**Task 3: Classifying the Problem**

Answer the following questions:

1. Is this a **goal-based agent** problem?
2. Is Tic-Tac-Toe a **deterministic** game? Why?
3. Is it a **fully observable** environment?
4. Is it a **single-agent** or **multi-agent** problem?

**1️⃣ Is this a goal-based agent problem?**

**✅ Yes.**  
Tic-Tac-Toe is a **goal-based agent problem** because the agents (players) choose actions based on achieving a specific goal — **to win the game by placing three of their marks in a row (horizontally, vertically, or diagonally)**, or at least to avoid losing (draw if possible).  
The agent evaluates possible future states to decide on the best move toward its goal.

**2️⃣ Is Tic-Tac-Toe a deterministic game? Why?**

**✅ Yes.**  
Tic-Tac-Toe is a **deterministic game** because:

* The **outcome of each move is fully determined by the current state and the action taken**.
* There’s **no randomness involved** in the game — given a particular board state and a player’s move, the resulting state is always predictable and fixed.
* No dice rolls, random cards, or hidden information elements exist in Tic-Tac-Toe.

**3️⃣ Is it a fully observable environment?**

**✅ Yes.**  
Tic-Tac-Toe is a **fully observable environment** because:

* **Both players can see the entire board at all times**.
* **There’s no hidden information** — every cell’s state (empty, X, or O) is visible.
* All agents have complete knowledge of the environment when making decisions.

**4️⃣ Is it a single-agent or multi-agent problem?**

**✅ Multi-agent problem.**  
Tic-Tac-Toe involves **two agents (players X and O)**, each making decisions that directly affect the other.

* It’s a **competitive, adversarial, two-player zero-sum game** where one agent’s gain is the other’s loss.
* Agents must consider the opponent’s possible moves and counter-moves when planning their strategy.