

Sai Chaithanya Teja Salkapuram

**A Report on 2048 Project:**

Step 1: I have Cloned all the required files on my computer in order to make the project work. Initially , I just played some random games in order to get familiar with the 2048 game. Next , I played some more games with MinMax.py to get more familiar with the game.

Step 2: In this step, I have created a file named “[MyAgent.py](#)” and copy pasted the [MinMax.py](#) code into the new file. Then I just ran some games in order to get the score like I did 5 tests and I got an average score of ~11K. This was the Professor’s code , it gave a good average score of approx ~11K.

Step 3: I pushed this code into git in order to just check my position with the other students , and shockingly I didn't get my name on the leaderboard ,which was strange and I don't know why this had happend.

Step 4: And finally I tried a different version of code , first I only tried to change the move order function and got a low score, I did not push this into my git repo as my name is not appearing on the leaderboard ,I don't know this is happening. And I tried with 0.1 sec ,I got an average score ~4k to 5k, for two or three runs.

Step 5: Now, I did many attempts in order to get better results. I did tune the code by writing a heuristic function, and I did like 10 runs with 0.5 sec as a time limit.

1st:13660,  
2nd:11872  
3rd:6484  
4th:10916  
5th:6044  
6th:5100  
7th:11584  
8th:6724  
9th:6848  
10th:5240

Total avg score: 8853.

This was the best I could do and got these results.

Step 6: And did many tuning on the code but in the first attempt itself I got like ~6k,in the first run, and the same like 3k or sometimes 5k on the initial runs.

Step 7: Once again changed the parameters in the heuristic function and did 5 runs

And I got an average score of ~4k to 5k. I know this is the worst score but I am still trying to do better. And yet, again I pushed my code, but the leaderboard don't have my name on that list.

#### Step 8: **FINAL VERSION**

This is my best version with an average score of ~12240 with 28 runs on my computer. I know it's not the best version but for me, this is the best version for me with 0.5 secs per move. Here are the scores for the 28 runs:

5782,15433,15500,14372,22264,11804,15608,7088,13336,6936,14980,7528,6752,11624,  
6984, 14996,14112,13148,14964,15644,13972,14964,11888,14860,11724,2936,11644,11884

I did push this version of my code to github, and yet again, still, there are no roots of my name on the leaderboard, I don't know why. And I have mailed the Professor 3 times but Sir never gave me a reply about this. This is my best version.

#### Step 9: **My FINAL UPDATED VERSION**

Professor gave me a reply and fixed the issue of my name not appearing on the leaderboard. And now I am able to check where I am when compared to my fellow classmates. Professor also gave me extra 24hrs to try and develop a better version of my code. So, finally after many successful failure attempts from no name on the leaderboard to my name on the leaderboard.

This 2048 AI agent uses expectimax search combined with alpha-beta pruning at MAX nodes for faster pruning and deeper lookahead. Its heuristic smartly blends snake path weighting, monotonicity, smoothness, merge potential, corner anchoring, and empty tile bonus to maintain an organized, merge-friendly board. Iterative deepening allows it to find the best move within a strict time limit while move ordering prioritizes UP and LEFT to corner big tiles safely. Balanced weights help avoid over-penalizing and ensure the agent builds higher merges consistently. Overall, this design achieves stable, strong scores.