AI - Semester Project Proposal

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Project Idea: Multiplayer Reversi with Special Features

Introduction

Reversi is a classic strategy board game that involves flipping opponent pieces to control the board. This project aims to enhance the traditional game by introducing a **multiplayer mode (2 or 4 players with a 2v2 team option)**, **special tiles with strategic bonuses**, and **dynamic board sizes (8x8, 10x10, 12x12)**. The game will maintain core Reversi mechanics while incorporating unique elements to create a fresh, competitive experience.

Rules & Constraints:

- Players take turns placing their pieces on the board.
- A valid move must sandwich an opponent's piece between two of the current player's pieces.
- Any sandwiched opponent pieces are flipped to the current player's color.
- The game ends when no more legal moves are available, and the player/team with the most pieces on the board wins.
- Multiplayer adjustments: In a 2v2 team mode, teammates' pieces do not flip each other, and scores are combined.
- Special Tiles:
    - Certain tiles, appearing randomly with rarity levels, provide special effects when landed on.
    - Special Effects like:
        - **Double Move:** Player places two pieces in one turn.
        - **Piece Removal:** Remove one opponent's piece from the board.
        - **Penalization:** Penalize the player by giving the opponent an extra move.
- The game supports board size customization (8x8, 10x10, 12x12) to allow varied playstyles.

Implementation Strategy

The game will be implemented using Python. AI players can be introduced using different algorithms for move selection.

Algorithms Used:

- Minimax/Iddfs/A* Algorithm for AI decision-making.
- Heuristic Evaluation Function to evaluate board states based on piece count, mobility, and control over special tiles.
- Randomized Tile Placement logic ensures fairness while maintaining unpredictability.
- Turn-based system with a queue structure to handle multiple players efficiently.

Deliverables

- Fully functional multiplayer Reversi game supporting 2 or 4 players.
- Dynamic board size selection (8x8, 10x10, 12x12).
- Special tiles with unique gameplay effects to enhance strategy.
- AI-based opponent (optional, for single-player mode).
- Game statistics tracking (scores, moves, special tile effects used).
- Well-documented code and project report detailing the algorithms and game rules.

This proposal ensures that our project adheres to the given requirements while introducing innovative gameplay mechanics that differentiate it from traditional Reversi implementations.