Explanation of the Utility Function

This function evaluates the quality of a **Connect Four** board state by assigning a numerical score:

- **Higher values favor our player.**
- **Lower values favor the opponent.**

1. Check for Terminal States

Before analyzing individual cells, the function first checks if the game has already ended:

- **Draw →** Return **0**.
- **Our win →** Return **max_utility** (the score when the board is completely filled with our pieces).
- **Opponent's win →** Return **min_utility** (the score when the board is completely filled with the opponent's pieces).

If the game is over, there's no need for further evaluation.

2. Evaluate Each Cell on the Board

The function examines each cell to determine how much it contributes to a potential win:

- **If the cell contains our piece or is empty**, we assess its potential to help us form a four-in-a-row.
- **If the cell contains an opponent's piece**, we assess its potential to help them form a four-in-a-row and subtract this from our score.

Each cell's utility is determined by checking its possible four-in-a-row connections in **eight compass directions**:

- **North (N), Northeast (NE), East (E), Southeast (SE), South (S), Southwest (SW), West (W), and Northwest (NW).**

The **total utility of a cell** is the sum of its contributions across all these directions.

3. Directional Win Analysis

For each of the **eight directions**, the function evaluates how close the sequence is to forming four in a row:

- **Blocked (opponent's piece or board edge) →** Score **-1**.
- **Open with no pieces →** Score **0**.

- **One of our pieces →** Score **1**.
- **Two of our pieces →** Score **2**.
- **Three of our pieces (one move away from winning) →** Score **3**.

4. Calculating the Total Utility

- The **overall board utility** is computed by summing up the utility of every cell.
- The opponent's potential wins are evaluated the same way, and their score is subtracted from ours.
- The final score represents **how favorable the board is for our player**.