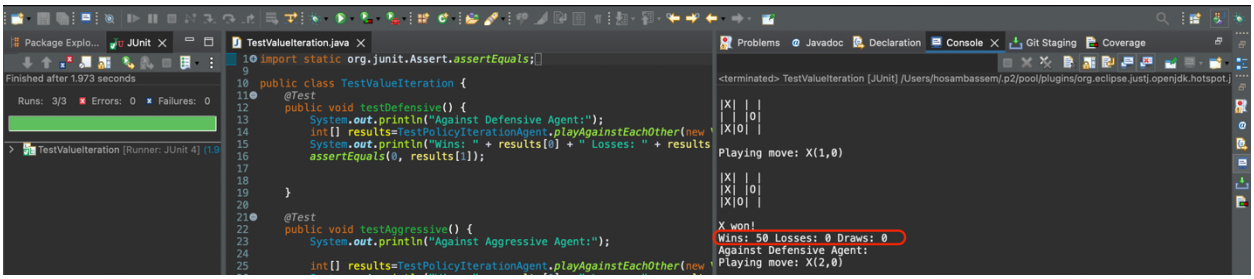
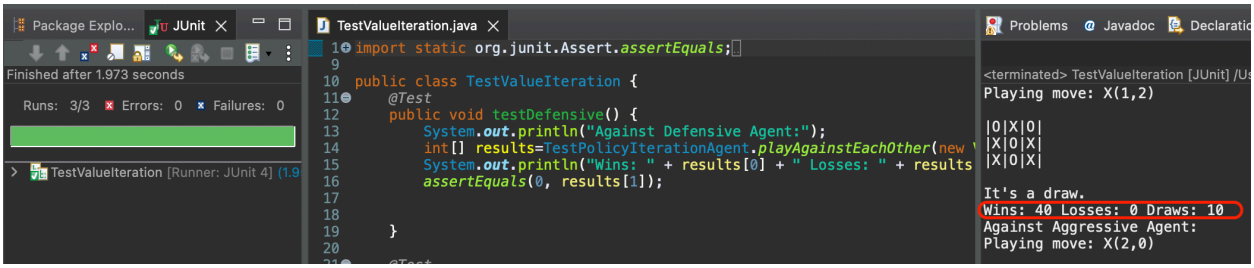
Hosam Farouk

Value Iteration Agent ***VS*** Random Agent:



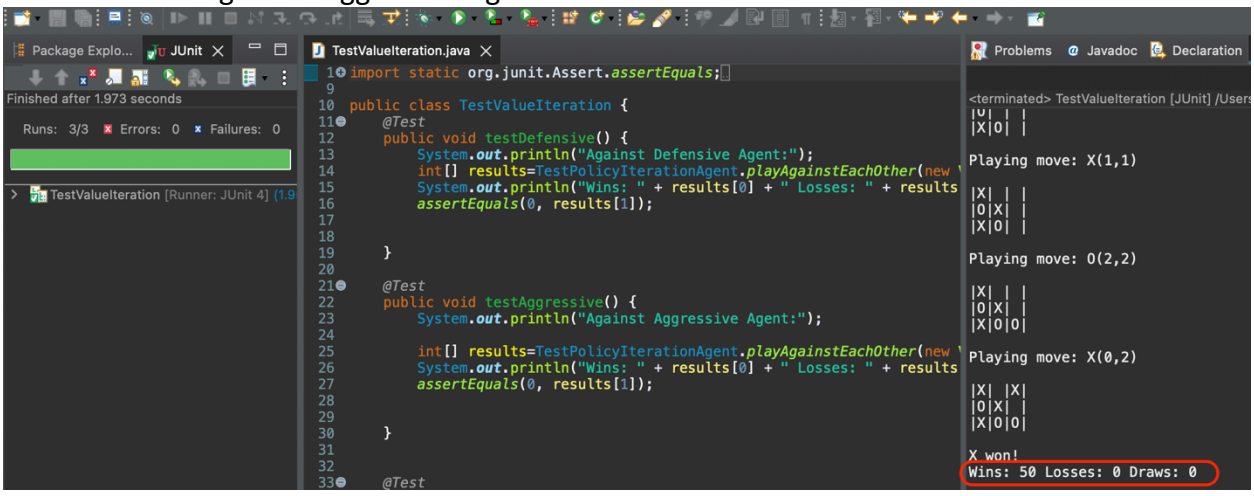
Wins: 50 | Losses: 0 | Draws: 0

Value Iteration Agent ***VS*** Defensive Agent:



Wins: 40 | Losses: 0 | Draws: 10

Value Iteration Agent ***VS*** Aggressive Agent:



Wins: 50 | Losses: 0 | Draws: 0

Function Implementations in 2-3 sentences:

iterate():

- This function performs k iterations of value iteration over all the states in the MDP.
- It iterates through all the states, skipping the terminal states and calculates the Q value using a helper method I created calculateQValue.
- And then it updates the states V value by taking the maximum Q value.

extractPolicy():

- This function derives a policy based on the computed value. It performs a single step of expectimax for each state to find the optimal move.
- As the iterate method it skips the terminal states and for non terminal states it calculates the Q value for all possible moves.
- And then it selects the move with the highest Q value for each state and stores it in the policy hashmap.

calculateQValue():

- This is a helper method that I implemented to compute the Q value for a given state and move.
- It first generates all possible transitions.
- Then it calculates the Q value using Bellmans Equation with a loop to acount for all the tranisitions.