

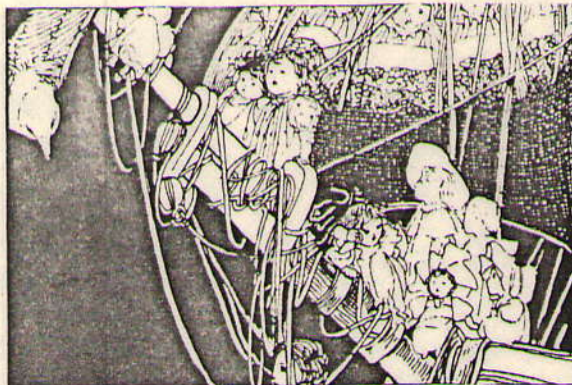
# Introducing Elementary School Children to the Computer

by Herbert L. Dershem

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The following is an outline of a presentation which has been used on several occasions to introduce elementary school classes to computers. Before microcomputers like the Radio Shack TRS-80 were so conveniently available, classes were brought to a computer center where the children used terminals. Recent experience with the TRS-80 has indicated that the session is more effective if the computer can be taken right into the classroom. The session described below assumes this mode of operation and it has been presented using a TRS-80 with Level I BASIC and 4K of RAM.

## THE PRESENTATION

### I. INTRODUCING THE COMPUTER

As the children enter the classroom, they see the name of the school and their class being printed on the computer's display screen in letters 5 centimeters high. This is done using the TRS-80 graphics facilities. After the name is printed, the screen is cleared and the name printed again. The children are then introduced to the computer by a brief description of the function of each of the component parts.

### II. HISTORY OF COMPUTING

A brief history of computing devices is presented through the use of objects which are displayed by the presenter. Aids to counting and arithmetic which could be shown and discussed are:

1. HANDS. Audience will provide these.
2. PEBBLES. Several pebbles in a pouch can be used to demonstrate how ancient shepherds counted their sheep to make sure all returned to the fold at night.
3. ABACUS. Objects were still used to keep a record of numbers, but place values were introduced.
4. SLIDE RULE. Instead of objects, these devices use length to represent numbers.
5. CALCULATORS. Almost all of the children will be familiar with these devices and their use of electronics to represent numbers.
6. COMPUTERS. These differ from calculators in their ability to store more than numerical information and to execute a sequence of instructions without human intervention. Larger brothers of the TRS-80 should be mentioned and a picture of such a machine might be shown.

### III. RUNNING A PROGRAM

A program is run which gives each student's age in various units. For our sessions we obtained a list of student names and birthdays before the class and embedded this data within the program. This was done to save time by having each child's name, birthday, and age appear on the screen in sequence. It is interesting trying to explain to the children how the computer "knows" their birthdays. An example of the output from the AGE program is shown on the next page:



JASON, YOUR BIRTHDAY IS 10-5-1969  
 TODAY IS 3-15-1978  
 YOU ARE NOW 3,083 DAYS OLD.  
 THAT IS ABOUT:  
 101 MONTHS  
 440 WEEKS  
 73,992 HOURS  
 4,439,520 MINUTES  
 266,371,200 SECONDS  
 IT IS 204 DAYS UNTIL YOUR BIRTHDAY.

#### IV. APPLICATIONS OF COMPUTERS

A description is given of several computer uses with which the students might be familiar. Some such applications we have used are printing their parents' pay checks, helping to solve crimes, keeping bank records, storage and retrieval of transportation and lodging reservations, arcade and TV games, and helping people learn. The last mentioned application leads us nicely into part V.

#### V. USING THE COMPUTER

Three programs are provided for the children to use. First they are demonstrated for the entire class, and then the students have an opportunity to individually use each program. This is done in groups of three while the remainder of the class works on some computer-related project assigned by the teacher such as writing a story about computers or drawing a picture of ways computers are used.

#### THE PROGRAMS

Each of the three programs used for this demonstration requires the students to use some abilities or techniques which they have been learning in the classroom.

The first is the game of HURKLE which is well documented elsewhere (see *What To Do After You Hit Return or P.C.C.'s First Book of Games*). It gives

the students practice dealing with a coordinate system and requires some good logical thinking. The TRS-80 version of HURKLE which is given here keeps the array of points on the screen at all times, blinks the position chosen each time for the student's convenience, and draws a picture of the HURKLE when and where he is found.

An addition drill is provided by the second program. The student is given 10 addition problems with each of the addends chosen at random between 1 and 10. The number of problems given and the upper limit on the addends can be modified by changing the values of M and K, respectively, in statement 450 of the program. By random selection, either the first addend, the second addend, or the sum is replaced by a question mark when the problem appears on the screen. The student is to provide a response. If the response is correct, an appropriate congratulatory message is displayed and the next problem is given. If the response is incorrect, a message indicating this is displayed and the student is given up to three more attempts. If after four tries, the student has failed to give the correct response, the program inserts the correct integer and tells the student to "CHECK MY ANSWER". After 10 problems, the program reports how many the student solved correctly on the first attempt.

The third program draws a line and asks the student to estimate its length in centimeters. If the student's response is correct, the program extends congratulations by blinking the student's name. If the response is incorrect, the program draws a line the length of the student's guess and requests a revised estimate.

#### COMMENTS

This presentation has been given to second and third grade classes with a great deal of success. The students are very attentive, excited about their experience, and anxious for further exposure to computers. Leaving the computer in the classroom for a week or more after the presentation for student use in free time would be a good follow-up to this introductory session.

#### PROGRAM LISTING —

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10 P."WHAT IS YOUR NAME":IN.A$
20 P."WELCOME TO COMPUTERLAND, ";A$;"."
30 P."ENTER 1 FOR HURKLE, 2 FOR MATH, 3 FOR METRICS, 4 TO QUIT":IN.I
40 ON I GOTO 50,450,840,980
50 CLS
60 P.AT1,"THE HURKLE IS HIDING UNDER AN *. FIND HIM BY ENTERING"
70 P.AT65,"TWO NUMBERS. FOR EXAMPLE, THE UPPER LEFT CORNER IS 09."
80 P.AT155,"NORTH"
90 P.I=1 TO 10
100 P.AT64*I+155,10-I;
110 F.J=1 TO 10:P." *":N.J:N.I
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PROGRAM LISTING —  
(continued)

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120 P.AT448,"WEST";:P.AT504,"EAST"
130 P.AT845,"0";
140 F.I=1 TO 9:P." ";1;:N.I
150 P.AT896:P.AT923,"SOUTH"
160 F.I=1 TO 2500:N.I:P.AT64
170 S=INT(RND(10))-1:D=INT(RND(10))-1:N=1
180 P.AT0:P.AT0,"WHAT IS YOUR GUESS, ";A$;:IN.G
190 C=INT(G/10):B=INT(G-10*C)
200 IF (R<=9)*(B>=0)*(C<=9)*(C>=0) THEN 230
210 P.AT64,"THAT'S NOT A LEGAL ENTRY, ";A$;". TRY AGAIN."
220 G.180
230 L=141+(10-B)*64+4*C
240 IF (C=D)*(R=S) THEN 350
250 P.AT0:P.AT64:P.AT65,"GO ";:IF R=S THEN 290
260 IF R<S THEN 280
270 P."SOUTH";:G.290
280 P."NORTH";
290 IF C=D THEN 330
300 IF C<D THEN 320
310 P."WEST";:G.330
320 P."EAST";
330 P." FROM";G:P.J=1 TO 10:P.I=1 TO 100:N.I:P.ATL," "
340 F.I=1 TO 100:N.I:P.ATL,"";:N.J=N+1:G.180
350 A=27+8*D:B=36-3*S:X=A-3:S.(X,R):S.(X,B+4)
360 X=A-2:S.(X,B-1):S.(X,B+1):S.(X,B+3)
370 X=A-1:S.(X,B-2):S.(X,B):S.(X,B+2)
380 X=A:S.(X,B-2):S.(X,B-1):S.(X,B+2)
390 X=A+1:S.(X,B-2):S.(X,B):S.(X,B+2)
400 X=A+2:S.(X,B-1):S.(X,B+1):S.(X,B+3)
410 X=A+3:S.(X,B):S.(X,B+4)
420 P.AT0:P.AT0,"YOU FOUND HIM IN";N;"GUESSES!"
430 P.AT64:P.AT64,"THANKS FOR THE HUNT, ";A$;".":G.970
440 REM ADDITION DRILL
450 CLS:K=10:P=128:H=0:W=0:M=10
460 F.I=1 TO H:W=BND(3):T=0:A=BND(K):B=BND(K):C=A+B
470 IF M=1 THEN 490
480 P.ATP,A;
490 P.ATP+10," + ";:IF M=2 THEN 510
500 P.ATP+15,B;
510 P.ATP+25," = ";:IF M=3 THEN 530
520 P.ATP+30,C;
530 P.ATP+15*(M-1)," ":P.ATP+15*(M-1)::IN.D
540 E=(M=1)*A+(M=2)*B+(M=3)*C
550 IF E=D THEN 590
560 W=W+(T=0):GOS.650
570 T=T+1:IF T<4 THEN 470
580 P.ATP+35,"CHECK MY ANSWER, ";A$;".
590 P.ATP,A;:P.ATP+10," + ":P.ATP+15,B;:P.ATP+25," = ";
600 P.ATP+30,C;:IF T=4 THEN 620
610 GOS.750
620 P=P+64:R=B+(T=0):N.I
630 P.ATP,A$;". YOU HAD";R;"PROBLEMS RIGHT AND";W;"WRONG."
640 G.970
650 IF T=0 THEN 690
660 P.ATP+35,"WRONG AGAIN.";3-T;"MORE";:IF T=2 THEN 680
670 P." TRIES." :RET.
680 P." TRY." :RET.
690 P.ATP+35;:ON RND(5) GOTO 700,710,720,730,740
700 P."TRY AGAIN, ";A$;".":RET.
710 P."ARE YOU SURE, ";A$;".":RET.
720 P."OH NO! YOU MISSED IT." :RET.
730 P."COME ON, ";A$;". YOU CAN DO IT." :RET.
740 P."NOT QUITE, ";A$;".":RET.
750 IF T=0 THEN 770
760 P.ATP+35,"RIGHT AFTER";T+1;"TRIES." :RET.
770 P.ATP+35;:ON RND(5) GOTO 780,790,800,810,820
780 P."GOOD WORK, ";A$;".":RET.
790 P.A$;". YOU'RE A GENIUS!" :RET.
800 P."YOU'RE ABSOLUTELY CORRECT!" :RET.
810 P."TONY SAYS GRRREAT!" :RET.
820 P."FANTASTIC, ";A$;".":RET.
830 REM CENTIMETER GUESS
840 CLS:L=RND(20):X=INT(L/.163+.5):G=0
850 F.I=0 TO X-1:S.(I,10):N.I
860 P.AT0,"HOW MANY CENTIMETERS IS THIS LINE, ";A$;:IN.M
870 G=G+1:IF L=M THEN 920
880 P.AT577,"NO ";A$;". A LINE";M;"CENTIMETERS LOOKS LIKE THIS."
890 N=INT(M/.163+.5):P.I=0 TO N-1:S.(I,15):N.I
900 P.I=N TO 127:R.(I,15):N.I
910 P.AT0:P.AT0,"WHAT'S YOUR NEXT GUESS, ";A$;:IN.M:G.870
920 P.AT576:P.AT576,"HURRAY FOR ";:F.I=1 TO 8-G:P.AT587
930 F.J=1 TO 100:N.J:P.AT587,A$;F.J=1 TO 100:N.J:N.I
940 IF G=1 THEN 960
950 P.AT640,"YOU GOT IT IN";G;"GUESSES." :G.970
960 P.AT640,"YOU GOT IT ON THE FIRST GUESS."
970 F.I=1 TO 2500:N.I:CLS:G.30
980 P."THANK'S FOR PLAYING WITH ME, ";A$;".
990 F.I=1 TO 2500:N.I:CLS:G.10

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