Heuristic Analysis The three heuristic functions my progam consists of are listed as follows:

1. unsharedMoves
   - This function searches for all the possible moves for the game agent, as well as the oppponent. Then, the function will subtract the number of shared moves between the opponent and the player from the player's number of moves. A shared move is defined as a move that is in the legal_move_set for both the player and the opponent.
2. unsharedMovesWeighted
   - this function will take the value from unsharedMoves and multiply it by two. Futhermore, the function will then add the number of shared moves to the result. This essentially gives an player's unshared move 2 points and a shared move 1 point.

3. unsharedMovesPenalty
   - this function will take the value of the unsharedMovesWeighted function and subtract from the value the maxScore of the oppenent. The function gives 2 points for player only moves, 1 point for player and oppenant shared move, and -1 point for oppenent only moves.

Out of the three functions, my program is going to be shipped with unsharedMovesPenalty. The tables below show it outperforming the other two algorithms. Running numbers, it outperformed the ID_Improved algorithm by 10.72%. In contrast, the unsharedMoves heuristic scored 2.15% worse and the unsharedMovesWeighted performed 0.72% worse. The reason why this is the heuristic of choice is because it factors in both the player and the opponent's scores. Additionally, unlike the algorithms discussed in class, this heuristic prioritizes the moves that provide maximum player only moves.

unsharedMoves Results

Student Avg: 67.86% | ID_Improved Avg: 65.71%

Match 1	Student	Random	15	5
Match 2	Student	MM_Null	14	6
Match 3	Student	MM_Open	15	5
Match 4	Student	MM_Improved	12	8
Match 5	Student	AB_Null	12	8
Match 6	Student	AB_Open	11	9
Match 7	Student	AB_Improved	13	7

Match 1	ID_Improved	Random	15	5
Match 2	ID_Improved	MM_Null	12	8
Match 3	ID_Improved	MM_Open	10	10
Match 4	ID_Improved	MM_Improved	14	6
Match 5	ID_Improved	AB_Null	14	6
Match 6	ID_Improved	AB_Open	14	6
Match 7	ID_Improved	AB_Improved	16	4

unsharedMovesWeighted Results

Student Avg: 70.00% | ID_Improved Avg: 69.29%

Match 1	Student	Random	17	3
Match 2	Student	MM_Null	14	6
Match 3	Student	MM_Open	11	9
Match 4	Student	MM_Improved	18	2
Match 5	Student	AB_Null	11	9
Match 6	Student	AB_Open	12	8
Match 7	Student	AB_Improved	14	6

Match 1	ID_Improved	Random	16	4
Match 2	ID_Improved	MM_Null	16	4
Match 3	ID_Improved	MM_Open	9	11
Match 4	ID_Improved	MM_Improved	12	8
Match 5	ID_Improved	AB_Null	16	4
Match 6	ID_Improved	AB_Open	14	6
Match 7	ID_Improved	AB_Improved	15	5

unsharedMovesPenalty Results

Student Avg: 70.71% | ID_Improved Avg: 81.43%

Match 1	Student	Random	20	0
Match 2	Student	MM_Null	16	4
Match 3	Student	MM_Open	16	4
Match 4	Student	MM_Improved	17	3
Match 5	Student	AB_Null	15	5
Match 6	Student	AB_Open	16	4
Match 7	Student	AB_Improved	14	6

Match 1	ID_Improved	Random	16	4
Match 2	ID_Improved	MM_Null	17	3
Match 3	ID_Improved	MM_Open	8	12
Match 4	ID_Improved	MM_Improved	13	7
Match 5	ID_Improved	AB_Null	16	4
Match 6	ID_Improved	AB_Open	14	6
Match 7	ID_Improved	AB_Improved	15	5