



Artificial Life:

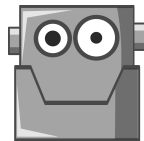
A Very Quick Introduction

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<https://www.ibisc.univ-evry.fr/~sivanov/fr/alife-intro.html>

What is artificial life?



<https://openclipart.org/>

Artificial Life: A (Partial) Replica of Real Life

Artificial life = a field of study which consists in examining **systems related to natural life** through the use of simulations.

- ▶ computer models, robotics, biochemistry, etc.
-

The term was coined in 1986 by **Christopher Langton**, an American biologist.



https://en.wikipedia.org/wiki/Artificial_life

Synthetic Life: Life In Vitro

Synthetic life = artificial life created in vitro from biomolecules and their component materials.

Why?

- ▶ study the **origins** of life
- ▶ study the **properties** of life
- ▶ **recreate** life

https://en.wikipedia.org/wiki/Synthetic_life

Which among these are artificial life?



a laptop



a neural network



a robotic arm

Types of Artificial Life

Software-based

- ▶ cellular automata
- ▶ neural networks

Hardware-based

- ▶ robots

Biochemical

- ▶ synthetic biology

Types of Artificial Life

Software-based

- ▶ cellular automata ← we will focus on this one
- ▶ neural networks

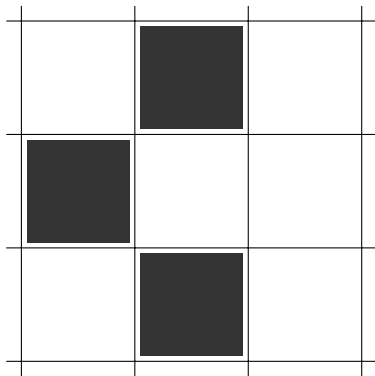
Hardware-based

- ▶ robots

Biochemical

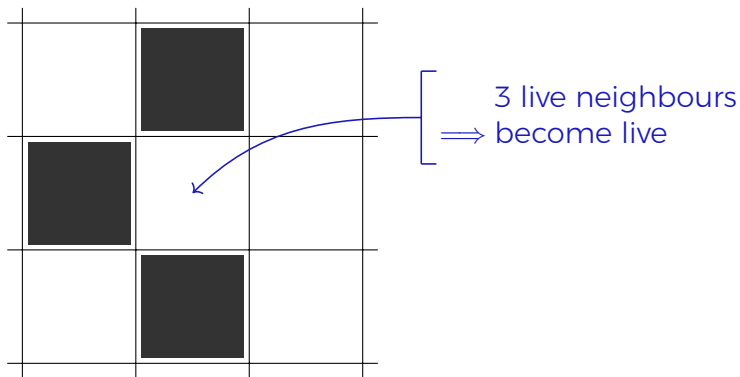
- ▶ synthetic biology

Cellular Automata



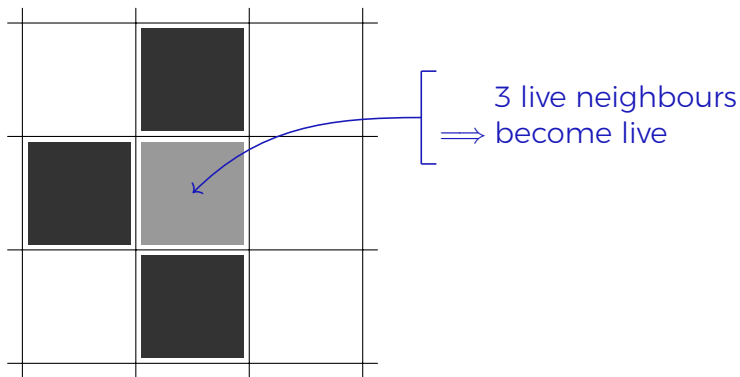
- ▶ infinite grid

Cellular Automata



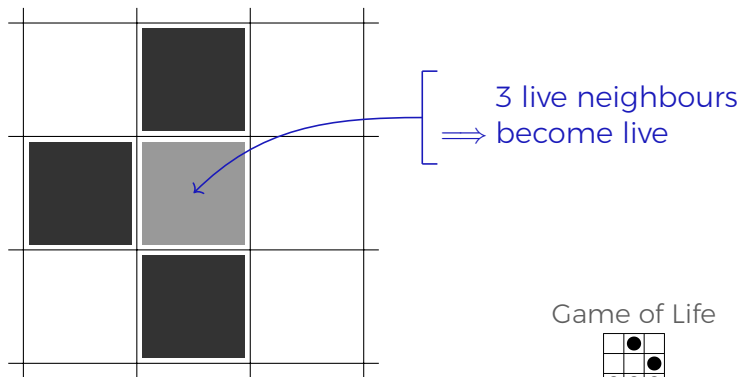
- ▶ infinite grid
- ▶ simple local programs in cells

Cellular Automata



- ▶ infinite grid
- ▶ simple **local programs** in cells
- ▶ step-by-step global updates

Cellular Automata



Game of Life



- ▶ infinite grid
- ▶ simple **local programs** in cells
- ▶ step-by-step global updates

NetLogo

We will use **NetLogo** to implement some **artificial life**.

<http://ccl.northwestern.edu/netlogo/>



It even runs in the Web browser:

<http://www.netlogoweb.org/launch>

(A download seems recommendable.)