INFO6205 Program Structures and Algorithms

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GitHub: https://github.com/laiyumi/INFO6205_final_project.git

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1 Task: TicTacToe

2 Evidence

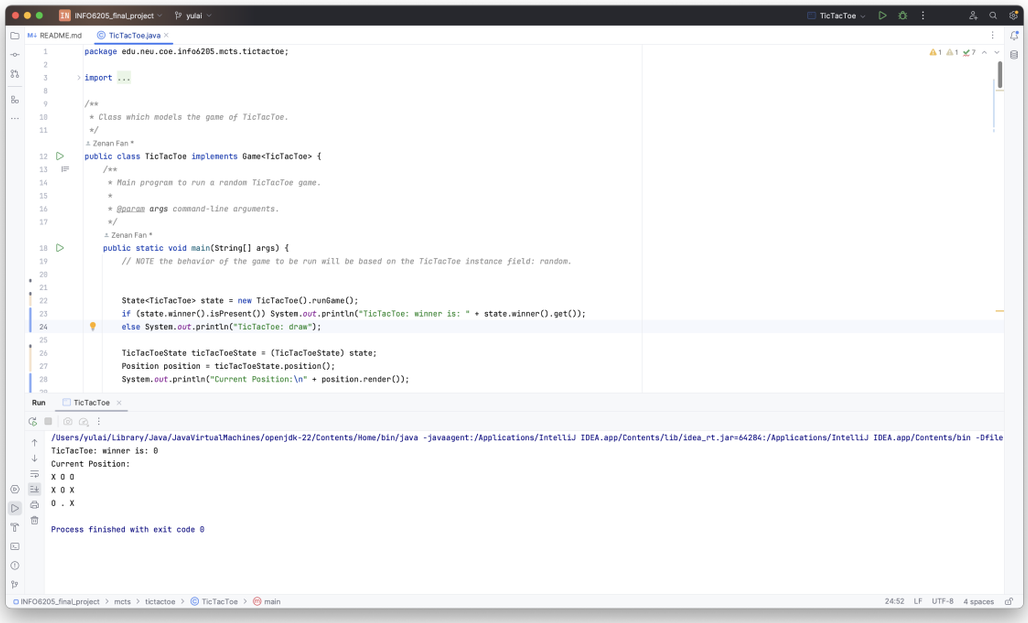

Figure 1: Print out the result

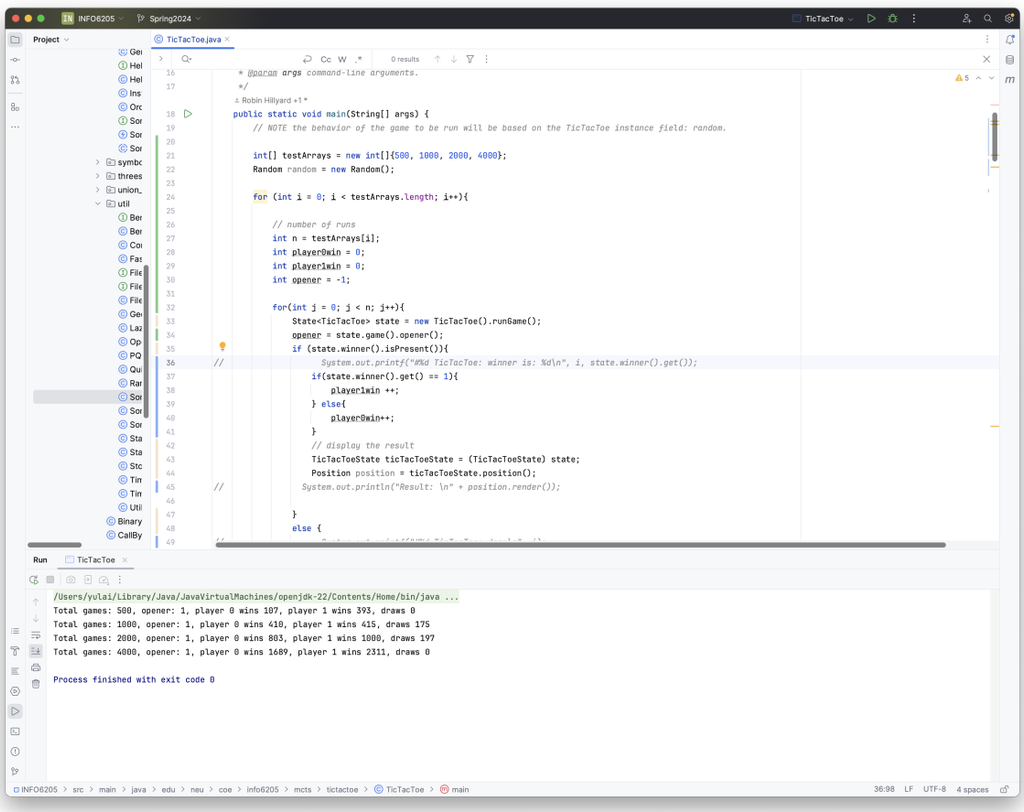

Figure 2: Default setting

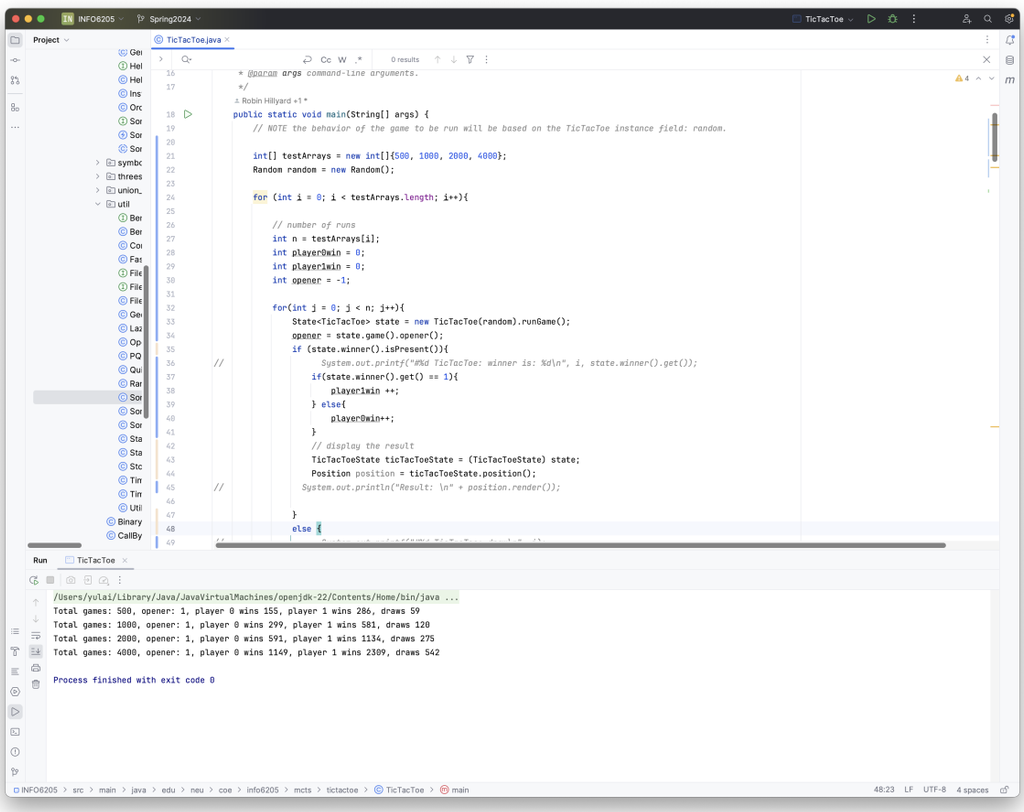

Figure 3: Random setting

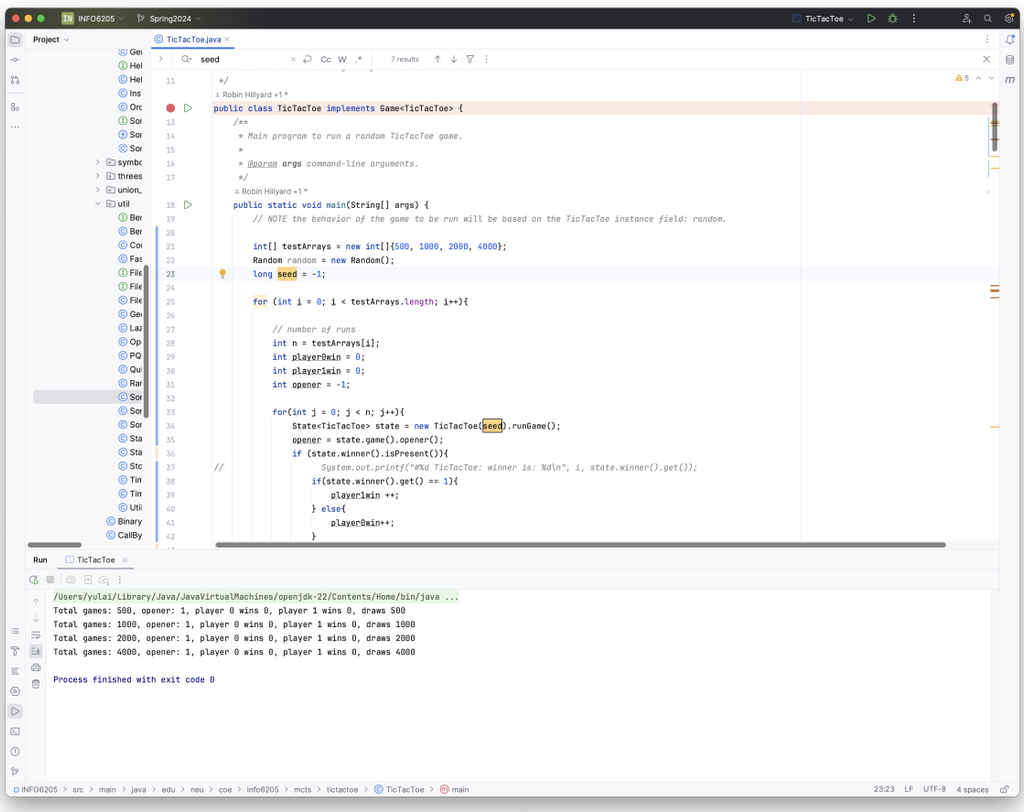

Figure 4: Seed = -1

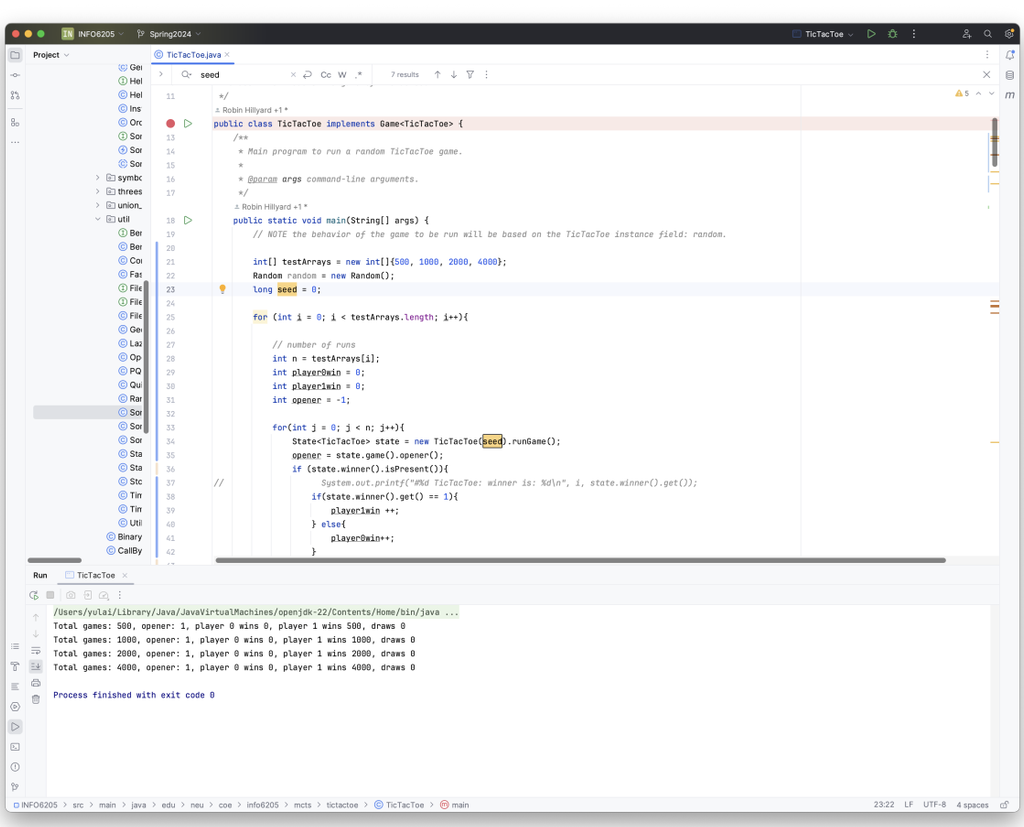

Figure 5: Seed = 0

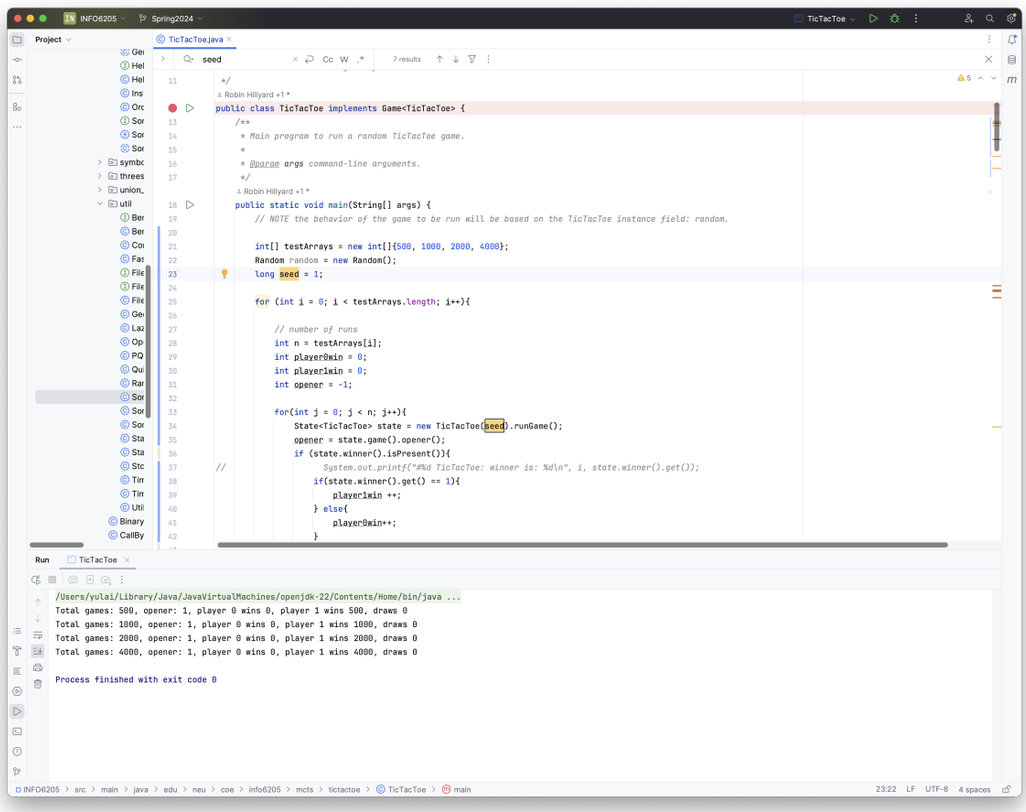

Figure 6: Seed = 1

3 Observations and Conclusions

TicTacToe (default)

Runs	N = 500	N = 1000	N = 2000	N = 4000
Player 0	107	410	803	1689
Player 1 (opener)	393	415	1000	2311
Draw	0	175	197	0

TicTacToe (Seed = -1)

Runs	N = 500	N = 1000	N = 2000	N = 4000
Player 0	0	0	0	0
Player 1 (opener)	500	1000	2000	4000
Draw	0	0	0	0

TicTacToe (Random)

Runs	N = 500	N = 1000	N = 2000	N = 4000
Player 0	155	299	591	1149
Player 1 (opener)	286	581	1134	2309
Draw	59	120	275	542

TicTacToe (Seed = 0)

Runs	N = 500	N = 1000	N = 2000	N = 4000
Player 0	0	0	0	0
Player 1 (opener)	0	0	0	0
Draw	500	1000	2000	4000

TicTacToe (Seed = 1)

Runs	N = 500	N = 1000	N = 2000	N = 4000
Player 0	0	0	0	0
Player 1 (opener)	500	1000	2000	4000
Draw	0	0	0	0

Figure 7: Test TicTacToe with random and seeds

From Figure 1, we can see that our code has achieved the correct conclusion. And our subsequent series of tests can also prove that my game implementation is in line with the actual situation from the data layer main.We can find from a large number of data experiments that the relationship between the two players is not one-sided, which is in line with the situation of random generation. But at the same time, the winning rate is always the same person, which is also in line with the characteristics of this game. Because tic-tac-toe can only take nine steps at most, one player can take five, and another can take four steps. So, the player who takes five steps will have a particular advantage, which is also reflected in the final winning rate. Furthermore, we observed that using seeds -1 and 1 creates deterministic conditions that always result in a win for the player who goes first. On the other hand, a seed of 0 results in all draws, indicating an implementation that ensures no victories.