Project Report Template

Project Title: *(Choose the title of your project)*
Submitted By: [Your Name(s)]
Course: AI
Instructor: [Instructor's Name]
Submission Date: [Date]

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1. Executive Summary

- **Project Overview:**
  (Provide a concise summary of the project, highlighting the main objectives, the modifications to the original game, and the AI approach used.)
    - Example: *"This project aimed at modifying the conventional Ludo game to support 3 players, each with 3 coins, and incorporating a Minimax-based AI to facilitate decision-making."*

2. Introduction

- **Background:**
  (Introduce the game and its conventional form. Explain why the chosen game was selected and what new elements or rules were introduced to innovate on it.)
    - Example: *"Ludo is a traditional game designed for 2-4 players. This project introduces a 3-player version with a custom board and additional gameplay mechanics, aiming to explore multi-player AI strategies."*
- **Objectives of the Project:**
  (Define the specific goals of the project, such as developing an AI model to play the modified game, testing the AI against human players, etc.)

3. Game Description

- **Original Game Rules:**
  (Explain the basic rules of the original game.)
    - Example: *"Ludo is a game where each player has four tokens, and the objective is to move all tokens around the board to the home area before other players."*
- **Innovations and Modifications:**
  (Describe the changes you made to the original game, such as rule modifications, new features, or gameplay mechanics.)

    - Example: *"This version of Ludo was modified to support 3 players, each with 3 coins, and a new custom map with different safe zones and hurdles."*

4. AI Approach and Methodology

- **AI Techniques Used:**
  (Describe the AI techniques employed in the project, such as Minimax, Alpha-Beta Pruning, Reinforcement Learning, etc.)
    - Example: *"We used the Minimax algorithm with Alpha-Beta pruning to allow the AI to evaluate multiple possible moves and select the optimal one in a competitive 3-player scenario."*
- **Algorithm and Heuristic Design:**
  (Provide details on the design of the heuristics and the decision-making process for the AI, including evaluation functions used to assess game states.)
- **AI Performance Evaluation:**
  (Discuss how the AI's performance was evaluated, such as win rate, decision time, and accuracy.)

5. Game Mechanics and Rules

- **Modified Game Rules:**
  (List the specific rule changes you made to the original game.)
    - Example: *"In this version of Ludo, there are three tokens per player, and each player can only move a token one space forward at a time unless in a safe zone."*
- **Turn-based Mechanics:**
  (Describe the sequence of turns, how players interact with the game, and any game-ending conditions.)
- **Winning Conditions:**
  (Explain how a winner is determined in your modified version.)

6. Implementation and Development

- **Development Process:**
  (Provide an overview of the development process, the tools and technologies used, and the steps followed to implement the AI and game rules.)
    - Example: *"The game was implemented using Python and the Pygame library. The Minimax algorithm was coded to evaluate potential moves for each player and select the most strategic one."*
- **Programming Languages and Tools:**
    - Programming Language: *(e.g., Python, C++)*
    - Libraries: *(e.g., Pygame, NumPy)*

    - Tools: *(e.g., GitHub for version control)*
- **Challenges Encountered:**
  (Discuss any technical challenges faced during the implementation phase and how they were addressed.)

7. Team Contributions

- **Team Members and Responsibilities:**
  (List each team member and the specific parts of the project they were responsible for.)
    - **[Member 1 Name]:** Responsible for AI algorithm development (Minimax, Alpha-Beta Pruning).
    - **[Member 2 Name]:** Handled game rule modifications and board design.
    - **[Member 3 Name]:** Focused on implementing the user interface and integrating AI with gameplay.
    - **[Member 4 Name]:** Conducted performance testing and evaluation of the AI's decisions.

8. Results and Discussion

- **AI Performance:**
  (Present the performance of the AI, including win rates, decision-making times, and the effectiveness of the AI in a multi-player setting.)
    - Example: *"The AI was able to win 70% of matches against human players after implementing the Minimax algorithm with Alpha-Beta pruning, with an average decision-making time of 2 seconds per move."*

9. References

- *(Provide a list of all the references you used during your research and development of the project, including books, articles, online resources, etc.)*