**CSC 407/607 Network Analysis**

**Fall 2020**

Homework #4

This is a group-based homework. Feel free to continue discussion with your group members. But once discussions are finished, you will need to run the program and generate results yourself for submission.

Using the preferred programming language that your group has chosen, build a simulator as follows:

1. Assume there are N=1,000 people in the small place. Use a simple array to record the status of each person, call it “infected”. For example, infected[1]=TRUE if user 1 is infected.
2. Each infected individual may come into contact with  ratio of all people in each round of infection.
3. Each contact between an infected individual and a healthy individual has a chance of that the healthy individual will be infected.
4. Output the number of infected individuals after each round. There are T=2,000 rounds.
5. Use some reasonable and , for example, =0.005 and =0.01, to generate the curve of total infection as a function of rounds.
6. Repeat step 5 and simulate the fact that each infected person stays infectious for rounds, after which s/he becomes immune forever. Note that you may want to choose a slightly larger set of and for your results to be interesting.
7. Repeat step 6 and simulate the fact that each immune person stays so only for rounds, after which s/he may be infected again. Note that you may want to choose a slightly larger set of and for your results to be interesting.
8. is defined as the total number of new infected caused by each infected individual, on an average. Compute for step 6 and 7.

What to submit: codes and snapshots of program execution for Step 5, 6, 7, and 8. Your codes should be well-commented.