

# Numbers

If you're a Roman who doesn't understand numbers to base 3, then this is the program for you. Convert between binary, hexadecimal, decimal and Roman numerals, plus any other number systems (to different bases) you care to invent. 7 fingered aliens catered for!

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1 REM *** BBC VERSION ***
10 REM ROMAN NUMBERS @1983 MICHAEL BEWS
20 REM CONVERTED TO BBC MICRO BY C.R.TANNE
R
25 GOTO40
30 ON ERROR IF ERR<>17 THEN GOTO 790 ELSE
MODE 7:PRINT TAB(14,12);CHR$(141);CHR$(129);"
GOOD BYE"'TAB(14);CHR$(141);CHR$(131);"GOOD B
YE":END
40 DIM K(8),A$(8),C(30):MODE 6
50 GOTO 680
70 L=5:CLS:PRINT " ROMAN NUMBERS @1983
MICHAEL BEWS"
80 PRINT TAB(0,2);"ENTER A COMPLETE ROMAN
NUMBER eg MCLXIV"
90 PRINT TAB(0,21);"PRESS <RETURN> TO RE
TURN TO MENU"
100 PRINT TAB(8,22);"
";TAB(0,22);:INPUT "ROMAN NUMBER "
;T$
110 PRINT TAB(0,20);"
"
120 IF T$="" THEN GOTO 790
130 PRINT TAB(0,L);"
";TAB(0,L);"ROMAN NUMBER: ";
T$;
140 FOR B=1 TO 3:SOUND 1,-15,120,1:SOUND 1,
-15,180,1:NEXT B
150 FOR X=1 TO LEN(T$)
160 IF MID$(T$,X,1)="M" THEN C(X)=1000
170 IF MID$(T$,X,1)="D" THEN C(X)=C(X)+50
0
180 IF MID$(T$,X,1)="C" THEN C(X)=C(X)+10

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0
190 IF MID$(T$,X,1)="L" THEN C(X)=C(X)+50
200 IF MID$(T$,X,1)="X" THEN C(X)=C(X)+10
210 IF MID$(T$,X,1)="V" THEN C(X)=C(X)+5
220 IF MID$(T$,X,1)="I" OR MID$(T$,X,1)="
1" THEN C(X)=C(X)+1
230 IF C(X)<1 THEN PRINT TAB(4,20);MID$(T$,
X,1);" IS NOT A ROMAN NUMBER !!":X=LEN(T$):NE
XT:GOTO 90
240 NEXT X
250 T=0
260 FOR X=1 TO LEN(T$)
270 IF C(X+1)>C(X) THEN C(X)=-C(X)
280 T=T+C(X):C(X)=0
290 NEXT X
300 X=0:IF LEN(T$)>16 THEN X=1
310 PRINT TAB(30,L+X);"=" ";T
320 FOR B=1 TO 3:SOUND 1,-15,40,1:SOUND 1,-
15,160,1:NEXT B
330 L=L+2:IF L>18 THEN PRINT TAB(0,21);STRI
NG$(79," ");TAB(0,21);:INPUT "PRESS <RETURN>
TO RETURN TO MENU";X$:GOTO 790
340 GOTO 90
350 CLS:PRINT " VARIABSE CALCULATOR @19
83 M.BEWS"
360 PRINT TAB(0,8);"CHOOSE ANY BASE BETWEEN
2 AND 24(Decimalequivalent). WE SHALL USE LE
TTERS 'A to N' FOR SYMBOLS REQUIRED AFTER 9 U
P TO ONE LESS THAN THE CHOSEN BASE VALUE"
370 PRINT TAB(25,17);" ";TAB
(0,17);:INPUT "ENTER CHOSEN BASE(2 to 24)";X$
380 IF LEN(X$)<1 OR LEN(X$)>2 OR VAL(X$)<2
OR VAL(X$)>24 THEN GOTO 370
390 B=VAL(X$)
400 CLS:PRINT " VARIBASE CALCULATOR @19
83 M.BEWS"
410 PRINT TAB(1,3);"Base: ";TAB(6,3);B;TAB
(28,2);"Decimal";TAB(28,3);"Equivalent."
420 X$="":IF B<10 THEN X$=" "
430 PRINT TAB(0,5);X$;B;CHR$(230);X$;B;CHR$
(229);X$;B;CHR$(228);X$;B;CHR$(227);X$;B;CHR$
(226);X$;B;CHR$(225);X$;B;CHR$(224);X$;B;CHR$
(231)
440 KO=99999:IF B=3 THEN KO=6560
450 IF B=2 THEN KO=255
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460 FOR X=1 TO 8:N=K(X):PRINT TAB(28,6+X);"
=";N;TAB(30,6+X);TAB(0,5+X);:GOSUB 500
470   FOR Y=8 TO 1 STEP -1:PRINT TAB(25-Y*3
);A$(Y);:NEXT Y
480 NEXT X
490 GOTO 560
500 FOR Z=1 TO 8:A$(Z)="":NEXT Z
510 NA=N:FOR Z=1 TO 8
520   I=INT(NA/B):IF NA-B*I>9 THEN A$(Z)=CH
R$(55+(NA-B*I)) ELSE A$(Z)=CHR$(48+(NA-B*I))
530   IF I>=B THEN NA=I:NEXT Z ELSE A%=Z:Z=
8:NEXT:Z=A%
540 IF I>9 THEN A$(Z+1)=CHR$(55+I) ELSE A$(
Z+1)=CHR$(48+I)
550 RETURN
560 PRINT TAB(0,19);"INPUT A DECIMAL NUMBER
FOR CONVERSION TOBASE";TAB(5,20);B;
570 PRINT " OR PRESS <RETURN> TO RETURN TO
MENU ";
580 PRINT "(BETWEEN 1 AND ";KO;")
      ";TAB(27,21);:INPUT X$
590 IF X$="" THEN GOTO 790
600 FOR X=1 TO LEN(X$):IF MID$(X$,X,1)<"0"
OR MID$(X$,X,1)>"9" THEN X=LEN(X$):NEXT:GOTO
560
610 NEXT X:N=INT(VAL(X$)):IF N<1 OR N>KO TH
EN GOTO 560
620 GOSUB 500
630 PRINT TAB(0,16);"
      ";TAB(0,15);
640 FOR Y=8 TO 1 STEP -1:PRINT TAB(25-Y*3);
A$(Y);:NEXT Y
650 PRINT TAB(28);"=";N
660 GOTO 560
670 STOP
680 VDU 23,224,32,96,32,32,0,0,0,0
690 VDU 23,225,240,16,32,64,240,0,0,0
700 VDU 23,226,240,16,112,16,240,0,0,0
710 VDU 23,227,128,128,160,240,32,0,0,0
720 VDU 23,228,240,128,240,16,240,0,0,0
730 VDU 23,229,192,128,240,144,240,0,0,0
740 VDU 23,230,240,16,32,64,128,0,0,0
750 VDU 23,231,96,144,144,144,96,0,0,0
760 VDU 23,232,240,144,96,144,240,0,0,0
770 DATA 1,5,8,10,16,20,32,255

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780 FOR X=1 TO 8:READ K(X):NEXT X
790 MODE7:VDU 23;8202;0;0;0;:PRINT CHR$(141
);CHR$(129);"-NUMBER SYSTEMS @1983 MICHAEL B
EWS-"CHR$(141);CHR$(131);"-NUMBER SYSTEMS @1
983 MICHAEL BEWS-"
800 PRINT " THIS PROGRAM EXAMINES A FEW OF
THE MANYCOUNTING SYSTEMS AND ENABLES YOU TO
INVENT SOME OF YOUR OWN!"
810 PRINT TAB(12,8);CHR$(141);CHR$(129);"--
M E N U--"TAB(12);CHR$(141);CHR$(131);"--M E
N U--"
820 PRINT TAB(6,11);"1.....ROMAN NUMBER
S"TAB(6);"2.....DECIMAL SYSTEM"TAB(6)
;"3.....BINARY SYSTEM"TAB(6);"4.....
.HEXADECIMAL"TAB(6);"5.....INVENT YOUR
OWN!"
830 PRINT TAB(11,24);CHR$(136);"SELECT KEY
NUMBER";
840 A=INKEY(1000):IF A=-1 THEN GOTO 840
850 SOUND 1,-15,150,1
860 IF A<49 OR A>53 THEN GOTO 840 ELSE MODE
6:VDU 23;8202;0;0;0;
870 A=A-48:ON A GOTO 880,950,1110,1180,350
880 CLS:PRINT " ROMAN NUMBERS @1983 MIC
HAEL BEWS"
890 PRINT TAB(10,3);"IN THE ROMAN SYSTEM"
900 PRINT "M=1000 D=500 C=100 L=50 X=10
V=5 I=1"
910 PRINT " A LOWER VALUE LETTER COMING IMM
EDIATELYIN FRONT OF A HIGHER VALUE LETTER IS
SUBTRACTED FROMTHE TOTAL INSTEAD OF BE
ING ADDED SO THAT LX=60 AND XL=40"
920 PRINT TAB(7,24);"PRESS ANY KEY TO CONTI
NUE";
930 IF INKEY$(1000)="" THEN GOTO 930
940 RF=1:GOTO 70
950 CLS:PRINT "DECIMAL SYSTEM
(Base 10)"
960 PRINT "ORIGIN: Ten fingers and thumb
s make it convenient to
count in groups of ten!"
970 PRINT "METHOD: All counting systems
need enough symblos to represen
t the count from zero up to
one less than the base
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    number.";
    980 PRINT " This means that
symbols 0 1 2 3 4 5 6 7 8          9 ar
e needed for DECIMAL.              There is
no separate symbol                for the";
    990 PRINT " BASE (Ten in the case
of Decimal), the BASE being      rep
resented by 1 0 to                1 comple
te group of ten items,           plus 0 remai
nder."
    1000 PRINT TAB(6,24);"PRESS ANY KEY TO CONTI
NUE";
    1010 IF INKEY$(1000)="" THEN GOTO 1010
    1020 CLS:PRINT "DECIMAL SYSTEM
(Base 10)"
    1030 PRINT "'1 0 0' therefore means the g
roups of ten and '1000' is ten times ten gr
oups of ten or 10 x 10 which is the same as
10";CHR$(226);" (10 to the power of 3)."
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1040 PRINT " 10";CHR\$(230);" "; "10";CHR\$(229); " "; "10";CHR\$(228); " "; "10";CHR\$(227); " "; "10";CHR\$(226); " "; "10";CHR\$(225); " "; "10";CHR\$(224); " "; "10";CHR\$(231)

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1050 PRINT "          1 0 0
0"
1060 PRINT "'      NOTE: ANY NUMBER RAISED TO
THE          POWER OF 1 (eg 10";CHR$(2
24);") IS          ITSELF AND ANY NUMB
ER RAISED          TO POWER 0 (eg 10";CHR$(
231);") IS          ALWAYS 1."'
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1070 PRINT " Using this convention, relating ascending powers of the BASE value, you can create a counting system to any BASE you wish!"

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1080 PRINT TAB(6,24);"PRESS ANY KEY TO CONTI
NUE";
1090 IF INKEY$(1000)="" THEN GOTO 1090 ELSE
B=10:GOTO 400
1100 GOTO 790
1110 CLS:PRINT "BINARY SYSTEM
(Base 2)"
1120 PRINT "'MECHANICAL AND ELECTRICAL SWITCHES ARE
SIMPLEST AND MOST RELIABLE WHEN THEY
HAVE ONLY TWO POSSIBLE STATES, 'ON' AND '
OFF'.";
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1130 PRINT " FROM OUR NOTES ON THE DECIMAL
      SYSTEM WE CAN SEE THAT BINARY NEEDS ONLY TWO
      SYMBLES '0' AND '1' TO COUNT UP TO ANY EQUI
      VALENT";
1140 PRINT "DECIMAL VALUE. USING THE 'OFF'
      STATE OF A SWITCH OR CIRCUIT TO REPRESENT
      0 AND THE 'ON' STATE TO REPRESENT 1, IT
      IS POSSIBLE TO REPRESENT ANY DECIMAL NUMBER ";
1150 PRINT "USING A CHAIN OF VERY SIMPLE TWO-
      STATE DEVICES."
1160 PRINT TAB(6,24); "PRESS ANY KEY TO CONTI
      NUE";
1170 IF INKEY$(1000)="" THEN GOTO 1090 ELSE
      B=2:GOTO 400
1180 CLS:PRINT "HEXADECIMAL
      (Base 16)"
1190 PRINT TAB(0,5); " Computers work best in
      binary."
1200 PRINT "Unfottunately humans do not! 18
      7 decimalis 10111010 in binary. ";
1210 PRINT " This computer uses 8-bit byte
      s. Each byte can hold numbers from 0 to
      255 (ie 11111111 binary). 16 (DEC) is 2";
      CHR$(227); ". ";
1220 PRINT "So hexadecimalis a good compromi
      se between computers and human and numbers f
      rom 0 to 255 (DEC) are all just two hex d
      igits."
1230 PRINT TAB(6,24); "PRESS ANY KEY TO CONTI
      NUE";
1240 IF INKEY$(1000)="" THEN GOTO 1240 ELSE
      B=16:GOTO 400
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