

Lab 3 (Due Mar 1st)

Write a simulator that can track how a computer worm propagates in a network of 10000 computers, such that $n < 10000$ of these computers are vulnerable to this particular worm.

In each step of the simulation, each infected computer randomly picks d other computers and tries to infect them. Let's assume these d computers are connected to the infected computer over the Internet. If a computer is attacked, then it is infected only if it is vulnerable. If an infected computer is attacked, it will be reinfected according to a random reinfection probability p . That also means another copy of the worm is running on this machine. When this machine tries to affect another vulnerable machine, let's assume only one copy of the worm propagates to the target machine.

Run a number of experimental simulations for various values of the parameters n , d , and p , including the cases $p=0$, $p=0.5$, and $p=1$. Keep track of how many infections and reinfections occur on each vulnerable computer and the total numbers of each category of vulnerable computers.

Try to find parameter values that cause the worm propagation to die out after a few rounds without infecting all the vulnerable computers and also try to find parameter values that cause the worm to overload all vulnerable computers, i.e., the computer runs >100 copies of the worm.

Your simulator should provide a GUI (Graphic User Interface) or a Window to allow a user to enter different simulation parameters. In addition, your simulator needs to visualize the worm propagation process. For example, you could use white squares to indicate regular computers, black squares for vulnerable computers, orange squares for infected computers, and red squares for re-infected computers. You need to submit all .java files of your solution on D2L.