GEOG 490/590 I SPATIAL MODELING I SPRING 2015

ASSIGNMENT 2: CELLULAR AUTOMATA MODELING

Objective: To manipulate and use a cellular automata model to explore the spatial patterns of segregation emerging from individual neighborhood preferences.

Description: For this assignment you will be using a Segregation model to explore the topic of spatial segregation. This model is based on Thomas Shellings model that explores the emergence of patterns with regards to race and socioeconomic segregation in urban areas. You will adjust the parameters in the model and observe how specific preferences to be close to similar individuals influences segregation patterns. We will also begin to change some NetLogo code in the Code window in order to become familiar with this programming language.

INSTRUCTIONS

PART 1: SIMULATING THE SHELLING CELLULAR AUTOMATA MODEL

1. Open the Segregation model from the link provided on the course website. Start by reading the Info window and then being adjusting the parameters as you feel fit and watch the emerging patterns that result.

2. In lab, your GTF will talk you to about the idea of *thresholds* in complex systems. He will also tell you what parameter settings to use to explore this concept.

3. Create a plot in NetLogo that displays the percentage of unhappy cells at each time step.

4. Create a plot that displays the percentage of similar cells at each time step.

5. Create a monitor that displays the number of unhappy cells at each time step.

6. Create a new global variable called “unhappy-ratio” that is calculated as the percentage of unhappy cells divided by the percentage of similar cells.

7. Create a plot that displays the unhappy-ratio variable at each time step.

PART 2: DISCUSSION

8. Create an Assignment 2 page. Provide videos and text that address the following questions:

- What minimum level of self-preference leads to emergent patterns of segregation?
- Does a specific threshold level exist that tips the system into an unstable state?
- How does increasing levels of self-preference change the nature of segregation patterns that emerge?
- What does the change in the unhappy-ratio at each time step tell you about the relationship between self-preference and the number of similar neighbors in one's neighborhood?
- What general conclusions can be drawn from your answers to questions (i) to (iii)?

GRADING

You will be graded based on the following criteria:

• Your answer to each question in Part 2	**5 POINTS**
TOTAL	**25 POINTS**

DUE DATE:
Tuesday, April 14th at 11:59pm
*Late submissions will be penalized 5% per day.