

COMPUTER SYSTEMS RESEARCH
Fall/Spring 2007-2008
Code and Testing Writeup Quarter 3

Running Description of Code:

At the end of the second quarter, the program ran the simulation and displayed the two graphs. The agent-environment interaction was complete with a few minor errors. Population growth over time and wealth distribution with Gini coefficient graphs were displayed. There were two different colored agents but they did not interact. In the beginning of the current quarter, I got Schelling segregation working. The next thing I added was an age limit for the agents. Agents die when they have acted for a random number of time steps within a range determined at their creation. This makes them more realistic. This quarter I used an exponential function for population growth, which is more realistic and still produces the logarithmic graph characteristic of population growth. Then I fixed an error in the agent move method which had agents turning back on themselves and going to locations with less sugar. This was because they valued locations that were further away more than close locations. Lastly I implemented winters in the top and bottom of the environment with periods of spring and fall in between summer and winter. This allowed me to analyze agent migration.

Description of Testing:

During first and second quarter, I tested the accuracy of the simulation according to Axtell and Epstein in Growing Artificial Societies. I also made continual references to the book and tested my code for accuracy this quarter when implementing winters and modifying the move method for segregation. Most of the second quarter testing involved analyzing the graphs. When changing the method for increasing the population I also had to analyze the population growth graph this quarter. I ultimately settled for exponential growth because it is most realistic. As populations increase in size, more and more children are born or agents are added. The logarithmic graph was preserved also. Other testing this quarter involved minor modifications of numbers when trying to get to carrying capacity again after introducing an age limit. I modified the age limit and the number of agents which could be added to the environment at each time step. Testing was also done to decide on how to implement Schelling segregation. Certain concessions had to be made to preserve the Sugarscape rules. The Sugarscape rules are more important because they determine agent survival. In the Schelling models, agents are only supposed to move if they are unhappy. In my simulation, agents throw out possible locations which would make them unhappy. There are various different possibilities for what determines an agent to be happy. After testing I determined that an agent would be happy if he either had no neighbors or more neighbors of his own color than of the other color.