Temple CST 2100 Modeling & Simulation in Science and Technology Spring 2016

Problem Set 4

(Out Tue 02/16/2016, Due Tue 02/23/2016)

Problem 4

(a) Modify the Matlab files `temple_abm_population_migrate_mate_and_age.m` from the course website `http://math.temple.edu/~seibold/teaching/2016_2100/` as follows: (a) increase the speed of the agents to 0.02; (b) place initially 500 agents uniformly in the left half domain, $(x, y) \in [0, 5] \times [0, 10]$; (c) change the code so that offspring producing cells are ones that contain 7, 8, 9, or 10 agents; (d) change the code so that (in each step) an offspring producing cell produces a new agent with probability 1/4. Run your code multiple times and explain your observations. Submit (i.e., email to the course instructor and TA) your program under the filename `yourfamilyname_problem4a.m`

(b) Change the probability of a cell producing a new agent to 1/5. Describe and explain what the model produces, and why.

(c) Leave the probability of a cell producing a new agent at 1/5, but now let a cell be offspring producing if it contains 7, 8, 9, 10, 11, 12, 13, 14, or 15 agents. Describe and explain what the model produces, and why.