

## Project Running Example

### Game of life

#### Text File

2 ← number of generations that you will need to simulate  
5 ← number of cells in the object about to be read  
2 3 ← (x=2, y=3) coordinates for the various cells of the object  
3 1  
3 3  
4 2  
4 3

#### Color scheme followed in this pdf

1. Blue cells are live cells
2. Green & white cells are neighbors' cell (dead cells)

#### Grid

Size: 10x10

0,0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9
1,0	1,1	1,2	1,3	1,4	1,5	1,6	2,7	1,8	1,9
2,0	2,1	2,2	2,3	2,4	2,5	2,6	3,7	2,8	2,9
3,0	3,1	3,2	3,3	3,4	3,5	3,6	3,7	3,8	3,9
4,0	4,1	4,2	4,3	4,4	4,5	4,6	4,7	4,8	4,9
5,0	5,1	5,2	5,3	5,4	5,5	5,6	5,7	5,8	5,9
6,0	6,1	6,2	6,3	6,4	6,5	6,6	6,7	6,8	6,9
7,0	7,1	7,2	7,3	7,4	7,5	7,6	7,7	7,8	7,9
8,0	8,1	8,2	8,3	8,4	8,5	8,6	8,7	8,8	8,9
9,0	9,1	9,2	9,3	9,4	9,5	9,6	9,7	9,8	9,9

## Step 01

### Generation 0

Initial Grid (after reading file)


Sec – array

Last = 4

2,3	3,1	3,3	4,2	4,3					
-----	-----	-----	-----	-----	--	--	--	--	--

nei – array

Last = -1

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**Step 02**

Now fill the nei – array:

1. Pick each cell's coordinates from Sec – array and find dead neighborhood (cells).
2. And insert those dead cells to nei – array (ensure there is no duplication).
3. Repeat above two steps till all neighborhood is added to nei – array.

Grid (Generation 0).


Sec – array

Last = 4

2,3	3,1	3,3	4,2	4,3					
-----	-----	-----	-----	-----	--	--	--	--	--

nei – array

Last = 16

1,2	1,3	1,4	2,2	2,4	3,2	3,4	2,0	2,1	3,0	4,0	4,1	4,4	5,1	5,2	5,3	5,4			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--	--	--

**Step 03**

Count Neighbors (live cell) for sec – array and nei – array. Remember live cells can be find using sec – array.

Grid (Generation 0).


Sec – array

Last = 4

Count →

2,3	3,1	3,3	4,2	4,3					
1	1	3	3	2					

nei – array

Last = 16

Count →

1,2	1,3	1,4	2,2	2,4	3,2	3,4	2,0	2,1	3,0	4,0	4,1	4,4	5,1	5,2	5,3	5,4			
1	1	1	3	2	5	3	1	1	1	1	2	2	1	2	2	1			

## Step 04

### 1. Now Apply Rules

a. cells (2,3) & (3,1) die because they have less than 2 live neighbors. **Rule: 3**  
so, these cells will be deleted from sec - array

b. Cells (3,3), (4,2) & (4,3) remain alive because they have 2 or 3 live neighbors.

**Rule: 2**

c. Cells (2,2) & (3,4) will become alive because they have exactly 3 live neighbors.

**Rule: 1**

This will be removed from nei – array and inserted in sec – array.

2. Remove All element from nei – array.

3. And update the Grid for Generation 1. Display the output.

Grid (Generation 1).


Sec – array

Last = 4

3,3	4,2	4,3	2,2	3,4					
-----	-----	-----	-----	-----	--	--	--	--	--

nei – array

Last = -1

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**Step 05**

Now fill the nei – array:

4. Pick each cell's coordinates from Sec – array and find dead neighborhood (cells).
5. And insert those dead cells to nei – array. (Ensure there is no duplication).
6. Repeat above two steps till all neighborhood is added to nei – array.

Grid (Generation 1).


Sec – array

Last = 4

3,3	4,2	4,3	2,2	3,4					
-----	-----	-----	-----	-----	--	--	--	--	--

nei – array

Last = 16

2,3	2,4	3,2	4,4	3,1	4,1	5,1	5,2	5,3	5,4	1,1	1,2	1,3	2,1	2,5	3,5	4,5			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--	--	--

**Step 06**

Count Neighbors (live cell) for sec – array and nei – array. Remember live cells can be find using sec – array.

Grid (Generation 1).


Sec – array

Last = 4

Count →

3,3	4,2	4,3	2,2	3,4					
4	2	3	1	2					

nei – array

Last = 16

Count →

2,3	2,4	3,2	4,4	3,1	4,1	5,1	5,2	5,3	5,4	1,1	1,2	1,3	2,1	2,5	3,5	4,5			
3	2	4	3	2	1	1	2	2	1	1	1	1	1	1	1	1			

**Step 07****1. Now Apply Rules**

- a. cell (3,3) will die because of overcrowding. **Rule: 4**  
so, cell will be deleted from sec - array
- b. Cells (4,2), (4,3) & (3,4) remain alive because they have 2 or 3 live neighbors.  
**Rule: 2**
- c. cell (2,2) die because it has less than 2 live neighbors. **Rule: 3**  
so, this cell will also be deleted from sec - array
- d. Cells (2,3) & (4,4) will become alive because they have exactly 3 live neighbors.

**Rule: 1**

This will be removed from nei – array and inserted in sec – array.

**2. Remove All element from nei – array.****3. And update the Grid for Generation 2. Display the output.**

Grid (Generation 2).


Sec – array

Last = 4

4,2	4,3	3,4	2,3	4,4					
-----	-----	-----	-----	-----	--	--	--	--	--

nei – array

Last = -1

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



## Step 8

Write all live cells coordinates to the output.txt as follows:

**2** ← number of generations

**5** ← number of live cells

**4 2** ← (x, y) coordinates for the various cells of the object

**4 3**

**3 4**

**2 3**

**4 4**