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(046)

Min-Max Algorithm (Simple Explanation)

- The Min-Max Algorithm is used in decision-making and game theory. It helps to find the best possible move for a player, assuming the opponent also plays optimally. It is often used in games like Tic-Tac-Toe or Chess.

How It Works:

1. There are two players: MAX and MIN.
   - MAX tries to get the highest possible score.
   - MIN tries to get the lowest possible score.
2. The algorithm goes through all possible

moves (like a game tree).
3. It chooses the move that gives the best result for MAX, assuming MIN plays perfectly.

Step-by-Step Explanation:

1. The program defines a function called 'minimax' that takes three inputs:
   - depth → current level of the tree
   - isMaxPlayer → True if it's the MAX player's turn
   - values → list of possible scores.
2. The function divides the list of values into two halves (left and right), representing two possible moves.
3. If it is MAX's turn, the function picks the higher value.
4. If it is MIN's turn, it picks the lower value.
5. This process continues until all possible moves are checked.
6. The final result is the best possible score MAX can guarantee.

Example:

Leaf node values: [3, 5, 6, 9, 1, 2, 0, -1]
The algorithm looks at all these values and

calculates step by step.
The final output is:
Best (Optimal) value is: 5

In Simple Words:

The Min-Max algorithm helps the computer choose the best move by thinking ahead.
It assumes that the opponent will always make the best possible move too.