

Name \_\_\_\_\_

2. This is the GAME OF LIFE simulation model. The shaded cells are ALIVE. The empty cells contain no life.

- Show what the GRID will look like after clicking the GO-ONCE button.
- If a cell died that was alive, put an **E** through it. The **E** means the cell died and is not Empty.
- If a cell was empty and became alive, then **SHADE IT IN** with your pen or pencil.

setup-blank

setup-random

initial density 35.0 %

draw-cells

When this button is down, you can add or remove cells by holding down the mouse button and "drawing".

go-once

go-forever

current density 0.1

recolor

recolor 27 (orange + 2)

Record Alive

89.9 (cyan + 4.9)

showPreviouslyAlive

ticks: 27

3D

### LIFE GAME/MODEL RULES:

For a space that is 'populated':

- Each cell with one or no neighbors dies, as if by loneliness.
- Each cell with four or more neighbors dies, as if by overpopulation.
- Each cell with two or three neighbors survives.

For a space that is 'empty' or 'unpopulated'

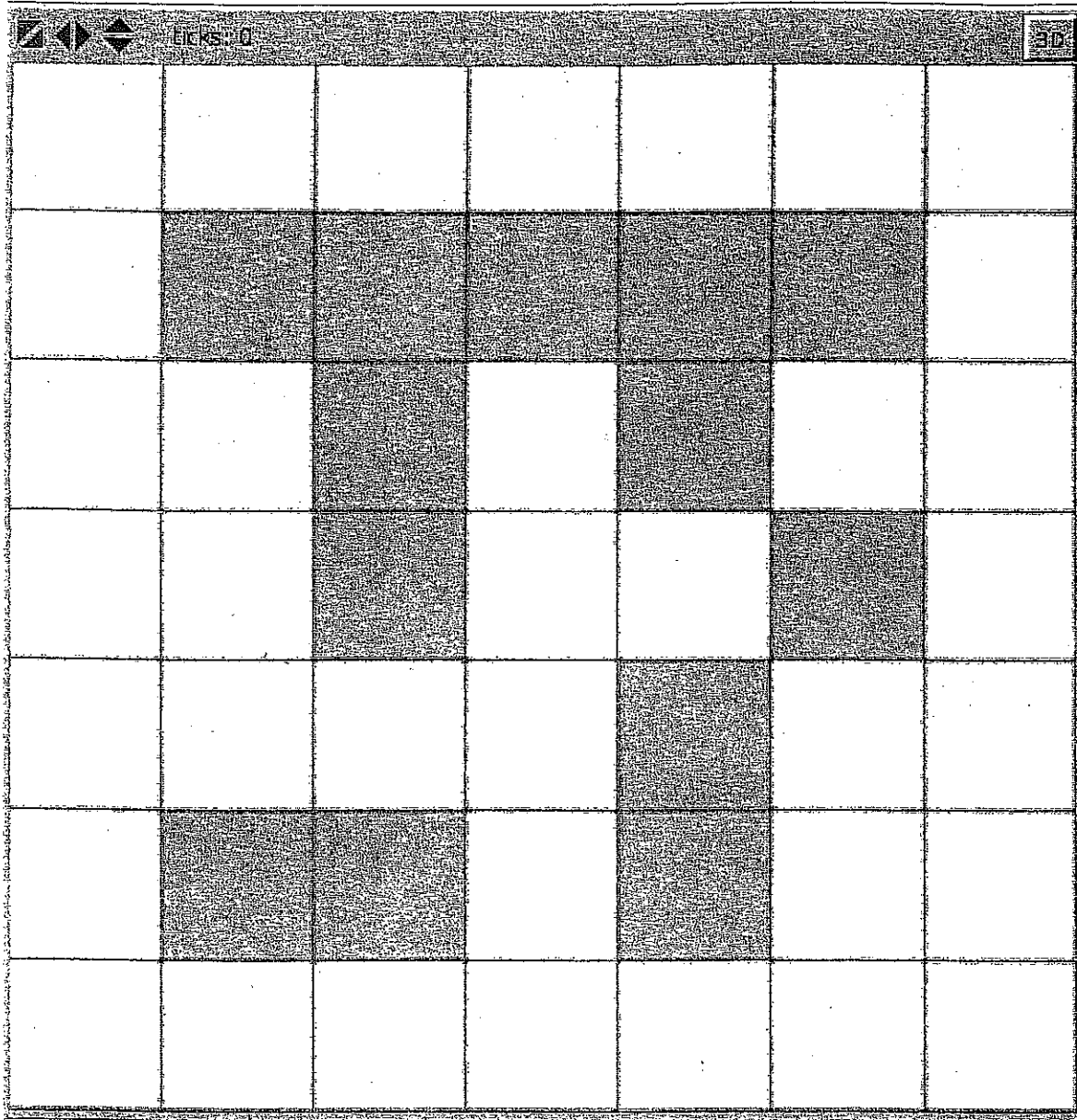
- Each cell with three neighbors becomes populated.

Models Library

- Sample Models
- Art
- Biology
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- Cellular Automata
- Life
  - Brians Brain
  - CA 1D Elementary
  - CA 1D Simple Examples
  - CA 1D Totalistic
  - CA Continuous
  - CA Stochastic
  - Life Turtle-Based

Name \_\_\_\_\_

Row \_\_\_\_\_ Seat \_\_\_\_\_



This particular cellular automaton is called The Game of Life.  
Each cell checks the state of itself and its eight surrounding neighbors and then sets itself to either alive or dead.  
If there are less than two alive neighbors, then the cell dies.  
If there are more than three alive neighbors, the cell dies.  
If there are 2 alive neighbors, the cell remains in the state it is in.  
If there are exactly three alive neighbors, the cell becomes alive.  
This is done in parallel and continues forever.  
HERE IS ANOTHER EXPLANATION OF THE SAME RULES:

The cells with LIFE are darker and filled in. You are to show what the GRID would be like in the next generation, i.e. after one single generation change. You will leave cells unchanged or mark them with E or mark them with A.

1. Mark E if a currently ALIVE cell DIES, to indicate it is EMPTY and has NO LIFE now. E for Empty. E
2. Mark A on any cell that was empty and was not alive that is ALIVE the next generation, i.e. that would be shaded in on the next generation. A for ALIVE. A
3. Leave all other cells the way they are if they do not change in the next generation. In other words, cells that were alive and are still alive do not need to be indicated or marked. Cells that were empty and are still empty do not need to be marked. Unchanged, no mark or letter needed.

For a space that is 'populated':  
Each cell with one or no neighbors dies, as if by loneliness.  
Each cell with four or more neighbors dies, as if by overpopulation.  
Each cell with two or three neighbors survives.

For a space that is 'empty' or 'unpopulated':  
Each cell with three neighbors becomes populated.

```
TO QuestionOne
```

```
ca
```

```
cro 8
```

```
ask turtles
```

```
[
```

```
  fd 2
```

```
  pd
```

```
  fd 2
```

```
  pu
```

```
  fd 1
```

```
  pd
```

```
  ifelse (remainder who 2 = 0)
```

```
    [ set shape "airplane" squareType1 ]
```

```
    [ squareType2 ]
```

```
]
```

```
END
```

```
TO squareType1
```

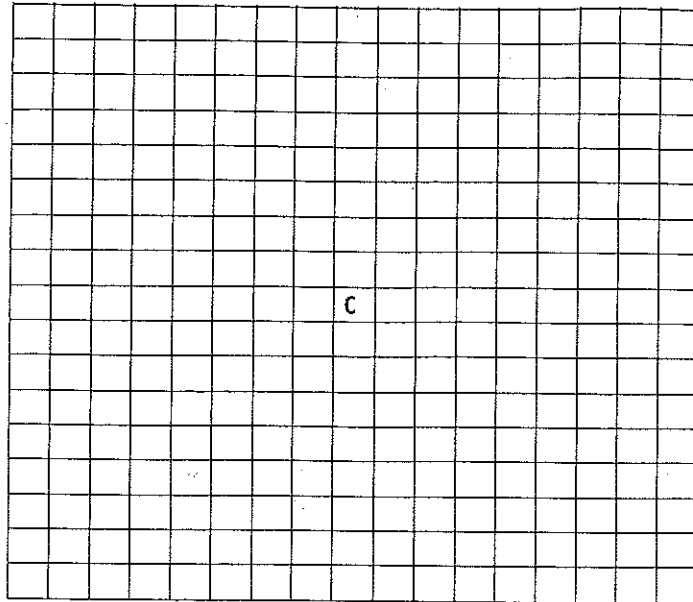
```
  repeat 4 [ fd 2 rt 90 ]
```

```
END
```

```
TO squareType2
```

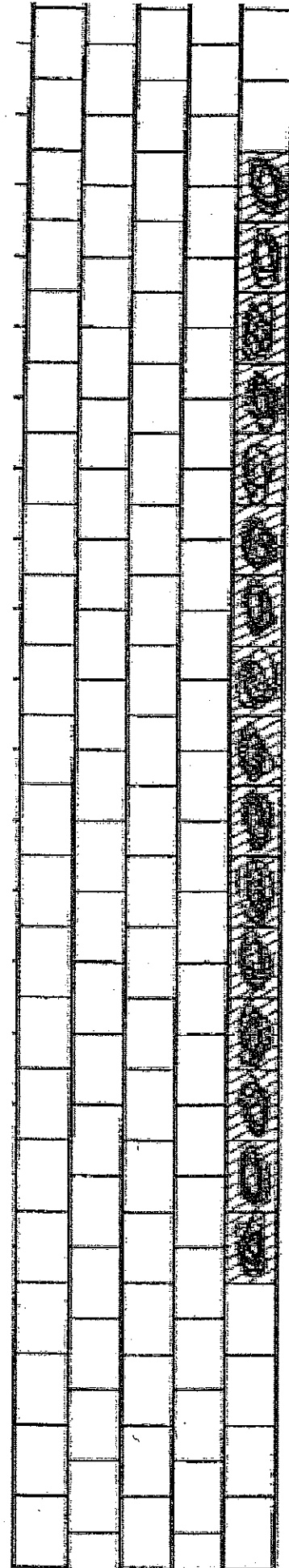
```
  repeat 4 [ fd 2 lt 90 ]
```

```
END
```



The GRID here is for your scratch paper and initial drawing. It will NOT be graded. Your answer goes on question (1.) page for graded "Show the output of"

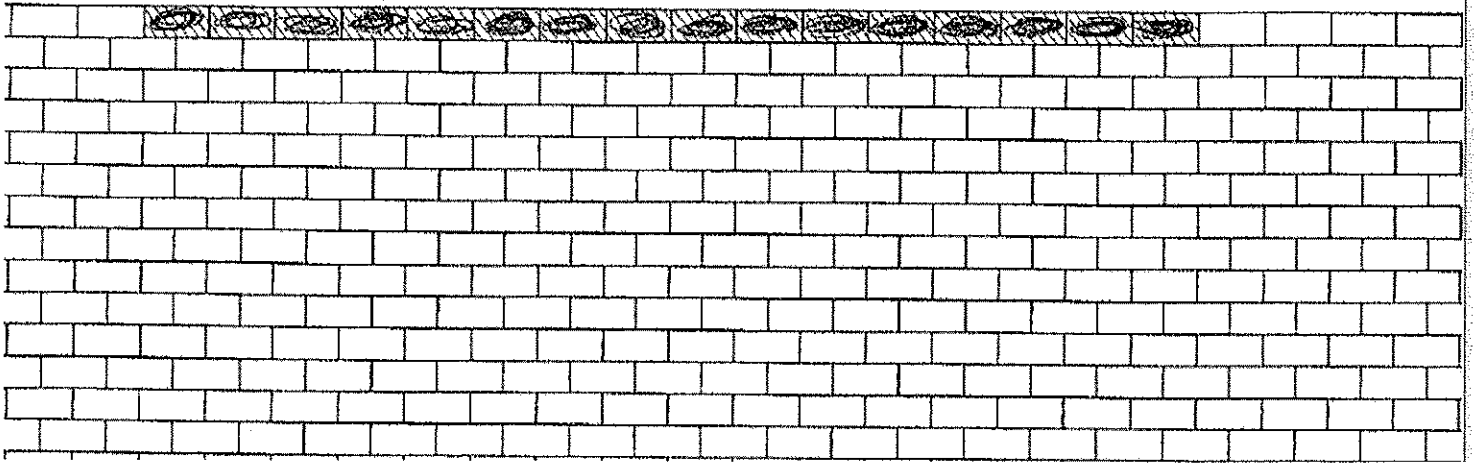
	A	B	C	E
1	Random Two Digit Number from 00 to 99		TEN more numbers to use up. Proceed LEFT to RIGHT!	
2	19		<u>47</u>	
3	79		<u>36</u>	
4	60		<u>52</u>	
5	69		<u>78</u>	
6	45		<u>14</u>	
7	76		<u>65</u>	
8	13		<u>11</u>	
9	24		<u>43</u>	
10	14		<u>47</u>	
11	28		<u>62</u>	
12	28			
13	28	<i>Rows TWO and BEYOND OIL</i>		
14	59	<i>As needed, until all ten</i>		
15	99	<i>#'s are used up.</i>		
16	16			
17	10			
18	<u>SIXTEEN for ROW ONE</u>			
19				



*oil spill percolation model*

Name \_\_\_\_\_

# oil spill percolation model



Carefully SHADE in the GRID. The assigned PROBABILITY will be **0.44** or a **44%** chance of the oil spreading to either neighbor below it. *Analogy: 44% free throw shooter.*

A variation of CAs involves adding a little chaos to the process, by having the rule work only with a certain probability. For this model of an oil spill—as seen from the side, looking through the earth—the cells look more like bricks. Each cell in a row has two neighbors in the row below it, one to the left and one to the right. A shaded cell represents oil having spread, or percolated, past a soil particle; the particles themselves are the intersections of a cell and its neighbor below. The rule for this model is this: If a cell is shaded, a certain probability exists that it will shade each of its neighbors. Any cell could therefore have two chances of being shaded. If the cell gets shaded by its left neighbor above, no need exists to test the right one.

You can fill in your answers on the next sheet. It is easier to work with and only has FOUR empty rows. Proceed using the RANDOM NUMBERS as you read a book. Go from TOP to BOTTOM down the page, and from left to right for each row of CELLS.

Note: Read the above directions for the CA (Cellular Automata) model carefully again, if you need to. Take NOTES on the rules, if you are uncertain and need to.