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# SECTION :

BS AI – 3C

# TASK :

08

# TOPIC

Implementation of Min-Max Algorithm in Python

# EXPLANATION

This program implements the Min-Max algorithm, which is commonly used in Artificial Intelligence for decision-making in two-player games like Tic Tac Toe or Chess. The algorithm assumes that both players play optimally — one player (the Maximizer) tries to maximize the score, while the other (the Minimizer) tries to minimize it.  
  
Explanation of key components:  
1. import math — Used to calculate the depth of the tree using logarithmic functions.  
2. minimax() function — This recursive function explores all possible moves up to a given depth.  
3. curDepth — Represents the current level in the decision tree.  
4. nodeIndex — Keeps track of which node (or move) is being evaluated.  
5. maxTurn — A boolean value that tells whether it’s the Maximizing player’s turn or Minimizing player’s turn.  
6. Base case — When curDepth == targetDepth, the recursion stops and returns the score of that node.  
7. For maximizing turn — The function chooses the maximum of the two possible child nodes.  
8. For minimizing turn — The function chooses the minimum of the two possible child nodes.  
  
In the example, the algorithm explores all possible outcomes from the list of scores [3, 5, 2, 9, 3, 5, 2, 9] and finds the optimal guaranteed score for the maximizing player, which is 9.  
  
Hence, the final output is: The optimal value is 9.