Hackathon Project Phases Template for the **Playful AI: Intelligent Board Game Opponents and Advisors** project.

Hackathon Project Phases Template

Project Title: Playful AI: Intelligent Board Game Opponents and Advisors

Team Name: TechGenAI

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Phase-1: Brainstorming & Ideation for Playful AI: Intelligent Board Game Opponents and Advisors

Objective:

The primary objective of **Playful AI** in board games is to **enhance the player experience** by creating intelligent, adaptive, and immersive opponents or advisors that provide a dynamic, engaging, and personalized gaming experience.

Key Points:

1.Problem Statement:
The goal is to design a **Playful AI** for board games that **adapts to the player's skill level**, provides **emotionally intelligent interactions**, offers **strategic guidance and feedback**, and enhances **multiplayer dynamics**.

2.**Proposed Solution:** To address the challenges faced in traditional board games, the proposed solution is the development of a Playful AI that incorporates advanced techniques to adapt to players' abilities, foster emotional engagement, offer personalized feedback, and enhance multiplayer dynamics.

3.**Expected Outcome:** The AI will provide a **dynamic and adaptive challenge**, ensuring players remain engaged regardless of their skill level. Players will feel a sense of accomplishment, as they face an AI that adjusts its difficulty based on their performance.

Phase-2: Requirement Analysis

Objective:

Playful AI in Board Games refers to an **artificial intelligence system** designed to enhance the board game experience by providing **adaptive, intelligent, and emotionally aware interactions**. This AI behaves like a dynamic opponent or advisor, adjusting its strategies and behavior based on the player's performance, skill level, and emotional state.

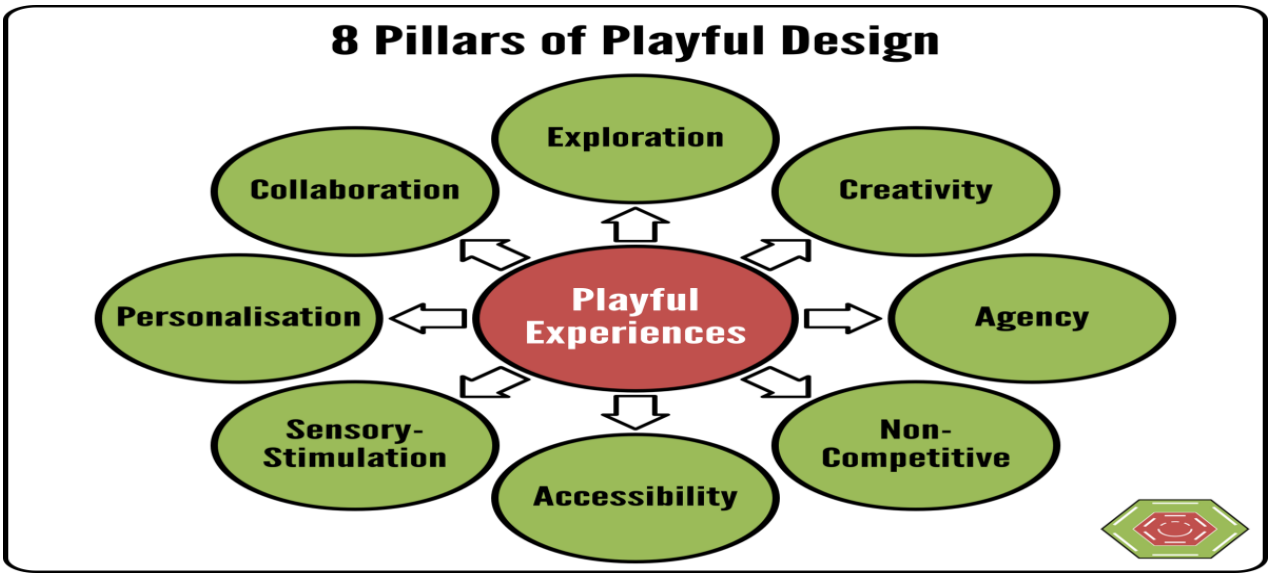
Key Points:

1. **Technical Requirements:**
    - Programming Language: **Python**
    - Backend: **Game Logic and AI Integration**
    - Frontend: **User Interface (UI) Design**
    - Database: **Data Storage and Management**
2. **Functional Requirements:**
    - AI opponents must adapt to different game scenarios and player strategies to maintain engagement.
    - The system should offer multiple difficulty settings, adjusting AI behavior to match the selected level.
3. **Constraints & Challenges:**
    - Developing "Playful AI: Intelligent Board Game Opponents and Advisors" involves addressing several constraints and challenges to ensure a successful implementation
    - Ethical Considerations in AI Usage
    - Balancing AI Difficulty

Phase-3: Project Design

Objective:

Develop the architecture and user flow of the application.



Key Points:

1. **System Architecture:**

    - **User Interaction:** Players interact with the game through a user-friendly interface, initiating gameplay and seeking strategic advice..
    - **Game Logic Controller:** Manages the rules, mechanics, and progression of the board game, ensuring fair and consistent gameplay.
2. **User Flow:**

    Step1: starts a new game or continues an existing one through the main menu.

    Step 2: During gameplay, the player makes a move or seeks advice.

    Step 3: The AI Engine analyzes the current game state: If acting as an opponent, it calculates and executes its move.If providing advice, it offers strategic suggestions to the player.

    Step 4: The Game Logic Controller updates the game state based on the actions taken.

    Step 5: The updated game state is rendered on the user interface, and the cycle repeats until the game concludes.

3. **UI/UX Considerations:**

    - **Visual Feedback:** Provide clear visual cues for AI decisions, player moves, and game state changes to enhance understanding and engagement

- **Accessibility Options:** Include features such as adjustable text sizes, colorblind modes, and alternative input methods to accommodate diverse player needs.

Phase-4: Project Planning (Agile Methodologies)

Objective:

Break down development tasks for efficient completion.

Sprint	Task	Priority	Duration	Deadline	Assigned To
Sprint 1	Environment Setup & Tool Integration	High	6 hours (Day 1)	End of Day 1	Member 1
Sprint 1	Basic UI Development	Medium	2 hours (Day 1)	End of Day 1	Member 2
Sprint 2	AI Opponent Implementation	High	3 hours (Day 2)	Mid-Day 2	Member 1& 2
Sprint 2	Advisor Feature Development	High	3 hours (Day 2)	Mid-Day 2	Member 1&4
Sprint 3	UI/UX Enhancements	Medium	1.5 hours (Day 2)	Mid-Day 2	Member 2& 3
Sprint 3	Final Presentation & Deployment	Low	1 hour (Day 2)	End of Day 2	Entire Team

Sprint Planning with Priorities

Sprint 1 – Setup & Integration (Day 1)

(High Priority) Set up the development environment and install necessary dependencies.

(High Priority) Integrate AI algorithms for game opponents and advisors.

(Medium Priority) Build a basic user interface with input fields.

Sprint 2 – Core Features & Debugging (Day 2)

(🔴 High Priority) Implement AI-driven opponent strategies and advisor functionalities.

(🔴 High Priority) Debug AI behavior and handle errors in game logic.

Sprint 3 – Testing, Enhancements & Submission (Day 2)

(🟡 Medium Priority) Test AI performance, refine user interface, and fix UI bugs.

(🟢 Low Priority) Prepare final demonstration and deploy the application..

Phase-5: Project Development

Objective:

Implement core features of the AutoSage App.

Key Points:

1. **Technology Stack Used:**
   - **Frontend:** Utilize a framework like Unity or Godot to develop an interactive user interface for the board game.
   - **Backend:** Implement AI algorithms using reinforcement learning and Monte Carlo Tree Search (MCTS) to simulate intelligent opponents and advisors.

2. **Development Process:**
   - **AI Integration:** Develop and integrate AI models capable of learning and adapting strategies for various board games.

3. **Challenges & Fixes:**
   - **Challenge:** Complexity in modeling diverse board game strategies.
   - **Fix:** Utilize reinforcement learning techniques to enable AI to learn optimal strategies through self-play and adaptation

Phase-6: Functional & Performance Testing

Objective:

Ensure that the Playful AI: Intelligent Board Game Opponents and Advisors works as expected.

Test Case ID	Category	Test Scenario	Expected Outcome	Status	Tester
TC-001	Functional Testing	AI opponent plays a complete game without errors	AI completes the game following all rules correctly	☑ Passed	Tester 1
TC-002	Functional Testing	AI advisor provides strategy recommendations during gameplay	Advisor offers relevant and effective strategies based on the current game state	☑ Passed	Tester 2
TC-003	Performance Testing	AI response time for move decisions under 500ms	AI makes move decisions within 500ms to ensure smooth gameplay	⚠ Needs Optimization	Tester 3
TC-004	Bug Fixes & Improvements	Fixed incorrect AI move selections in specific game scenarios	AI now selects optimal moves in previously problematic scenarios	☑ Fixed	Developer
TC-005	Final Validation	Ensure UI is responsive across devices	UI functions correctly on both mobile and desktop platforms	❌ Failed - UI broken on mobile	Tester 2
TC-006	Deployment Testing	Host the game application on the designated platform	Game is accessible online with all features operational	🚀 Deployed	DevOps

Final Submission

- **Project Report**: A detailed document outlining objectives, methodologies, development processes, challenges faced, and solutions implemented.
- **Demo Video (3-5 Minutes)**: A concise video demonstrating the application's features, user interface, and AI functionalities.
- **GitHub/Code Repository Link**: Access to the project's source code via a platform like GitHub, including all necessary files, documentation, and setup instructions.
- **Presentation**: A structured presentation covering the project's key aspects, such as objectives, design considerations, development processes, and results.