**Modified Chess**

Section: BCY-6B

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# Abstract

This project presents a modified version of the classic chess game developed in Python using the Tkinter library. The primary enhancement involves modifying the movement of the Bishop piece to move with the combined abilities of a Queen, thus allowing both diagonal and straight-line movement. The game features a graphical user interface (GUI), full board interaction, and an AI component that plays as the Black side. The AI evaluates positions based on piece values and selects moves accordingly. Additional features include move history tracking, check and checkmate detection, and visual feedback for user interaction.

# Objectives

- Develop a graphical chess game using Python and Tkinter.

- Implement modified rules allowing the Bishop to move like a Queen.

- Create an AI component capable of playing autonomously as the Black side.

- Provide a smooth and interactive user experience with visual cues and move history.

# Key Features

- Enhanced Bishop Movement: Bishops have the combined movement of Bishops and Queens, providing strategic advantages.

- Artificial Intelligence Opponent: The Black side is controlled by an AI using a simple evaluation function based on material value.

- Graphical User Interface: The game board, pieces, and control panel are built using Tkinter, with clear visual styling and responsive feedback.

- Move Validation: All legal moves are determined dynamically, with check and checkmate logic included.

- Move History: A scrollable move history list records each move using standard algebraic notation.

- Game Status Tracking: Displays the current player, check warnings, and end-of-game messages for checkmate and stalemate.

- Restart and Quit Options: Easy control over game lifecycle with buttons for new game initiation and exiting the application.

# AI Strategy

The AI implemented for the Black side uses a greedy evaluation approach:  
- Generates all legal moves available to Black.  
- Evaluates each possible move by simulating the resulting board state.  
- Selects the move with the highest evaluation score based on the sum of piece values.  
- Resolves tie scores by randomly selecting among equally good moves.

# Modifications to Standard Chess

- The Bishop piece, traditionally limited to diagonal movement, is modified to move like a Queen.  
- This change introduces new strategic considerations and increases the Bishop’s value in both AI evaluation and gameplay.

# Technologies Used

- Language: Python 3.x

- GUI Library: Tkinter

- AI Logic: Custom evaluation and move selection

# Conclusion

The Modified Chess Game is a successful demonstration of integrating rule modifications into a traditional game environment while incorporating AI logic for autonomous gameplay. The project provides a solid foundation for future enhancements such as improved AI algorithms, multiplayer support, and advanced rule customization.