Project Title: Chess Variant with Bishop Adopting Queen's Functionality

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1. Project Overview

Project Topic:

This project explores a modified version of chess where the bishop has been given the movement capabilities of a queen. This means the bishop can now move both diagonally and in straight lines (horizontally and vertically), fundamentally altering the strategic depth of the game.

Objective:

The primary goal of this project is to analyze the impact of this rule change on chess gameplay. The project will implement this modified version of chess with rule enforcement, player interaction, and an AI opponent.

2. Game Description

Original Game Background:

Chess is a classic two-player strategy game played on an 8x8 board. Each player controls 16 pieces, including pawns, knights, bishops, rooks, a queen, and a king. The objective is to checkmate the opponent's king by putting it in a position where it cannot escape capture.

Innovations Introduced:

- The **bishop** now moves like a **queen**, meaning it can move in straight lines (horizontally and vertically) in addition to its original diagonal movement.

- This modification significantly changes the strategic importance of bishops, as they gain increased mobility similar to the queen.
- Players must rethink their tactics due to the altered piece strength and board control.

3. AI Approach and Methodology

AI Techniques to be Used:

- Rule-based move validation to ensure correct implementation of the bishop's new movement pattern.
- Random AI opponent for move generation (with potential for future enhancement using Minimax).

Heuristic Design:

- Piece value adjustments to reflect the bishop's enhanced role.
- Evaluation of board states based on control over key squares and piece activity.

Complexity Analysis:

- The change in movement rules increases board mobility for bishops, requiring modifications in move validation.
- AI strategy must consider the additional power of bishops when making moves.

4. Game Rules and Mechanics

Modified Rules:

- The bishop now moves like a queen (both diagonally and in straight lines).
- All other pieces retain their original movement patterns and rules.

Winning Conditions:

- Standard chess winning conditions apply (checkmate, stalemate, or resignation).

Turn Sequence:

- Players alternate turns, moving one piece per turn according to legal moves.

5. Implementation Plan

Programming Language: Python

Libraries and Tools:

- Standard Python for game logic and rule enforcement.

Milestones and Timeline:

- **Week 1-2:** Game design and rule finalization.
- **Week 3-4:** Implementing board representation and move validation.
- **Week 5-6:** Coding the AI opponent logic and movement constraints.
- **Week 7:** Testing the modified game mechanics and refining move validation.
- **Week 8:** Final testing and report preparation.

6. References

- Standard chess rules and strategy resources.
- AI-based chess game development references.
