Assignment 2

Tic Tac Toe Game Report

Minmax Algorithms

Test Case	**win**	**loss**(HUMAN)	**Draw**	**Comment about outcome**
Raound1	**W**(ai)	**L**(H)		The AI wins the game against the human player. The human player loses the game.
Raound2			**D**	The game ends in a draw between the AI and human.
Raound3	**W**(ai)	**L**(H)		The AI wins the game against the human player. The human player loses the game.
Raound4	**W**(ai)	**L**(H)		The AI wins the game against the human player. The human player loses the game.
Raound5	**W**(ai)	**L**(H)		The AI wins the game against the human player. The human player loses the game.
Raound6			**D**	The game ends in a draw between the AI and human.
Raound7	**W**(ai)	**L**(H)		The AI wins the game against the human player. The human player loses the game.
Raound8			**D**	The game ends in a draw between the AI and human.
Raound9	**W**(ai)	**L**(H)		The AI wins the game against the human player. The human player loses the game.
Raound10	**W**(ai)	**L**(H)		The AI wins the game against the human player. The human player loses the game.
Total	**7**	**7**	**3**	**10(match)**

Reinforcement learning

Test Case	win	loss(HUMAN)	Draw	Comment about outcome
Raound1	**W**(ai)	**L**(H)		In this round, the AI demonstrates superiority, securing a win against the human player.
Raound2	**W**(ai)	**L**(H)		In this round, the AI demonstrates superiority, securing a win against the human player.
Raound3			**D**	The game ends in a draw, indicating a balanced performance where neither the AI nor the human gains a clear advantage.
Raound4	**L**(ai)	**W**(H)		Surprisingly, the human player succeeds in defeating the AI in this round, showcasing variability in RL performance.
Raound5	**W**(ai)	**L**(H)		In this round, the AI demonstrates superiority, securing a win against the human player.
Raound6			**D**	The game ends in a draw, indicating a balanced performance where neither the AI nor the human gains a clear advantage.
Raound7			**D**	The game ends in a draw, indicating a balanced performance where neither the AI nor the human gains a clear advantage.
Raound8	**L**(ai)	**W**(H)		Surprisingly, the human player succeeds in defeating the AI in this round, showcasing variability in RL performance.
Raound9	**W**(ai)	**L**(H)		In this round, the AI demonstrates superiority, securing a win against the human player.
Raound10			**D**	The game ends in a draw, indicating a balanced performance where neither the AI nor the human gains a clear advantage.
Total	**4**	**2**	**4**	**10(match)**

Mini-Max Algorithm Analysis:

Comments:

- **Mini-Max consistently performs well, winning the majority of games against the human player.**
- **The algorithm tends to result in a draw less frequently, indicating a decisive outcome in most games.**
- **The human player faces challenges, losing in the majority of encounters with the Mini-Max algorithm.**

Reinforcement Learning (RL) Analysis:

Comments:

- **RL demonstrates variability in performance, winning fewer games than Mini-Max.**
- **RL shows improvement in some games, as seen in the wins, but also faces losses.**
- **The draw percentage is higher compared to Mini-Max, indicating a more balanced outcome.**

Overall Efficacy Analysis:

- **Mini-Max consistently outperforms RL in terms of winning games.**
- **RL demonstrates a more balanced performance, with a notable number of draws.**
- **The choice between the two approaches depends on the desired outcome – Mini-Max for decisive victories, RL for a more varied gameplay experience with potential for improvement over time.**