Lab 7, Part 2

Part 2 (50-60 minutes) For Part 2 you will have new lab partners, with whom you will work also on Friday and for HW2. You will not submit anything from Lab Part 2 (the material below), but the work you do will become part of HW2.

In Lab 2, you will begin to experiment with a very simple pandemic model, with the following guidelines. *Note that none of these numbers are intended to represent the current covid-19 pandemic, but are for use for the purposes of learning programming*.

- Persons (agents) move randomly around the world exposing or being exposed to a virus.
    - Each person is in one of the following four states:
        - infected and symptomatic,
        - infected and asymptomatic,
        - not infected, or
        - previously infected and immune.

      Represent these states with colors.
    - A slider should determine the initial number of persons in the experiment, ranging in increments of 25 from 50 to 1000.
    - Persons move around the world in steps of size 1 per tick. Movement should be random (like a wander procedure) except that *persons will avoid symptomatic individuals* trying to avoid being in the same patch.
    - Assume that a person who gets the virus has a 2% probability of dying, and a 50% probability of being symptomatic. (Note that for this first simple model, we are not modeling the period in which a person might be contagious but pre-symptomatic. We will begin with the assumption that if a person is exposed and is going to catch the virus, they will catch the virus in 2 ticks as either symptomatic or pre-symptomatic.)
- A slider should determine the percentage of people who wear masks.
- Use four global variables to determine the probability of the virus spreading from an infected person to an uninfected person at each time step, if the two persons are on the same patch. If that spread happens, the person will catch the virus in 2 turns and become contagious. (Note in this example we will use patches to represent proximity, rather than radius.) The four probabilities depend on who is wearing a mask.
    - No masks: p1 = .5
    - Uninfected person with mask: p2 = .35
    - Infected person with mask: p3 = .15
    - Both persons with masks: p3 = .1

Discuss how you could extend this model.

- How could you model a pre-symptomatic stage when a person is contagious and will become symptomatic? How could you model variation in the time it takes to become symptomatic?
- Consider some spatial models that might be more realistic in terms of movement. Could you model at a local scale—for example a college with common meeting spaces? A global scale where there is restricted travel between countries?