

# CSI2100-01 Lab 11

## Cellular Automaton

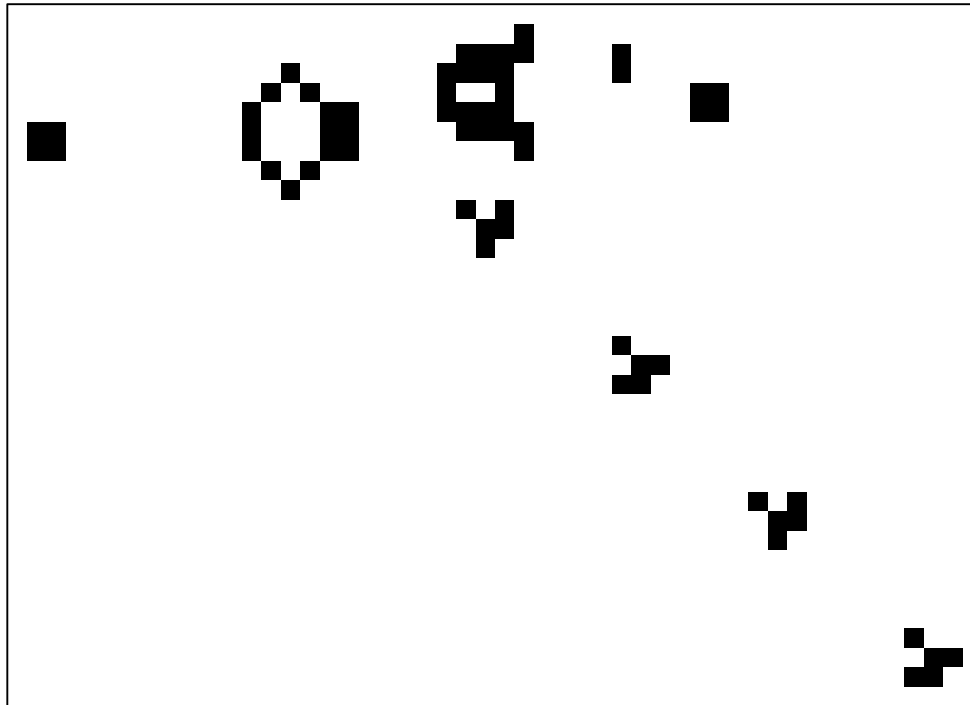
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# Overview

- Rules of Cellular Automaton
- Examples

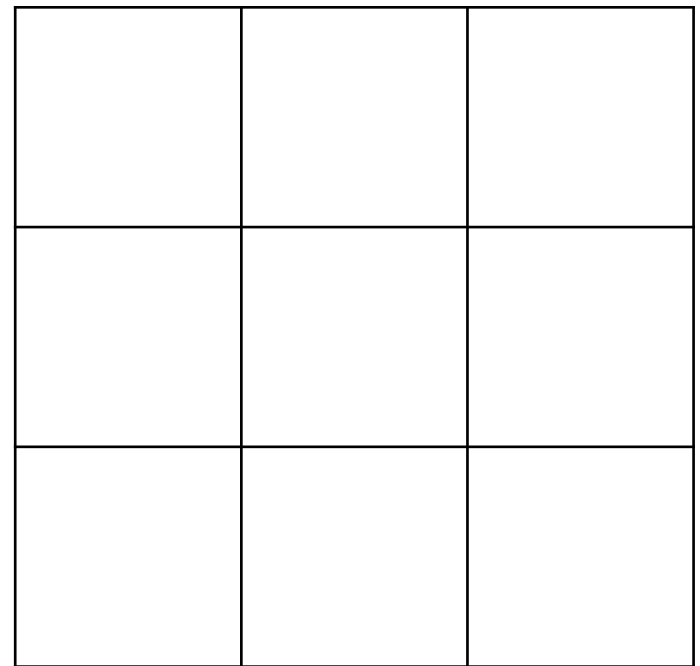
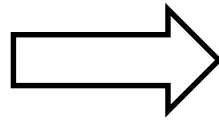
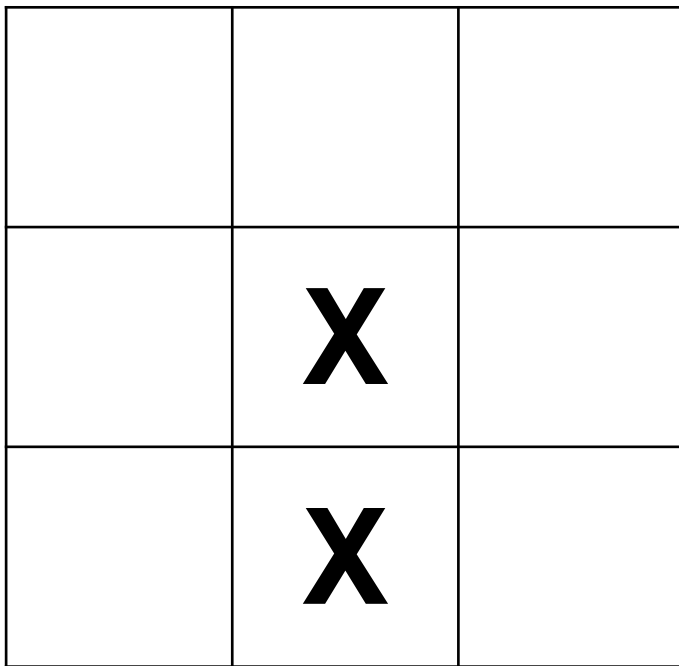
# Glide and Gun



[https://en.wikipedia.org/wiki/Cellular\\_automaton#/media/File:Gospers\\_glider\\_gun.gif](https://en.wikipedia.org/wiki/Cellular_automaton#/media/File:Gospers_glider_gun.gif)

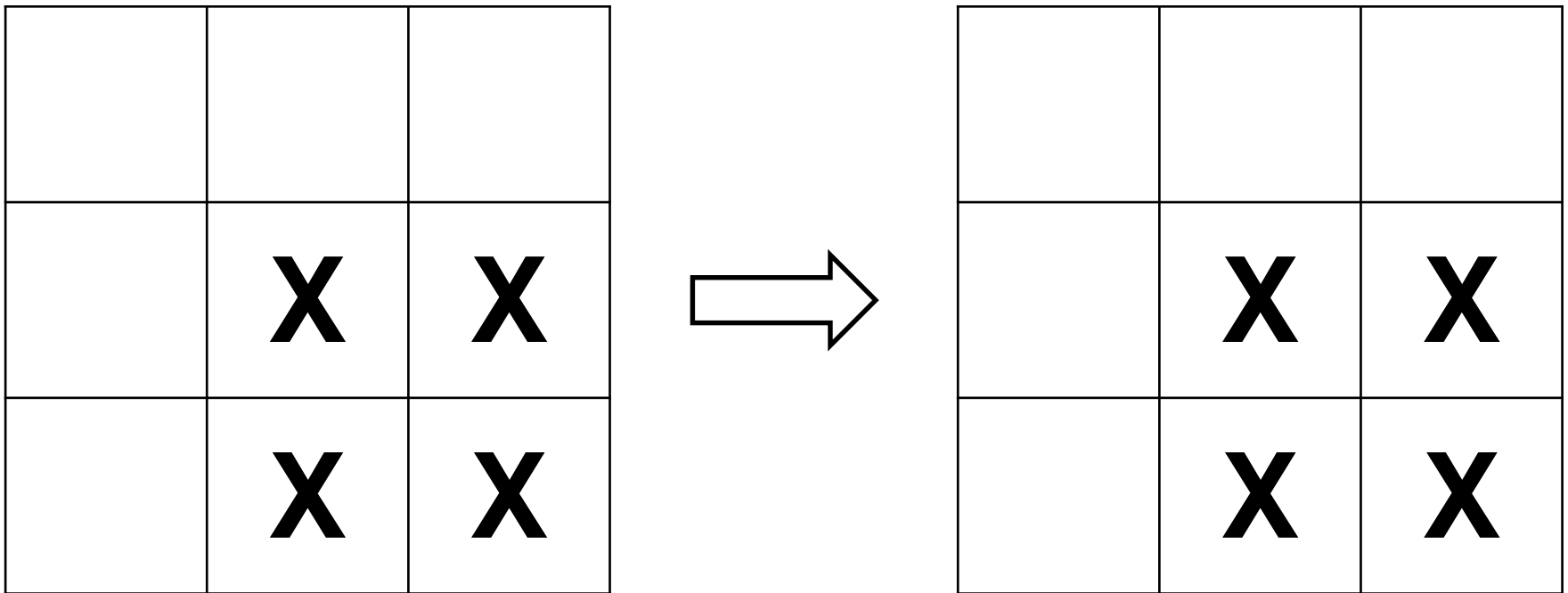
# Rules of Cellular Automaton

1. Any live cell with fewer than two live neighbours dies, as if caused by under-population.



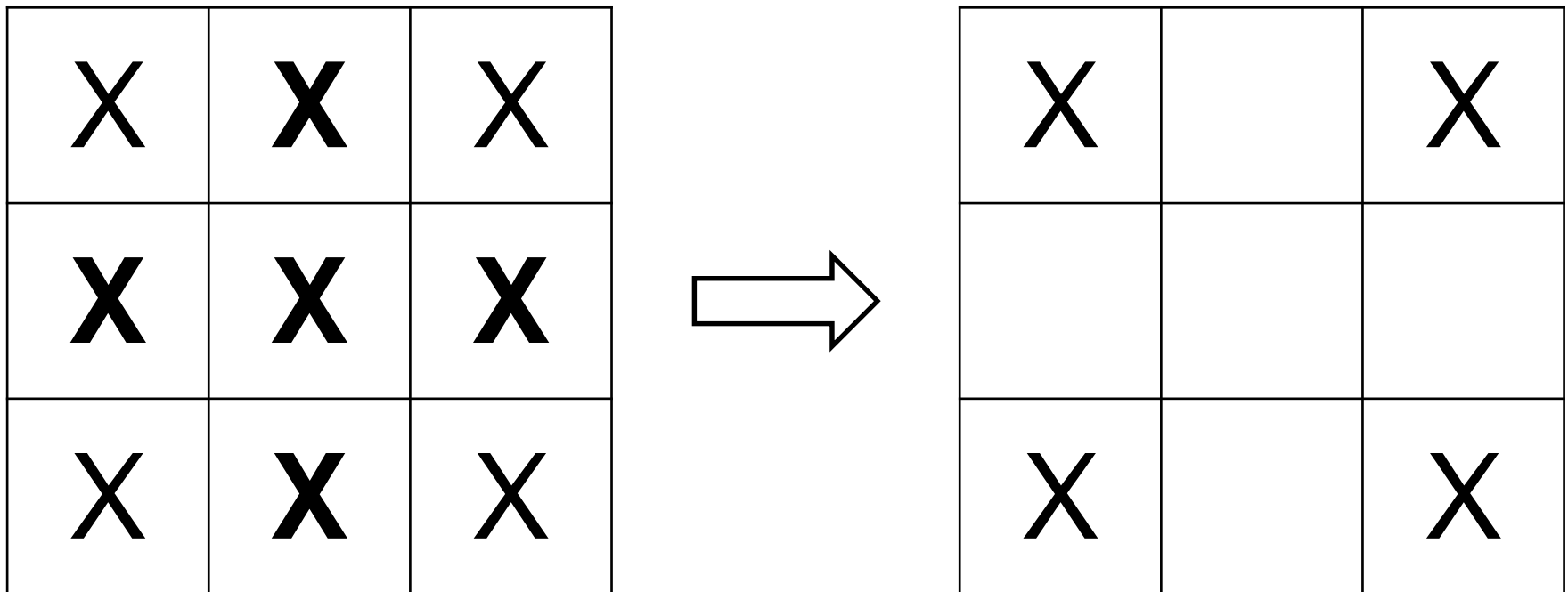
# Rules of Cellular Automaton

2. Any live cell with two or three live neighbours lives on to the next generation.



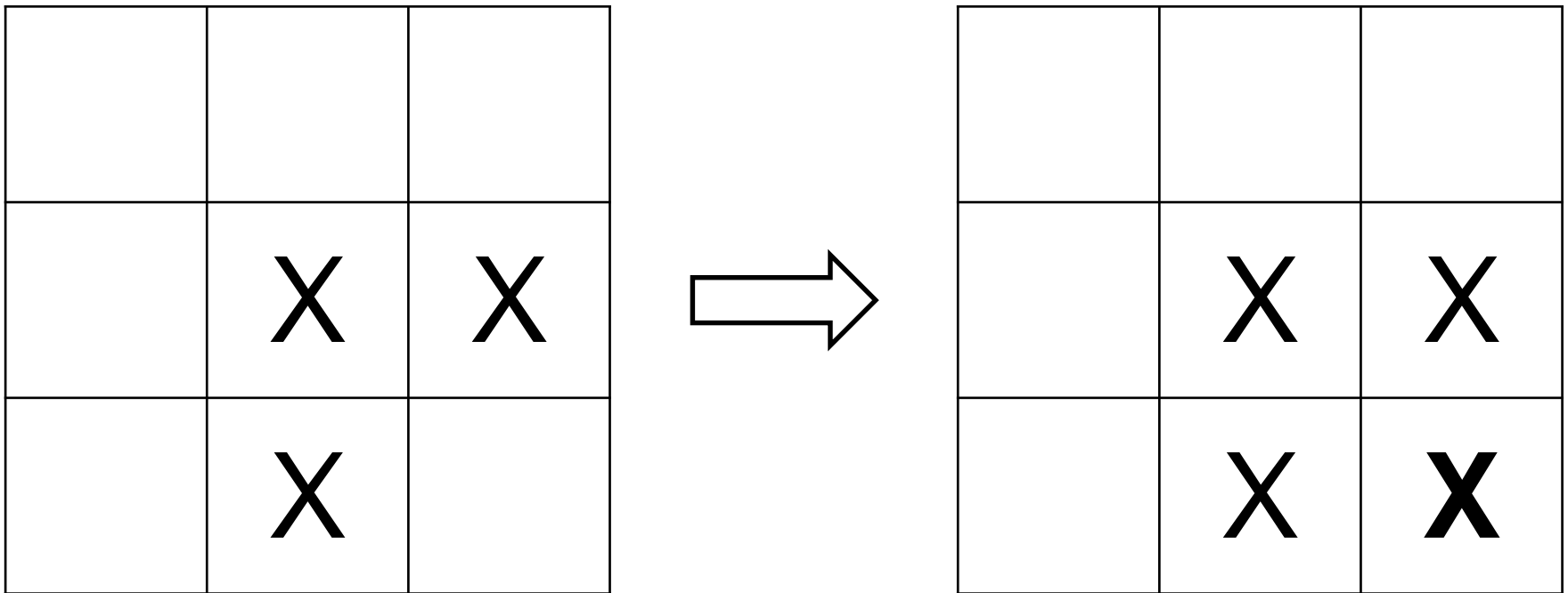
# Rules of Cellular Automaton

3. Any live cell with more than three live neighbours dies, as if by overcrowding.



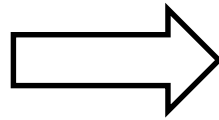
# Rules of Cellular Automaton

4. Any dead cell with exactly three live neighbours becomes a live cell, as if by reproduction.



# Example 1

X	X	X

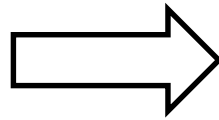


	X	
	X	
	X	



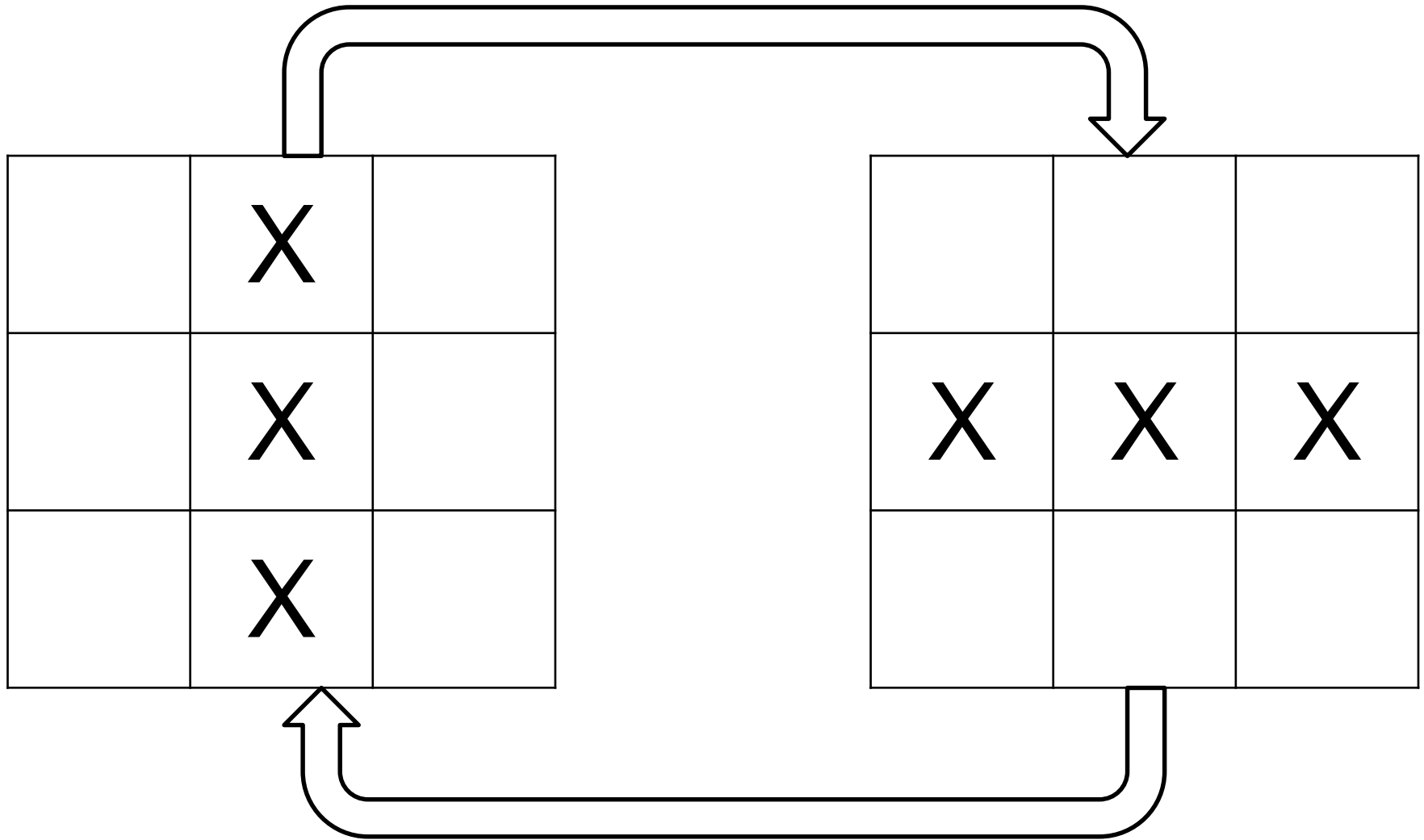
## Example 2

	X	
	X	
	X	



X	X	X

## Example 1 and Example 2



# 20x20 Example

The screenshot shows the PyCharm IDE interface. The main editor window displays the output of a Python script, which is a 20x20 grid. The grid is composed of characters 'x' and 'xxx' on a background of spaces. The output is formatted with a dashed line at the top and bottom, and each row is labeled on the right side from 'row 0' to 'row 19'. The grid shows a pattern of 'x' characters in the first three rows (rows 0-2) and 'xxx' characters in rows 10-12. The rest of the grid is empty.

```
-----  
| x          | row 0  
| x          | row 1  
| x          | row 2  
|           | row 3  
|           | row 4  
|           | row 5  
|           | row 6  
|           | row 7  
|           | row 8  
|           | row 9  
|      xxx   | row 10  
|      x     | row 11  
|      xxx   | row 12  
|           | row 13  
|           | row 14  
|           | row 15  
|           | row 16  
|           | row 17  
|           | row 18  
|           | row 19  
-----
```

The PyCharm interface includes a menu bar (File, Edit, View, Navigate, Code, Refactor, Run, Tools, VCS, Window, Help), a toolbar, and a sidebar with 'Project' and 'Favorites' views. The 'Run' tab is active, showing the command: `C:\Users\alkorang\PycharmProjects\csi2100\venv\Scripts\python.exe C:/Users/alkorang/PycharmProjects/csi2100/myCellularAutomata.py`. The status bar at the bottom indicates 'CRLF UTF-8 2 spaces\* Python 3.8 (csi2100)'.