

SUPERNIM.BAS

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Row

Weight Binary

		1	1	2	4	8
1	1		1			
2	111		3	1	2	
3	11111		5	1	4	
4	1111111		7	1	2	4
5	11111111		9	1		8
6	111111111		9	1		8

Standard
Layout

Weight ← # of entries
in each group.

each of these numbers are
divisible by 2 i.e. This
is a "winning" position

Strategies

1. Markers are removed alternately by player and computer; either may go first; any # of remaining markers may be removed but from only one row on a given move.
2. To win the "player" should on his move, remove markers from a row which will restore the group counts to a winning position. This is only possible if the board is "not" in a winning position when it is the players turn to move.
 - a) If the player goes 1st, the computer will always win; either for last marker removed wins or last marker removed loses.
 - b) If the computer goes 1st, the player can win if he follows 2 above and makes no mistake.

SUPER NIM STRATEGY

To Win

Standard Layout

Last marker wins

Computer goes 1st

1. If computer removes 1 marker in any row containing an odd number of markers

Remove 1 marker in any row containing an odd number of markers

2. If computer removes a marker from a row containing an even number of markers

of markers
in row before
Computer moves

2 or 6

of markers
in row before
Player moves

2

3

6

7

of
markers
to be
removed

1

3

1

3

4

7

4

4

1

6

5

5

3

8

8

1

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50 RANDOMIZE TIMER
60 SCREEN 0:WIDTH 80:KEY OFF:COLOR 15,1:CLS
70 KEY 1, " )"+CHR$(13)
80 ' **** Standard Setup ****
90 ' **** Standard Setup ****
100 ' **** Standard Setup ****
110 ROW(1)=1:ROW(2)=3:ROW(3)=5:ROW(4)=7:ROW(5)=9:ROW(6)=9
120 EIGHT(1)=0:FOUR(1)=0:TWO(1)=0:ONE(1)=1
130 EIGHT(2)=0:FOUR(2)=0:TWO(2)=1:ONE(2)=1
140 EIGHT(3)=0:FOUR(3)=1:TWO(3)=0:ONE(3)=1
150 EIGHT(4)=0:FOUR(4)=1:TWO(4)=1:ONE(4)=1
160 EIGHT(5)=1:FOUR(5)=0:TWO(5)=0:ONE(5)=1
170 EIGHT(6)=1:FOUR(6)=0:TWO(6)=0:ONE(6)=1
180 ' **** Draw Game Board ****
190 ' **** Draw Game Board ****
200 ' **** Draw Game Board ****
210 FOR X=1 TO 6
220 COLOR 0,1:LOCATE 4+2*X,20:PRINT X
230 COLOR 15,1
240 LOCATE 4+2*X,75
250 PRINT "(":PRINT USING "#";ROW(X));:PRINT ")"
260 COLOR 14,1
270 FOR MARKER=1 TO ROW(X)
280     LOCATE 4+2*X,22+3*MARKER
290     PRINT CHR$(219);
300 NEXT MARKER
310 NEXT X
320 ' **** Player Input ****
330 ' **** Player Input ****
340 ' **** Player Input ****
350 COLOR 15,1
360 LOCATE 22,1:PRINT "Standard (S), Random (R) or Custom (C) setup?";
370 LET START$=INKEY$
380 IF START$="S" OR START$="s" THEN 420
390 IF START$="R" OR START$="r" THEN 1640
400 IF START$="C" OR START$="c" THEN 1770
410 GOTO 370
420 LOCATE 22,1:PRINT SPACE$(80);
430 LOCATE 22,1:PRINT "Last marker wins (1) or loses (2)?"
440 LET WIN$=INKEY$
450 IF WIN$ <> "1" AND WIN$ <> "2" THEN 440
460 LOCATE 22,1:PRINT SPACE$(80);
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470 COLOR 0,1:LOCATE 3,20
480 IF WIN\$="1" THEN PRINT "TO WIN, TAKE LAST MARKER"
490 IF WIN\$="2" THEN PRINT "TO WIN, AVOID TAKING LAST MARKER"
500 COLOR 15,1
510 LOCATE 22,1:PRINT "Do you want to go first (1) or second (2)?";
520 LET FIRST\$=INKEY\$
530 IF FIRST\$ <> "1" AND FIRST\$ <> "2" THEN 520
540 IF FIRST\$="1" THEN PLAYER=1
550 IF FIRST\$="2" THEN PLAYER=2
560 COLOR 7,1:LOCATE 22,1:PRINT SPACE\$(80);
570 IF PLAYER=2 THEN 790
580 '*****
590 '***** Accept Human Move *****
600 '*****
610 PLAYER=1
620 LOCATE 22,1:PRINT SPACE\$(80);
630 LOCATE 22,1:COLOR 0,1:PRINT "YOUR TURN: ";
640 COLOR 7,1:PRINT "Enter ROW NUMBER (1-6): ";:LINE INPUT R\$
650 IF R\$="" THEN 2170
660 IF VAL(R\$)<1 OR VAL(R\$)>6 OR LEN(R\$)>1 THEN BEEP:GOTO 620
670 IF ROW(VAL(R\$))=0 THEN BEEP:GOTO 620
680 R = INT(VAL(R\$))
690 LOCATE 22,45:COLOR 7,1:PRINT "Remove HOW MANY? ";:LINE INPUT REMOVE\$
700 IF REMOVE\$="" THEN 2170
710 IF VAL(REMOVE\$)<1 OR VAL(REMOVE\$)>ROW(R) THEN BEEP: LOCATE 22,45:PRINT SPACE\$(25):GOTO 690
720 IF LEN(REMOVE\$)>2 THEN BEEP:LOCATE 22,45:PRINT SPACE\$(25):GOTO 690
730 IF ASC(RIGHT\$(REMOVE\$,1))>57 OR ASC(RIGHT\$(REMOVE\$,1))<48 THEN BEEP:LOCATE 2
2,45:PRINT SPACE\$(25):GOTO 690
740 REMOVE = INT(VAL(REMOVE\$))
750 COLOR 7,1:LOCATE 22,1
760 PRINT SPACE\$(80)
770 GOTO 1280
780 '*****
790 '***** Choose Computer Move *****
800 '*****
810 LOCATE 22,1:PRINT SPACE\$(80);
820 LOCATE 22,1:COLOR 0,1:PRINT "MY TURN: ";
830 COLOR 16,1:PRINT "Please Wait";
840 FOR W=1 TO 2500:NEXT W
850 PLAYER=2
860 EIGHT=EIGHT(1)+EIGHT(2)+EIGHT(3)+EIGHT(4)+EIGHT(5)+EIGHT(6)
870 FOUR=FOUR(1)+FOUR(2)+FOUR(3)+FOUR(4)+FOUR(5)+FOUR(6)
880 TWO=TWO(1)+TWO(2)+TWO(3)+TWO(4)+TWO(5)+TWO(6)
890 ONE=ONE(1)+ONE(2)+ONE(3)+ONE(4)+ONE(5)+ONE(6)
900 IF (EIGHT MOD 2) + (FOUR MOD 2) + (TWO MOD 2) + (ONE MOD 2) = 0 THEN 920
910 IF EIGHT + FOUR + TWO > 0 THEN 960 ←
920 LET R=INT(RND(1)*6)+1
930 IF ROW(R)=0 THEN 920
940 COLOR 7,1
950 REMOVE=1:GOTO 1280
960 '***** "Last Loses" strategy *****
970 IF WIN\$="1" THEN 1080
980 'Count Nonzero and Greater than 1 rows
990 NONZERO=0:MULTI=0
1000 FOR X=1 TO 6
1010 IF ROW(X) > 0 THEN NONZERO=NONZERO+1
1020 IF ROW(X) > 1 THEN MULTI=MULTI+1:R=X
1030 NEXT X
1040 IF MULTI > 1 THEN 1080
1050 IF MULTI=0 THEN 920
1060 IF NONZERO MOD 2 = 0 THEN REMOVE=ROW(R) ELSE REMOVE=ROW(R)-1
1070 GOTO 1280
1080 '***** Try all moves until one results in EIGHT, FOUR, TWO and ONE
1090 '***** all being divisible by 2
1100 LET R=0

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1110 LET R=R+1:IF ROW(R)=0 THEN 1110
1120 LET REMOVE=ROW(R)
1130 LET ROW(0)=ROW(R)-REMOVE
1140 EIGHT(0)=INT(ROW(0)/8)
1150 RMR = ROW(0) MOD 8
1160 IF (EIGHT - EIGHT(R) + EIGHT(0)) MOD 2 = 1 THEN 1250
1170 FOUR(0) = INT(RMR/4)
1180 RMR = RMR MOD 4
1190 IF (FOUR - FOUR(R) + FOUR(0)) MOD 2 = 1 THEN 1250
1200 TWO(0) = INT(RMR/2)
1210 IF (TWO - TWO(R) + TWO(0)) MOD 2 = 1 THEN 1250
1220 ONE(0) = RMR MOD 2
1230 IF (ONE - ONE(R) + ONE(0)) MOD 2 = 1 THEN 1250
1240 GOTO 1260
1250 IF REMOVE > 1 THEN REMOVE = REMOVE-1:GOTO 1130
1260 IF R < 6 THEN 1110 ELSE 920
1270 '***** Subtract Markers *****
1280 '**** Subtract Markers *****
1290 '**** Subtract Markers *****
1300 IF PLAYER =2 THEN FOR A=1 TO 1000:NEXT A
1310 COLOR 7,1:LOCATE 22,1:PRINT SPACE$(80);
1320 FOR GONE=0 TO REMOVE-1
1330 LOCATE 4+2*R,22+3*(ROW(R)-GONE)
1340 IF PLAYER = 1 THEN SOUND 1000, 2 ELSE SOUND 500, 2
1350 PRINT CHR$(32);
1360 FOR A=1 TO 500:NEXT A
1370 NEXT GONE
1380 LET ROW(R)=ROW(R)-REMOVE
1390 COLOR 15,1
1400 LOCATE 4+2*R, 76:PRINT USING "##";ROW(R)
1410 EIGHT(R)=INT(ROW(R)/8)
1420 RMR=ROW(R) MOD 8
1430 FOUR(R)=INT(RMR/4)
1440 RMR=RMR MOD 4
1450 TWO(R)=INT(RMR/2)
1460 ONE(R)=RMR MOD 2
1470 GOTO 1500
1480 IF PLAYER=1 GOTO 790 ELSE GOTO 590
1490 '***** Check for Win *****
1500 '**** Check for Win *****
1510 '**** Check for Win *****
1520 IF WIN$="2" THEN 1610
1530 IF ROW(1)+ROW(2)+ROW(3)+ROW(4)+ROW(5)+ROW(6) > 0 THEN 1480
1540 LOCATE 20,20
1550 IF PLAYER=1 THEN PRINT "YOU WIN! PLAY AGAIN? (Y/N)";
1560 IF PLAYER=2 THEN PRINT "I WIN! PLAY AGAIN? (Y/N)";
1570 LET AGAIN$=INKEY$
1580 IF AGAIN$="" THEN 1570
1590 IF AGAIN$="Y" OR AGAIN$="y" THEN CLS:GOTO 90
1600 IF AGAIN$="N" OR AGAIN$="n" THEN END ELSE GOTO 1570
1610 IF ROW(1)+ROW(2)+ROW(3)+ROW(4)+ROW(5)+ROW(6) <> 1 THEN 1480
1620 GOTO 1540
1630 '***** Random Setup *****
1640 '**** Random Setup *****
1650 '**** Random Setup *****
1660 FOR X=1 TO 6
1670 LET ROW(X) = INT(RND(1)*16)
1680 EIGHT(X) = INT(ROW(X)/8)
1690 RMR=ROW(X) MOD 8
1700 FOUR(X)=INT(RMR/4)
1710 RMR=RMR MOD 4
1720 TWO(X)=INT(RMR/2)
1730 ONE(X)=RMR MOD 2
1740 NEXT X
1750 CLS:GOTO 2020
1760 '***** Random Setup *****
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1770 '***** Custom Setup *****
1780 '*****
1790 FOR X=1 TO 6
1800 LOCATE 4+2*X,25
1810 PRINT SPACE$(30)
1820 LOCATE 4+2*X,25
1830 PRINT "HOW MANY IN ROW";X;"(0 - 15)"
1840 LINE INPUT Q$
1850 IF VAL(Q$)>15 OR VAL(Q$)<0 THEN BEEP:GOTO 1800
1860 IF VAL(Q$)=0 AND Q$<>"0" THEN BEEP:GOTO 1800
1870 LET ROW(X)=INT(VAL(Q$))
1880 FLAG=0
1890 FOR Y = 0 TO 15
1900 IF ROW(X) = Y THEN FLAG = 1
1910 NEXT Y
1920 IF FLAG = 0 THEN 1800
1930 EIGHT(X) = INT(ROW(X)/8)
1940 RMR = ROW(X) MOD 8
1950 FOUR(X) = INT(RMR/4)
1960 RMR = RMR MOD 4
1970 TWO(X) = INT(RMR/2)
1980 ONE(X) = RMR MOD 2
1990 NEXT X
2000 CLS
2010 '*****
2020 '***** Redraw Game Board *****
2030 '*****
2040 FOR X = 1 TO 6
2050 COLOR 0,1:LOCATE 4+2*X,20:PRINT X
2060 COLOR 15,1
2070 LOCATE 4+2*X,75
2080 PRINT "(";:PRINT USING "#";ROW(X);:PRINT ")"
2090 COLOR 14,1
2100 FOR MARKER=1 TO ROW(X)
2110 LOCATE 4+2*X,22+3*MARKER
2120 PRINT CHR$(219);
2130 NEXT MARKER
2140 NEXT X
2150 COLOR 15,1
2160 GOTO 420
2170 LOCATE 22,1:PRINT SPACE$(80)
2180 LOCATE 20,20:COLOR 7,1:PRINT "I ACCEPT YOUR RESIGNATION. PLAY AGAIN PRINT (Y/N)"::GOTO 1570
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