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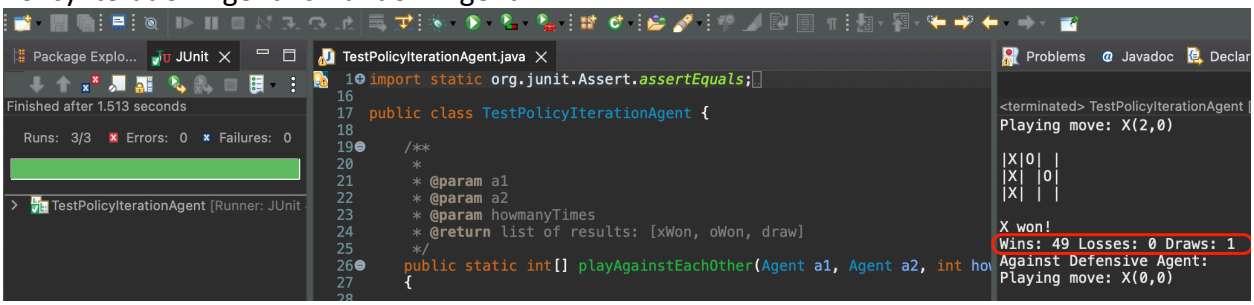
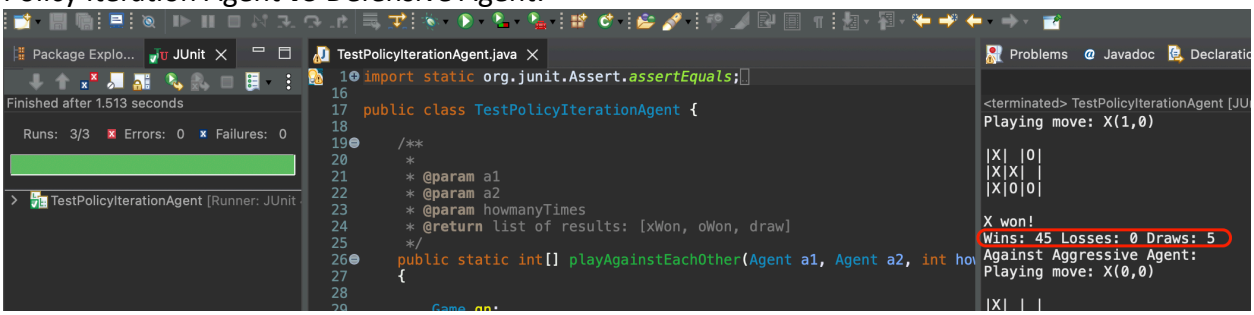
Policy Iteration Agent ***VS*** Random Agent:



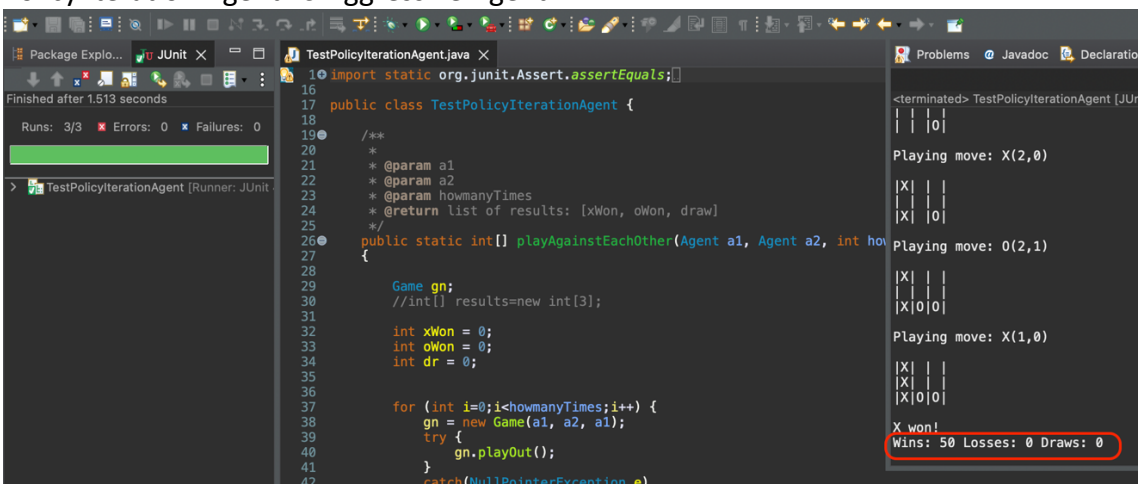
Wins: 49 | Losses: 0 | Draws: 1

Policy Iteration Agent ***VS*** Defensive Agent:



Wins: 45 | Losses: 0 | Draws: 5

Policy Iteration Agent ***VS*** Aggressive Agent:



Wins: 50 | Losses: 0 | Draws: 0

Function Implementations in 2-3 sentences:

initRandomPolicy():

- This method initializes a random policy by assigning a random valid move for each state and the terminal states are skipped.
- It assigns a random move from the list of possible moves. This provides a starting point for the process.
- And lastly it updates the curPolicy hashmap with the policy for each state.

evaluatePolicy():

- First it loops through states and skips terminal states, and for non-terminal states it calculates the Q value using the current policy.
- It updates the state's value in the policyValues hashmap and checks for convergence by comparing the difference of the new value to the previous one in relation with the delta factor.
- And lastly the previous value is set to the current value to continue with the iteration.

improvePolicy():

- First initialized a new Policy Object to store a copy of the current policy for comparison after update.
- Used the Iterator to loop through the states in the curPolicy HashMap to see and update the optimal move.
- For each state the Q value is calculated for all possible moves using the calculateQvalue helper method and then updates the best move and value if a higher q value was found and it updates the policy for that state in the curPolicy HashMap and returns if the policy has changed.

train():

- First called the initRandomPolicy() to initialize a random policy.
- It iteratively evalutes a policy and checks for improvement until convergence.
- When the policy stops changing i.e is converged the final policy is assigned to the agent.

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.