

Adrian Gellert

Professor Maximillian Bender

CS231 Lecture A, Lab D

11 October 2022

Adrian's Project 3: Agent-Based Simulations

ABSTRACT

This project is a stepping stone from Conway's Game of Life, which used arrays instead of linked lists to create a simulation. Like Conway's Game of Life, this project used multiple classes to control different aspects of the simulation: the display landscape, the social agents, and the anti-social agents. In contrast to project 2, this project provided a preview to how inheritance works within the Java programming language (the agent classes used location information provided by the super class Agent). In addition, rather than using an array-based grid to check placement of objects, this project created a continuous space containing agents, by storing agents with different placements in a linked list of separate storage nodes. This brings us to the main goal of the project, which is to understand how linked lists and nodes function.

RESULTS

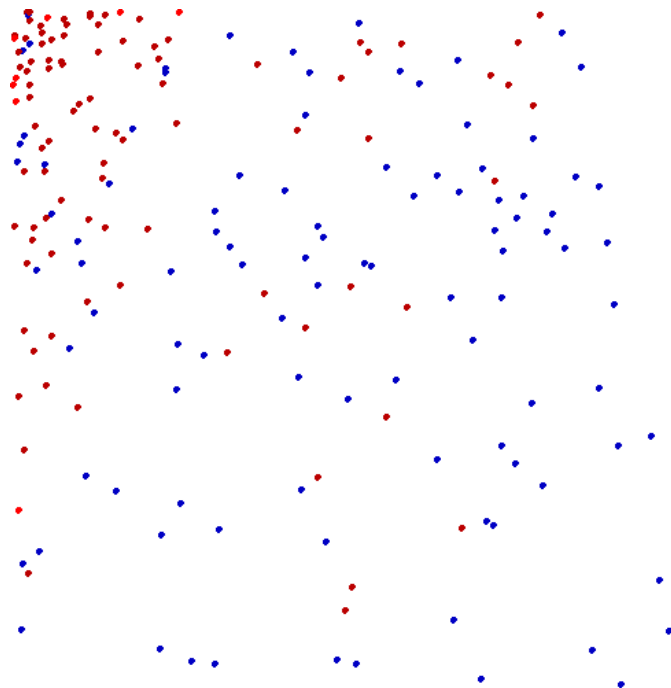


Figure 1: End of Agent Simulation (500 iterations) using radius equal to 20

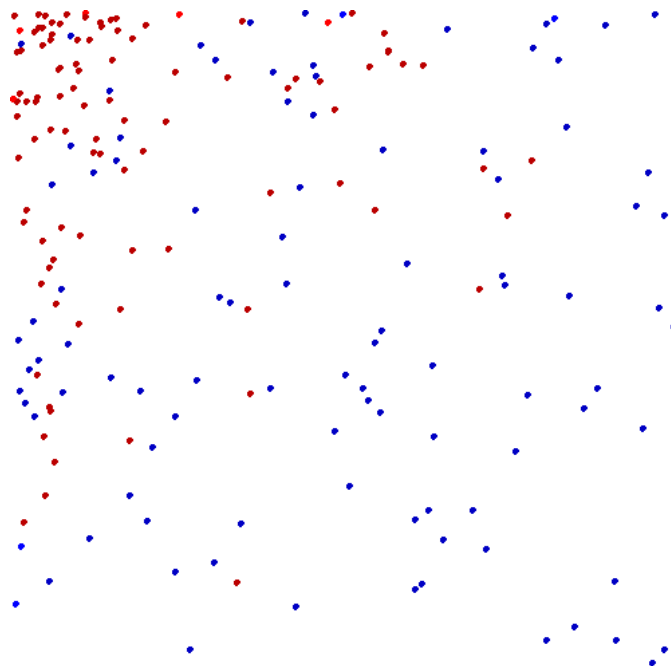


Figure 2: End of Agent Simulation (500 iterations) using radius equal to 40

NOTES

Each simulation was fairly similar. However, the two figures indicate that in later iterations the SocialAgent locations stabilize to one spot for both radii. However, the AntiSocialAgents continue to move. I also noticed that for the larger radii, the AntiSocialAgents that just moved in the previous iteration are more spread out across the landscape than in the smaller radii image.

REFLECTION

As stated in the abstract, this project used linked lists. We used linked lists instead of array lists because we wanted to keep each agent as a separate item but with pointers to other agents. We wanted each agent to store locations within its definition as an object so that we could use math to calculate their location in relation to each other. This process of using math was not possible in an array list because each object in the array list only had an index location based on the array list but did not have location information. Linked lists allowed us to compare agents to each other on a continuous landscape rather than copying and iterating through a grid based landscape as in Conway's Game of Life. In a way, this made the simulation process more efficient.

COLLABORATION

I got help from Catherine (“Jaime”) Yockey for code that we had similar errors that she had fixed. I also used pseudocode discussed in Discord and lecture code.

LIBRARIES

I imported and used the Math, Random, Color, Graphics, Iterator, ArrayList, and Collections libraries