

210
004630

Program Description I

Page 1 of 8

Program Title GAME OF LIFE (9X9)

Contributor's Name JOHN RAUSCH

Address 402 VIRGINIA AVE

City FRANKLIN

State OHIO

Zip Code 45005

Program Description, Equations, Variables THE GAME OF LIFE WAS ORIGINALLY DESCRIBED IN SCIENTIFIC AMERICAN, OCTOBER 1970, IN AN ARTICAL BY MARTIN GARDNER. THE GAME ITSELF WAS ORIGINATED BY JOHN CONWAY OF CONVILLE AND CAIUS COLLEGE, UNIVERSITY OF CAMBRIDGE, ENGLAND.

IN THE GAME, ORGANISMS EXIST IN THE FORM OF COUNTERS ON A LARGE CHECKERBOARD (9X9 IN THIS VERSION) AND DIE OR REPRODUCE ACCORDING TO SOME SIMPLE GENETIC RULES. CONWAY'S CRITERIA FOR CHOOSING HIS GENETIC LAWS WERE CAREFULLY DELINEATED AS FOLLOWS:

- 1) THERE SHOULD BE NO INITIAL PATTERN FOR WHICH THERE IS A SIMPLE PROOF THAT THE POPULATION CAN GROW WITHOUT LIMIT.
- 2) THERE SHOULD BE INITIAL PATTERNS THAT APPARENTLY DO GROW WITHOUT LIMIT.
- 3) THERE SHOULD BE SIMPLE INITIAL PATTERNS THAT GROW AND CHANGE FOR A CONSIDERABLE PERIOD OF TIME BEFORE COMING TO AN END. IN THREE POSSIBLE WAYS: FADING AWAY COMPLETELY (FROM OVERCROWDING OR ISOLATION), SETTLING INTO A STABLE CONFIGURATION THAT REMAINS UNCHANGED THEREAFTER, OR ENTERING INTO AN OSCILLATING PHASE IN WHICH THEY REPEAT AN ENDLESS CYCLE OF TWO OR MORE PERIODS.

(CONTINUED)

Operating Limits and Warnings

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

210
004630

Program Description I

Program Title _____

Contributor's Name _____

Address _____

City _____

State _____

Zip Code _____

Program Description, Equations, Variables IN BRIEF, THE RULES SHOULD BE SUCH AS TO MAKE THE BEHAVIOR OF THE POPULATION UNPREDICTABLE. CONWAY'S GENETIC LAWS ARE DELIGHTFULLY SIMPLE. FIRST NOTE THAT EACH CELL OF THE CHECKERBOARD (ASSUMED TO BE AN INFINITE PLANE OF WHICH YOU ARE VIEWING ONLY A SMALL SECTION) HAS EIGHT NEIGHBORING CELLS, FOUR ADJACENT ORTHOGONALLY, AND FOUR ADJACENT DIAGONALLY. THE RULES ARE:

- 1) SURVIVALS. EVERY COUNTER (ORGANISM) WITH TWO OR THREE NEIGHBORING COUNTERS SURVIVES THROUGH THE NEXT GENERATION.
- 2) DEATHS. EVERY COUNTER WITH MORE THAN THREE NEIGHBORING COUNTERS DIES FROM OVERCROWDING. EVERY COUNTER WITH LESS THAN TWO NEIGHBORING COUNTERS DIES FROM ISOLATION.
- 3) BIRTHS. EVERY EMPTY CELL WITH EXACTLY THREE NEIGHBORING COUNTERS GIVES BIRTH.

IT IS IMPORTANT TO REMEMBER THAT ALL BIRTHS AND DEATHS OCCUR SIMULTANEOUSLY. TOGETHER THEY CONSTITUTE A SINGLE GENERATION IN THE LIFE HISTORY OF THE INITIAL CONFIGURATION.

YOU WILL FIND THE POPULATION CONSTANTLY UNDERGOING UNUSUAL, SOMETIMES BEAUTIFUL, AND ALWAYS UNEXPECTED CHANGE. IN A FEW

(CONTINUED)

Operating Limits and Warnings _____

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

210
004630

Program Description I

Page 3 of 8

Program Title

Contributor's Name

Address

City

State

Zip Code

Program Description, Equations, Variables CASES THE POPULATION EVENTUALLY DIES OUT, ALTHOUGH THIS MAY NOT HAPPEN UNTIL AFTER A GREAT MANY GENERATIONS. MOST STARTING PATTERNS EITHER REACH STABLE CONFIGURATIONS (CONWAY CALLS THEM "STILL LIVES") THAT CANNOT CHANGE OR CONFIGURATIONS THAT OSCILLATE FOREVER. CONFIGURATIONS WITH NO INITIAL SYMMETRY TEND TO BECOME SYMMETRICAL. ONCE THIS HAPPENS THE SYMMETRY CANNOT BE LOST, ALTHOUGH IT MAY INCREASE IN RICHNESS.

THIS PROGRAM RUNS BEST ON AN HP-97 SINCE IT CAN RUN IN A CONTINUOUS MODE PRINTING EACH GENERATION IN AN ESPECIALLY NICE FORM. HOWEVER, SATISFACTORY RESULTS CAN BE OBTAINED ON AN HP-67. THE CONFIGURATIONS ARE EASILY COPIED ONTO GRIDDED PAPER. IT TAKES LESS THAN THREE MINUTES TO RUN A GENERATION. THIS SEEMS FAST WHEN COMPARED TO THE FIFTY MINUTES REQUIRED BY A 10X10 LIFE GAME ALSO IN THE LIBRARY. THE DIFFERENCE IS NOT SIZE. THE 9X9 WAS CHOSEN FOR NEAT PRINT OUT APPEARANCE, NOT SPEED. IN ADDITION, THIS PROGRAM CAN OPTIONALLY CHECK FOR "STILL LIVES" AND TERMINATE WHEN TWO CONSECUTIVE GENERATIONS ARE IDENTICAL. OSCILLATIONS CANNOT BE CHECKED WITH A COMPUTER OF ANY SIZE EASILY! EVEN WHEN RUNNING IN THE CONTINUOUS MODE.

(CONTINUED)

Operating Limits and Warnings

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

210
00463D

Program Description I

Page 4 of 8

Program Title

Contributor's Name

Address

City

State

Zip Code

Program Description, Equations, Variables EXECUTION CAN BE INTERRUPTED AFTER EACH GENERATION. IMMEDIATELY AFTER THE GENERATION IS PRINTED, A ONE SECOND PAUSE WINDOW (DISPLAY WILL BE 0:0000000000) WILL APPEAR. YOU CAN CAUSE THE PROGRAM TO STOP BY PRESSING ANY DIGIT KEY (OR R/S OF COURSE). TO RESUME EXECUTION OF THE NEXT GENERATION, JUST PRESS R/S. YOU CAN ALSO CAUSE THE CURRENT GENERATION TO BE REPRINTED BY PRESSING C (TAKE NOTE HP-67 USERS). IN AN EMERGENCY, YOU CAN STOP THE PROGRAM EVEN AFTER IT HAS STARTED EXECUTION (BUT NOT AFTER IT STARTS PRINTING THE NEXT GENERATION) AND REPRINT THE CURRENT GENERATION BY PRESSING C. THE ONLY THING THAT WILL HAVE CHANGED IS THE GENERATION NUMBER STORED IN REGISTER E, SO YOU MAY WANT TO SUBTRACT ONE FROM IT BEFORE PRESSING C.

MANY THANKS TO MORDECAI SCHWARTZ WHOSE IOXIO GAME OF LIFE POINTED OUT THE FEASIBILITY OF PROGRAMMING THIS VERY UNUSUAL AND WELL KNOWN (AMONG RECREATIONAL MATH FANS) GAME ON THE HP-67 AND HP-97.

ANYONE THAT CAN PROVIDE A SIGNIFICANT IMPROVEMENT TO THE EXECUTION TIME IS URGED TO CONTACT ME DIRECTLY.

Operating Limits and Warnings NO EDIT IS MADE ON THE INITIAL GRID COORDINATES TO BE SURE THEY ARE IN THE RANGE OF 1 TO 9. NO ATTEMPT WILL BE MADE TO DESCRIBE (OR EVEN FIGURE OUT) WHAT MIGHT HAPPEN IF ILLEGAL ENTRIES ARE MADE.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

Sketch(es)

```
      X   X
    X X X X X
      X           X
      X   X   X   X
      X           X
      X X X X X
```

Sample Problem(s) THE CONFIGURATION SHOWN IN THE
ABOVE SKETCH IS INPUT AND THE FIRST SIX GENERA-
TIONS (INCLUDING ZERO) ARE INCLUDED.

035A
2.4 0355
2.6 0358
3.3 0362
3.4 0362
3.5 035E
3.6 0355
3.7 0362
4.2 0362
4.8 0352
5.2 033E
5.4 0382
5.6 0382
5.8 0382
6.2 0362
6.8 0362
7.3 0322
7.4 0322
7.5 0322
7.6 0322
7.7 0322
035C

Solution(s)

0.	1.	2.	3.	4.	5.	6.
0.123456789	0.123456789	0.123456789	0.123456789	0.123456789	0.123456789	0.123456789
1.000000000	1.000000000	1.000000000	1.000000000	1.000000000	1.001000100	1.001000100
2.000101000	2.001101100	2.001101100	2.001101100	2.011101110	2.010101010	2.010000010
3.001111100	3.001101100	3.010101010	3.110101011	3.010101010	3.010000010	3.000000000
4.010000010	4.010200010	4.110000011	4.000000000	4.001101100	4.000101000	4.001000100
5.010101010	5.110000011	5.111000111	5.000111000	5.000101000	5.000101000	5.000101000
6.010000010	6.010000010	6.110111011	6.100111001	6.001000100	6.001101100	6.001000100
7.001111100	7.001111100	7.001000100	7.001010100	7.001000100	7.001010100	7.001000100
8.000000000	8.000111000	8.001000100	8.000101000	8.000111000	8.000111000	8.000000000
9.000000000	9.000000000	9.000010000	9.000000000	9.000000000	9.000010000	9.000111000

Reference(s) SCIENTIFIC AMERICAN, OCT 1970, NOV 1970, JAN 1971, FEB 1971, AND APR 1971. MATHEMATICAL GAMES FEATURE. INTERESTED READERS ARE URGED TO OBTAIN COPIES OF THESE ARTICLES. THE GAME OF LIFE RESULTED IN MORE RESPONSE TO MARTIN GARDNER THAN ANY OTHER TOPIC COVERED IN HIS MONTHLY FEATURE.

1

GAME OF LIFE (9x9)

CLEAR
INIT CELL
NEXT GENR
CON?
S/L CHK?

2

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	LOAD SIDE 1 AND SIDE 2.			
2	CLEAR. (DOES NOT AFFECT EXECUTION MODES)		A	C.
3	SELECT CONTINUOUS (1) OR STOP (0) MODE OF EXECUTION. DEFAULTS TO 1.		D	ALTERNATELY 0 & 1
4	SELECT "STILL LIFE" CHECK. ON (1), OFF (0) WHEN ON, REQUIRES A LITTLE MORE RUN TIME PER GENERATION. DEFAULTS TO 0.		E	ALTERNATELY 1 & 0
5	SPECIFY INITIAL CELL CONFIGURATION. INDICATE THE ROW (1-9) AND COLUMN (1-9) OF THE CELL THAT IS TO CONTAIN LIFE IN GENERATION 0. REPEAT AS REQUIRED.	ROW, COL	B	0.
6	NEXT GENERATION. GENERATION 0 IS PRINTED BEFORE ACTUAL GENERATION IS COMPUTED. AFTER THE PRINTING OF A GENERATION IS COMPLETED, THE FOLLOWING WILL OCCUR: A) IF STOP MODE WAS SELECTED, CALCULATOR WILL STOP. THIS IS YOUR FIRST CHANCE TO CORRECT AN INITIAL CONFIGURATION. PRESS R/S TO CONTINUE OR GO TO STEP 3 TO ADD ANY CELLS YOU FORGOT. IF YOU PUT ANY IN THE WRONG PLACE YOU WILL HAVE TO START OVER AT STEP 2. YOU CAN ALSO PRESS C TO REPRINT THE INITIAL CONFIGURATION. B) YOU WILL SEE A ONE SECOND PAUSE WINDOW (EVEN IN CONTINUOUS MODE) WHERE YOU CAN STOP EXECUTION BY PRESSING ANY DIGIT KEY OR R/S. YOUR OPTIONS ARE THE SAME AS IN A ABOVE. C) NEXT GENERATION WILL BE COMPUTED AND PRINTED. A ZERO IS PRINTED IF A "STILL LIFE" IS DETECTED AND CHECK IS ON.		C	SEE TEXT

00463 D

12-19-76

12-19-76

STEP	KEY ENTRY	KEY CODE
001	*LBLE	21 11
002	DSPB	-63 00
003	CLRG	16-53
004	P+S	16-51
005	CLRG	16-53
006	CLX	-51
007	RTN	24
008	*LBLE	21 12
009	STOI	35 46
010	INT	16 34
011	X+I	16-41
012	FRC	16 44
013	1	01
014	0	00
015	X	-35
016	10X	16 33
017	1/X	52
018	ST+I	35-55 45
019	CLX	-51
020	RTN	24
021	*LBLE	21 13
022	RCLC	36 15
023	DSPB	-63 00
024	PRTX	-14
025	.	-62
026	1	01
027	2	02
028	3	03
029	4	04
030	5	05
031	6	06
032	7	07
033	8	08
034	9	09
035	DSPB	-63 09
036	PRTX	-14
037	CLX	-51
038	STOI	35 46
039	*LBLE	21 00
040	ISZI	16 26 46
041	RCL1	36 45
042	RCL1	36 46
043	+	-55
044	PRTX	-14
045	RCL1	36 46
046	9	09
047	X*Y	16-32
048	GT00	22 00
049	CLX	-51
050	SFC	16-11
051	F07	16 23 00
052	R/S	51
053	CF3	16 23 03
054	PSE	16 51
055	F37	16 23 03
056	R/S	51

COMMENTS
CLEAR.
INITIALIZE CELL.
COORDINATE IS CON- VERTED TO A FRACTIONAL VALUE WITH A 1 IN PROPER POSITION AND ADDED TO ROW.
NEXT GENERATION. CURRENT GENERATION IS PRINTED BEFORE COMPUTATION OF NEXT GENERATION IS STARTED.
LOOP TO PRINT OUT ALL NINE ROWS.
STOP IF NOT IN CON- TINUOUS MODE. PAUSE TO PERMIT INTERRUPTION BY R/S OR DIGIT ENTRY.

STEP	KEY ENTRY	KEY CODE
057	RCLC	36 15
058	1	01
059	+	-55
060	STOE	35 15
061	1	01
062	STOI	35 46
063	0	00
064	RCL2	36 02
065	RCL1	36 01
066	GSB1	23 01
067	RCL1	36 01
068	RCL3	36 03
069	RCL2	36 02
070	GSB1	23 01
071	RCL2	36 02
072	RCL4	36 04
073	RCL3	36 03
074	GSB1	23 01
075	RCL3	36 03
076	RCL5	36 05
077	RCL4	36 04
078	GSB1	23 01
079	RCL4	36 04
080	RCL6	36 06
081	RCL5	36 05
082	GSB1	23 01
083	RCL5	36 05
084	RCL7	36 07
085	RCL6	36 06
086	GSB1	23 01
087	RCL6	36 06
088	RCL8	36 08
089	RCL7	36 07
090	GSB1	23 01
091	RCL7	36 07
092	RCL9	36 09
093	RCL8	36 08
094	GSB1	23 01
095	RCL8	36 08
096	0	00
097	RCL9	36 09
098	GSB1	23 01
099	F17	16 23 01
100	GSB4	23 04
101	RCLC	36 15
102	CLRG	16-53
103	P+S	16-51
104	STOE	35 15
105	GT00	22 13
106	*LBLE	21 01
107	STOA	35 11
108	R4	-31
109	+	-55
110	ENT1	-21
111	R1	16-31
112	+	-55

COMMENTS
ADD 1 TO GENERATION NUMBER.
COMPUTE NEXT GEN- ERATION. SUBROO- TINE AT LABEL 1 IS CALLED FOR ALL NINE ROWS AFTER PUTTING THE ROWS BEFORE AND AFTER IN Z AND Y AND PUTTING THE ROW TO BE COMPUTED IN X.
CHECK FOR STILL LIFE IF SELECTED. PUT NEXT GENERATION IN P REGISTERS AFTER CLEARING THEM EXCEPT FOR E. THEN GO TO PRINT GENERATION. COMPUTE NEXT GEN- ERATION FOR ONE ROW. ROW BEING WORKED ON IS STORED IN A. THEN ROWS BEFORE AND AFTER ARE ADD- ED AS START FOR

REGISTERS

1	2	3	4	5	6	7	8	9
ED			CURRENT					
			GENERATION					
ZERO	S1	S2	S3	S4	S5	S6	S7	S8
			NEXT					
			GENERATION					
A USED	B USED	C	D	E GENERATION NUMBER	I USED			

STEP • KEY ENTRY KEY CODE

COMMENTS

STEP

KEY ENTRY

KEY CODE

COMMENTS

113 1 01
 114 0 00
 115 X -35
 116 1 01
 117 X 55
 118 + 55
 119 + 55
 120 FRC 16 44
 121 STOB 35 12
 122 CLX -51
 123 STOB 35 00
 124 GSB2 23 02
 125 GSB2 23 02
 126 GSB2 23 02
 127 GSB2 23 02
 128 GSB2 23 02
 129 GSB2 23 02
 130 GSB2 23 02
 131 GSB2 23 02
 132 GSB2 23 02
 133 RCLB 36 00
 134 EEX -23
 135 9 05
 136 = -24
 137 P+S 16-51
 138 STOI 35 45
 139 P+S 16-51
 140 ISZI 16 26 46
 141 RTN 24
 142 *LBL2 21 02
 143 1 01
 144 0 00
 145 STX0 35-35 00
 146 RCLA 36 11
 147 X -35
 148 FRC 16 44
 149 STOR 35 11
 150 LSTX 16-63
 151 INT 16 34
 152 RCLB 36 12
 153 1 01
 154 0 00
 155 X -35
 156 FRC 16 44
 157 STOB 35 12
 158 CLX -51
 159 LSTX 16-63
 160 INT 16 34
 161 3 03
 162 - -45
 163 X=0? 16-43
 164 GT03 22 03
 165 CHS -22
 166 X#Y? 16-32
 167 RTN 24
 168 *LBL3 21 03

NEIGHBOR COUNT. ROW
 BEING WORKED ON IS
 THEN ADDED AND SHIF-
 TED LEFT AND RIGHT
 AND ADDED TO START-
 ING POINT TO OBTAIN
 TOTAL NEIGHBOR COUNT.
 NEXT ROW IS STARTED
 AT ZERO IN REGO.
 SUBROUTINE AT LABEL
 2 IS CALLED NINE TIM-
 ES FOR EACH DIGIT
 (COLUMN) IN ROW.

NEW ROW IS CHANGED
 TO A FRACTION. P AND
 S REGISTERS ARE SW-
 ITCHED AND NEW ROW
 IS STORED. THEN P
 AND S ARE SWITCHED
 BACK AND I IS
 INCREMENTED
 EACH DIGIT IN ROW IS
 CHECKED AGAINST ITS
 CORRESPONDING NEI-
 GHBOR COUNT IN REG
 B. EACH TIME CALLED,
 DIGIT AND COUNT IS
 EXTRACTED AND
 REMAINING PART IS
 PUT BACK IN REG.

AT STEP 160, X
 CONTAINS NEIGHBOR
 COUNT AND Y CONTAIN-
 S CURRENT CELL
 VALUE (0 OR 1). THREE
 IS SUBTRACTED FROM
 COUNT. IF RESULT IS
 ZERO, NEW CELL WILL
 BE LIVE REGARDLESS
 OF Y. IF X IS EQUAL

169 1 01
 170 170 ST+0 35-55 00
 171 RTN 24
 172 *LBLD 21 14
 173 CLX -51
 174 F0? 16 23 00
 175 1 01
 176 SF0 16 21 00
 177 X#0? 16-42
 178 CF0 16 22 00
 179 PRTX -14
 180 RTN 24
 181 *LBL2 21 15
 182 1 01
 183 F1? 16 23 01
 184 CLX -51
 185 SFI 16 21 01
 186 X=0? 16-43
 187 CF1 16 22 01
 188 PRTX -14
 189 RTN 24
 190 190 *LBL4 21 04
 191 CLX -51
 192 STOI 35 46
 193 *LBL5 21 05
 194 ISZI 16 26 46
 195 RCLT 36 45
 196 P+S 16-51
 197 RCLT 36 45
 198 P+S 16-51
 199 X#Y? 16-32
 200 200 RTN 24
 201 RCLT 36 46
 202 9 05
 203 X#Y? 16-32
 204 GT05 22 05
 205 RCLT 36 15
 206 DSP0 -63 00
 207 PRTX -14
 208 CLX -51
 209 PRTX -14
 210 R/S 51

TO Y AFTER CHS, NEW
 CELL IS LIVE.

ALTERNATELY TURN
 CONTINUOUS MODE
 OFF AND ON.

ALTERNATELY TURN
 STILL LIFE CHECK
 ON AND OFF.

CHECK FOR STILL
 LIFE. EACH ROW OF
 CURRENT GENERAT-
 ION IS COMPARED
 TO CORRESPONDING
 ROW OF NEW GENER-
 ATION. IF ANY ARE
 NOT EQUAL THE GEN-
 ERATION WILL CONT-
 INUE. IF ALL ARE
 EQUAL THE GENER-
 ATION NUMBER IS
 PRINTED FOLLOWED
 BY A ZERO AND THE
 PROGRAM STOPS.

LABELS

FLAGS

SET STATUS

INITIALIZE CELL	C NEXT GENERATION	D CONTINUOUS MODE ?	E STILL LIFE CHECK ?	F CONTINUOUS IF OFF	ON OFF	TRIG	DISP
0	C	D	E	1 STILL LIFE CHECK IF ON	0 ☐ ☒	DEG ☒	FIX ☒
1 COMPUTE NEI GHBOR COUNT	2 GENERATE CELL CHECK	3 CREATE LIFE	4 STILL LIFE CHECK	2	1 ☐ ☒	GRAD ☐	SCI ☐
STILL LIFE CHECK LOOP	7	8	9	3	2 ☐ ☒	RAD ☐	ENG ☐
					3 ☐ ☒		n 0