CSC 254 Assignment 5 Report

By LiWei Jiang and YuanChen Tao

1. Intro

   This assignment was originated from the game called Conway's game of Life which users need to input points on the panel and due to the rule of organisms, they'll either live or die based on the positions. The assignment asked us to allow machine (or computer) to simultaneously run the program on different number of threads or executors instead of just on one which could largely boost the speed of operations. While more threads could make the running speed faster, it could turn slower when the threads or executors exceeds 32. The following data will tell you about that.

2. Included Codes

   Executor Package (Including Coordinator.java and Life.java)

   Thread Package (Including Coordinator.java and Life.java)

3. Running Instructions

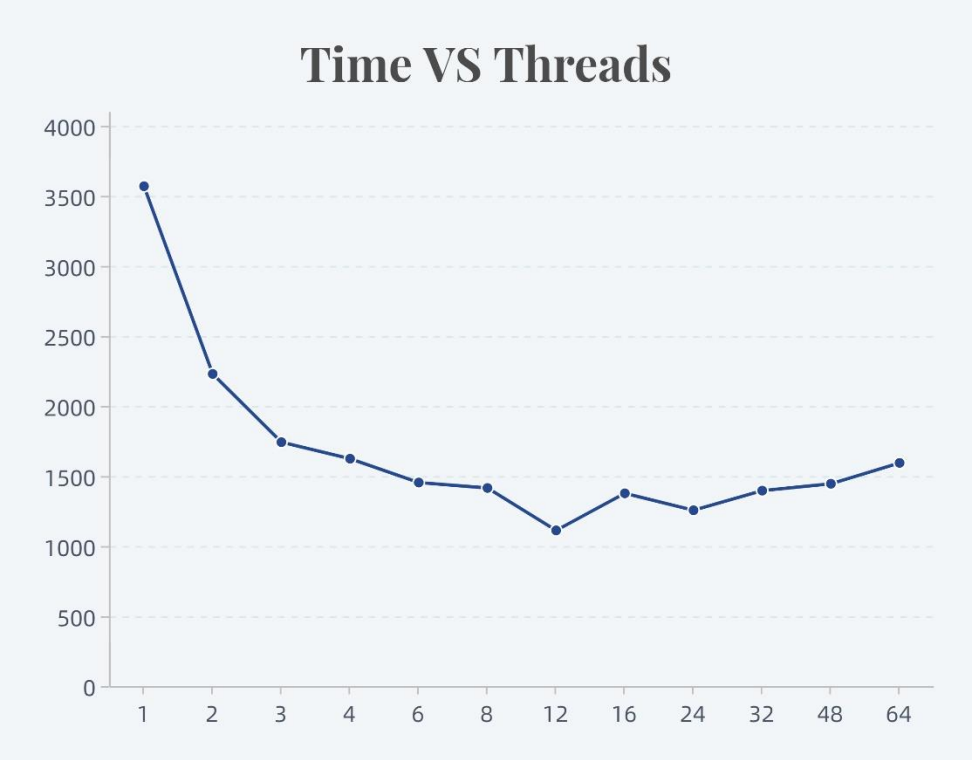
   To run the program in IDE:

   Import the whole package in and start running in the terminal. First, we need to go to the package you need to run which is either the executor version or the threads version. Then, after compiling, we could use the command:

   java Life -s (number) -t (number)

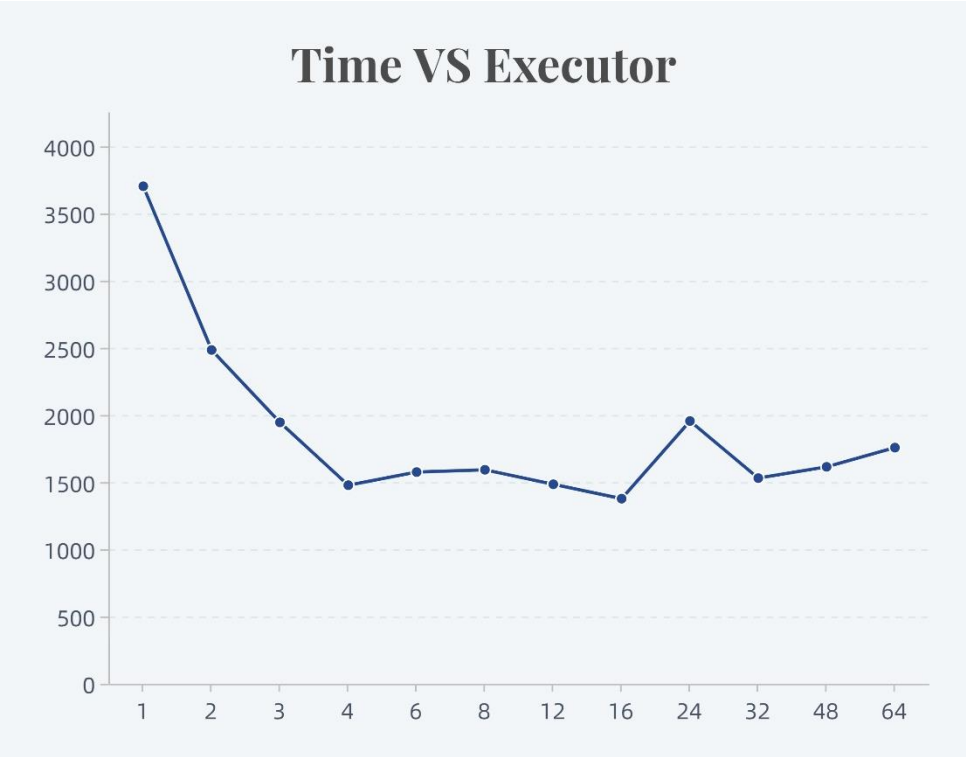
which -s num represents number of iterations of a spin loop to execute per dot when updating the board and -t num represents number of threads (max) that should be running at any given time.

4. Speed Up Analysis



threads	Speed (in milliseconds)
1	3569
2	2229
3	1742
4	1624
6	1454
8	1415
12	1112
16	1377
24	1256
32	1396
48	1445
64	1594

These two pieces of data represents the thread version. We could see from the graph, the speed remains fluctuate until the threads turned over 12. We could see the speed largely increase after.



threads	Speed (in milliseconds)
1	3703
2	2484
3	1945
4	1477
6	1575
8	1592
12	1484
16	1377
24	1955
32	1530
48	1614
64	1757

These two pieces of data represents the executor version. We could see from the graph, the speed remains fluctuate until the threads turned over 48. We could see the speed largely increase after.

5. Extra Credit

   We modify the program so that it performs work at each time step proportional to the number of occupied cells, rather than the total number of cells on the board.