EX.NO:4 **DATE:4/9/2024**

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MINIMAX ALGORITHM

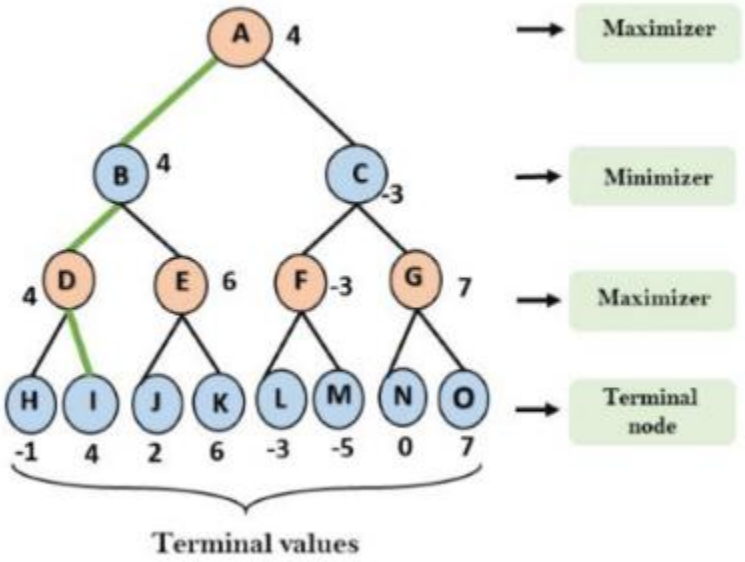
• A simple example can be used to explain how the minimax algorithm works. We've included an example of a game-tree below, which represents a two-player game.

• There are two players in this scenario, one named Maximizer and the other named Minimizer.

• Maximizer will strive for the highest possible score, while Minimizer will strive for the lowest possible score.

• Because this algorithm uses DFS, we must go all the way through the leaves to reach the terminal nodes in this game-tree.

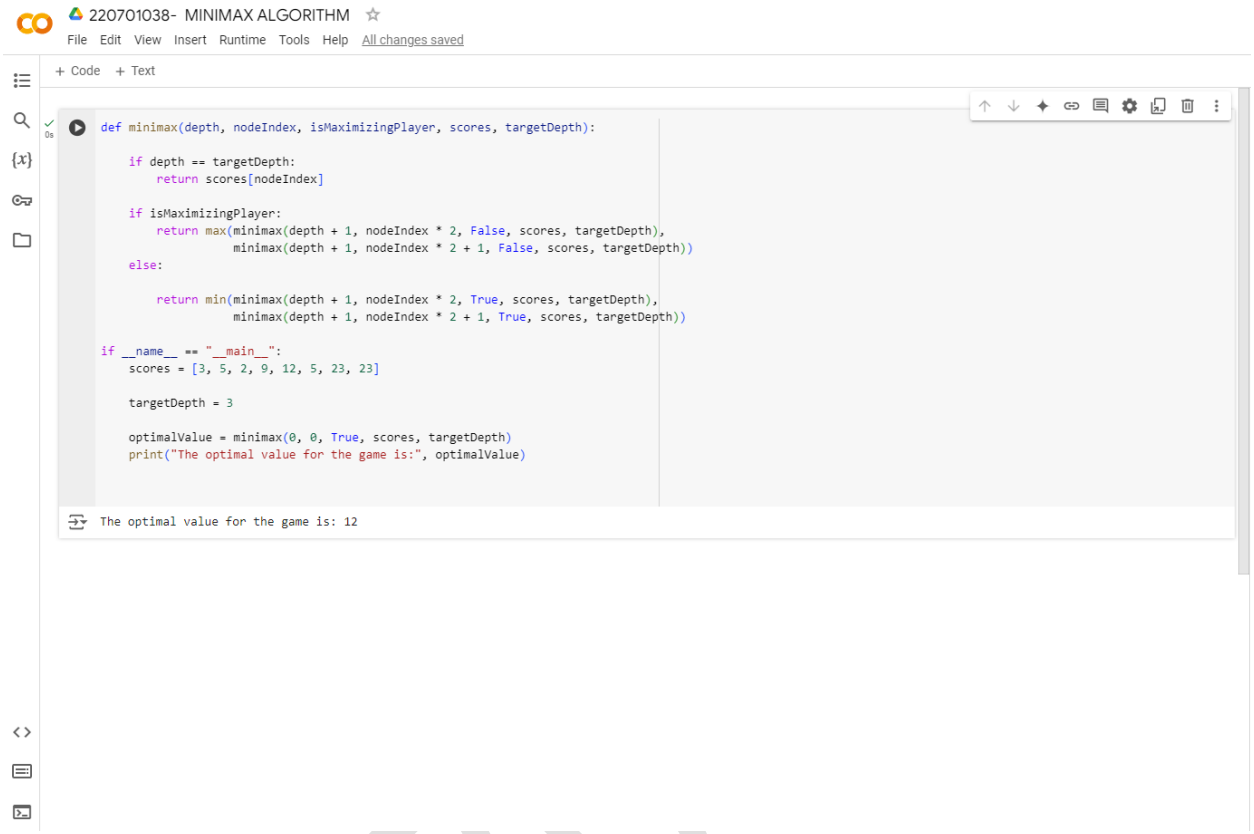
• The terminal values are given at the terminal node, so we'll compare them and retrace the tree till we reach the original state.



CODE:

```
def minimax(depth, nodeIndex, isMaximizingPlayer, scores, targetDepth):


    if depth == targetDepth:
        return scores[nodeIndex]

    if isMaximizingPlayer:
        return max(minimax(depth + 1, nodeIndex * 2, False, scores,
targetDepth),
                   minimax(depth + 1, nodeIndex * 2 + 1, False, scores,
targetDepth))
    else:

        return min(minimax(depth + 1, nodeIndex * 2, True, scores,
targetDepth),
                   minimax(depth + 1, nodeIndex * 2 + 1, True, scores,
targetDepth))


if __name__ == "__main__":
    scores = [3, 5, 2, 9, 12, 5, 23, 23]

    targetDepth = 3

    optimalValue = minimax(0, 0, True, scores, targetDepth)
    print("The optimal value for the game is:", optimalValue)
```

OUTPUT:


220701038- MINIMAX ALGORITHM
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if isMaximizingPlayer:
return max(minimax(depth + 1, nodeIndex * 2, False, scores, targetDepth),
minimax(depth + 1, nodeIndex * 2 + 1, False, scores, targetDepth))
else:
return min(minimax(depth + 1, nodeIndex * 2, True, scores, targetDepth),
minimax(depth + 1, nodeIndex * 2 + 1, True, scores, targetDepth))
if __name__ == "__main__":
scores = [3, 5, 2, 9, 12, 5, 23, 23]
targetDepth = 3
optimalValue = minimax(0, 0, True, scores, targetDepth)
print("The optimal value for the game is:", optimalValue)
The optimal value for the game is: 12

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