Summer school complex systems – Project: emergence of residential segregation

In 1969 Thomas Schelling developed a relatively simple model of social segregation. This model shows how simple local interactions can lead to a surprising aggregate macro result. More specifically, it shows how agents with a mild preference for being among similar neighbours can lead in aggregate to the collapse of mixed neighbourhoods, and high levels of segregation. In this mini-project we implemented a two-dimensional version of Schelling's segregation model using the simulation platform Netlogo. We can use this simulation model to explore how sensitive the model's outcomes are to the specific parameter settings. Instructions on how to run the simulation are provided at the bottom of the webpage. Questions *a-c* rely on the computer simulation; question *d* can be answered without it. You can also choose to program the 1-dimensional or 2-dimensinal model yourself in the program language of your choosing, based on Schelling's original paper from 1969.

a. Run each of the different decision rules 1-7 (under "preference settings") multiple times, using the default settings for the other parameters. Keep track of average segregation levels and "happiness" levels for each rule (for example, in a spreadsheet). Which rule leads to the highest levels of segregation? What is your conclusion about the sensitivity of the model with regard to actors' preferences?

b. Now use Rule 3 for each group, and experiment with different settings for the number of actors. What is your conclusion?

c. Set up an experiment of your own, that is, compare some combinations of parameter settings not mentioned above yet, and motivate why this comparison is interesting. What do you find?

d. We have seen that if actors merely try to avoid being in a minority situation (i.e., Rule 3), high segregation typically emerges. However, situations with low segregation and high happiness are also feasible under this rule. How would you characterize this equilibrium, and why are we so unlikely to observe it in our simulations?

Instructions for running the simulation:
Netlogo can be downloaded and installed from the Netlogo website (In order to run the script you need to download version 5.2.1.). Alternatively, you can download and unzip a portable version for Windows from here, which can be run from a flash drive (run NetLogo 5.2.0.exe after unzipping). Also download our simulation model file (segregation_2.nlogo) from here. Open the model file from Netlogo; further instructions for running the simulation are provided on the tab "Info".

Litrature:
Schelling, Th.C., Models of segregation, American Economic Review 59: 488-493 (1969)
Schelling, Th.C., Sorting and mixing: Race and sex, in: Th.C. Schelling, Micromotives and Macrobehavior, New York: Norton 1978, 135-166
Gilbert, N. en K.G. Troitzsch, Simulation for the Social Scientist, Buckingham, UK: Open Unversity Press, chapter 1 and 2 (p. 1-26)