Using Your Pocket Computer For Coding

Whether for business or for pleasure, the TRS-80 PC-1 can produce a random number code for up to 26 different items.

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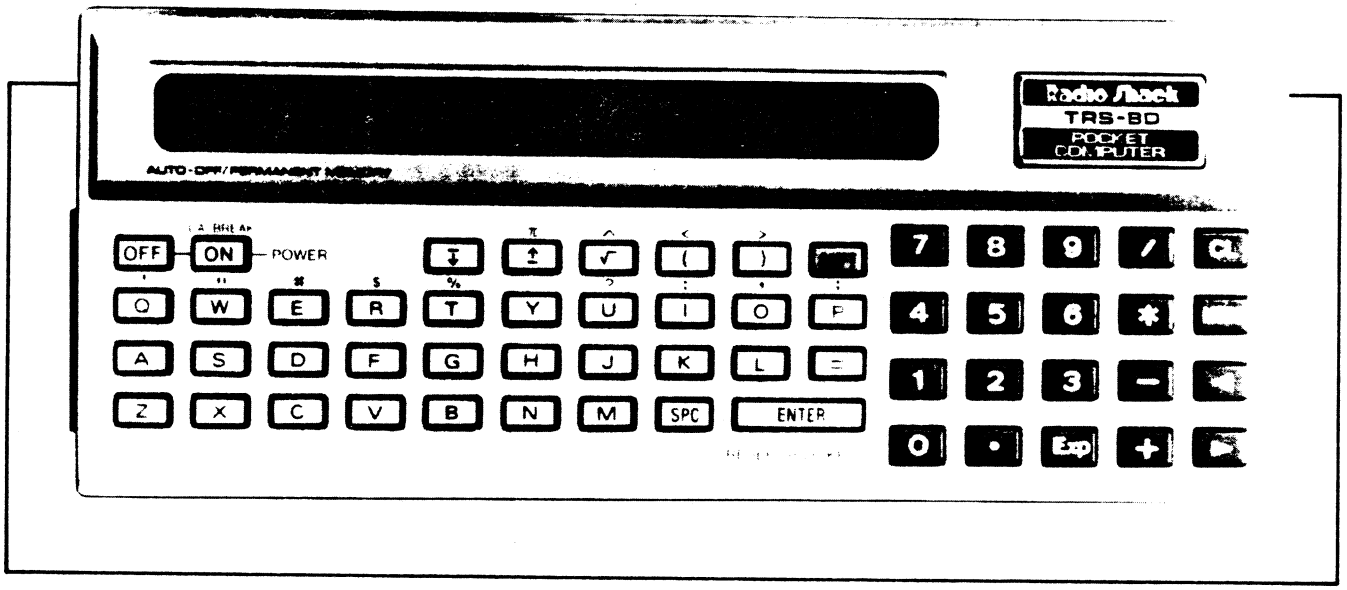

Coding words and letters can be fun, or it can be a very serious business. In war time, codes are important for passing messages and protecting their contents from the enemy. Community watches can make use of codes for the purpose of sending messages with CB radios, thus preventing the people they are protecting against from understanding the messages. Business can use codes for preventing competitors from stealing their trade secrets.

This program, for the TRS-80 PC-1, will produce a random number code for up to 26 different items. It will print the number, item, and code in the order in which the items were typed into the computer, and in order of the code, random numbers will be assigned to each item. It will search for a particular item-code combination or for a code-item combination. The program is menu driven and may be used in a variety of ways.

Because of the general manner in which the program was written, its use will be detailed to help you find the best way to make use of it. The example is just one of the many possibilities which exist.

Community watch streets example

Assume you are running a community watch communication system. The streets covered by your watch have been divided in sections. Each section has 26 streets or locations which must be identified on the air. Most of your members have pocket computers, but not all, so you must use both a hardcopy and computer system at the same time.

In one section, the 26 streets are:

1. Albert Dr.
2. Bailor Blvd.
3. Bay Front Road
4. Caroline Lane
5. Carl Street
6. Disk Drive
7. Drover Street
8. East Blvd.
9. East Drive
10. East Main Street
11. Flower Street
12. First Street
13. Howard Blvd.
14. Judge Lane
15. Kings Drive
16. Kings Way Lane
17. North Blvd.
18. North Lane
19. North Street
20. Plots Drive
21. Que Lane
22. Red Circle
23. South Blvd.
24. South Lane
25. South Street
26. University Blvd.

One of the limitations of the pocket computer is that the number of characters which may be stored in any given memory location is limited to seven. All names of streets will have to be reduced to seven or less characters.

The idea is to use the CB radio to tell a member of the watch that street number 1234 needs to be checked without

telling the person on that street that there is a car on its way. This program helps you do that.

The symbols <CR> stand for pressing the ENTER key of your computer. After typing R.<CR> or RUN<CR> in either the RUN or DEFine modes, you will hear three beeps and then see the main menu:

C F HELP I L N R S V?

The amount of space available for the menu was limited in comparison with our needs. Only the first letter could be included with the exception of the HELP selection. Select HELP by typing H<CR> and you will produce on the printer or display:

C CODE SORT
F FIX/DBLS
I ITEM-CODE
L LIST
N SIZE/#
R RANDOM #
S STREETS/ETC.
V VALUE-ITEM

This is a listing of the meanings of each letter in the menu. The listing is in alphabetic order, and not in the order in which the routines must be selected to operate the program. The selection S for STREETS/ETC., is the first selection you should make. This selection allows you to define the items, locations, and letters to be randomized. In the community watch example, this would be the list of streets shown earlier.

The second selection needed is N for SIZE #. This selection allows you to specify the size of the random number to be generated. In the example, we will use a three-digit random number. This may or may not be a good selection for your particular location.

The next selection is R for RANDOM #. This selection generates a random number for each street. The size of the number is the size specified in selection number two.

The last selection that should be made when starting the system is L for LIST. This selection produces a listing in the order of the input of the streets or items. If you do not perform this task now and select C for CODE SORT, this order will be lost and cannot be recalled until you decide to generate a new set of random numbers.

Turn your computer on and type R.<CR>, to recall the menu:

C F HELP I L N R S V?

Type S<CR> for STREETS/ETC. and you will see:

?

Now enter the name of each street using only seven characters, one at a time, followed by a <CR>. Assume you entered all of the information correctly, with one exception, without error. Because of the limited amount of internal memory and the amount of code used for the program, no error correction routine was built-in. There is a way to handle the problem. The names are stored in location A$(36) to A$(61) and A$(62) to A$(87). To examine these memory locations you need only press the BREAK key and type A$(36)<CR>. When you do so you will see:

ALBERT

If you type Kings Drive as KINGS<CR> you could check on this by pressing the left arrow key and then changing the number behind the A$ to A$(50). After making the change and pressing <CR> you will see:

KINGS

This will be on the display if you made the error noted. To correct this entry, press the left arrow and change the display to match the following:

A$(50) = "KINGS DRIVE"

After pressing <CR>you will see:

KINGS D

These are the first seven digits of what you just entered. You may examine the information in location 50 and see that the correction needed has been made.

There are two locations used to save the name KINGS D. One was at 50, the other is at 50 plus 26, or 76. Examine the information stored in A$(76) and then change it to correct the error as noted.

You will have to type R.<CR> to recall the main menu to the display:

C F HELP I L N R S V?

Type N<CR>and you will see:

SIZE?

Earlier we noted that three digit random numbers would be used. Type 3<CR> to return to the main menu:

C F HELP I L N R S V?

This time select R<CR> to tell the computer to generate some random numbers. You will see:

NEW SEED (Y/N)?

Since this is your first use of the program, there is no seed number available to generate random numbers. Type Y<CR>, and you will see the following:

SEED?

Type 123456789<CR>. There will be a delay as the computer generates 26 random numbers, one for each street you entered. After the computer has completed its task, you will hear three beeps and see the main menu:

C F HELP I L N R S V?

You are now ready to examine the information you entered and the random numbers generated. Type L<CR> and you will see:

DATE?

Assume the random assignments are to be used on 12/12/84. Type 12/12/84<CR> and you will produce the following on your printer or display:

12/12/8
NO ITEM CODE
1. ALBERT 395.
2. BAILOR 86.
3. BAY FRO 987.
4. CAROLIN 709.
5. CARL 317.
6. DISK 299.
7. DROVER 886.
8. E BLVD 382.
9. E DRIVE 808.
10. E MAIN 584.
11. FLOWER 451.
12. FIRST 387.
13. HOWARD 919.
14. JUDGE 137.
15. KINGS D 168.
16. KINGS W 880.
17. N BLVD 259.
18. N LANE 968.
19. N STREE 273.
20. PLOTS 298.
21. QUE LAN 871.
22. RED CIR 39.
23. S BLVD 900.
24. S LANE 702.
25. S STREE 150.
26. UNIVERS 462.

The date is missing the year. Eight characters are needed to produce an entire date. If you must have a date, it will be necessary to leave out the slash marks or make some other change to reduce the number of characters used.

This list is good for finding the code given to the name of the street. To obtain a list of the streets in order of the code numbers, the C for CODE SORT is selected. Take care not to perform this step until you need to, because once you have ordered the streets by number, you won't be able to re-order them until you generate new random numbers. After typing C<CR> there will be a delay. When the computer has completed its task, you will hear three beeps and see the main menu on the display:

C F HELP I L N R S V?

Select list again by typing L<CR>, entering the date as 12/12/84<CR>, and you will see on the printer or display:

12/12/8
NO ITEM CODE
1. RED CIR 39.
2. BAILOR 86.
3. JUDGE 137.
4. S STREE 150.
5. KINGS D 168.
6. N BLVD 256.
7. N STREE 273.
8. PLOTS 298.
9. DISK 299.
10. CARL 317.
11. E BLVD 382.
12. FIRST 387.
13. ALBERT 395.
14. FLOWER 451.
15. UNIVERS 462.

16. E MAIN 584.
17. S LANE 702.
18. CAROLIN 709.
19. E DRIVE 808.
20. QUE LAN 871.
21. KINGS W 880.
22. DROVER 886.
23. S BLVD 900.
24. HOWARD 919.
25. N LANE 968.
26. BAY FRO 987.

The program has produced a set of random numbers matched with streets. The community watch may use the random number code for streets, and in the short run, anyone without the code will have trouble understanding what number goes with what street. Since the computer can produce new lists with ease, the list may be changed daily, weekly, or in any other manner found useful by the watch.

The two lists can be used by themselves without the aid of the computer. There are additional program abilities which make it even easier to use the code.

In the case of the example, all selections produced unique random numbers. This may not always be the case. If you happen to produce two identical random numbers, there is a utility to correct the numbers for this circumstance. Looking at the main menu:

C F HELP I L N R S V?

the option which allows you to change a random number is F for FIX DBLS or fix for doubles. If you type F<CR> you will see:

NUMBER?

This question is asking you which number you want to change. The number is the value you see listed first. Currently, number 18 is CAROLIN 709. Let's change this to 710. Type 18<CR> and you will see:

NEW VALUE?

As you answer to this question, type 710<CR>. You have just changed the random number. The main menu will again appear on the display:

C F HELP I L N R S V?

Typing I<CR> you will see:

ITEM?

If you answer CAROLIN, the computer will search its file and produce the following:

710. CAROLIN

If the computer returns directly to the menu without producing a result, one of two things happened. Either you did not spell the name in exactly the same manner as it appears on the list, or you forgot to turn the printer on, and the computer thought the printer was on. On the display should be the main menu:

C F HELP I L N R S V?

The only option yet to be selected is V. Type V<CR> and you will see:

CODE?

Enter 710<CR> and the computer will search its files and produce the following:

CAROLIN 710.

The computer should now be showing the main menu. To break the program, you must either turn the computer off or press the BREAK key.

Lines 70 and 71 are used to enter the original names of streets into the computer. The computer does not care if you enter names or just letters.

Examining the program

The program is divided into 10 parts. Part one, consisting of lines 1-10, is the menu and the routing of the IF statements which direct the program, depending on the answers given in the menu question. All menu answers must be single letters, including the HELP selection. If an answer is given which is not in the selection, line 10 will return the program to the menu.

Lines 12-16 are used to sort the information according to their assigned random numbers. The code numbers are stored in locations 10-35, the sorted names in locations 36-61, and an original format list of names in lines 62-87. There is very little room left in the computer, so be very careful in adding code to the program.

Line 20 is used to enter the size of the random number. This value is stored in memory location E.

Lines 30 and 31 are used to enter a correction to the random number when duplicate numbers are produced. The value is entered into the array in line 31 before the program is sent back to the main menu.

Lines 40-43 are the help routine. This set of code prints on display or printer the meanings of each of the letters in the menu.

Lines 50-59 are the lines which produce the random number. The random number generator used needs a seed number. This number should be about seven digits long at least and should not be negative.

The listing routine is in lines 60-64. This routine is used no matter what order the numbers and values are in.

Lines 70 and 71 are used to enter the original names of streets into the computer. The computer does not care if you enter names or just letters. If you wanted to use the 26 letters of the alphabet, you could do so and then spell out each word as needed.

Lines 80 and 81 search the data set for a particular item while lines 90 and 91 perform a similar function for a particular random number. In both cases, if the number is not found, the computer simply returns you to the main menu.

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PROGRAM LISTING

1:BEEP 3:INPUT "C F HELP I L N R S V?";A$:
  IF A$="I" THEN 80
2:IF A$="C" THEN 12
3:IF A$="F" THEN 30
4:IF A$="R" THEN 50
5:IF A$="L" THEN 60
6:IF A$="S" THEN 70
7:IF A$="N" THEN 20
8:IF A$="H" THEN 40
9:IF A$="V" THEN 90
10:GOTO 1

12:FOR C=10 TO 35:FOR A=10 TO 44-C
13:IF A(A)<A(A+1) THEN 16
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14:D=A(A):A(A)=A(A+1):A(A+1)=D
15:D$=A$(A+26):A$(A+26)=A$(A+27):A$(A+27)=D$
16:NEXT A:NEXT C:GOTO 1

20:INPUT "SIZE?";E:E=8-E:GOTO 1

30:INPUT "NUMBER?";A:INPUT "NEW VALUE?";C
31:A(A+9)=C:GOTO 1

40:PRINT "C CODE SORT":PRINT "F FIX/DBLS":PRINT "I ITEM-CODE"
41:PRINT "L LIST":PRINT "N SIZE/#"
42:PRINT "R RANDOM #":PRINT "S STREETS/ETC.":PRINT
   "V VALUE-ITEM"
43:GOTO 1

50:INPUT "NEW SEED(Y/N)?";A$
51:IF A$="Y" INPUT "SEED?";B
52:FOR C=10 TO 35:B=23B-INT(23B/(10[8+1))*(10[8+1)
53:A(C)=INT (B/10[E):NEXT C
54:FOR A=36 TO 61:A$(A)=A$(A+26):NEXT A
55:GOTO 1

60:INPUT "DATE?";A$:PRINT A$
61:PRINT "NO ITEM  CODE"
62:C=35:F=0:FOR D=10 TO 35: C=C+1:F=F+1:
   PRINT F;" ";A$(C);" ";A(D)
63:NEXT D
64:GOTO 1

70:FOR C=36 TO 61:INPUT A$(C):A$(C+26)=A$(C):NEXT C
71:GOTO 1

80:INPUT "ITEM?";A$:FOR C=36 TO 61:IF A$=A$(C) PRINT A(C-26);"
";A$
81:NEXT C:GOTO 1

90:INPUT "CODE?";A:FOR C=10 TO 35:IF A=A(C) PRINT
   A$(C+26);" ";A
91:NEXT C:GOTO 1
```

Program listing.