```
10 REM              SURVIVAL  (v2)
20 REM            By G. Camp, 1988
30 REM      Box 361, Lyndoch, S.A. 5351
40 REM
50 REM  Conway's game of life for two persons
60 REM
70 REM      (all REM's can be removed!)
80 REM
90 REM
100 GOSUB 1170:                 REM set all variables
& sound envelopes
110 GOSUB 1040:                 REM define characters
120 GOSUB 1920:                 REM poke machine code
and clear memory
130 GOSUB 1380:                 REM intro screen - got
o instructions if wanted
140 GOSUB 380:                  REM draw game screen
150 num=num1:GOSUB 570:         REM select square for
first 4 organisms
160 SOUND 129,150,150,15,0,1:SOUND 130,300,150,15,0,1:S
OUND 132,600,150,15,0,1
170 CALL &A000:                 REM calculate new boar
d and print it
180 p1=PEEK(&A10E):             REM get new player 1 s
core
190 p2=PEEK(&A10F):             REM get new player 2 s
core
200 gen=gen+1:GOSUB 320:        REM print generation a
nd scores
210 IF p1=0 OR p2=0 THEN 240:   REM test for end of ga
me
220 num=num2:GOSUB 570:         REM now get positions
for 2 new men
230 GOTO 160:                   REM do it all again an
d again and again!!
240 GOSUB 900:                  REM pronounce winner
250 GOSUB 1380:                 REM intro screen - aga
in
260 GOSUB 1320:                 REM reset game variabl
es
270 GOSUB 1940:                 REM clear memory block
280 GOTO 140:                   REM and play again
290 REM
300 REM print scores and generation
310 REM
320 PEN 1:LOCATE 34,14:PRINT USING"##";p1
330 PEN 2:LOCATE 34,18:PRINT USING"##";p2
340 PEN 3:LOCATE 32,10:PRINT USING"####";gen:RETURN
350 REM
360 REM draw screen
370 REM
380 MODE 1:INK 0,0:BORDER 0:INK 1,6:INK 2,11:INK 3,10:P
EN 3:PAPER 0:WINDOW 1,25,1,25
```

```
390 PRINT sc$(0);:FOR x=1 TO 7:PRINT sc$(1)sc$(1)sc$(2)
;:NEXT:PRINT sc$(1)sc$(1)sc$(3);:WINDOW 1,40,1,25
400 x=27:y=1:n=14:l=5:GOSUB 510
410 x=27:y=6:n=14:l=15:GOSUB 510
420 x=27:y=21:n=14:l=5:GOSUB 510:WINDOW #1,28,39,22,24:
PAPER #1,0
430 PEN 2:LOCATE 28,3:PRINT"-=";:PEN 1:PRINT"SURVIVAL";
:PEN 2:PRINT"=-"
440 PEN 3:LOCATE 29,8:PRINT"GENERATION"
450 PEN 1:LOCATE 28,12:PRINT men$(1):LOCATE 31,12:PRINT
 name$(1)"S";
460 PEN 2:LOCATE 28,16:PRINT men$(2):LOCATE 31,16:PRINT
 name$(2)"S";
470 GOSUB 320:RETURN
480 REM
490 REM draw boxes - x=xpos y=ypos n=width l=length
500 REM
510 LOCATE x,y::PRINT CHR$(150)STRING$(n-2,154)CHR$(156
);:FOR yy=y+1 TO y+l-2:LOCATE x,yy:PRINT CHR$(149);:LOC
ATE x+n-1,yy:PRINT CHR$(149);:NEXT
520 LOCATE x,yy:PRINT CHR$(147)STRING$(n-2,154)CHR$(153
);
530 RETURN
540 REM
550 REM choose positions on board - alternate players
560 REM
570 FOR i=1 TO num
580 GOSUB 680
590 turn=2+(turn=2)
600 GOSUB 680
610 turn=2+(turn=2)
620 NEXT
630 turn=2+(turn=2)
640 CLS #1:RETURN
650 REM
660 REM move cursor and select square
670 REM
680 CLS#1:PEN #1,3:IF comp=turn THEN 820
690 PRINT#1," Place your";:PRINT#1,men$(turn)" ";name
$(turn);
700 x=1:xx=1:yy=1:y=1:GOSUB 1500
710 IF INKEY(35)=0 THEN GOSUB 1540:GOSUB 380:CALL &A098
:GOTO 680
720 IF (INKEY(0)=0 OR INKEY(72)=0) AND y>1 THEN yy=y-1
730 IF (INKEY(2)=0 OR INKEY(73)=0) AND y<8 THEN yy=y+1
740 IF (INKEY(8)=0 OR INKEY(74)=0) AND x>1 THEN xx=x-1
750 IF (INKEY(1)=0 OR INKEY(75)=0) AND x<8 THEN xx=x+1
760 GOSUB 1500:x=xx:y=yy:GOSUB 1500
770 IF (INKEY(9)=0 OR INKEY(76)=0) AND PEEK(FNadr)=0 TH
EN POKE FNadr,turn:LOCATE x*3-1,y*3-1:PRINT men$(turn);
:SOUND 7,50*turn,-1,0,1,1:p1=p1-(turn=1):p2=p2-(turn=2)
:GOSUB 320:GOSUB 1500:FOR a=1 TO 500:NEXT:RETURN
780 FOR a=1 TO 200:NEXT:GOTO 710
790 REM
800 REM coaputer's turn
810 REM
820 PRINT#1,"   MY TURN":PRINT#1,men$(1);" ";name$(1);:
CALL &A110
830 IF PEEK(&A1DA)>0 THEN 850
840 x=INT(RND*8)+1:y=INT(RND*8)+1:IF PEEK(FNadr)>0 THEN
 840 ELSE 860
850 x=PEEK(&A1DA):y=PEEK(&A1DB)
860 POKE FNadr,1:p1=p1+1:GOSUB 320:FOR a=1 TO 4:LOCATE
x*3-1,y*3-1:PRINT men$(0);:FOR b=1 TO 300:NEXT:SOUND 7,
a*30,20,0,1,1:LOCATE x*3-1,y*3-1:PRINT men$(1);:FOR b=1
 TO 200:NEXT:NEXT:RETURN
870 REM
880 REM pronounce winner then wait for key or 60 odd se
conds
890 REM
900 SOUND 135,0,1,0:FOR x=30 TO 1 STEP -1
910 SOUND 1,x*40,20,0,1:SOUND 2,x*20,20,0,1:SOUND 4,x*3
0,20,0,1:PEN #1,3
920 IF p1=0 AND p2=0 THEN PRINT#1:PRINT#1," DRAWN GAME"
:GOTO 960
930 PRINT#1,"   SURVIVOR"
940 IF p1=0 THEN win=2 ELSE win=1
950 PRINT#1,men$(win);" ";name$(win)"S";
960 FOR y=1 TO 150:NEXT:CLS #1:FOR y=1 TO 150:NEXT:NEXT
970 PEN #1,2:PRINT#1,"Press a key  to replay":PEN #1,1:
PRINT#1,"-=SURVIVAL=-";
980 WHILE INKEY$<>"":WEND
990 a$="":x=0:WHILE x<13200 AND a$="":x=x+1:a$=INKEY$:W
END
1000 RETURN
1010 REM
1020 REM redefine characters
1030 REM
1040 IF PEEK(&A000)<>&DD THEN SYMBOL AFTER 240:MEMORY &
9FFF
1050 SYMBOL 241,24,100,4,35,85,84,14,63
1060 SYMBOL 242,112,136,128,220,163,32,114,124
1070 SYMBOL 243,114,245,185,131,176,143,96,31
1080 SYMBOL 244,78,175,157,193,13,241,6,248
1090 SYMBOL 245,3,28,126,198,214,76,125,121
1100 SYMBOL 246,192,56,126,99,107,51,190,158
1110 SYMBOL 247,115,35,41,46,23,18,9,6
1120 SYMBOL 248,206,196,148,116,232,72,144,96
1130 RETURN
1140 REM
1150 REM set variables
1160 REM
1170 MODE 1:INK 0,0:BORDER 0:INK 1,26:PEN 1:PAPER 0:LOC
ATE 22,25:PRINT"Please wait...."
1180 RANDOMIZE TIME:DEFINT a-z
1190 DIM men$(2),sc$(3),name$(2)
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```
1200 DEF FNadr=&A20B+(x-1)+10*(y-1)
1210 ENT -1,1,-2,3,1,4,5,1,-6,1:ENV 1,1,15,6,5,-1,3,5,-
1,5,5,-1,10
1220 s$=CHR$(154)+CHR$(154)+CHR$(158):sc$(0)=CHR$(150)+
s$+s$+s$+s$+s$+s$+s$+s$+CHR$(154)+CHR$(154)+CHR$(156)
1230 s$=CHR$(149)+"  ":sc$(1)=s$+s$+s$+s$+s$+s$+s$+s$+C
HR$(149)
1240 s$=CHR$(154)+CHR$(154)+CHR$(159):sc$(2)=CHR$(151)+
s$+s$+s$+s$+s$+s$+s$+s$+CHR$(154)+CHR$(154)+CHR$(157)
1250 s$=CHR$(154)+CHR$(154)+CHR$(155):sc$(3)=CHR$(147)+
s$+s$+s$+s$+s$+s$+s$+s$+CHR$(154)+CHR$(154)+CHR$(153)
1260 num1=4:num2=1:name$(1)="DEREDWUN":name$(2)="BLUDOO
DA"
1270 men$(2)=CHR$(15)+CHR$(2)+CHR$(241)+CHR$(242)+CHR$(
10)+CHR$(8)+CHR$(8)+CHR$(243)+CHR$(244)
1280 men$(1)=CHR$(15)+CHR$(1)+CHR$(245)+CHR$(246)+CHR$(
10)+CHR$(8)+CHR$(8)+CHR$(247)+CHR$(248)
1290 REM
1300 REM reset game variables
1310 REM
1320 turn=INT(RND*2)+1:REM select whose turn first
1330 gen=0:p1=0:p2=0
1340 RETURN
1350 REM
1360 REM intro screen
1370 REM
1380 MODE 1:INK 0,0:BORDER 0:INK 1,6:INK 2,11:INK 3,10:
PAPER 0:PRINT CHR$(23)CHR$(1);
1390 PEN 3:x=14:y=4:n=12:l=5:GOSUB 510:PAPER 0:PEN 1:LO
CATE 16,6:PRINT"SURVIVAL"
1400 LOCATE 8,5:PRINT men$(1):LOCATE 5,8:PRINT name$(1)
:LOCATE 30,5:PRINT men$(2):LOCATE 27,8:PRINT name$(2)
1410 PEN 1:x=10:y=13:n=19:l=5:GOSUB 510:PEN 2:LOCATE 12
,15:PRINT CHR$(164)" 6. Camp, 1988"
1420 x=5:y=21:n=28:l=5:GOSUB 510:PEN 3:LOCATE 6,22:PRIN
T"Press [I] for instructions":LOCATE 12,23:PRINT "[C] t
o play computer":LOCATE 12,24:PRINT"[T] for two players
"
1430 GOSUB 1820
1440 IF a$="I" THEN GOSUB 1540:GOTO 1380
1450 IF a$="C" THEN comp=1:RETURN
1460 IF a$="T" THEN comp=0:RETURN ELSE GOTO 1430
1470 REM
1480 REM draw box in screen grid box - x,y = grid pos
1490 REM
1500 MOVE 48*x-36,435-48*y:DRAWR 0,-38,turn:DRAWR 38,0:
DRAWR 0,38:DRAWR -38,0:RETURN
1510 REM
1520 REM instructions
1530 REM
1540 MODE 1:INK 0,13:BORDER 13:INK 1,26:INK 2,0:INK 3,4
:PEN 3:WINDOW #1,3,38,6,20:PEN #1,2:PAPER #1,0
1550 x=1:y=1:n=30:l=3:GOSUB 510
1560 x=1:y=4:l=19:n=40:GOSUB 510
1570 x=11:y=23:l=3:n=30:GOSUB 510
1580 PEN 1:LOCATE 2,2:PRINT"SURVIVAL - INSTRUCTIONS..
.":LOCATE 12,24:PRINT"Press any key to continue..."
1590 PRINT #1,"This game is based on Conway's game of l
ife.":PRINT#1
1600 PRINT#1,"In the original game counters, repre
senting organisms, were placed on a grid and then a set
 of rules was used to determine whether each organis
m survived to the next generation.":PRINT#1
1610 PRINT#1,"Each empty cell was also examined tosee i
f a new organism could be born in it for the next gener
ation.":GOSUB 1820:CLS #1
1620 PRINT#1,"The rules are:":PRINT#1:PRINT#1,"Deaths:"
1630 PRINT#1,"If an organism has one or no neigh
bors then it dies from isolation.":PRINT#1,"If
 an organism has four or more neighbors then it dies
 from overcrowding."
1640 PRINT#1:PRINT#1,"Survivals:":PRINT#1,"If an organi
sm has two or three neighbors then it survives to t
he next generation.":GOSUB 1820:CLS #1
1650 PRINT#1,"Births:":PRINT#1,"If an empty cell of the
 grid has exactly three neighbors then an organi
sm is born in it for the next generation."
1660 PRINT #1:PRINT#1,"SURVIVAL is Conway's game of lif
e for two players, or for one player against the com
puter."
1670 PRINT#1:PRINT#1,"Each person controls the destiny
 of a different organism, and the winneris the organism
 that survives to completely control the 8x8 playing
 grid."
1680 GOSUB 1820:CLS #1:PRINT#1,"The organisms playing t
o survive arethe "name$(1)"S and the "name$(2)"S.":PRIN
T#1:PRINT#1,"The computer always plays as the "name$(1)
"S."
1690 PRINT#1:PRINT#1,"Each player first places";num1;"o
rganisms";:PRINT#1,"on the grid, and then Conway's rule
dare applied to calculate the next generation."
1700 PRINT#1:PRINT#1,"When births are calculated the ne
w organism generated is determined by which organism h
as at least two neighbors to the empty grid cell.":
GOSUB 1820:CLS #1
1710 PRINT#1,"If one or both organisms die out then
 the game ends.":PRINT#1
1720 PRINT#1,"After each generation has been calcu
lated the players can add";num2;:PRINT#1,"more organism
s to the grid in any empty grid cell."
1730 PRINT#1:PRINT#1,"The process is then repeated unti
l awinner has been found.":PRINT#1:PRINT#1,"Control key
s:"
1740 PRINT#1,"  Joy stick or cursor keys to move.";:PR
INT#1,"  Fire button or copy key to select an empty
grid cell.":GOSUB 1820:CLS #1
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1750 PRINT#1,"Players take turns to set organisms onto
the grid, and the first turn isalternated between the p
layers.":PRINT#1:PRINT#1,"A message in the bottom right
 hand  of the screen indicates whose turn  it currently
 is."
1760 PRINT#1:PRINT#1,"Hint: Use your turn to add organi
smsthat will result in the birth of    more of your org
anisms or the death of your opponant's orgarisms.":PRIN
T#1
1770 PRINT#1,"Press [I] at any time during the    game
to reread these instructions."
1780 GOSUB 1820:RETURN
1790 REM
1800 REM empty keyboard buffer and get a key - with or
without sound
1810 REM
1820 SOUND 1,98,-1,0,1:SOUND 2,100,-1,0,1:SOUND 4,102,-
1,0,1
1830 WHILE INKEY$<>"":WEND
1840 a$="":WHILE a$="":a$=UPPER$(INKEY$):WEND
1850 RETURN
1860 REM
1870 REM poke m/c routine and clear memory block
1880 REM entries are: &A000 - calculate new screen and
print it.
1890 REM              &A098 - print screen
1900 REM              &A110 - computers turn
1910 REM
1920 RESTORE 1950:t!=0:FOR x=&A000 TO &A1DB:READ a$:a=V
AL("&"+a$):t!=t!+a
1930 POKE x,a:NEXT:READ check!:IF check!<>t! THEN MODE
1:PRINT"DATA ERROR":END
1940 FOR x=&A200 TO &A2FF:POKE x,0:NEXT:RETURN
1950 DATA DD,21,0B,A2,01,01,01,21,00,00,CD,3D,A0,7C,85,
FE,00,28,62,FE
1960 DATA 01,28,5E,FE,04,30,5A,FE,03,28,5A,DD,7E,00,DD,
77,6E,DD,23,04
1970 DATA 78,FE,09,C2,07,A0,06,01,0C,79,FE,09,28,57,DD,
23,DD,23,C3,07
1980 DATA A0,DD,7E,01,CD,6A,A0,DD,7E,FF,CD,6A,A0,DD,7E,
09,CD,6A,A0,DD
1990 DATA 7E,0A,CD,6A,A0,DD,7E,0B,CD,6A,A0,DD,7E,F7,CD,
6A,A0,DD,7E,F6
2000 DATA CD,6A,A0,DD,7E,F5,FE,01,28,05,FE,00,C8,2C,C9,
24,C9,3E,00,18
2010 DATA A9,DD,7E,00,FE,00,20,A2,7D,FE,02,38,04,3E,02,
18,99,3E,01,18
2020 DATA 95,11,00,A2,21,6E,A2,01,64,00,ED,B0,01,01,01,
DD,21,0E,A1,3E
2030 DATA 00,DD,77,00,DD,77,01,11,0B,A2,C5,E1,7C,64,B4,
3D,67,7D,85,85
2040 DATA 3D,6F,CD,75,BB,1A,FE,01,28,09,FE,02,28,0D,21,
F2,A0,18,0E,21
2050 DATA FA,A0,DD,34,00,18,06,21,04,A1,DD,34,01,7E,FE,
00,28,06,CD,5A
2060 DATA BB,23,18,F5,13,04,78,FE,09,20,C3,06,01,0C,79,
FE,09,C8,13,13
2070 DATA 18,B8,20,20,0A,08,08,20,20,00,0F,01,F5,F6,0A,
08,08,F7,F8,00
2080 DATA 0F,02,F1,F2,0A,08,08,F3,F4,00,08,07,DD,21,0B,
A2,01,01,01,21
2090 DATA 00,00,DD,7E,00,FE,00,20,48,CD,3D,A0,7C,85,FE,
04,30,3F,FE,00
2100 DATA 28,3B,FE,01,28,2A,FE,02,28,15,7C,FE,03,28,2E,
FE,02,28,2A,FE
2110 DATA 00,28,04,3E,04,18,24,3E,05,18,20,7C,FE,02,28,
08,FE,00,28,15
2120 DATA 3E,06,18,13,3E,01,18,0F,7C,FE,01,28,04,3E,02,
18,06,3E,04,18
2130 DATA 02,3E,00,DD,77,6E,DD,23,04,78,FE,09,20,A1,06,
01,DD,23,DD,23
2140 DATA 0C,79,FE,09,20,95,3E,00,32,D9,A1,32,DA,A1,32,
DB,A1,3E,06,F5
2150 DATA 32,D8,A1,CD,A6,A1,3A,D9,A1,FE,00,20,07,F1,3D,
FE,00,20,EC,C9
2160 DATA F1,C9,01,01,01,DD,21,79,A2,3A,D8,A1,DD,BE,00,
28,15,04,DD,23
2170 DATA 78,FE,09,20,F0,0C,DD,23,DD,23,06,01,79,FE,09,
C8,18,E3,3E,01
2180 DATA 32,D9,A1,78,32,DA,A1,79,32,DB,A1,C9,00,00,00,
00
2190 DATA 46787
```