

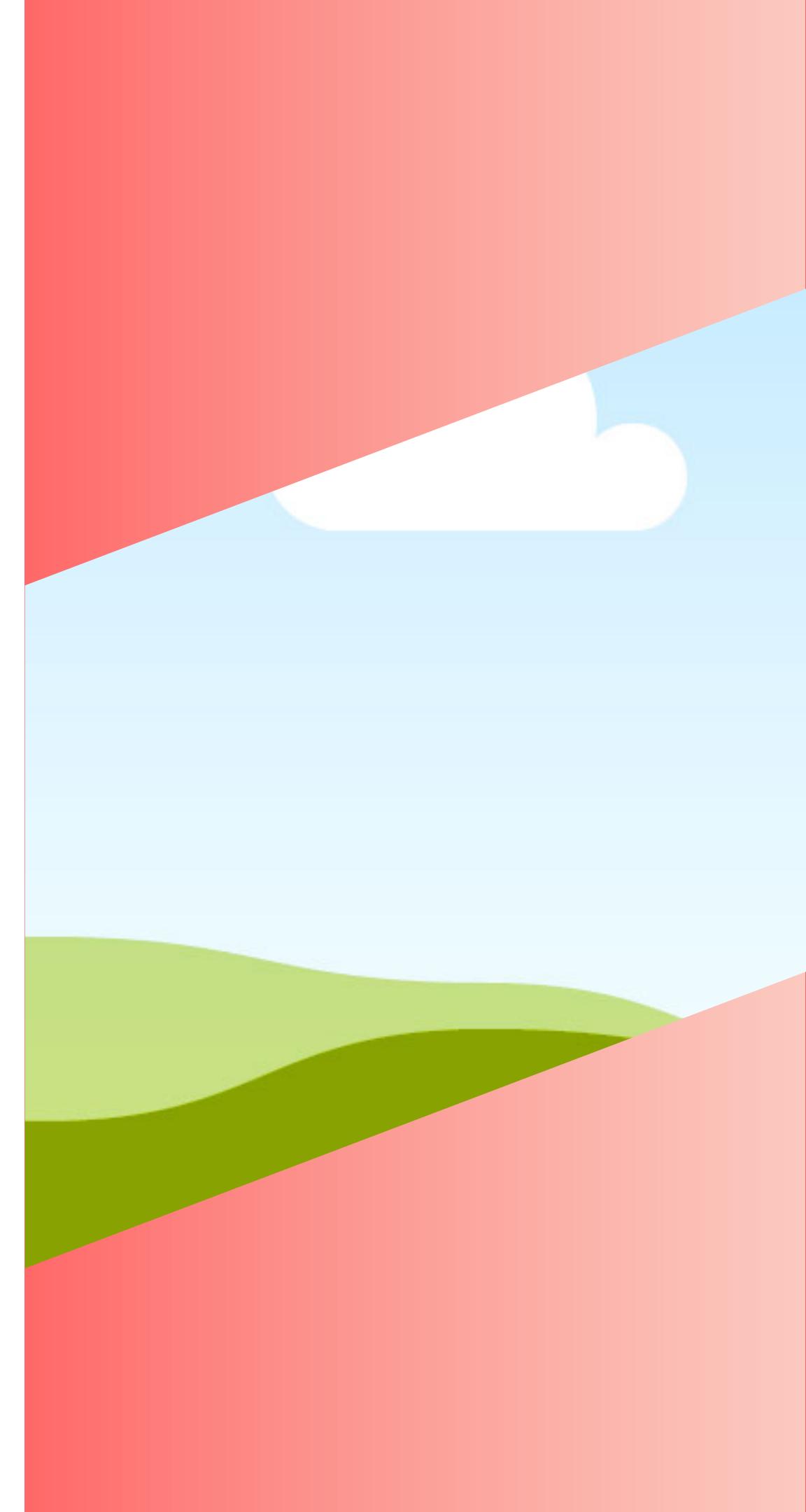
Primena perzistentne homologije u evolutivnim igram

Seminarski rad iz Računarske
Topologije
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Svetozar Iković
69/2016

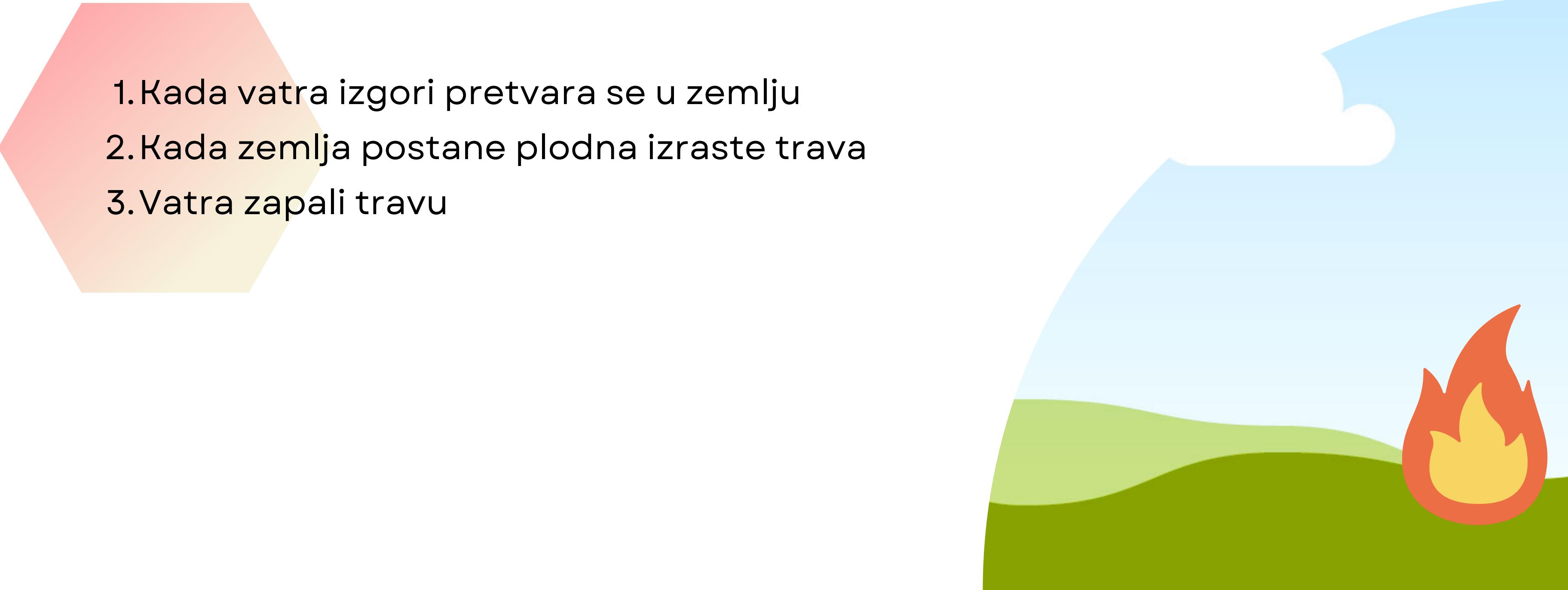
Šta su evolutivne igre?

Evolutivne igre u računarskom programiranju koriste koncepte evolucije za generisanje i unapređivanje igrača ili strategija tokom vremena. Koriste genetske algoritme ili druge tehnike inspirisane prirodom kako bi simulirale prirodnu selekciju, ukrštanje i mutaciju radi postizanja boljih rezultata.



Earth-Fire-Grass

Pravila igre

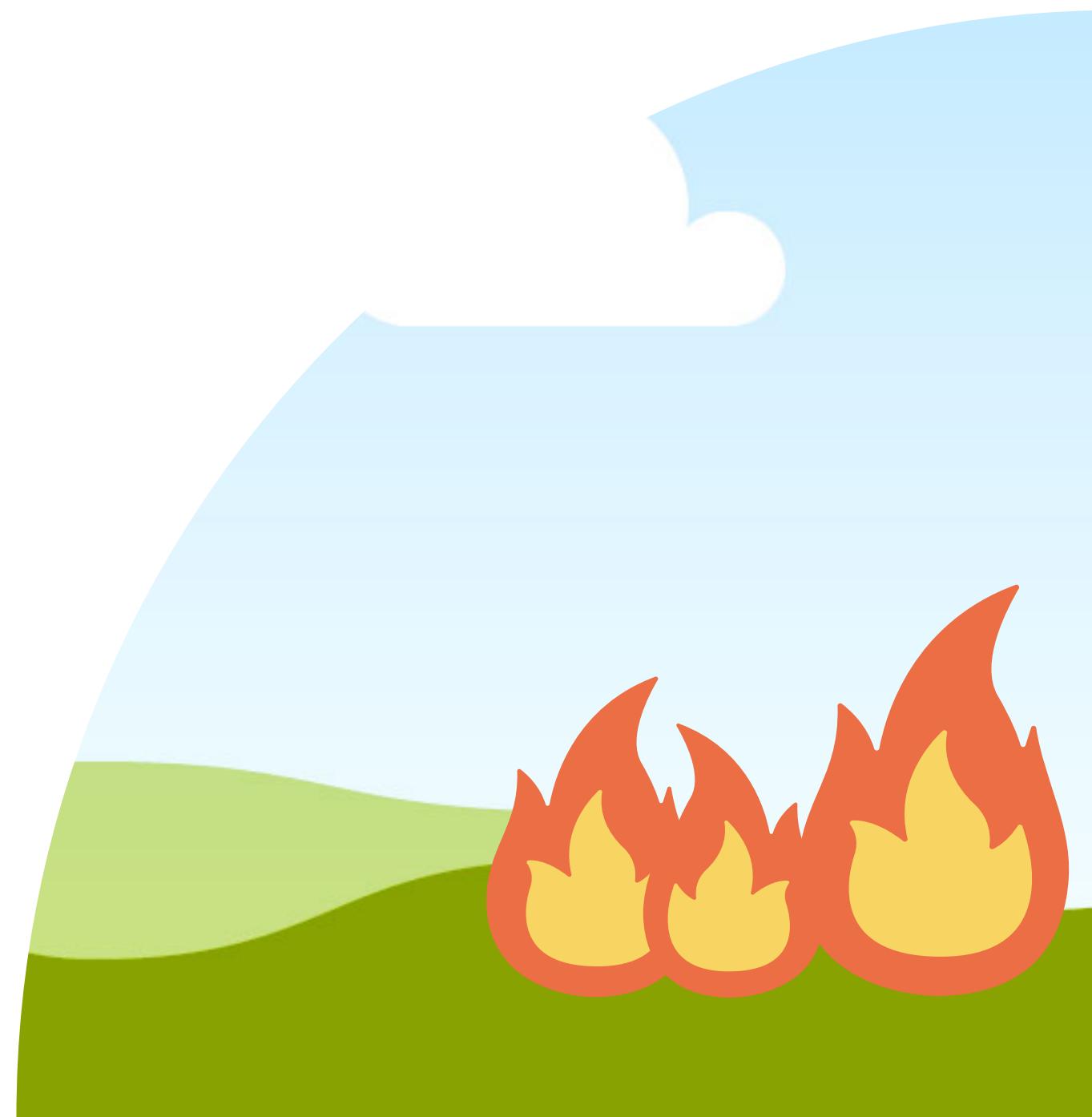
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1. Kada vatra izgori pretvara se u zemlju
 2. Kada zemlja postane plodna izraste trava
 3. Vatra zapali travu

Earth-Fire-Grass-Water

Dodatna pravila igre



4. Voda se ne menja



ChatGPT

- Da li ChatGPT zna python i pygame
- Korak po korak objašnjavanje
- Ograničenje dužine koda
- Opis celog problema u jednoj poruci



The script should emulate the followin simulation.

Let me explain the simulation, there is a square map, and each square of the map can be grass, earth or fire. If a square is grass and there is a fire square next to it, there's a chance that the grass square catches fire and becomes a fire square. The fire square after some time extinguishes and turns into a earth square, similarly on the earth square after some time grass starts to grow and it turns into a grass square.

can you write python script using the pygame library that does the following:

1. creates a nxn matrix
2. each cell of the matrix can be grass, earth or fire (represented with different colors)
3. you can color the cell by selecting a color and then clicking on the cell
4. runs the simulation explained at the start when you press space



Sure! Here's an example Python script that uses the Pygame library to create a simulation that matches your description:

```
python
import pygame
import random

# Define some colors
BLACK = (0, 0, 0)
WHITE = (255, 255, 255)
GREEN = (0, 255, 0)
BROWN = (165, 42, 42)
RED = (255, 0, 0)
ORANGE = (255, 165, 0)

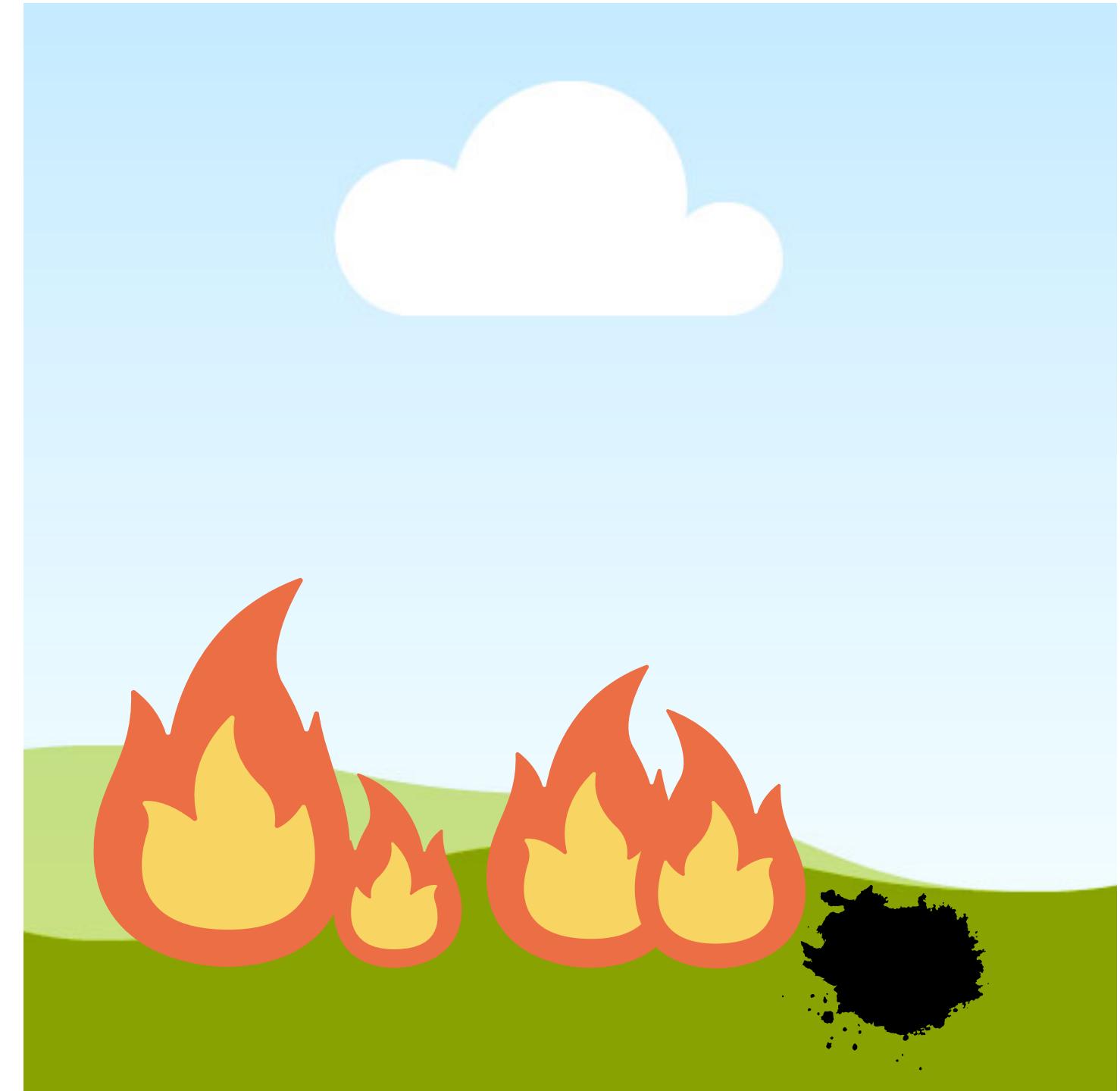
# Set the dimensions of each cell and the grid size
CELL_WIDTH = 10
CELL_HEIGHT = 10
GRID_SIZE = 50
```

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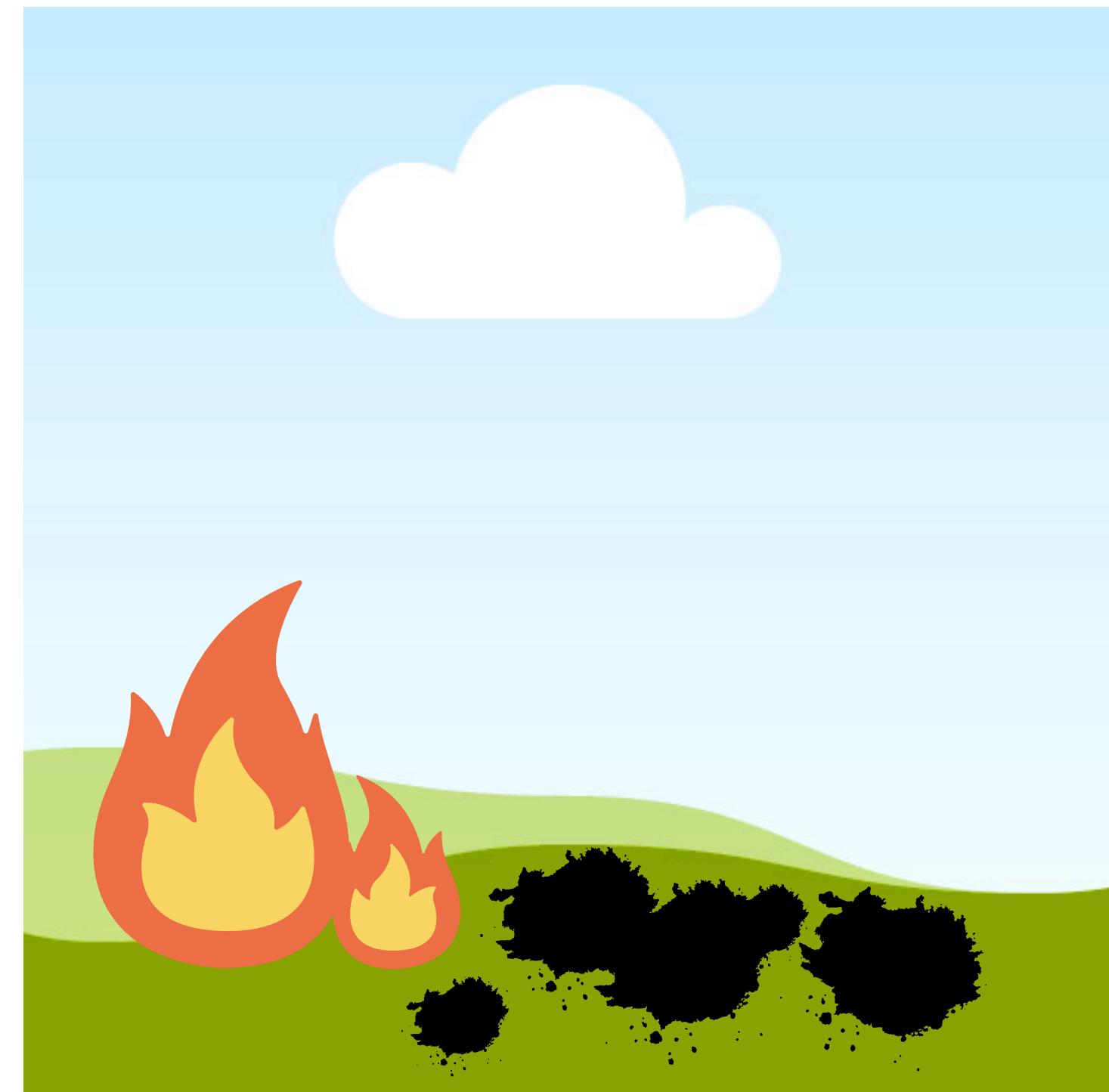
Implementacija simulacija

- Matrica odnosno mapa
- Polje (Tile)
- Trenutno stanje i istorija
- Snimanje ekrana
- Bojenje

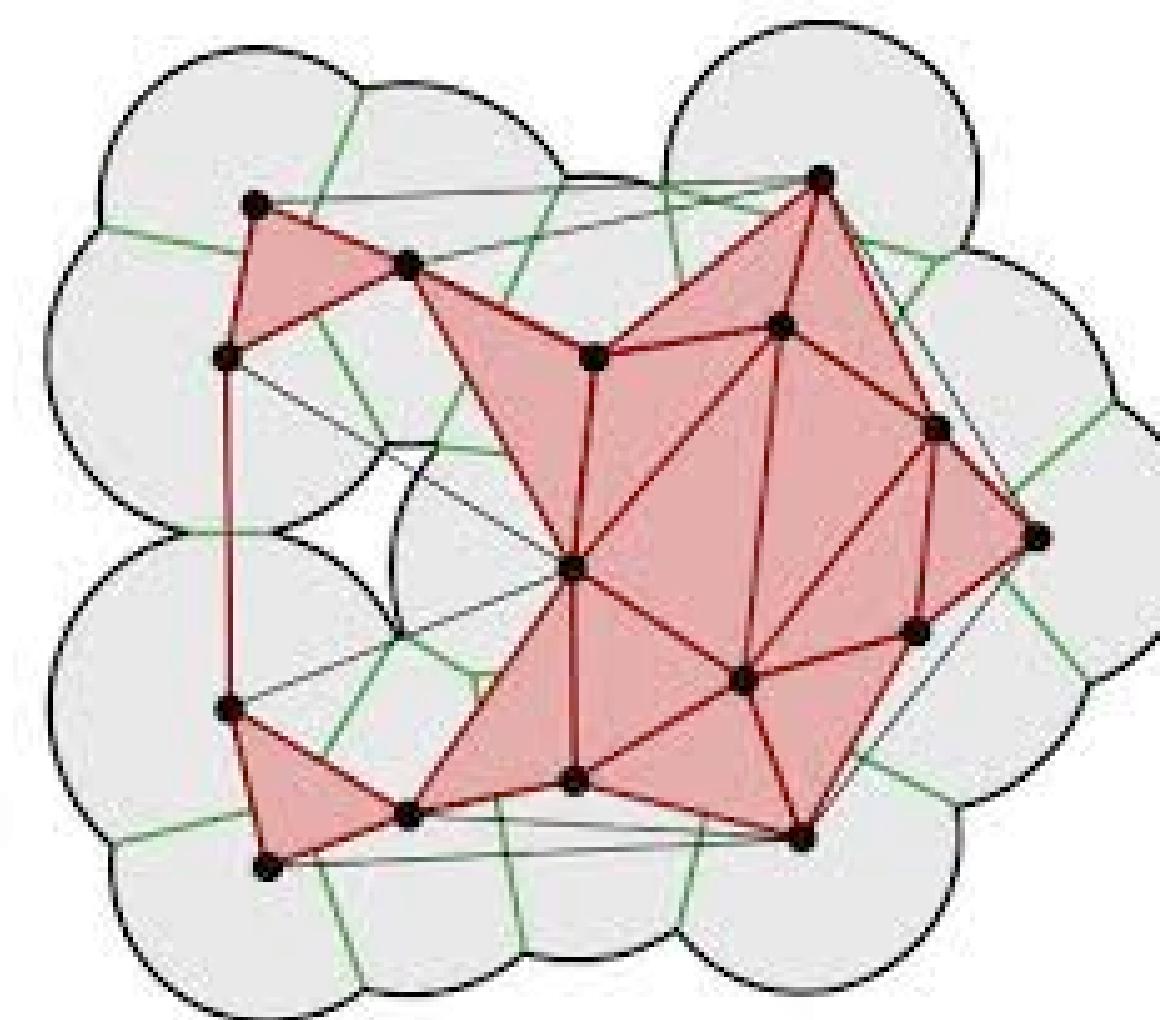
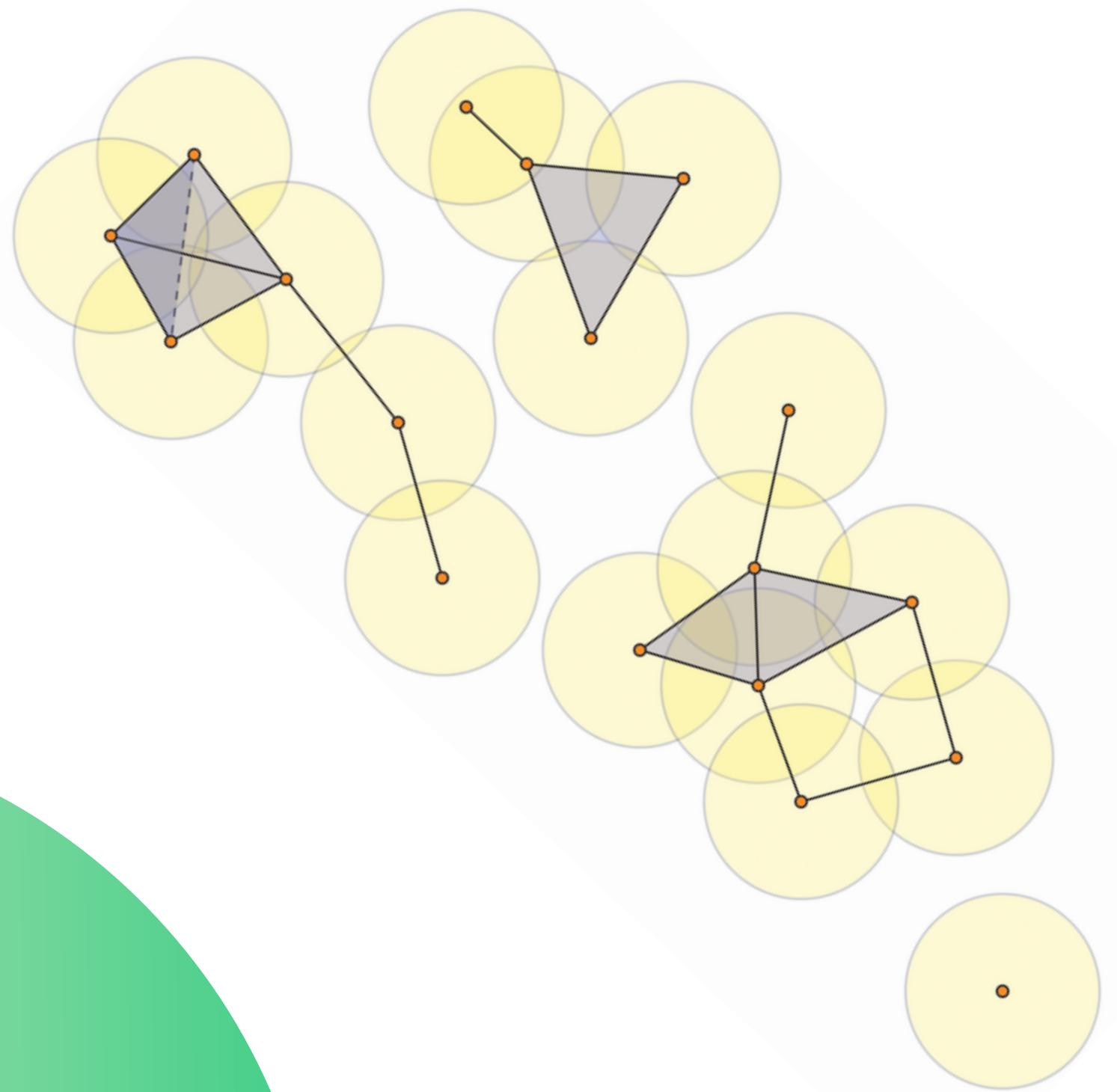


Implementacija procesiranja

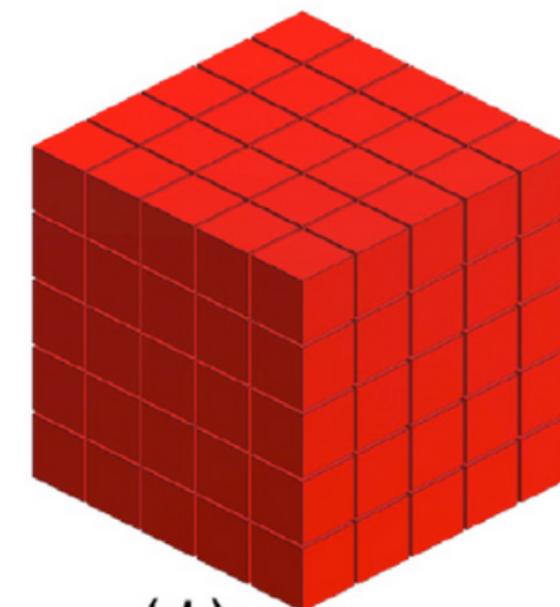
- Gudhi
- Matplotlib voxels



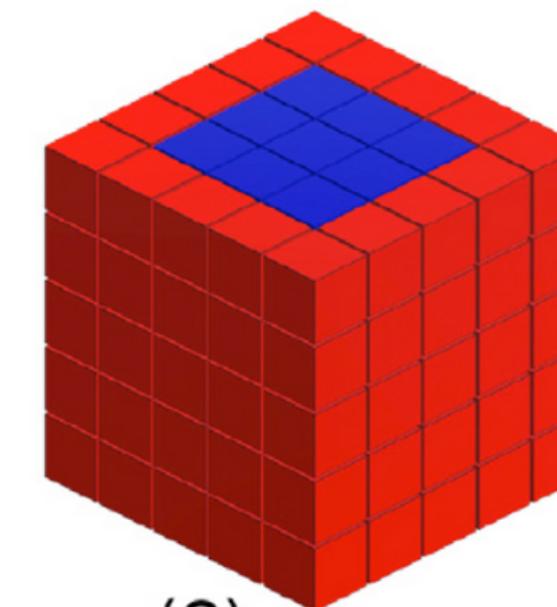
Vietoris Rips ili Alpha Kompleks



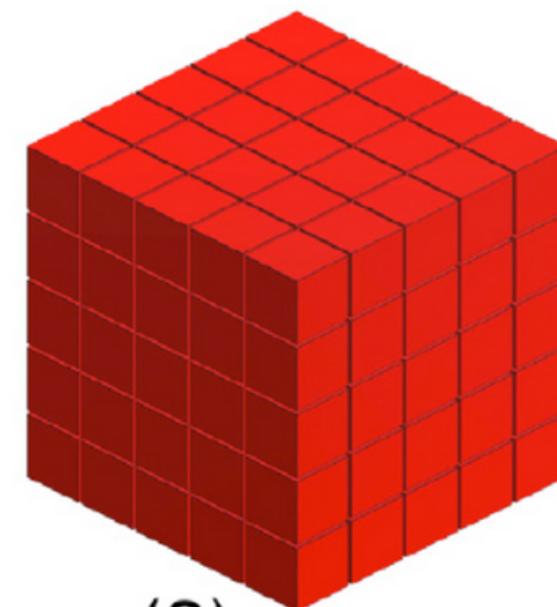
Vatra ili Vatra^c



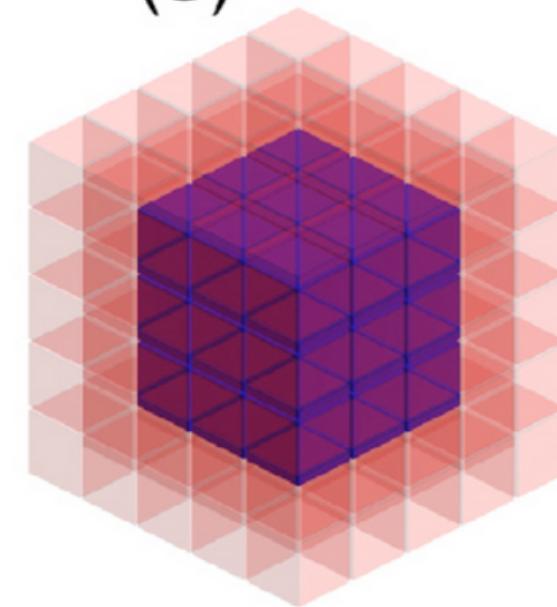
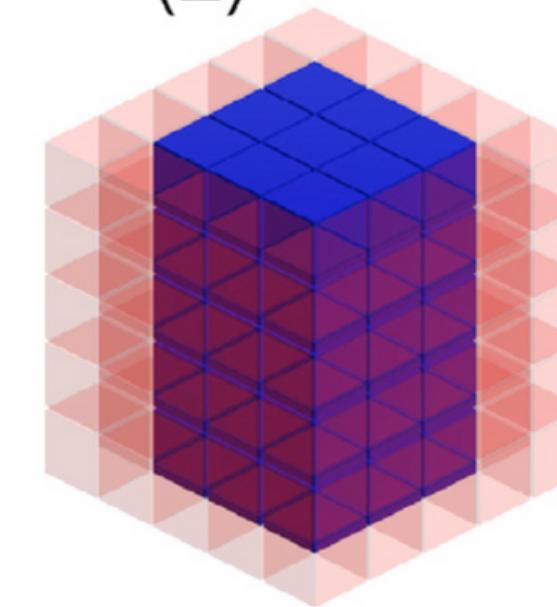
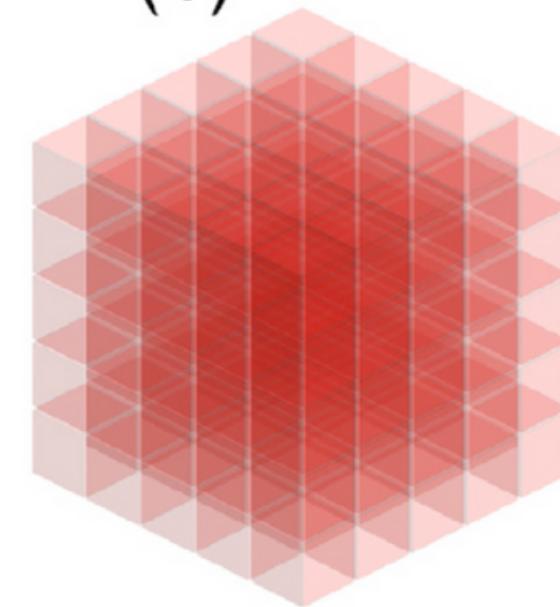
(1)



(2)

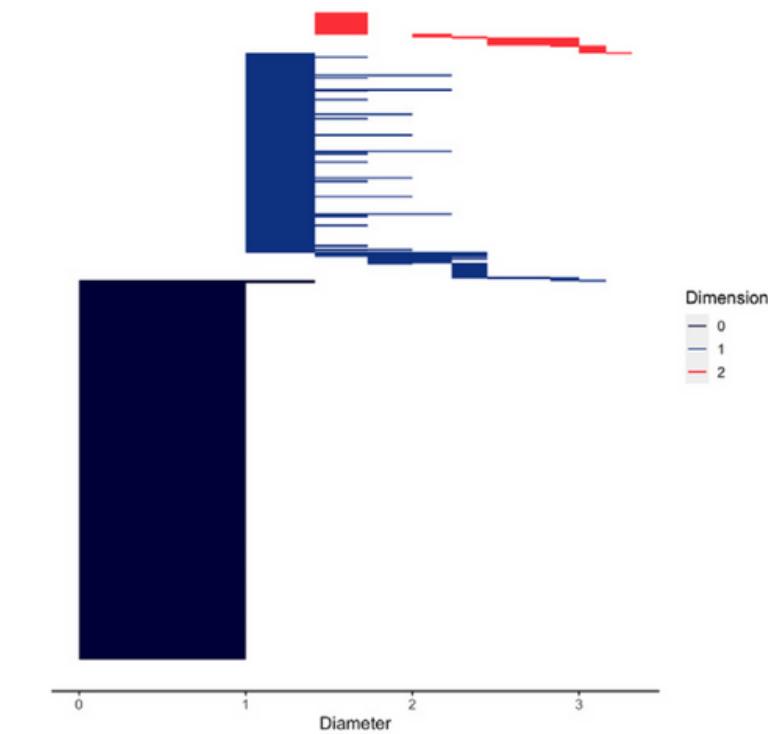
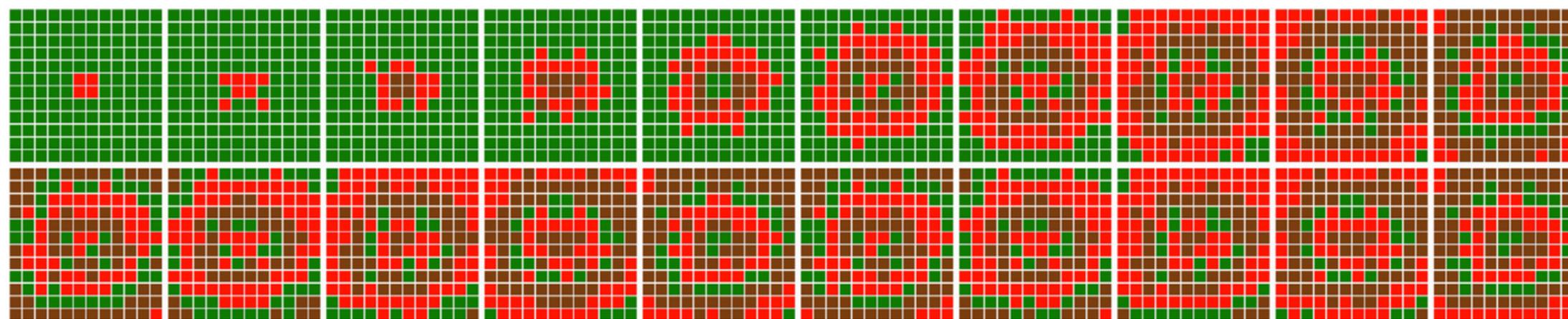


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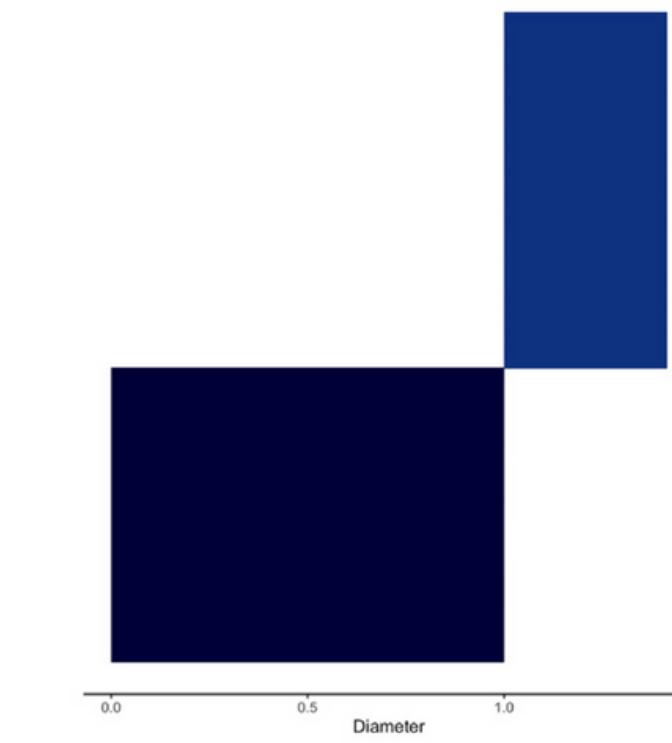
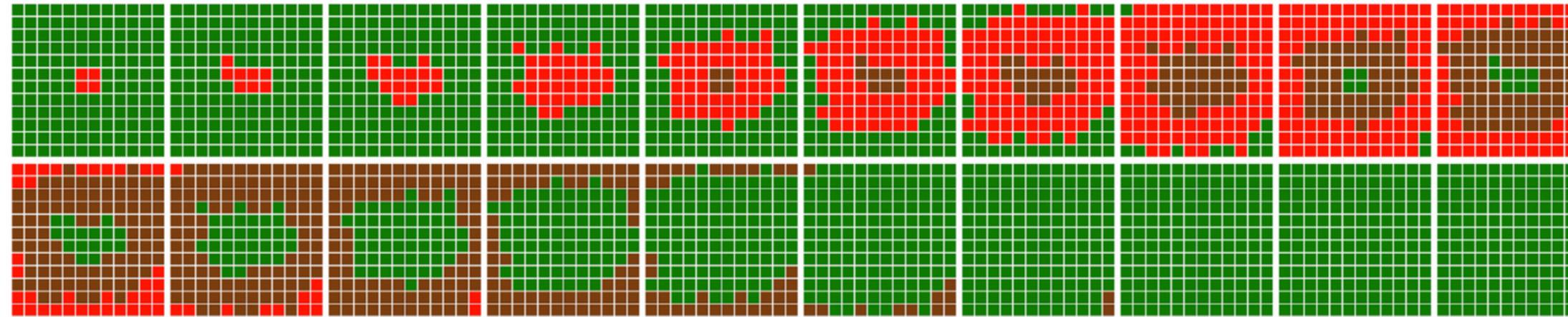


Rezultati u originalnom radu

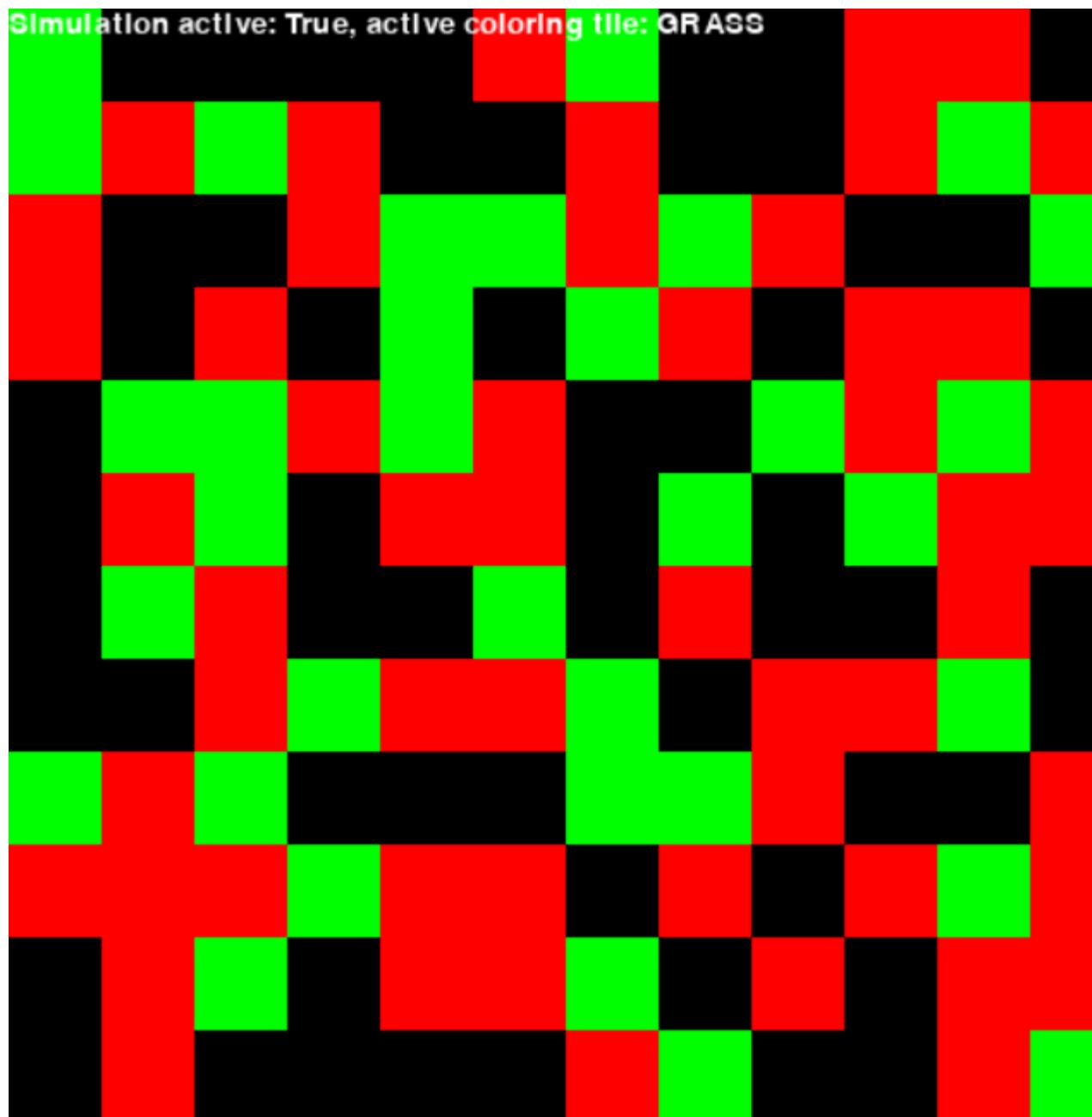
Životni vek 2 – 20 iteracija



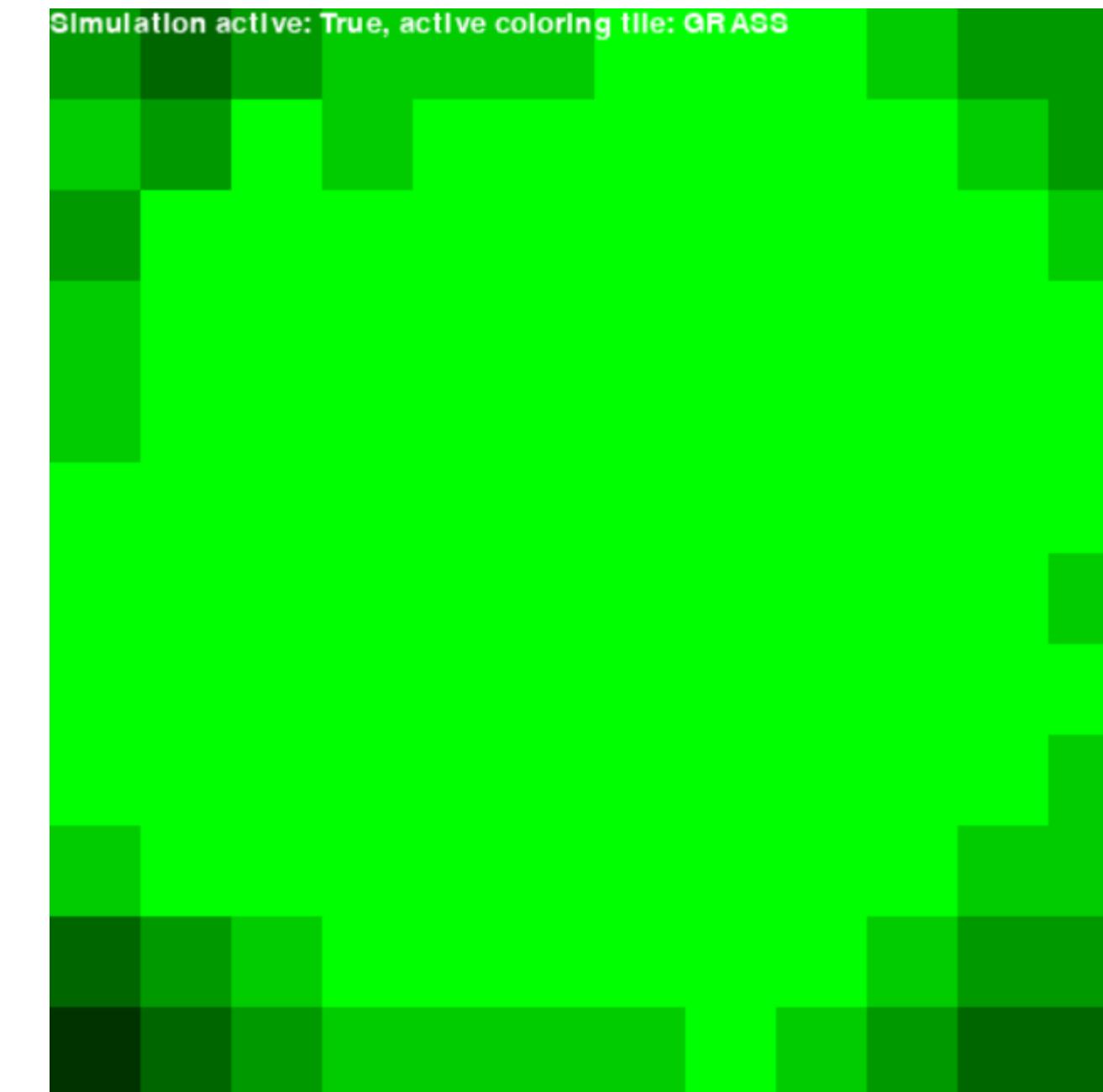
Životni vek 5– 20 iteracija



Rezultati u originalnom radu

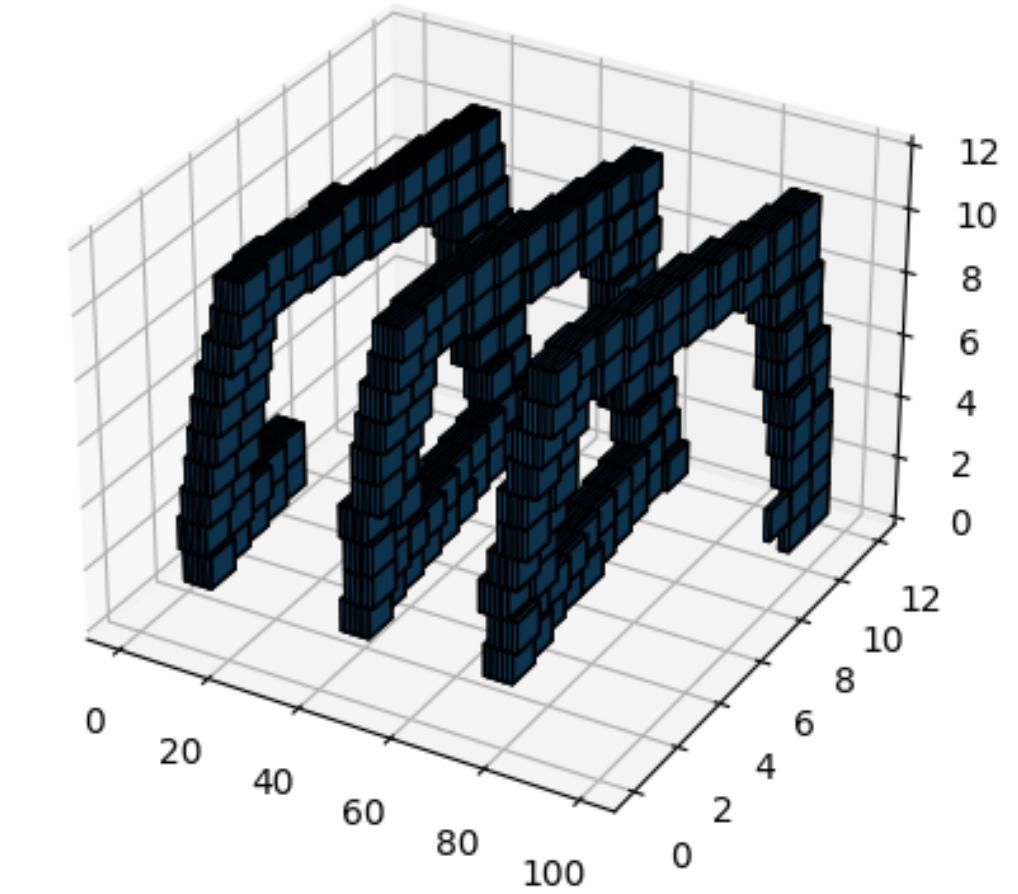
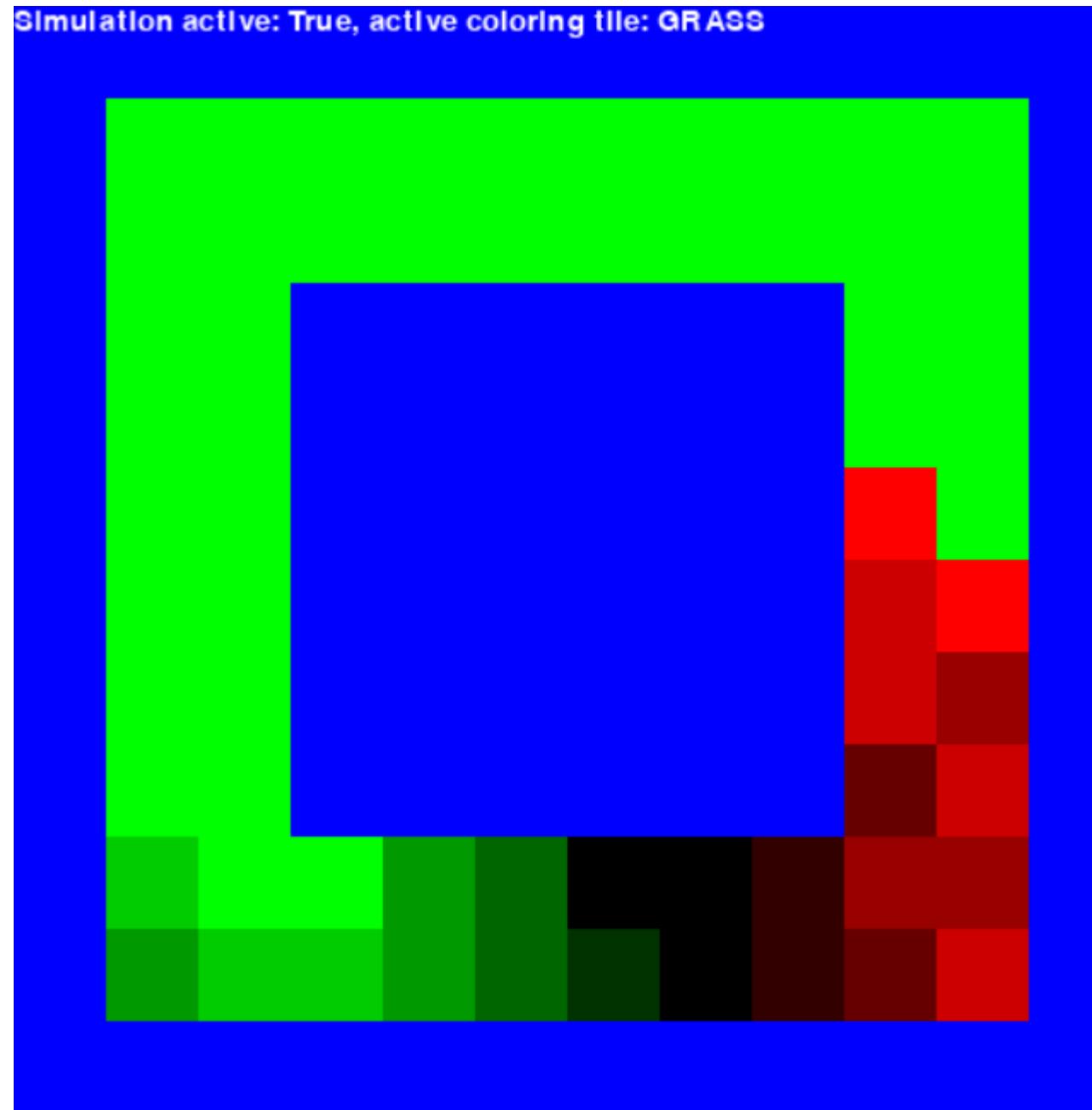
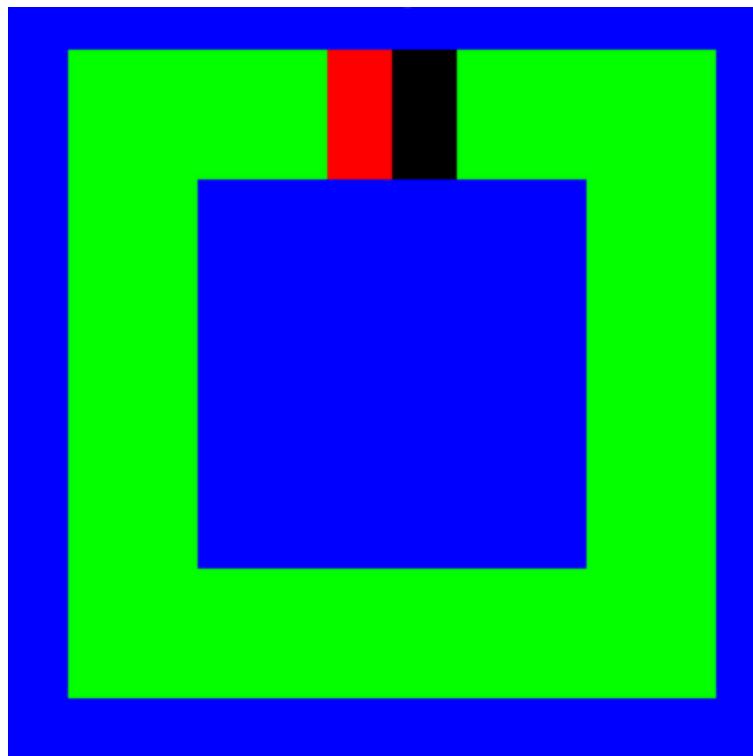


Životni vek 2 – 100 iteracija

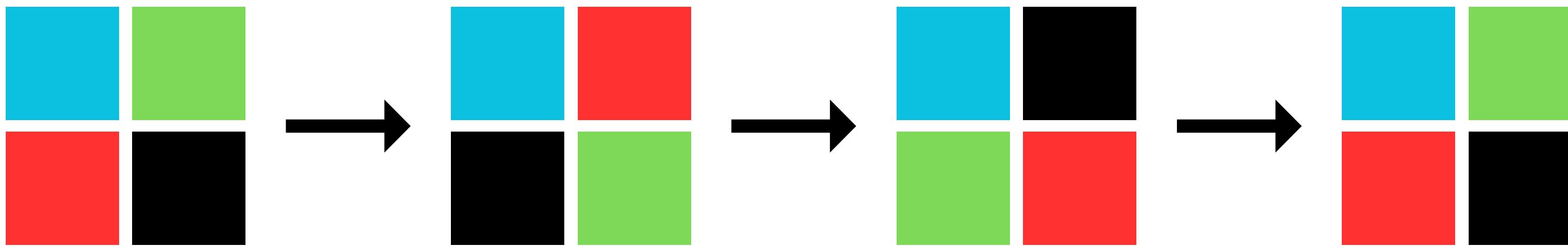


Životni vek 5 – 20 iteracija

Stabilan beskonačni ciklus

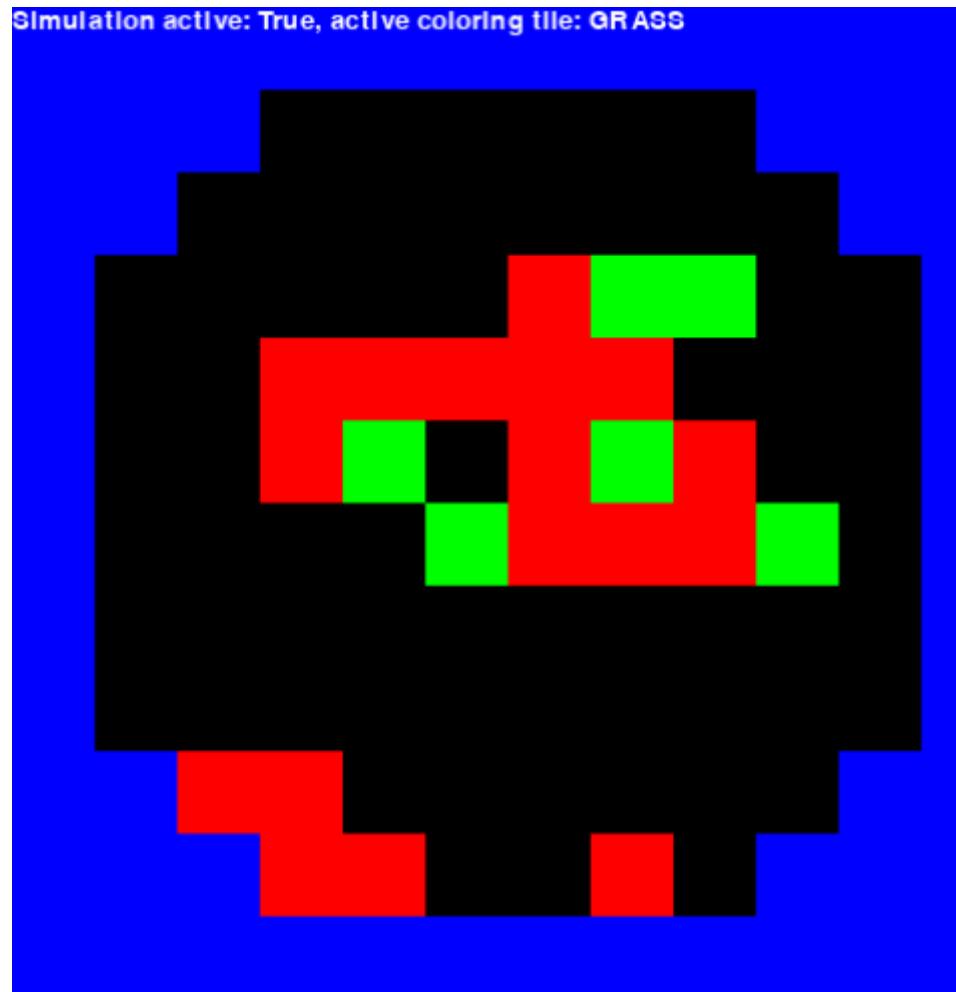
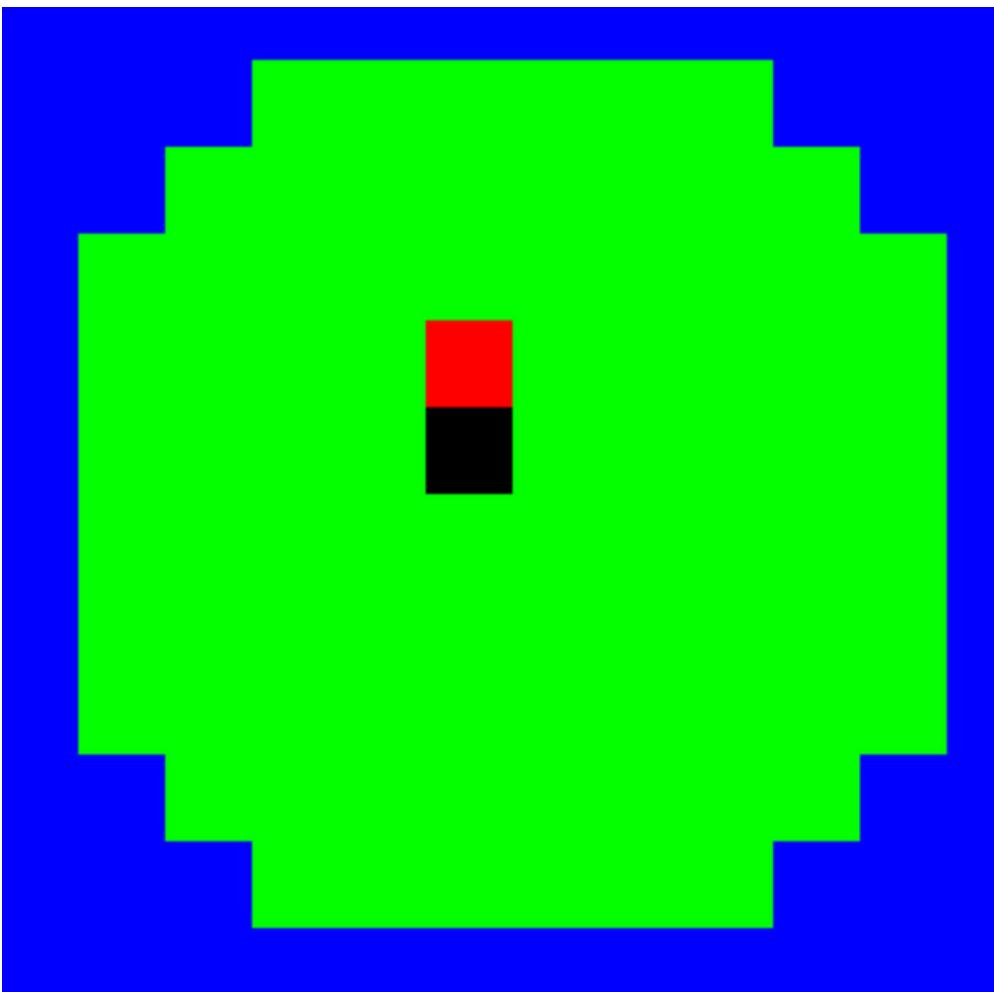


Jednostavan beskonačni ciklus

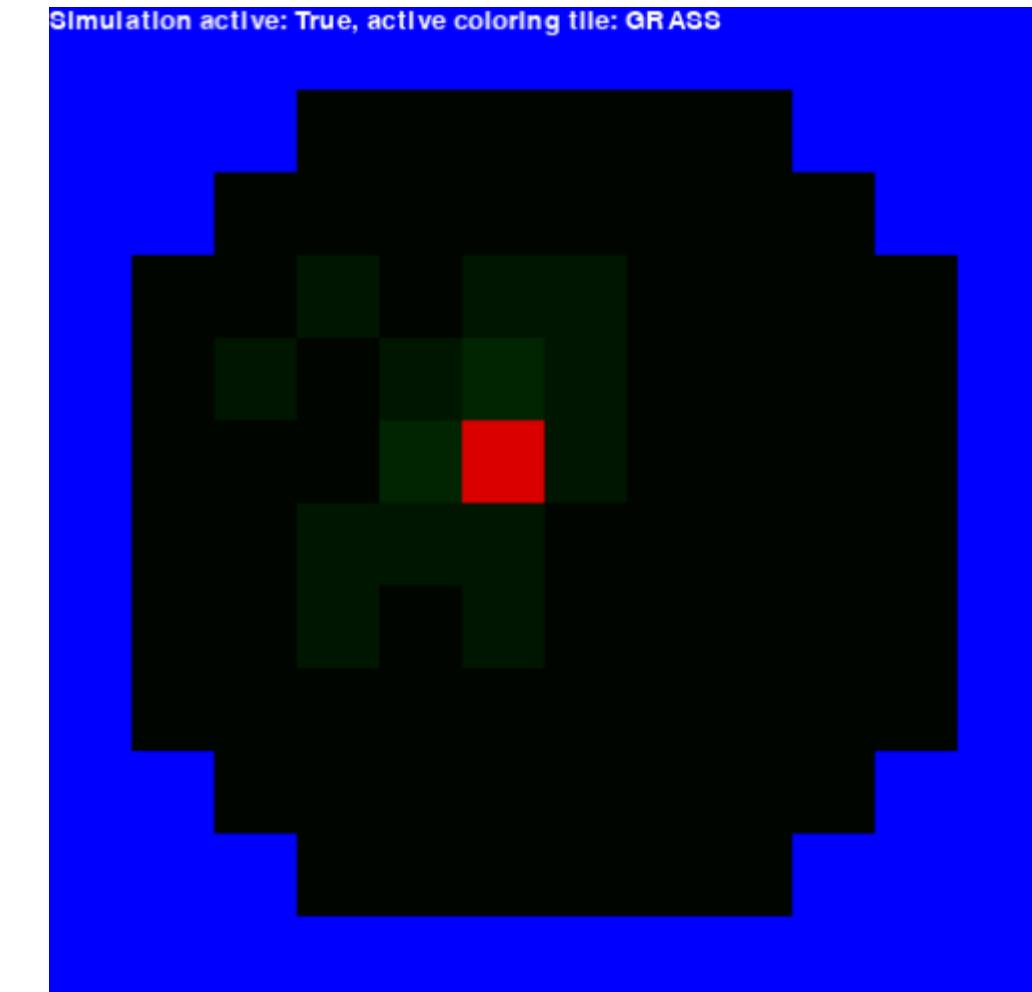


Životni vek 0

Jednostavan beskonačni ciklus



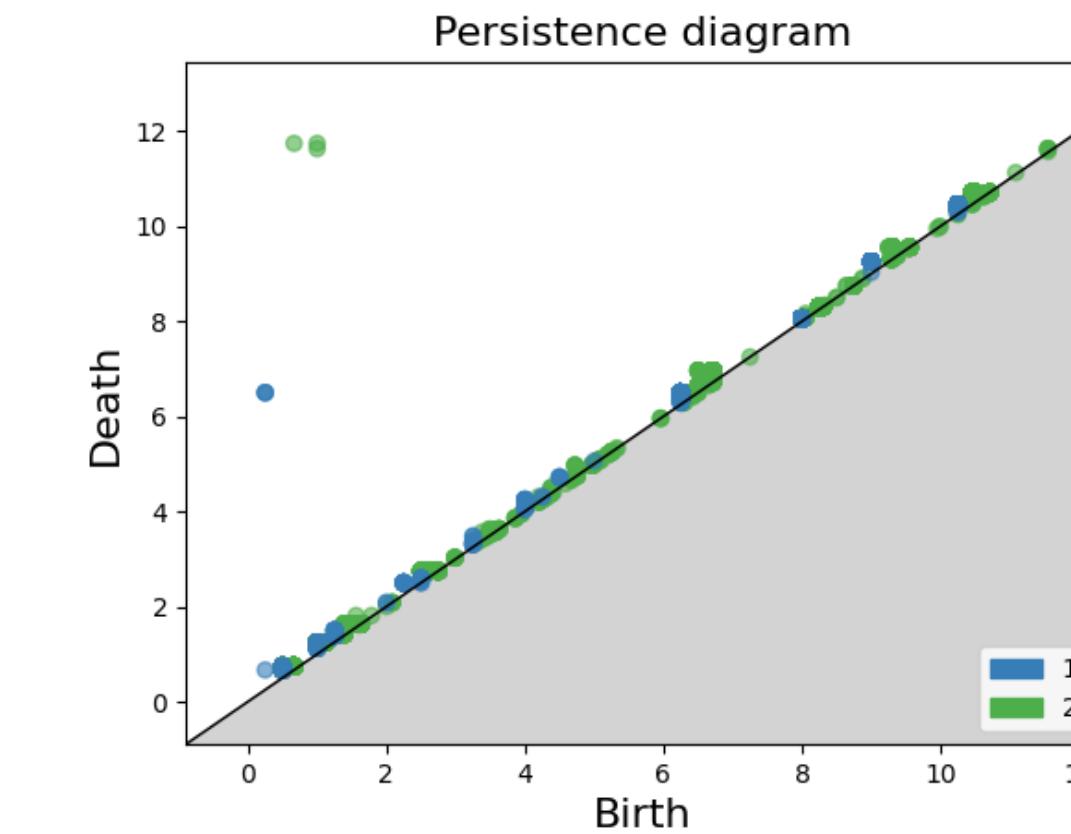
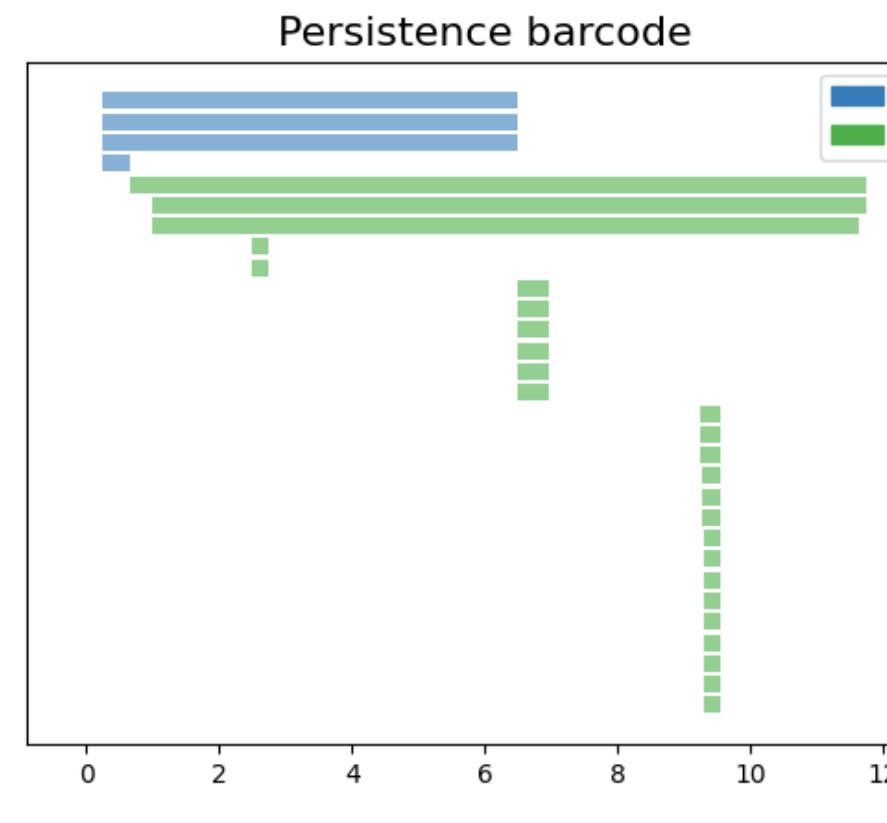
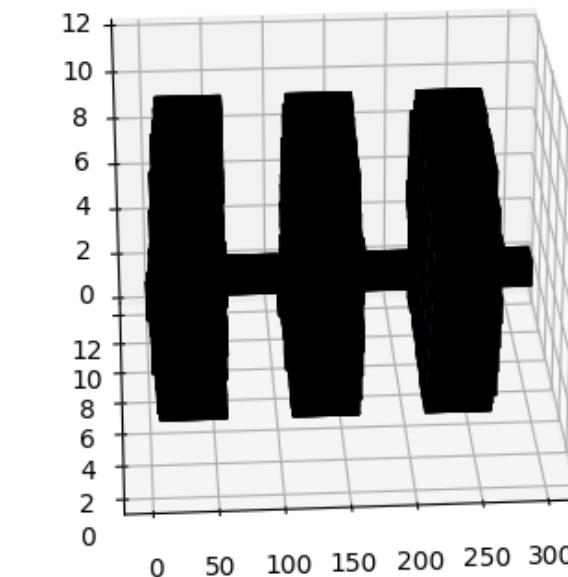
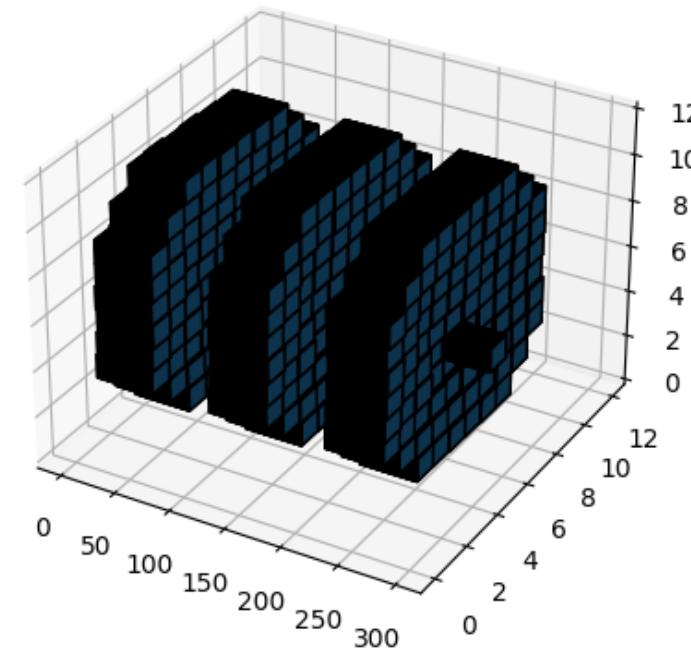
Životni vek 5
100 iteracija



Životni vek 50
300 iteracija

Dijagrami perzistencije

Životni vek 50
300 iteracija





Hvala na pažnji!

