Reed-Frost epidemic model

https://www.osc.edu/education/si/projects/epidemic

Inspired by Problem 1+2

Write a program that emulates the mathematical epidemic model of Reed and Frost. For purposes of simplicity, fix the number of individuals in the population at 1,000 and fix the maximum number of time periods at 25. However, allow the probability of effective contact and the number of immunes to vary so that the effects of social service programs such as immunization or prevention education can be observed. Thus, the only input to your program will be the initial number of immunes and the effective contact probability.

For output, your program should display in each time period the number of:

1. susceptibles
2. active cases
3. immunes

Run the program many times while varying the number of immunes and the probability of effective contact. Sensitize yourself to epidemic patterns and variations.

Modify the basic code, rewriting it on a **lattice,** assuming that all the individuals are standing next to each other in a room.

Like before, some will be immune. Let one individual be an active case. He can now infect **only** his immediate neighbors. In the next time period, those people who got sick now have a chance to infect their neighbors and so on.

You will need the same input and output that was described in Problem 1. In addition you may want to input the position of that first active case.

The most dramatic output, though, will be a two-dimensional grid that shows all the individuals in the room and what state they are in (i.e., sick, immune, or contagious). As time periods go by, you can watch the disease spread through the room.

Run your program many times with different input parameters. How does the pattern of the epidemic flow change with affective contact probability?