

Assignment 13: Simple AgentCubesOnline Models

NOTE 1: For this assignment and going forward, you should use your own account at <http://www.agentcubesonline.com> with your Wofford e-mail name (*without* @email.wofford.edu) as your username, and MC201W00f0rd as your initial password (all those round thingies are zeroes!). Use search at upper level to find your models and clone them to your new account; there is a reported bug that the “clone” button may actually be labeled “save” even when editing a model from a different account.

NOTE 2: All of your models in ACO should be documented *internally* by explaining each method (replace the words “your comments” with a short description of what that method does); and *externally* by editing the project *description* (using the markdown language; see <https://en.wikipedia.org/wiki/Markdown>).

I. Predator-Prey models

a) For the rabbits and wolves model from Assignment 12, start with the “basic model” as described in the story before you made it more realistic:

- Wolves move randomly in a field,
- Wolves have some chance of generating a new wolf, and
- If a wolf sees a rabbit directly in front of them, it eats that rabbit;
- At any given time, there is some small but increasing chance the wolf will die as it ages.
- Rabbits move randomly in a field and
- Rabbits have some chance of generating a new rabbit.

First, make sure your model “really works as intended” above, then run multiple times. What kinds of outcomes do you observe? What variation in your parameters, or changes in behavior, produce what range of observable outcomes?

b) Make a “new” World (under the World pop-down menu), of size 25x25x1. Fill the grid with your “field” agent, put in some wolves and rabbits, and run several times. What kinds of outcomes do you observe? What variation in your parameters produce what range of observable outcomes?

Copy your model and *after writing out clearly the changes in your story*, add one or more of the changes-in-story that makes your model more realistic. Test and develop your changes using the “small, 9x16” world and then compare the results for the 25x25 world. Run multiple times. What kinds of outcomes do you observe? What variation in your parameters produce what range of observable outcomes?

c) What other situations “look/feel like” and can be modeled analogous to a predator-prey relationship?

II. S-I-R models

a) For the basic Healthy-Sick model from Assignment 12:

- If a healthy person is next to at least one sick person, there is some chance that the healthy person changes into a healthy person.
- Healthy and sick persons both move randomly on campus.

Run the model for different numbers of healthy and sick persons and for different chances of getting sick. Run multiple times. What kinds of outcomes do you observe? What variation in your parameters produce what range of observable outcomes?

Add some recovery method. **START WITH A STORY OF RECOVERY.** Compare recovery with immunity to recovery without immunity. Run multiple times. What kinds of outcomes do you observe? What variation in your parameters, or changes in behavior, produce what range of observable outcomes?

b) Make a “new” World (under the World pop-down menu), of size 25x25x1. Fill the grid with your “campus” agent, put in a number of healthy individuals and a few sick individuals, and run several times. What kinds of outcomes do you observe? What variation in your parameters produce what range of observable outcomes?

Copy your model and *after writing out clearly the changes in your story*, add one or more of the changes-in-story that makes your model more realistic. Test and develop your changes using the “small, 9x16” world and then compare the results for the 25x25 world. Run multiple times. What kinds of outcomes do you observe? What variation in your parameters produce what range of observable outcomes?

c) What other situations “look/feel like” an SIR model?