Trevor Bright
CSE 622
5066452

Assignment #5

The program I wrote was all in Python. I made two functions that perform the simulations similarly, but one went for a defined number of minutes and N while the other ran until a specific percent of people that knew the rumor was achieved for N=10000. For each, I started by creating inserting N-1 number of students that did not know the rumor into an array, then added one more that did know the rumor. Then started the loop of the simulation where the two functions differ. In the standard one where the minutes and N is passed, it defines a for loop that increments until it hits the target minutes, while the other is a while loop that goes until the percentage is equal to expected percentage that is passed. Both if them start the minute by pairing all student randomly, going through each pair and calling the spreadRumor function, which will add 1 to the number of times the other student has heard the rumor if it knows it 50% of the time. It then breaks up the pairs, putting all student back into one array, then counting the number of students that have heard it once, have heard it twice and are no longer spreading it, and students that haven't heard it at all.

I noticed that similar to the infection disease modeling, it grew exponentially. The more people that knew the rumor, the higher chance it would spread. It wasn't perfectly exponential due to the rule of stopping the spreading of the rumor if the student has heard it twice.

Results

Below are the averages after running the simulation 10 time for each different N value. There are three different lengths it ran for: 10, 20, and 40 minutes.

```
Average N=100: 5.600%
Average N=1000: 0.660%
Average N=10000: 0.070%
```

10 minutes

```
Average N=100: 9.400%
Average N=1000: 1.050%
Average N=10000: 0.113%
```

20 minutes

```
Average N=100: 18.800%
Average N=1000: 2.210%
Average N=10000: 0.209%
```

40 minutes

These are the times returned when the simulation achieved 10% and 50% of the population knowing the rumor with N=10000.

Trevor Bright
CSE 622
5066452

```
For N=10000
Average time 10% known: 2083
Average time 50% known: 13716
```