**Fitness Calculation Algorithm:**

1. **Initialization:**
   * Set ai\_piece to 1 (representing the AI's pieces).
   * Set opponent\_piece to -1 (representing the opponent's pieces).
   * Initialize the fitness score to 0.
2. **Capturing Opponent Pieces:**
   * Calculate the number of opponent pieces on the original board (original\_opponent\_pieces).
   * Calculate the number of opponent pieces on the new board after the move (new\_opponent\_pieces).
   * Determine the number of captured pieces (captured\_pieces) as the difference between original\_opponent\_pieces and new\_opponent\_pieces.
   * Increase the fitness score by 10 points for each captured opponent piece (fitness += captured\_pieces \* 10).
3. **Improving Position:**
   * Iterate through each cell on the board.
   * For each AI piece on the board:
     + Increase the fitness score by the row index of the piece (fitness += (board.shape[0] - i) \* 1) to incentivize moving closer to becoming a king (i.e., reaching the opposite side of the board).
     + Increase the fitness score by 2 points if the piece is positioned in the central four squares of the board (2 <= i <= 5 and 2 <= j <= 5), which are considered more strategic.
4. **Avoiding Capture:**
   * Iterate through each cell on the board.
   * For each AI piece on the board:
     + Check all four diagonal directions for potential opponent pieces that could capture the AI piece.
     + If an opponent piece is found diagonally adjacent and the square behind it is empty (indicating a potential capture), decrease the fitness score by 5 points (fitness -= 5).
5. **Mobility:**
   * Iterate through each cell on the board.
   * For each AI piece on the board:
     + Check all four diagonal directions for empty squares (indicating potential moves).
     + Increase the fitness score by 1 point for each empty square found diagonally adjacent to the AI piece (fitness += 1).

**Summary:**

The fitness function evaluates a move based on four criteria:

* Capturing opponent pieces.
* Improving the position of AI pieces towards becoming kings and controlling the center.
* Avoiding being captured by opponent pieces.
* Increasing the mobility of AI pieces by having more available moves.