

8 QUEENS ACTION!

92 chess solutions in 40 seconds

Program by Dave Oblad

Lightning-fast ACTION! solution to "The Eight Queens Problem" from the April, 1985 Antic. Requires the ACTION! programming language cassette from Optimized Systems Software. Works on all 8-bit Atari computers of any memory size, with disk or cassette. Disk subscribers: You can use this program without ACTION! Select the "L" option from DOS 2 for the file, QUEEN.EXE.

In line with Antic's long-held belief that our published programs are part of a two-way communications process with readers of the magazine, many Antic programming take-aparts conclude with suggestions for possible enhancements that an ambitious programmer might make in the listings.

But Dave Oblad took it as a personal challenge when he saw Angelo Giambra's "The Eight Queens Problem" in the April, 1985 Antic and read our final comment: "For a real challenge, you might want to try modifying the program so that only the 12 unique solutions are found."

(The original April article showed that there are 92 possible ways to arrange eight queens on a chessboard so that none of them threatens another. As the most powerful chess piece, a queen can attack for any distance along any straight line.)

In Dave's letter to Antic, he wrote, "I spent the next two days cranking away at my Atari in the ACTION! language, which is much faster than BASIC. My algorithm solves and displays all 92 general solutions in approximately 40 seconds—and finds the 12 unique solutions in 30 seconds."

Listing on page 66



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```

380 PITCH=12:HOLD=4:WAIT=0:GOSUB 530
390 OCTAVE=6:PITCH=1:HOLD=4:WAIT=0:GOS
UB 530
400 OCTAVE=5:PITCH=12:HOLD=4:WAIT=0:GO
SUB 530
410 PITCH=10:HOLD=16:WAIT=8:GOSUB 530
420 PITCH=12:HOLD=16:WAIT=32:GOSUB 530

430 PITCH=8:HOLD=16:WAIT=8:GOSUB 530
440 PITCH=7:HOLD=32:WAIT=0:GOSUB 530
450 GRAPHICS 0:END
460 REM TIME DELAY
480 POKE 540,WAIT
490 IF PEEK(540) THEN 490
500 RETURN
510 REM SUBROUTINE TO CONTROL
520 REM TWO 16-BIT SOUNDS
530 POKE 540,HOLD:X=USR(ADR(S16$),FREQ
(OCTAVE,PITCH),VOL,FREQ(OCTAVE+1,PITCH
),VOL)
540 IF PEEK(540) THEN 540
550 X=USR(ADR(S16$),FREQ(OCTAVE,PITCH
),0,FREQ(OCTAVE+1,PITCH),0)
560 GOTO 480
20000 REM DATA FOR M-L SUBROUTINE

```

```

HV 20010 DATA 104,201,2,240,33,201,4,240,
12,170,224,0,240,41
TD 20020 DATA 202,104,104,240,247,208,245
,104,141,2,210,104,141,0
GX 20030 DATA 210,104,104,41,15,9,160,141
,3,210,104,141,6,210
IG 20040 DATA 104,141,4,210,104,104,41,15
,9,160,141,7,210,96
BU 30000 REM FREQUENCIES FOR FREQ ARRAY
NT 30010 DATA 27357,25821,24372,23003,217
12,20493,19342,18256,17231,16264,15351
,14489
HW 30020 DATA 13675,12907,12182,11490,108
52,10243,9668,9125,8612,8128,7626,7241

EP 30030 DATA 6834,6450,6088,5746,5423,51
18,4830,4559,4303,4061,3832,3617
WT 30040 DATA 3414,3222,3040,2869,2708,25
55,2412,2276,2148,2027,1913,1805
JN 30050 DATA 1703,1607,1517,1431,1350,12
74,1202,1134,1070,1010,953,899
FK 30060 DATA 848,800,755,712,672,634,598
,564,532,501,473,446
IK 30070 DATA 421,397,374,353,332,313,295
,278,262,247,233,219

```

```

ELSE
OD
OD
POSITION
D==+1 PI
RETURN
PROC TRY
FOR Y=0
DO
FOR X
DO
A=P
IF
IF
OD
OD
DISPLAY
RETURN
PROC SW
C=0 I(C
WHILE
DO
I(C)
IF C
FOR
DO
A
OD
FI
OD
A=P(0)

```

chess solutions in 40 seconds

8 QUEENS ACTION!

Article on page 40

STRING 1

; 8-QUEENS SOLUTION
; BY DAVE OBLAD
; (C) 1985, ANTIC PUBLISHING

```

BYTE ARRAY T(96),P(8),I(8),O(8),M(8)
BYTE A,B,C,D,X,Y,L1,L2,L3,OPT=53279

```

```

PROC SEARCH()
FOR X=0 TO 7
DO
Y=X*8 B=1
FOR A=0 TO 7
DO
IF T(Y+A)#O(A) THEN B=0 FI
OD
IF B=1 THEN RETURN FI
OD
RETURN

```

```

PROC ROTATE()
FOR A=0 TO 7
DO
B=7-O(A) M(B)=A
OD
FOR A=0 TO 7
DO
O(A)=M(A)
OD
RETURN

```

```

PROC TEST()
FOR A=0 TO 7
DO O(A)=P(A) OD
FOR L1=0 TO 1
DO
FOR L2=0 TO 1
DO
FOR L3=0 TO 3

```

```

DO
SEARCH()
IF B=1 THEN RETURN FI
ROTATE()
OD
FOR A=0 TO 7
DO M(A)=O(A) OD
FOR A=0 TO 7
DO O(7-A)=M(A) OD
OD
FOR A=0 TO 7
DO O(A)=7-O(A) OD
OD
B=0
RETURN

```

```

PROC KEEP()
X=D*8
FOR A=0 TO 7
DO T(X+A)=P(A) OD
RETURN

```

```

PROC DISPLAY()
;REMOVE 5 SEMI-COLONS BELOW
;FOR UNIQUE SOLUTIONS ONLY!

;IF D#0 THEN TEST()
; IF B=1 THEN RETURN
; ELSE KEEP()
; FI
;FI

```

```

FOR Y=0 TO 7
DO
FOR X=0 TO 7
DO
POSITION(X+15,Y+8)
IF P(Y)=X THEN PRINT("Q")

```

assembly
FIN
PA
LIST

```

0 ; CO
10 ; E
20 ; f
30 ;
40
45
50 ;
60 SD
70 ;
80 SD
90 SD
0100
0110
R
0120
0130
0140
0150
0160
0170
0180
0190
0200
0210
0220
0230
0240
"

```

```

0.      ELSE PRINT(" ") FI
245     OD
        OD
        POSITION(18,18)
41      D==+1 PRINTB(D)
        RETURN
15      PROC TRY()
        FOR Y=0 TO 6
        DO
17          FOR X=Y+1 TO 7
51          DO
                A=P(X)-P(Y) B=X-Y
08          IF A>7 THEN A=255-A+1 FI
41          IF A=B THEN RETURN FI
                OD
51          OD
25          DISPLAY()
        RETURN
12      PROC SWAP()
98      C=0 I(C)==+1
95      WHILE I(C)=C+2
        DO
                I(C)=0 C==+1 I(C)==+1
                IF C<7 THEN
                FOR B=0 TO C
                DO
                        A=P(B) P(B)=P(B+1) P(B+1)=A
                OD
                OD
                FI
                OD
                A=P(0) P(0)=P(1) P(1)=A

```

```

RETURN
PROC MAIN()
BYTE CONSOLE=53279
DO
    GRAPHICS(0) POKE(752,1)
    POSITION(8,0)
    PRINT(" 8-QUEENS SOLUTIONS")
    PRINT(" BY DAVE OBLAD")
    FOR A=0 TO 7 DO P(A)=A I(A)=0 OD
    FOR A=0 TO 96 DO T(A)=0 OD
    D=0
    DO
        TRY() SWAP()
        FOR A=0 TO 7
        DO
            IF A#P(A) THEN EXIT FI
        OD
        IF A=0 OR OPT#? THEN EXIT FI
    OD
    IF A=0 THEN POSITION(15,20)
    PRINT("COMPLETE")
    PUTE()
    PRINT("PRESS KEY TO RE-RUN")
    FI
    DO
        UNTIL CONSOLE < 7
    OD
    OD
RETURN

```

assembly language

FINE SCROLLING WORLD: PART I

Article on page 70

LISTING 1

```

0 ; COARSE SCROLLING, LISTING 1
10 ; BY MARK ANDREWS
20 ; ANTIC PUBLISHING
30 ;
40      * = $3000
45      JMP INIT
50 ;
60 SDMCTL = $022F
70 ;
80 SDLSTL = $0230
90 SDLSTH = $0231
0100 ;
0110 COLOR0 = $02C4 ;05 COLOR REGISTE
R
0120 COLOR1 = $02C5
0130 COLOR2 = $02C6
0140 COLOR3 = $02C7
0150 COLOR4 = $02C8
0160 ;
0170 TCKPTR = $2000
0180 ;
0190      .OPT OBJ
0200 ;
0210 ; DISPLAY LIST DATA
0220 ;
0230 START
0240 LINE1 .SBYTE " ANTIC PRESENTS
"
0250 LINE2 .SBYTE "
"
0260      .SBYTE " coarse scrolling
"
0270 LINE3 .SBYTE " On You
r"
0280      .SBYTE " Atari
"
0290 LINE4 .SBYTE " BY (YOUR NAME)
"
0300 ;
0310 ; DISPLAY LIST
0320 ;
0330 HLST NOP ;('HELLO' LIST)
0340      .BYTE $70,$70,$70
0350      .BYTE $70,$70,$70,$70,$70
0360      .BYTE $46
0370      .WORD LINE1
0380      .BYTE $70,$70,$70,$70,$47
0390 SCROLN NOP ;(THIS IS THE LIN
E WE'LL SCROLL)
0400      .WORD $00 ; A BLANK TO BE F
ILLED IN LATER
0410      .BYTE $70,$42
0420      .WORD LINE3
0430      .BYTE $70,$70,$70,$70,$46
0440      .WORD LINE4

```

continued on next page