

This Commodore version of the language concludes the series on PILOT which began four issues ago and included Apple and Atari versions. This program needs at least 8K memory and works on tape or disk-based systems.

VIC And PET PILOT Interpreter

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PILOT is an acronym for Programmed Instruction, Learning, or Teaching. Because it is a simple language, teachers can easily develop lesson programs, and beginning students can quickly learn how to program.

This version of PILOT contains all of the core commands used for displaying information and accepting responses. It also has some mathematical capabilities.

The interpreter is written in BASIC so that it is transportable between machines. There is, however, one machine language routine called by line 3 and loaded by the following statement in line 20:

```
20 ....:FORX=826 TO 831:READ Z:POKEX,Z:
NEXT:.....
```

The routine can be loaded anywhere to suit your system needs by simply changing the 826 and 831 values. For the VIC, I would suggest changing the values to 820 and 825. Don't forget to change the SYS call in line 3 if you change the above values.

For computers other than Commodore, the routine must be replaced by an input routine which will accept colons and commas.

The next section describes the editor, the commands, and the implemented PILOT statements.

The Editor

The editor behaves just like the BASIC editor. To enter a line, type the line number, the PILOT statement, and hit RETURN. Any statement entered without a line number is assumed to be a command (see Commands) and is executed as such.

The screen editor is fully active during program entry. To correct an error in a statement or command, just move the cursor to it and enter the

correction. Remember, the RETURN key must be pressed for it to be changed in memory.

When the editor is storing a PILOT program line in memory, it first removes the PILOT command and tokenizes it. Thus, if an illegal command is used, an error message will be generated before the program is run.

Commands

The following describes the editor's commands.

LIST xx-yy – Lists the specified lines from memory. xx, yy, or both can be removed.

RUN – Executes the PILOT program currently in memory.

SAVE 0:name – Saves the program in memory to disk on drive 0. No quotes are necessary.

LOAD name – Loads the program from disk. No quotes are necessary.

NEW – Clears the current program from memory.

BASIC – Exits the interpreter and returns to BASIC.

PLIST xx-yy – Same as the list command, except the output is sent to device 4.

PILOT Variables And Statements

PILOT variables consist of either a "\$" for a string variable or a "#" for a numeric variable, followed by a single letter. For example, #N and \$S are correct, whereas \$NAME is not.

The PILOT statements implemented are:

T: Type

Outputs text and variables to the screen. For example:

```
1 T: VALUE #X
```

will type "VALUE xx".

If the statement is ended by a ";" no carriage return will be printed.

J: and U: Jump and Use

Transfer program execution to the specified routine. In the case of Use, the current line number is stored so it can be returned to (see End). For example:

```
2 J:*PRINT
```

jumps to the routine labeled PRINT. Labels are designated by beginning a line with an "*" sign. No statement should follow this label on the same line.

E: End

Transfers control back to the statement following the last Use statement executed.

M: Match

Match is the most complicated and powerful of the PILOT commands. It checks to see if certain keywords are present in a string variable or in the input buffer (see Accept). For example:

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Number Recognition	•	•	•	•
Addition		•	•	
Subtraction		•	•	
Add.—Vertical/Horizontal		•	•	
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NOTE: All software requires 8K cassette/16K disk

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10 M: YES, OK, ALRIGHT

checks to see if YES, OK, or ALRIGHT are present in the input buffer. To check a string for keywords:

15 M: \$n YES, OK, ...

If a match is found the Y flag is set; otherwise the N flag is set (see Modifiers).

I: If

If is a nonstandard command which allows for mathematical testing. It can check to see if a given variable is less than, greater than, or equal to a second given value or variable. For example:

20 I: #N < 9

or

25 I: #C = #F

Only >, <, and = can be used.

C: Compute

Performs simple four-function calculations in a linear order (no parentheses) and assigns the value to a numeric variable. The calculations are performed in floating point mode so reasonable accuracy can be expected. For example:

30 C: #N = #G*10/#T + 10

If a "#R" is encountered in the expression, a random number between 0 and 1 is substituted.

A: Accept

Inputs a response from the user. If no destination variable is given, the response is stored in a buffer which can be used by Match. For example:

40 A: #N inputs a value into N

41 A: inputs a response into the buffer

H: Home

Clears the screen and returns the cursor to home.

End

Stops the program execution and returns to the editor. This statement cannot be modified by a "Y" or "N". For example:

50 END

Modifiers

Any of the commands can be modified with either a "Y" or "N." If a command is modified, it will be executed only if the specified flag is set. For example:

1 TY: YES

will print YES only if the Y flag is set. The Y and N flags are set by either a Match or If statement.

Error Messages

The following are the error codes generated during program run:

1 – Illegal variable name

2 – Unknown label

3 – Stack overflow (too many Uses)

4 – Stack empty (an E: with no Use)

5 – Bad format

6 – Division by zero

7 – Numeric out of range (greater than 32767)

Notes On Program Operation

1. To stop a PILOT program run, hit the "@" key. To stop a list, hit any key.

2. If for some reason the program returns to BASIC level, just type GOTO 40 <RETURN> to re-enter without losing the current program.

3. If a NEW statement is not given before loading a new program, the current program and the new program will be merged in memory.

4. The maximum number of lines allowed is contained in the variable M and is set in line 10. This can be changed.

5. For cassette operation, make the following changes:

500 OPEN1,1,1,R\$:PRINT"SAVING"R\$

600 OPEN1,1,0,R\$:PRINT"LOADING"R\$

6. This interpreter is about 3K bytes long, and about 4K bytes are taken after system initialization. This still leaves 3K on an 8K PET!

This program gives the user access to a fairly complete set of PILOT commands, while at the same time leaving enough space for program development even on an 8K PET.

```

1 GOTO10:REM***PILOT***
2 I$=""
3 SYS826:IFPEEK(0)=13THENRETURN
4 I$=I$+CHR$(PEEK(0)):GOTO3
10 CLR:M=200:X=0:Y=0:A=0:P=0:Z=0:I$="":DIMS%(
  9),N%(26),SS(26),LS(M),CS(15):F%=0
20 PRINT"[CLEAR]**** PILOT V2.1 ****":FORX=82
  6TO831:READZ:POKEZ,Z:NEXT:FORX=0TO15
25 READCS(X):NEXT:DATA32,207,255,133,0,96
30 DATALIST,RUN,SAVE,LOAD,NEW,BASIC,PLIST,T,J
  ,E,U,M,C,A,I,H
40 PRINT"[DOWN]PILOT."
50 GOSUB2:PRINT:IFASC(I$)=32ANDLEN(I$)=1THENG
  OTO50
60 IFLEFT$(I$,1)=" "THENI$=MID$(I$,2):GOTO60
70 L=VAL(I$):IFL<>0THENGOTO200
80 L=1:H=M:R$="":FORX=1TOLEN(I$):IFMID$(I$,X,
  1)<>" "THENNEXTX:GOTO140
90 R$=MID$(I$,X+1):I$=LEFT$(I$,X-1)
100 L=VAL(R$):H=L:FORX=1TOLEN(R$):IFMID$(R$,X,
  1)<>" "THENNEXTX:GOTO120
110 L=VAL(LEFT$(R$,X-1)):H=VAL(MID$(R$,X+1))
120 IFL=0THENL=1
130 IFH=0THENH=M
140 FORX=0TO6:IFI$<>LEFT$(CS(X),LEN(I$))THENNE
  XT:PRINT"UNKNOWN COMMAND.":GOTO40
150 ONX+1GOTO400,1000,500,600,700,800,390
200 IFL>MTHENPRINT"LINE NUMBER OUT OF RANGE.":
  GOTO40
210 X=LEN(STR$(L)):X$=MID$(I$,X):IFX$=" "THENL$
  (L)="":GOTO50
220 IFLEFT$(X$,1)=" "THENX$=MID$(X$,2):GOTO220
230 X=3:IFMID$(X$,2,1)<>" ":THENX=4:IFMID$(X$,3,
  1)<>" ":THENL$(L)=X$:GOTO50

```



```

240 FORZ=7TO15:IFLEFT$(X$,1)<>C$(Z) THENNEXT:PR
INT"ILLEGAL COMMAND.":GOTO40
250 IFMID$(X$,2,1)="Y" THENZ=Z+10
260 IFMID$(X$,2,1)="N" THENZ=Z+20
270 L$(L)=CHR$(Z-6)+MID$(X$,X):GOTO50
390 OPEN1,4:GOTO410
400 OPEN1,3
410 FORX=LTOH:IFL$(X)=" " THEN450
420 X$=" ":Z=ASC(L$(X)):IFZ>30 THENX$=LEFT$(L$(
X),1):GOTO440
425 IFZ>20 THENZ=Z-20:X$="N"+X$
430 IFZ>10 THENZ=Z-10:X$="Y"+X$
435 X$=C$(Z+6)+X$
440 PRINT#1,X;X$;MID$(L$(X),2)
450 GETX$:IFX$<>" " THENCLOSE1:GOTO40
460 NEXT:CLOSE1:GOTO40
500 OPEN1,8,2,R$+" ,S,R":PRINT"SAVING "R$
510 FORX=1TOM:IFL$(X)=" " THEN530
520 PRINT#1,X;CHR$(13)CHR$(34)L$(X)CHR$(34)CHR
$(13);
530 NEXTX:CLOSE1:GOTO40
600 OPEN1,8,2,R$+" ,S,R":PRINT"LOADING "R$
610 INPUT#1,X:IFSTGOTO630
620 INPUT#1,L$(X):IFST=0GOTO610
630 CLOSE1:GOTO40
700 GOTO10
800 PRINT"{DOWN}EXITING TO BASIC....":END
1000 L=0:FORX=1TO25:N$(X)=0:S$(X)=" ":NEXT:P=0:F
%=0
1010 L=L+1:IFL=>MORL$(L)="END" THEN40
1011 GETX$:IFX$=" " THEN40
1015 IFL$(L)=" " THEN1010
1020 X=ASC(L$(L)):IFX>40 THEN1010
1030 IFX>20 THENX=X-20:IFF%=1 THEN1010
1040 IFX>10 THENX=X-10:IFF%=0 THEN1010
1050 C$=MID$(L$(L),2):ONXGOTO1100,1220,1300,120
0,1500,1600,1700,1800,1900
1090 PRINT"ERROR #"E"IN LINE"L:GOTO40
1100 Z=0:IFRIGHT$(C$,1)="-":THENZ=1:C$=LEFT$(C$,
LEN(C$)-1)
1105 FORX=1TOLEN(C$):X$=MID$(C$,X,1):IFX$="# " TH
EN1150
1110 IFX$=" " THEN1160
1120 PRINTX$;NEXT:IFZ=0 THENPRINT
1130 GOTO1010
1150 GOSUB1190:X$=STR$(N$(Y)):GOTO1120
1160 GOSUB1190:X$=S$(Y):GOTO1120
1190 X=X+1:Y=ASC(MID$(C$,X,1))-64:IFY<10RY>26TH
ENE=1:GOTO1090
1195 RETURN
1200 IFP>8 THENE=3:GOTO1090
1210 P=P+1:S$(P)=L
1220 IFVAL(C$)<>0 THENL=VAL(C$)-1:GOTO1010
1230 FORX=1TOM:IFC$<>L$(X) THENNEXT:E=2:GOTO1090
1240 L=X:GOTO1010
1300 IFP=0 THENE=4:GOTO1090
1310 L=S$(P):P=P-1:GOTO1010
1500 X=1:C$=C$+" ",X$=AC$:IFLEFT$(C$,1)="$ " THEN
GOSUB1590
1510 FORZ=XTOLEN(C$):IFMID$(C$,Z,1)<>" " THENNEX
T
1520 Z$=MID$(C$,X,Z-X):FORY=1TOLEN(X$):IFMID$(X
$,Y,LEN(Z$))=Z$ THENF%=1:GOTO1010
1560 NEXT:IFZ<LEN(C$) THENX=Z+1:GOTO1510
1570 F%=0:GOTO1010
1590 Y=ASC(MID$(C$,2))-64:IFY<10RY>26 THENE=1:GO
TO1090
1595 X$=S$(Y):X=4:RETURN
1600 A=3:Z=0:X$=" ":IFLEFT$(C$,1)<>" " ORMID$(C$,
3,1)<>" " THENE=5:GOTO1090
1610 Y=1:X$=MID$(C$,A,1):A=A+1:IFMID$(C$,A,1)="-
" THENA=A+1:Y=-1
1620 IFMID$(C$,A,1)<>" " THENY=Y*VAL(MID$(C$,A))
:A=A+LEN(STR$(Y))-1:GOTO1650
1630 X=ASC(MID$(C$,A+1))-64:IFX<10RX>26 THENE=1:
GOTO1090

```

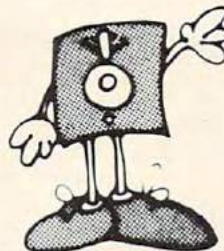
```

1635 IFX=18 THENY=Y*RND(1):GOTO1650
1640 Y=Y*N$(X):A=A+2
1650 IFX$=" " THENZ=Y
1655 IFX$="-" THENZ=Z-Y
1660 IFX$="+" THENZ=Z+Y
1665 IFX$="/" THENZ=Z/Y
1670 IFX$="*" THENZ=Z*Y
1675 IFX$=" " THENZ=Z/Y
1680 IFA<LEN(C$)GOTO1610
1685 Y=N$(X1):IFX-4>0 THENIFMID$(C$,X-4)="-" ANDX
-4<>ATHENZ=-Z
1690 X=ASC(MID$(C$,2))-64:IFX<10RX>26 THENE=1:GO
TO1090
1692 IFZ>32767 ORZ<-32767 THENE=7:GOTO1090
1695 N$(X)=Z:GOTO1010
1700 IFC$=" " THENGOSUB2:AC$=IS:PRINT:GOTO1010
1720 X=ASC(MID$(C$,2))-64:IFX<10RX>26 THENE=1:GO
TO1090
1730 GOSUB2:Z=VAL(IS):PRINT:IFLEFT$(C$,1)="# " TH
ENN$(X)=Z
1740 IFLEFT$(C$,1)="$ " THENS$(X)=IS
1750 GOTO1010
1800 IFLEFT$(C$,1)<>" " THENE=5:GOTO1090
1810 X=ASC(MID$(C$,2))-64:IFX<10RX>26 THENE=1:GO
TO1090
1820 A=N$(X):X$=MID$(C$,3,1):IFMID$(C$,4,1)<>" "
THENX=VAL(MID$(C$,4)):GOTO1840
1830 X=ASC(MID$(C$,5))-64:IFX<10RX>26 THENE=1:GO
TO1090
1835 X=N$(X)
1840 F%=0:IFX$=" " ANDA<X THENF%=1
1850 IFX$=" " ANDA>X THENF%=1
1860 IFX$=" " ANDA=X THENF%=1
1870 GOTO1010
1900 PRINT"{CLEAR}";:GOTO1010

```

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20 Questions

```

1 H:
2 T:WELCOME TO THE GAME
  OF TWENTY QUESTIONS..
3 T:BY ASKING QUESTIONS
  WHICH HAVE YES OR
4 T:NO ANSWERS, TRY TO
  GUESS THE OBJECT
5 T:WHICH HAS BEEN SELECTED.
6 T:
7 T:BE SURE TO END EACH
  QUESTION WITH A '?'.
8 T:
9 T:
10 C:#C=0
11 *ROUND
12 C:#C=#C+1
13 *QUESTION
14 T:ENTER QUESTION #C
15 A:
16 M: ?
17 TN:THAT ISN'T A QUESTION.
18 JN:*QUESTION
19 M:A? ,E? ,I? ,O? ,U? ,Y?
20 TY:YES
21 TN:NO
22 T:
23 I:#C<20
24 JY:*ROUND
25 T:END OF TWENTY
  QUESTIONS. PRESS RETURN
26 T:TO START AGAIN.
27 A:
28 J:1
29 END
  
```

Guess

```

1 H:
2 T:THIS IS THE GAME OF
  GUESS.
3 T:TRY TO GUESS A NUMBER
  BETWEEN 1
4 T:AND 100.
5 C:#G=0
6 C:#N=#R*100
7 *GUESS
8 C:#G=#G+1
9 T:
10 T:GUESS NUMBER #G ?;
12 A:#Q
15 I:#Q<#N
16 TY:TO LOW.
17 I:#Q=#N
18 TY:RIGHT! IN #G GUESSES.
20 JY:*END
21 I:#Q>#N
22 TY:TO HIGH.
23 J:*GUESS
25 *END
26 T:
27 T:PLAY AGAIN ? ;
28 A:
29 M: YES, OK, ALRIGHT, GOOD, Y
30 JY:1
31 T:O.K. , GOODBYE!
32 END
  
```

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