EE 205
Programming Assignment 1
Team: RTS

Team Members

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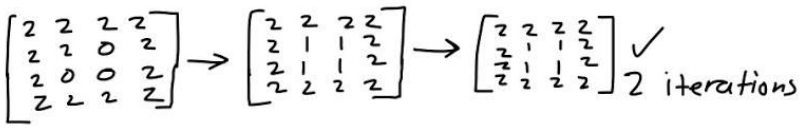
Task 1:

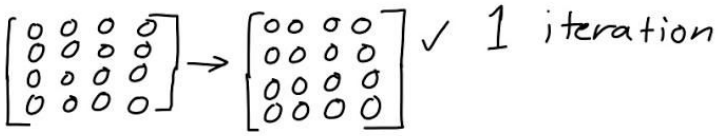
Solve problem 16 from Programming Problems Section 3.3 in the textbook.
Ask the user how many squares, i.e. what grid dimensions they want. Use try-catch to catch any “wrong” answers, such as size is 0. The smallest size possible is 4x4. It must be a square.
The edge squares are colored blue in the image below. Ask the user to supply 4 edge temperatures. You will have to pick some initial temperature for the first inner square, colored yellow. Suggestion: pick one of the edge temperatures.
Use try-catch.
Test cases must include grids of different sizes. Write function printmatrix to print the intermediate results of your code as well as the final results. (i.e. print the grid).

Hand Examples:

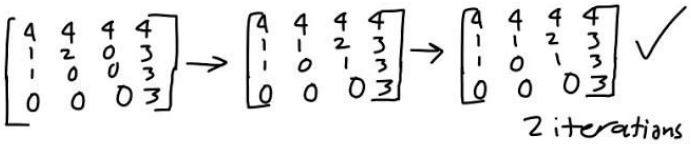
Given: Size = 4x4
$t_1 = 2$
$t_2 = 2$
$t_3 = 2$
$t_4 = 2$
$t_{in} = 2$



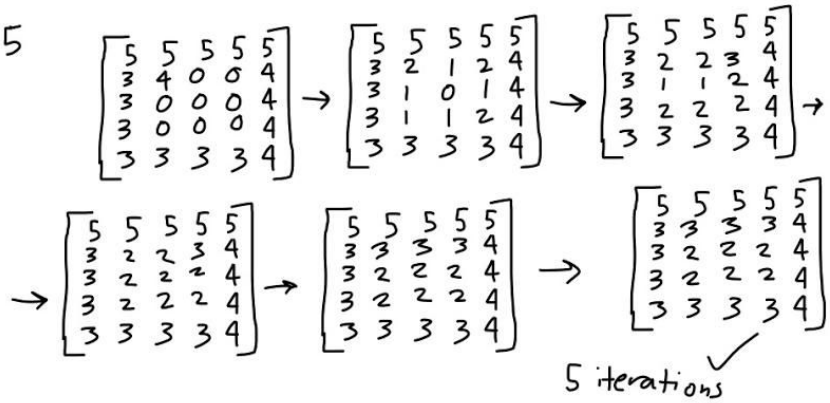
Given: Size = 4x4
$t_1 = 0$
$t_2 = 0$
$t_3 = 0$
$t_4 = 0$
$t_{in} = 0$



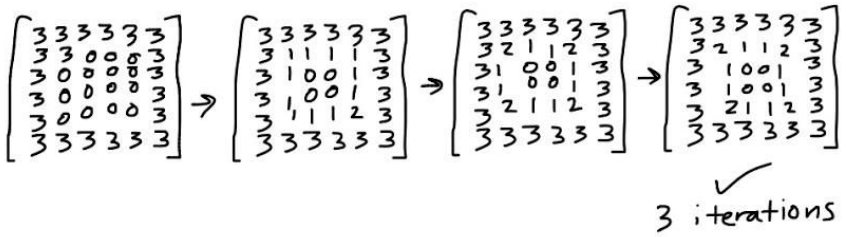
Given: Size = 4x4
$t_1 = 4$
$t_2 = 3$
$t_3 = 0$
$t_4 = 1$
$t_{in} = 2$



Given: Size = 5x5
$t_1 = 5$
$t_2 = 4$
$t_3 = 3$
$t_4 = 3$
$t_{in} = 4$



Given: Size = 6x6
$t_1 = 3$
$t_2 = 3$
$t_3 = 3$
$t_4 = 3$
$t_{in} = 3$



Results:

```
Please enter a square size (integer >= 4):
4
Please enter 4 edge temperatures:
92 43 23 65
Please enter an inner temperature:
35

1 iteration(s)
---------------
        92              92              92              92
        65              39              43              43
        65              31              35              43
        23              23              23              43

2 iteration(s)
---------------
        92              92              92              92
        65              57              56              43
        65              45              41              43
        23              23              23              43

3 iteration(s)
---------------
        92              92              92              92
        65              64              60              43
        65              48              43              43
        23              23              23              43

4 iteration(s)
---------------
        92              92              92              92
        65              66              61              43
        65              49              44              43
        23              23              23              43

5 iteration(s)
---------------
        92              92              92              92
        65              66              61              43
        65              49              44              43
        23              23              23              43
```

```
Please enter a square size (integer >= 4):
4
Please enter 4 edge temperatures:
54 23 52 65
Please enter an inner temperature:
43

1 iteration(s)
---------------
        54              54              54              54
        65              29              26              23
        65              36              34              23
        52              52              52              23

2 iteration(s)
---------------
        54              54              54              54
        65              45              39              23
        65              49              40              23
        52              52              52              23

3 iteration(s)
---------------
        54              54              54              54
        65              51              42              23
        65              52              42              23
        52              52              52              23

4 iteration(s)
---------------
        54              54              54              54
        65              53              43              23
        65              53              42              23
        52              52              52              23

5 iteration(s)
---------------
        54              54              54              54
        65              53              43              23
        65              53              42              23
        52              52              52              23
```

```
Please enter a square size (integer >= 4):
7
Please enter 4 edge temperatures:
23 54 12 54
Please enter an inner temperature:
23
```

```
14 iteration(s)
---------------
        23          23          23          23          23          23          23
        54          36          29          27          29          36          54
        54          40          33          30          33          41          54
        54          41          33          30          33          41          54
        54          39          30          27          30          39          54
        54          32          23          21          23          32          54
        12          12          12          12          12          12          54
```

```
Please enter a square size (integer >= 4):
8
Please enter 4 edge temperatures:
23 12 54 65
Please enter an inner temperature:
27
```

```
16 iteration(s)
---------------
        23          23          23          23          23          23          23          23
        65          41          31          26          23          20          17          12
        65          48          37          29          24          20          16          12
        65          51          40          32          26          21          16          12
        65          53          43          36          30          24          18          12
        65          54          46          40          35          30          22          12
        65          55          50          46          43          39          31          12
        54          54          54          54          54          54          54          12
```

```
Please enter a square size (integer >= 4):
9
Please enter 4 edge temperatures:
35 57 78 67
Please enter an inner temperature:
56
```

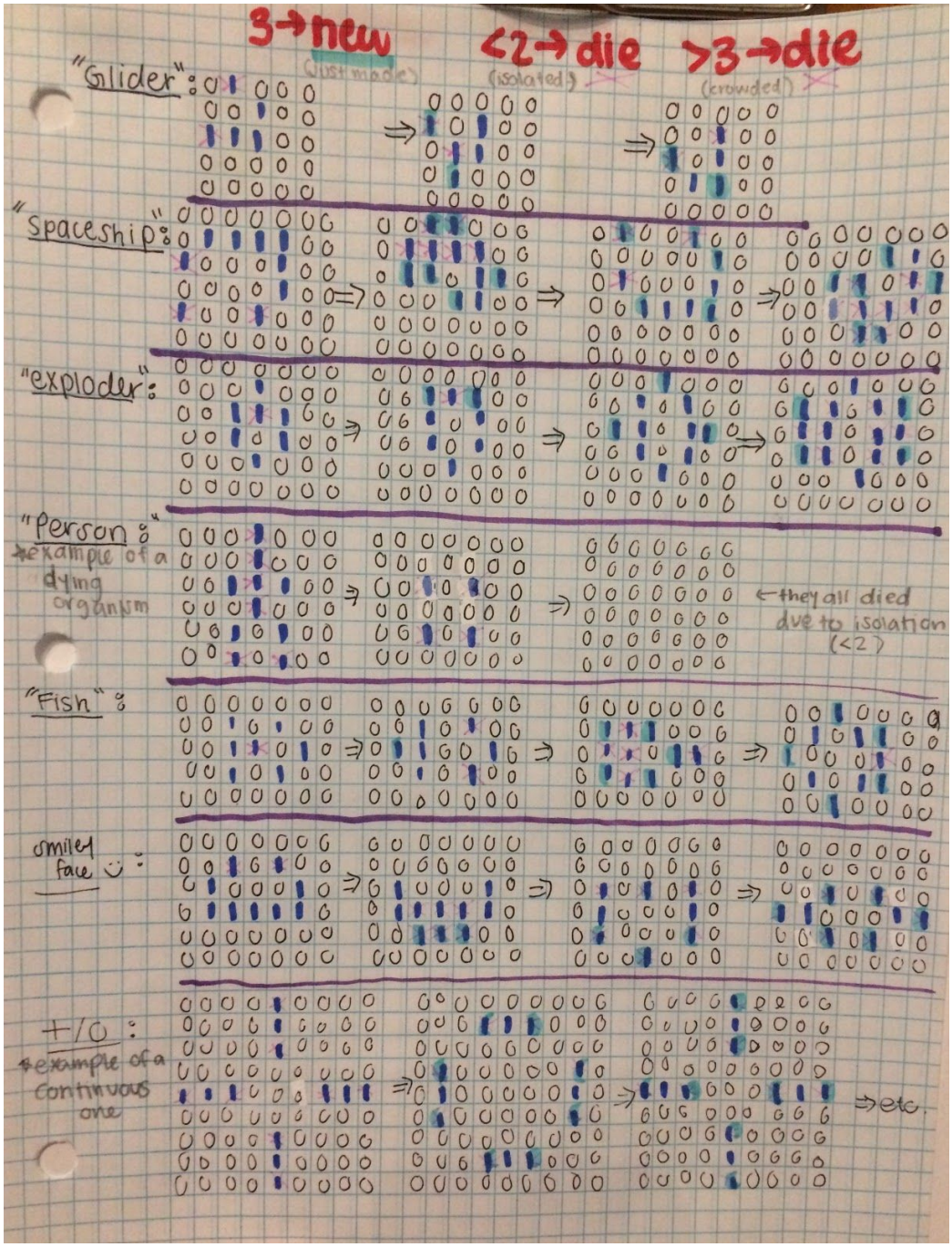
```
28 iteration(s)
---------------
        35          35          35          35          35          35          35          35          35
        67          49          42          39          38          38          40          45          57
        67          55          48          44          42          42          44          49          57
        67          58          52          48          46          46          48          51          57
        67          60          55          52          50          50          51          53          57
        67          62          59          57          55          55          55          56          57
        67          65          63          62          61          61          60          59          57
        67          69          69          69          69          68          67          65          57
        78          78          78          78          78          78          78          78          57
```

Commentary:

For this application, the program first prompts the user to enter in valid values for edge temperatures, inner square temperature, and the size of the square in terms of an integer n. After that, the array is cleared then the edges are filled with the user given edge temperatures. Next, the inner squares are recursively filled with the average of the surrounding 4 squares until the values of all inner squares remains constant. In the end, each square iteration is printed with the count of iterations needed. This works well and works in our test cases. This could be improved by making the printing format nicer.

Task 2:

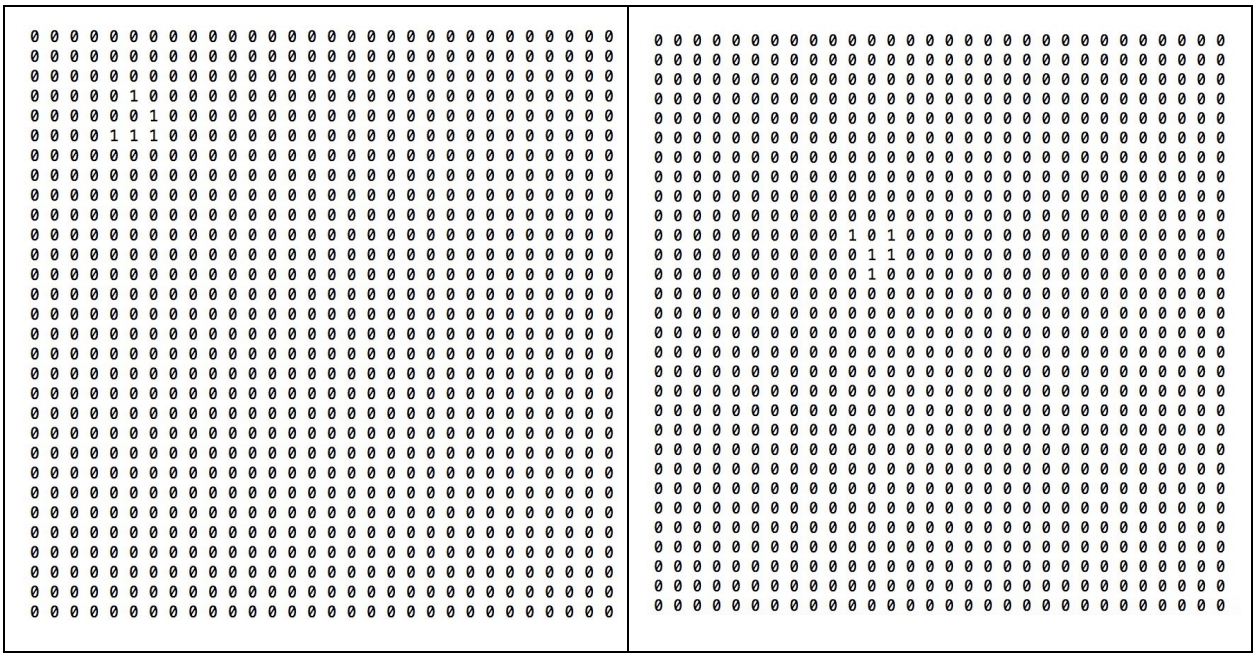
Hand examples:



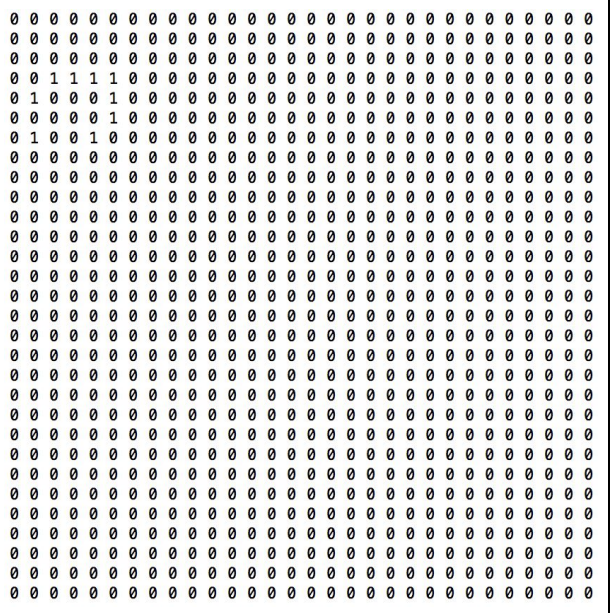
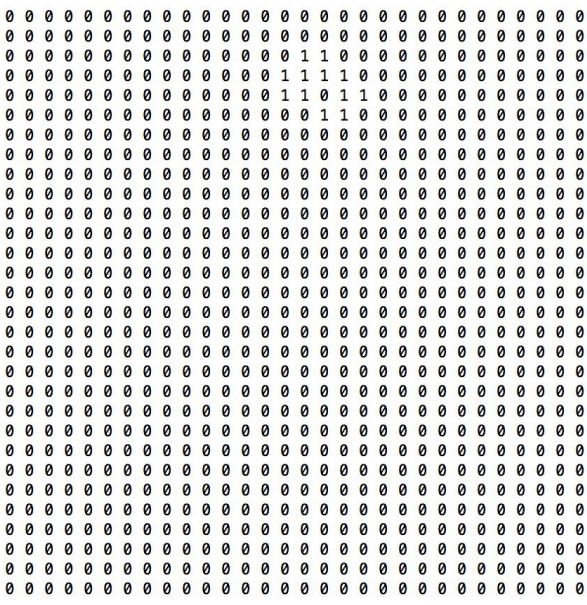
Results (Final Results):

Glider

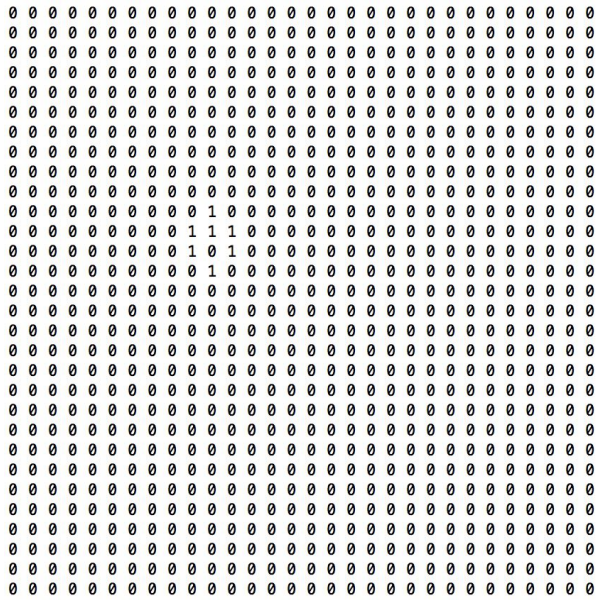
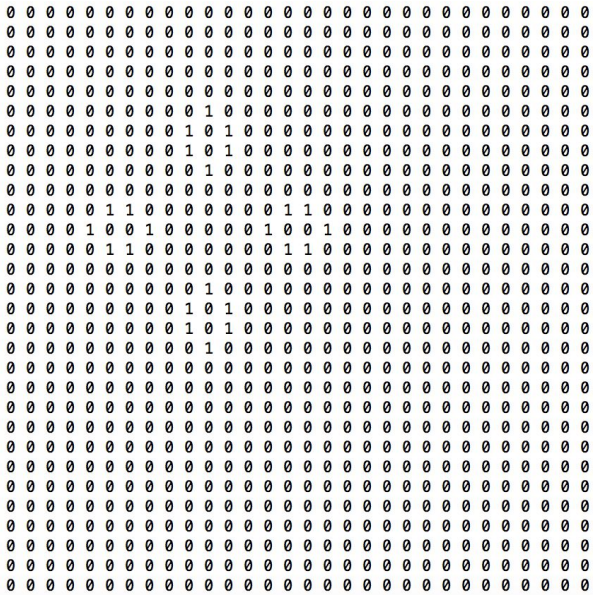
Before	After



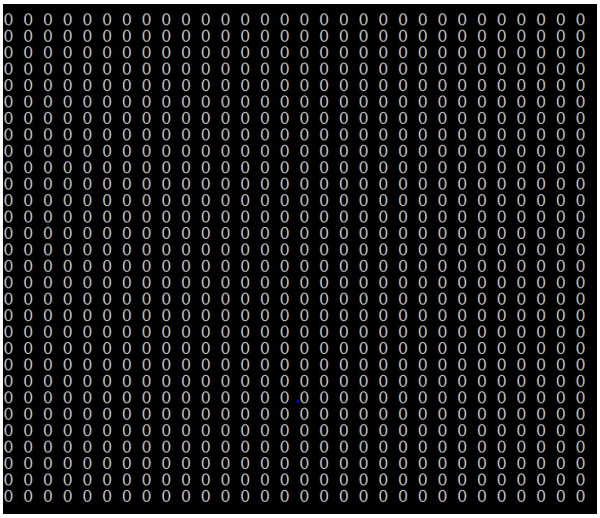
Spaceship

Before	After
	

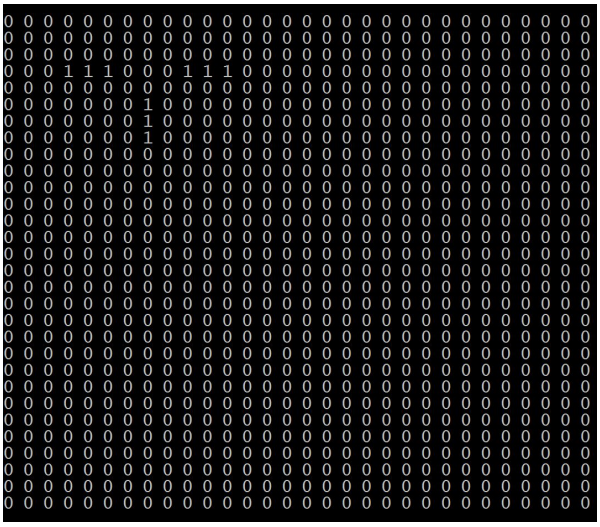
Exploder

Before	After
	

Person

Before	After
	

Fish

Before	After
	

Commentary:

This program executes mathematician John H. Conway's game of Life To start the game, the user is offered the choice of several rudimentary "organisms." The grid with the starting organism is printed back to the user, and the program executes the rules of Life. The grid is printed back to the user every time that a rule of life changes the previous conditions. This results in a series of grid images that reflect the rules of Life. All of the organism choices mimic the organisms in the applet linked in the instructions.