFERENCE IN SORT ROUTINES IS NOT APPARENT UNTIL YOU START SORTING MORE THAN ABOUT 50 TO 100 NAMES. THEN THE DIFFERENCE IN TIME IS NO LESS THAN DRAMATIC! FOR THOSE OF YOU WHO NEED TO BE CONVINCED, DELETE LINES 715 THRU 775 AND INSERT THE BUBBLE SORT AS FOLLOWS:

```
720 S=0:N=N-1
740 FOR J=1 TO N
750 NB=NB(J)
755 B#NB(J+1)
760 IFNB<B# THEN 770
762 NB(J)=B#
764 NB(J+1)=NB
765 S=S+1
770 NEXT J
775 IF S=1 THEN 720
```

PLAN ON VISITING A DISTANT FRIEND WHILE THE SORT IS WORKING (BUBBLE THAT IS).

3-TO SEE AN INDIVIDUAL FILE - IS RATHER NICE TOO. IT USES THE INSTRING FUNCTION TO LOOK FOR A UNIQUE COMBINATION OF CHARACTERS. SINCE THAT IS TRUE, YOU CAN SEE HOW MANY "JOHNS" THERE ARE IN YOUR LIST, BUT IT WILL ALSO PULL OUT ALL THE JOHNSONS AND JOHNSTONS! YOU CAN ALSO PULL OUT OF YOUR LIST ALL PHONE NUMBERS WHICH START WITH A GIVEN PREFIX, FOR EXAMPLE, 565-XXXX. THE MORE INFORMATION YOU GIVE THE INSTRING FUNCTION, THE MORE SELECTIVE IT WILL BE IN PULLING OUT NAMES. IF YOU GIVE IT A COMPLETE PHONE NUMBER, IT WILL DISPLAY FOR YOU THE NAME THAT GOES WITH THAT NUMBER.

YOU MUST KNOW THE COMPLETE NAME AND PHONE # IN ORDER TO MAKE CORRECTIONS. OTHERWISE YOU MAY BE MAKING CORRECTIONS TO THE WRONG JOHNSON, FOR EXAMPLE.

ADDING NAMES TO THE FILE WILL PUT THEM ALL AT THE END OF THE FILE, AND YOU MAY THEN WISH TO MAKE ANOTHER SORT. SINCE THE SORT IS FAST, THIS SHOULD BE NO PROBLEM.

DELETING A NAME FROM THE FILE DOES NOT LEAVE A BLANK IN THAT SPACE, BUT CLOSES THE FILE UP, SO THAT THERE ARE NO BLANKS. IT ALSO REDUCES THE NUMBER OF ITEMS (N OR P1-SENTINEL NUMBERS) TO MATCH. IF YOU MAKE A CORRECTION AND SIMPLY PUSH ENTER, THEN THERE WILL BE A BLANK IN THAT SPACE, AND A SORT WILL MOVE IT TO THE TOP OF THE LIST, SINCE A NULL STRING HAS THE LOWEST VALUE. WHEN DELETING AND ADDING NAMES YOU MAY WANT TO USE THIS FEATURE, AS IT IS MUCH FASTER. END...



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5 REM * NAME/PHONE FILE INSF88 20 JUN 78 *
9 END"
10 CLEAR(0000):CLS:DIMN(600):DIMB(600)
20 CLS:PRINT#20," * * * M E N U * *"
22 PRINT
30 PRINT"TYPE 1-TO BUILD A FILE"
40 PRINT"TYPE 2-TO SEE THE ENTIRE FILE"
50 PRINT"TYPE 3-TO SEE AN INDIVIDUAL FILE"
60 PRINT"TYPE 4-TO MAKE CORRECTIONS"
70 PRINT"TYPE 5-TO SAVE CURRENT FILE ON TAPE"
80 PRINT"TYPE 6-TO INPUT A FILE FROM TAPE"
82 PRINT"TYPE 7-TO SORT FILE ALPHABETICALLY"
84 PRINT"TYPE 8-TO PRINT LIST ON LINE PRINTER"
85 PRINT"TYPE 9-TO ADD NAMES TO FILE"
86 PRINT"TYPE 10-TO DELETE A NAME FROM FILE"
87 PRINT"TYPE 11-TO SAVE FILE ON DISK"
88 PRINT"TYPE 12-TO LOAD FILE FROM DISK"
90 INPUT Q:ON Q GOTO 100,200,300,400,500,600,700,900,950,1000,1100,1200
100 INPUT"WHEN READY, PRESS ENTER( TO CLOSE FILE TYPE ZZZZ FOR ITEM)",X
110 FOR I=1TO600:CLS
111 PRINT"ENTER NAMES PHONE # WITHOUT COMMAS"
112 PRINT"THEN PUSH ENTER KEY":INPUT N(I)
115 IF N(I)="ZZZZ"THEN P1=I:GOTO150
135 IF FRE(X)<100GOTO150
140 NEXT
150 PRINT"FILE CLOSED---":INPUT"TO SEE THE MENU PUSH ENTER":X
160 GOTO20
200 CLS:FOR I=1TOP1:PRINTN(I):NEXT
210 INPUT"TO SEE THE MENU, PUSH ENTER":X:GOTO20
300 CLS:INPUT"ENTER NAME (FIRST OR LAST) OR NUMBER":Y
310 FOR I=1TOP1
312 IF N(I)="ZZZZ"THENPRINT"END OF LIST, TYPE 1 FOR ANOTHER NAME, 0 FOR MENU":INPUTXELSE320
314 IFX=1THEN300:ELSE320
320 FORJ=1 TO(LEN(N(I))-LEN(Y)+1)
330 IFY=MID$(N(I),J,LEN(Y))THENPRINTN(I):T=I
340 NEXTJ
350 NEXT I
360 GOTO312
400 CLS:PRINT"ENTER THE NAME FOR THE LINE YOU WISH TO CHANGE (NO COMMAS)"
405 INPUT N
410 FOR I=1TOP1:IFN=N(I)THEN430
415 NEXT
420 PRINT"NAME NOT IN FILE":GOTO460
430 PRINT"ENTER THE CORRECTED INFORMATION, NAME,PHONE"
440 INPUT N(I)
450 PRINT"THE LINE NOW READS - ":PRINTN(I)
460 INPUT"FOR ANOTHER CORRECTION TYPE 1, ELSE 0":X
470 IFX=1THEN400
480 GOTO20
500 CLS:INPUT"READY CASSETTE FOR RECORDING, PRESS ENTER":X
510 PRINT"COPYING. "
520 PRINT#-1,P1
530 FOR I=1TOP1:PRINT#-1,N(I):NEXT
540 PRINT"RECORDING COMPLETE -",P1-1," ITEMS RECORDED"
550 INPUT"TO SEE MENU, PUSH ENTER":X:GOTO20

```

```

600 CLS:INPUT"WHEN READY TO READ TAPE, PUSH ENTER";X
610 PRINT"INPUTING. . . ."
620 INPUT#-1,P1
630 FORI=1TOP1:INPUT#-1,N#(I):NEXT
640 PRINT"INPUT OF";P1-1;"ITEMS COMPLETE"
650 INPUT"TO SEE MENU, PUSH ENTER";X:GOTO20
700 CLS:PRINT"SORTING. . . ."
710 N=P1
715 M=N
720 M=INT(M/2)
725 IFM=0THEN810
730 J=1:K=N-M
735 I=J
740 L=I+M
745 IFN#(I)<N#(L)THEN760
750 T#N#(I):N#(I)=N#(L):N#(L)=T#
755 I=I-M
760 IFI<1THEN760
765 GOTO740
768 J=J+1
770 IFJ>KTHEN720
775 GOTO735
780 N=P1
810 FORI=1TON:PRINTN#(I):NEXTI
820 PRINT:PRINT"SORT COMPLETE":INPUT"TO SEE MENU, PUSH ENTER";X:GOTO20
900 CLS:FORI=1TOP1
901 IFN#(I)="#ZZZZ"THEN910
902 BB(I)=LEN(N#(I))-8
905 LPRINTLEFT$(N#(I),BB(I));STRING$(25-BB(I)," ");TAB(25)RIGHT$(N#(I),8)
907 PRINTN#(I):C1=C1+1
908 IFC1=50THENLPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":LPRINT" ":C1=0
909 NEXTI
910 PRINT"LINE PRINT COMPLETED":INPUT"TO SEE MENU, PUSH ENTER";X:GOTO20
950 FORI=P1TOS80
955 PRINT"TYPE NAME PHONE # TO BE ADDED THEN ENTER. TYPE ZZZZ TO*";
956 PRINT"CLOSE FILE":INPUT N#(I)
960 IFN#(I)="#ZZZZ"THEN:P1=1:GOTO150
965 NEXT
1000 CLS:INPUT"ENTER NAME YOU WANT DELETED";Y#
1005 T=0
1010 FORI=1TOP1
1020 FORJ=1TO(LEN(N#(I))-LEN(Y#)+1)
1030 IFY#=MID$(N#(I),J,LEN(Y#))THEN T=I
1040 IFY#=MID$(N#(I),J,LEN(Y#))THEN PRINT N#(I)
1050 NEXT J
1060 NEXT I
1065 IFT=0THENPRINT"NAME NOT FOUND, TYPE 1 FOR ANOTHER NAME, 0 FOR MENU"
1067 IFT=0THENINPUT X:IFX=100TO1000 ELSE20
1070 FORI=1TOP1
1080 N#(I)=N#(I+1):NEXTI
1085 P1=P1-1
1090 PRINT"DELETED=====PRESS 1 TO DELETE ANOTHER NAME, 0 FOR MENU"

```

```

1095 INPUT X: IF X=1 THEN 1000 ELSE 20
1100 CLS:PRINT "OUTPUT TO DISK - FILENAME IS 'NAMEPHD'"
1110 OPEN "O",1,"NAMEPHD/DAT"
1115 PRINT #1,P1
1120 FOR I=1 TO P1
1130 PRINT #1,NB(I)
1135 IF NB(I)="" THEN 1160
1140 PRINT #1,I,
1150 NEXT I
1160 CLOSE 1
1170 PRINT I: " ITEMS ON DISK, PUSH ENTER FOR MENU": INPUT X
1180 GOTO 20
1200 CLS:PRINT "INPUT FROM DISK - FILENAME IS 'NAMEPHD'"
1210 OPEN "I",1,"NAMEPHD/DAT"
1215 INPUT #1,P1
1220 FOR I=1 TO P1
1230 INPUT #1,NB(I)
1240 IF EOF(1) THEN 1260
1250 NEXT I
1255 P1=I
1260 CLOSE 1
1270 PRINT I: " ITEMS CAME FROM DISK, PUSH ENTER FOR MENU": INPUT X
1280 GOTO 20

```

#### -DIFFERENCES IN ROM-

YOU MAY OR MAY NOT KNOW THAT SOME OF THE EARLIER TRS-80'S ARE SLIGHTLY DIFFERENT IN THE WAY THEY DISPLAY SOME CHARACTERS. THE ROM WHICH GENERATES THE DISPLAY ON THOSE MACHINES DID NOT DISPLAY THE UP, DOWN, RIGHT OR LEFT ARROWS, BUT INSTEAD HAD BRACKETS, BACKWARDS SLASH AND AN UP KARET. THOSE MACHINES WHICH DID PRINT ARROWS IN LEVEL I WILL NO LONGER DO IT IN LEVEL II. ONLY THE UP ARROW (RAISE TO A POWER) IS USED IN LEVEL II. THE RIGHT ARROW WILL SPACE THE CURSOR EIGHT SPACES TO THE RIGHT (LIKE A TAB SET). THE DOWN ARROW MOVES THE CURSOR DOWN ONE LINE (LINE FEED). THE ACTUAL ARROWS MAY STILL BE PRINTED IN LEVEL II THOUGH. BY USING "CHR\$(92)" FOR DOWN ARROW, "CHR\$(93)" FOR LEFT ARROW, AND "CHR\$(94)" FOR THE RIGHT ARROW.

#### -A LOOK AT MEMORY IN LEVEL II-

PEEK AND POKE ARE USEFUL COMMANDS. HERE IS A PROGRAM FOR YOU TO TRY

```

5 A=(START ADDRESS IN MEMORY IN DECIMAL)
10 B=(ENDING ADDRESS IN MEMORY IN DECIMAL)
15 N=A FOR I=A TO B
20 PRINT N; (PEEK(I)); CHR$(PEEK(I)); N=N+1: NEXT I

```

RUN IT THIS WILL PRINT OUT THE MEMORY LOCATION, THE DECIMAL VALUE STORED THERE AND ITS ASCII VALUE. IF YOU HAVE PREVIOUSLY GIVEN A "NEW" COMMAND, WITHOUT POWERING THE CPU OFF, YOU CAN SEE BITS AND PIECES OF A PREVIOUS PROGRAM AT VARIOUS LOCATIONS. THE BASIC USE OF PEEK IS "PRINT PEEK(XXXXX)" IN COMMAND MODE. WITHIN A PROGRAM YOU CAN MAKE PEEK EQUAL TO A VARIABLE, AS IN "A=PEEK(XXXXXX)". THIS IS A CHEAP WAY TO FIND OUT WHAT YOUR MEMORY IS UP TO

#### -AN ALTERNATE "PRINT B" FOR LEVEL II-

THE SCREEN OF THE TRS-80 IS MEMORY MAPPED. THE UPPER LEFT CORNER IS MEMORY LOCATION 15360, THE UPPER RIGHT IS 15423, LOWER LEFT IS 16320 AND LOWER RIGHT IS 16383. AS YOU CAN SEE, THERE ARE 64 LOCATIONS ACROSS THE SCREEN. THE CENTER OF THE SCREEN IS AT ABOUT 15903. IT IS POSSIBLE TO USE THE POKE COMMAND AND PUT ANY SELECTED CHARACTER, ASCII OR GRAPHICS, AT ANY LOCATION ON THE SCREEN. TRY THIS.

```

10 CLS:POKE 15903,91
30 GOTO 30

```

AND RUN IT THIS SHOULD PUT AN UP ARROW IN THE CENTER OF THE SCREEN. LINE 30 MAKES THE CURSOR GO AWAY SO IT WILL NOT BOTHER YOU. YOU CAN NOW CHANGE THE LOCATION WITHIN THESE LIMITS: 15360 TO 16383. HERE IS YET ANOTHER ONE TO FOOL WITH

```

5 CLS
10 FOR I=0 TO 255
20 POKE 15550+2*I, I
30 FOR J=1 TO 50: NEXT J
40 NEXT I
50 GOTO 50
RUN

```

# INTERACTIVE LEVEL 1 KEYBOARD- T. ROSENBAUM, TACOMA, WA-

HOW MANY TIMES HAVE YOU WANTED TO WRITE A LEVEL 1 PROGRAM WHICH WOULD ALLOW YOU TO CAUSE PROGRAM BRANCHING WITHOUT HAVING TO STOP THE PROGRAM WITH AN "INPUT" STATEMENT? HOW CAN YOU MAKE A LEVEL 1 "PONG TYPE GAME" AND CONTROL THE MOTION OF THE BALL WITHOUT STOPPING PROGRAM EXECUTION? HERE IS A WAY YOU CAN DO JUST THAT WITHOUT USING T-BUG OR OTHER SOPHISTICATED OR EXOTIC TRICKS. YOU DO IT SIMPLY BY TURNING ON AND OFF GRAPHIC DOTS AT THE UPPER LEFT HAND CORNER OF THE DISPLAY. (YOU COULD DO IT ANYWHERE ON THE SCREEN, BUT IT WILL MESS UP YOUR GAME BOARD).

THE THEORY IS TO TURN ON GRAPHIC DOTS AT (1,0) (3,0) AND (5,0), WHICH ARE IN PRINT POSITIONS 0, 1 AND 2, RESPECTIVELY. THEN YOU EXECUTE A P. AT0: \*\* (NO SPACE BETWEEN QUOTES). THE CURSOR IS NOW LOCATED AT PRINT POSITION 0 AND THE THREE GRAPHIC DOTS ARE "ON". IF YOU HIT THE "LEFT ARROW" KEY, GRAPHIC DOT (1,0) WILL TURN OFF. IF YOU HIT THE SPACE BAR, GRAPHIC DOT (3,0) WILL TURN OFF AND IF YOU HIT THE SPACE BAR TWICE QUICKLY, GRAPHIC DOT (5,0) WILL TURN OFF.

NOW YOU USE THE "POINT(X,X)" COMMAND TO SEE WHICH OF THE GRAPHIC DOTS IS TURNED OFF, AND YOU CAN CAUSE PROGRAM BRANCHING DEPENDING UPON WHICH OF THE DOTS ARE SET, WHICH IN TURN DEPENDS ON WHICH OF THE KEYS YOU PUSHED.

THE FOLLOWING IS A SAMPLE PROGRAM WHICH WILL DEMONSTRATE THIS PRINCIPLE:

```
10 REM * LEVEL 1 KEYBD INTERACTIVE PGM *
20 REM * 1978, T. ROSENBAUM *
30 CLS
```

```
40 P. AT0: **
42 REM * THERE IS NO SPACE BETWEEN QUOTES IN 40*
50 SET (1,0):SET (3,0):SET (5,0)
55 FOR I= 1 TO 200:NEXT I
60 IF POINT (5,0)=0 THEN P. AT200: "YOU ARE VERY QUICK!":G. 40
70 IF POINT (3,0)=0 THEN P. AT200: "THE SPACE BAR WAS PUSHED ONCE!":G. 40
80 IF POINT (1,0)=0 THEN P. AT200: "YOU PUSHED THE LEFT ARROW DIDN'T YOU":G. 40
90 P. AT200: "PUSH SPACE BAR 1 OR 2 TIMES OR PUSH LEFT ARROW KEY":G. 40
AND RUN IT.....
```

YOU SHOULD BE ABLE TO COME UP WITH SOME VERY INTERESTING VARIATIONS ON THIS THEME.

THIS DEMO PROGRAM MAKES FOR AN INTERESTING SHOW-OFF OF WHAT THE COMPUTER CAN DO. IT IS ALMOST AS THOUGH THE COMPUTER "KNOWS" WHAT YOU DID, AND LETS YOU KNOW THAT IT KNOWS. YOU MAY WANT TO CHANGE THE TIMER LOOP IN LINE 55 TO CHANGE THE LENGTH OF TIME EACH STATEMENT STAYS ON THE SCREEN.

THE FOLLOWING PROGRAM ILLUSTRATES THIS IDEA EVEN FURTHER. IT IS FOR LEVEL 1. PAY ATTENTION TO THE "PRINT ATs" IN THIS LISTING. THEY MAY NEED TO BE CHANGED TO LEVEL 1 P. ATx. YOU ARE THE FAST MOVING DOT. PUSHING THE SPACE BAR ONCE SHOULD CHANGE YOUR DIRECTION CW BY 45 DEGREES. THE BACK ARROW SHOULD CHANGE YOUR DIRECTION CW 45 DEGREES AND PUSHING THE SPACE BAR TWICE QUICKLY SHOULD REVERSE YOUR DIRECTION. THE REMAINDER OF THE RULES OF THE GAME ARE IN THE INSTRUCTIONS FOR THE GAME ITSELF. YOU MUST TRY TO HIT THE TARGET DOT WITH YOUR DOT.....

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```

4 CLS
5 PRINT@ 22,"ADVANCED CAPTURE"
7 PRINT"YOU MUST ENTER THE REPULSION AND INVISIBILITY"
8 PRINT"PARAMETERS INTO THE COMPUTER. THEY WILL DETERMINE"
9 PRINT"THE SKILL LEVEL AT WHICH YOU WILL PLAY. THE LARGER"
10 PRINT"THE PARAMETER, THE MORE DIFFICULT IT WILL BE TO"
11 PRINT"CATCH THE DOT...."
15 PRINT"WHEN YOU ARE READY TO BEGIN TYPE IN THE LETTER L"
16 PRINT"AND ENTER":INPUT N
18 PRINT"ENTER":INPUTN
34 CLS
36 PRINT"ENTER REPULSION RANGE:":PRINT*:PRINT"0 - 4 : NOVICE"
38 PRINT"5 - 9 : AMATEUR":PRINT"OVER 9 : PRO":INPUTY
39 CLS
40 PRINT"ENTER INVISIBILITY RANGE:":PRINT"0 - 1 : NOVICE"
42 PRINT"2 - 4 : AMATEUR":PRINT"OVER 5 : PRO":INPUTQ
44 IF Q>18PRINT"GOOD LUCK! YOU'LL NEED IT TO FIND ME.":FORN=1T02000:NEXTN
48 CLS
50 W=0:T=0:R=0
100 X=0
185 FORN=1T0125:M=N+2:SET(M,3):SET(M,47):NEXTN
186 FORN=1T045:M=N+2:SET(3,M):SET(127,M):NEXTN
187 O=1
188 FORM=7T099STEP23:O=-1*O:P=12+(O-1)/2:FORN=0T02:SET(M+N,P+O*N)
189 SET(M+9+2*N,P+O*5):SET(M+22-N,P+O*N):NEXTN:SET(M+4,P+O*3):SET(M+6,P+O*4)
110 SET(M+16,P+O*4):SET(M+18,P+O*3):NEXTN
112 FORM=47T088STEP3:FORN=0T02:SET(M+N,32-N*2):NEXTN:NEXTM
113 FORM=0T0100STEP92:FORN=0T022STEP2:SET(M+N,25):NEXTN
114 FORM=0T018STEP2:SET(M+10,17+N):NEXTN:NEXTM
115 FORM=0T0106STEP16:FORN=0T02:SET(M+N,40):SET(M+N+8,43)
116 SET(M+1,N+39):SET(M+9,42+N):NEXTN:NEXTM
119 FORM=46T088:M=POINT(N,19):M=POINT(N,22):M=POINT(N,25):NEXTN
120 A=RND(3):B=RND(3):C=3:D=1:IF (A=2)*(B=2)GOTO120
121 H=80:V=20:G=36:U=20
123 PRINT@0,"":SET(1,0):SET(3,0):SET(5,0)
124 IF X=4 X=1:T=T+1:GOTO135
126 J=A:K=B:E=H:F=V:GOSUB250
129 RESET(H,V)
132 H=E:V=F:A=J:B=K
133 IF N=2 GOTO400
135 X=X+1
138 P=ABS(V-U)+ABS(H-G)
141 IF P<Q GOTO147
144 SET(E,F)
147 IF P>V GOTO165
153 IF C=2 A=1:B=0:GOTO165
156 IF D=2 B=3:A=C:GOTO165
159 B=0:A=RND(3):GOTO165
165 J=C:K=D:E=G:F=U:GOSUB250
168 RESET(G,U)
171 SET(E,F):G=E:U=F:C=J:D=K
172 IF N=2 GOTO400
174 IF POINT(1,0)=1 GOTO123
176 IF POINT(5,0)=0 C=ABS(C-4):D=ABS(D-4):GOTO123
177 IF POINT(3,0)=0 GOTO194
180 ON CGOTO182,184,186
182 ON DGOTO188,189,190
184 ON DGOTO191,191,192
186 ON DGOTO190,193,188
188 C=2:GOTO123
189 D=1:GOTO123

```



```

190 D=2:GOTO123
191 C=3:GOTO123
192 C=1:GOTO123
193 D=3:GOTO123
194 ON CGOTO196,198,200
196 ON DGOTO190,193,188
198 ON DGOTO192,192,191
200 ON DGOTO188,189,190
250 ON JGOTO253,259,256
253 E=E-1:GOTO259
256 E=E+1
259 ON KGOTO262,268,265
262 F=F-1:GOTO268
265 F=F+1
268 N=0
269 IF POINT(E,F)=0 M=0:RETURN
271 IF F=3 F=5:K=3:N=1:GOTO274
274 IF F=47 F=45:K=1:N=1:GOTO274
277 IF E=3 E=5:J=3:N=1:GOTO281
279 IF E=127 E=125:J=1:N=1:GOTO281
281 IF ((H=E)*(V=F))+((G=E)*(U=F))N=2:RETURN
282 IF N=1 RETURN
283 E=RND(115)+7:F=RND(35)+7
284 IF POINT(E,F)=1 GOTO283
285 FORN=1TO4:A(N)=0:NEXTN
287 IF POINT(E-1,F-1)=1 A(1)=1
289 SET(E-1,F-1)
291 IF POINT(E+1,F-1)=1 A(2)=1
293 SET(E+1,F-1)
295 IF POINT(E-1,F+1)=1 A(3)=1
297 SET(E-1,F+1)
299 IF POINT(E+1,F+1)=1 A(4)=1
300 SET(E,F)
301 SET(E+1,F+1)
302 FORN=1TO250:NEXTN
303 IF A(1)=0 RESET(E-1,F-1)
305 IF A(2)=0 RESET(E+1,F-1)
307 IF A(3)=0 RESET(E-1,F+1)
309 IF A(4)=0 RESET(E+1,F+1)
311 J=RND(3):K=RND(3)
313 IF (J=2)*(K=2)GOTO311
315 RETURN
400 FORA=1TO5:SET(H+A-1,V):SET(H+A+1,V):SET(H,V+A-2):SET(H,V+A+2)
402 SET(H+A-3,V+A-3):SET(H+A-3,V+A+3):NEXTA
405 FORN=1TO1000:NEXTN
407 FORA=1TO150
409 N=RND(9):H=RND(7):RESET(H+N-4,V+N-3):NEXTA
412 FORN=H-4 TO H+4
415 FORM=V-3 TO V+3
418 RESET(N,M):NEXTM:NEXTN
420 M=M+1
422 R=T-R
425 PRINT@407,"IT TOOK YOU ";R;
428 PRINT@471,"TIME UNITS TO GET";
431 PRINT@535,"ME THAT TIME";
440 R=T
450 IF W<1PRINT@9,"YOU'VE CAUGHT ME ";W;" TIMES IN":GOTO453
451 PRINT@9,"YOU'VE CAUGHT ME ONE TIME IN "
453 PRINT@ 41,T;" TIME UNITS"
455 PRINT@0,"":GOTO100

```

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