

Wenyue Wang, Shushu Zhao

- For this project, we include three files, two .c files and a .h file. We mainly used a big while loop to iterate with days, on each day, we called `update_neighbor` function to update the state of how current node infected by other connected nodes. In addition, we introduced the small-world map and disconnect activity for more randomness.

Check of correctness

- We check with a complete set, and track the number of all kinds of people day by day, and we got the trend as follows:
- From the general trend we can see as time goes by, infection number increase then decrease, while s number keeps decreasing and r number keep increasing

```
day1: s:499, i:1, r:0
day2: s:498, i:2, r:0
day3: s:497, i:3, r:0
day4: s:494, i:5, r:1
day5: s:491, i:7, r:2
day6: s:489, i:9, r:2
day7: s:488, i:10, r:2
day8: s:486, i:12, r:2
day9: s:483, i:15, r:2
day10: s:480, i:18, r:2
day11: s:476, i:22, r:2
day12: s:470, i:28, r:2
day13: s:463, i:34, r:3
day14: s:458, i:36, r:6
day15: s:448, i:45, r:7
day16: s:436, i:51, r:13
day17: s:421, i:65, r:14
day18: s:402, i:82, r:16
day19: s:376, i:104, r:20
day20: s:348, i:119, r:33
day21: s:315, i:143, r:42
day22: s:276, i:179, r:45
day23: s:231, i:216, r:53
day24: s:201, i:237, r:62
day25: s:170, i:252, r:78
day26: s:145, i:267, r:88
day27: s:113, i:286, r:101
day28: s:89, i:297, r:114
day29: s:72, i:309, r:119
day30: s:56, i:311, r:133
day31: s:40, i:305, r:155
day32: s:24, i:307, r:169
day33: s:19, i:298, r:183
day34: s:17, i:286, r:197
day35: s:12, i:277, r:211
day36: s:9, i:267, r:224
day37: s:8, i:258, r:234
day38: s:4, i:253, r:243
day39: s:3, i:245, r:252
day40: s:2, i:235, r:263
day41: s:2, i:222, r:276
day42: s:1, i:208, r:291
day43: s:0, i:196, r:304
day44: s:0, i:186, r:314
day45: s:0, i:178, r:322
day46: s:0, i:173, r:327
day47: s:0, i:163, r:337
day48: s:0, i:152, r:348
day49: s:0, i:145, r:355
day50: s:0, i:134, r:366
day51: s:0, i:129, r:371
day52: s:0, i:122, r:378
day53: s:0, i:112, r:388
day54: s:0, i:107, r:393
day55: s:0, i:103, r:397
day56: s:0, i:98, r:402
day57: s:0, i:92, r:408
day58: s:0, i:86, r:414
day59: s:0, i:81, r:419
day60: s:0, i:71, r:429
day61: s:0, i:69, r:431
day62: s:0, i:67, r:433
day63: s:0, i:62, r:438
day64: s:0, i:60, r:440
day65: s:0, i:58, r:442
day66: s:0, i:54, r:446
day67: s:0, i:51, r:449
day68: s:0, i:47, r:453
day69: s:0, i:44, r:456
day70: s:0, i:44, r:456
day71: s:0, i:42, r:458
day72: s:0, i:40, r:460
day73: s:0, i:40, r:460
day74: s:0, i:40, r:460
day75: s:0, i:38, r:462
day76: s:0, i:36, r:464
day77: s:0, i:35, r:465
day78: s:0, i:32, r:468
day79: s:0, i:29, r:471
day80: s:0, i:28, r:472
day81: s:0, i:26, r:474
day82: s:0, i:23, r:477
day83: s:0, i:21, r:479
day84: s:0, i:21, r:479
day85: s:0, i:21, r:479
day86: s:0, i:20, r:480
day87: s:0, i:19, r:481
day88: s:0, i:18, r:482
day89: s:0, i:18, r:482
day90: s:0, i:18, r:482
day91: s:0, i:18, r:482
day92: s:0, i:18, r:482
day93: s:0, i:17, r:483
day94: s:0, i:17, r:483
day95: s:0, i:16, r:484
day96: s:0, i:15, r:485
day97: s:0, i:14, r:486
day98: s:0, i:14, r:486
day99: s:0, i:14, r:486
day100: s:0, i:13, r:487
```

Experiment results

Here, we use numAgents = 500, numIteration = 100, numNearestNeighbors = 10, pInfection = 0.05, pRecovery = 0.08

trial	pReplaceRandom	pDisconnect	Max num of #infected	Iteration num of max infected num	Current infected	Current recovered
1	0	0	22	23	0	56
2	0.25	0	221	30	3	492
3	0	0.5	27	86	18	97
4	0.25	0.5	240	28	1	490

From the results we can see that if we did not change the map to small-world map and did not add the Disconnect probability, the infected number will be really low. In addition, if we only have the disconnect, the infected will still be low but the max infected number will appear relatively late.

Division of labor

- Wenyue Wang: build the graph, write report
- Shushu Zhao: implement the model, write report