

INTRODUCTION TO THE SCHELLING SEGREGATION MODEL

Back in the early 1970s, before the advent of commercially available personal computers (circa 1974), Thomas C. Schelling (Co-Recipient, 2005 Nobel Prize in Economics) devised deceptively simple models to investigate ideas on complexity and self-organization.

In particular, Schelling devised a checkerboard model to demonstrate how a city comprising agents of different “classes” (e.g., religions, races, ages, castes, etc.), initially highly diversified, might suddenly “tip” into a highly segregated city if subjected to a small shock (e.g., some agents move out). The interesting aspect of this model is that the tipping can occur even if each individual agent has only a mild preference for not becoming isolated among neighbors of a different class. This famous model is now referred to as the “Schelling Segregation Model” or, alternatively, as the “Schelling Tipping Model.”

Chris Cook (ISU graduate, B.S., Comp S, 2004) has developed an open-source interactive computer demo of the Schelling Segregation Model. Exercise 2 (to be assigned next) will ask each exercise team to use this demo to conduct systematic experiments testing various “hypotheses” (conjectures) about segregation effects. In preparation for Exercise 2, this first warm-up Exercise 1 asks each exercise team to explore the demo’s current structure and capabilities and to propose possible hypotheses of interest that could be explored using the demo as currently structured.

Chris’s Schelling Segregation Model Demo, developed in *C#/.Net*, is freely available for downloading and installation (with an automated installation wizard) at the ACE Interactive Computer Demos site at <http://www.econ.iastate.edu/tesfatsi/acedemos.htm>. It comes with a ready-made and easy to use graphical user interface; no programming of any kind is required for its use.

References for Exercise 1:

- [1] ** Thomas C. Schelling, *Micromotives and Macrobehavior*, W. W. Norton & Company, New York, 1978, **Chapter 4 (“Sorting and Mixing: Race and Sex”)**, **pages 147-155** HAND-OUT
- [2] ** Christopher Cook, **“Home Page: The Schelling Segregation Model Demo” (htm)**, site accessible online at <http://www.econ.iastate.edu/tesfatsi/demos/schelling/schellhp.htm>
- [3] ** Leigh Tesfatsion, **“Experimental Design: Basic Concepts and Terminology” (pdf,43K)**, linked to my on-line Syllabus, Part I.A, site accessible online at <http://www.econ.iastate.edu/classes/econ308/tesfatsion/gamedef.pdf>

Exercise Questions: (10 Points Total)

Q1: Carefully describe the essential structural features of Schelling’s original segregation model (hereafter referred to as the “Schelling Model”) as set out by Schelling in reading [1], pages 147-155. What important social issue(s) does the model address?

Important Note: Here you are being asked to clarify *structure* and provide *interpretation*. You are *not* being asked to summarize the results of any experiments run with the model.

Q2: Carefully describe the essential structural features of Chris Cook’s Schelling Segregation Model Demo [2](hereafter referred to as “the Schelling Demo”). In the Schelling Demo, various parameter values (“initial conditions”) must be specified by the user before any experiments can be run. Identify, specifically, the nature of these initial conditions.

Q3: Carefully construct a *flow diagram* for the Schelling Demo, i.e., a diagram consisting of boxes and directed arrows among the boxes that explains the basic flow of events in the Schelling Demo once a user has specified all needed initial conditions.

Q4: In what ways, if any, does the Schelling Demo capture the essential features of the Schelling Model? In what ways, if any, does the Schelling Demo differ from the Schelling Model? Explain carefully.

Q5: Using the experimental design notes [3] as a guide, carefully develop and describe **TWO** specific hypotheses (conjectures) about segregation that your exercise group finds interesting and that could be experimentally tested using the Schelling Demo as currently constructed (i.e., with no changes to the source code required).