Laboratory 8: Deconstructing and modifying an Agent-Based Model: NetLogo

1. The goals of the explorations today are for you
   a. to get comfortable "deconstructing" an existing model to understand its structure,
   b. to gain confidence in modifying the code, and
   c. to motivate you to learn to code at some point in the future.

   (Note: *deconstruction* is the leading learning mode for most scientific programmers . . . *run, modify, write*).

2. **Turning Code to a Story**: In class today we demonstrated how to turn a simple story into a code. We'll start with the Susceptible (healthy) → Infected (sick) model so you see that you get the same result as the "systems dynamics" approach. The approach we will take is "directed inquiry" so I'll start by suggesting questions, observations, and changes.

   a. Recall the basic story:
      i. If a healthy person is next to a sick person, there is a chance that the healthy person changes into a sick person.
      ii. Healthy and sick persons move randomly in the world.
   b. Start by going to: http://webs.wofford.edu/panoffrm/COSC150/SimplerSick.html
   c. Run the program several times. Each time hit "Setup" then "go".
      i. Observe what happens.
      ii. Does the model always run the same way in detail (is it deterministic or stochastic?)?
   d. Follow the instructor to look at the actual code and make various modifications.
      i. Each time you change the code, you must RECOMPILE before running.
      ii. Keep track of which part of the code is changed and its effect.
      iii. Which changes are "cosmetic" (semantics) and which really change the model?

3. **A More Complex Story:** Now your task is to try to determine the "story" of DiseaseModel by running it, changing it only from the "outside," that is, by changing the given parameters and observing the effects of those changes, then deciding if you want to change the code itself.
   a. Start by going to: http://webs.wofford.edu/panoffrm/COSC150/InfectionV6.html and each time you want to run the model, hit "Setup Model" then "Run/Pause"
      i. Make a list of all of the adjustable parameters accessible from the "GUI" (Graphical User Interface)
      ii. Run the program multiple times, changing one parameter at a time (reload the model if you want to rest the defaults) and observe the behavior
   b. Record your observations for your multiple runs
      i. What driving questions are sparked by your "poking around"?
      ii. Feel free to change the actual code, too, if you want.
   c. NOTE 1: if you "EXPORT" the html version of the code, you can run it "offline".
   d. NOTE 2: much more background information is available on the Shodor website: http://www.shodor.org/featured/DiseaseModel including links to the Mac/PC version of the code if you want to download.

4. Write a summary of your explorations and lessons learned. How can you model the effect of social distancing in this kind of model? **EMAIL a PDF by FRIDAY 5 pm.**