Puzzle Challenge Game Documentation

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Subject:

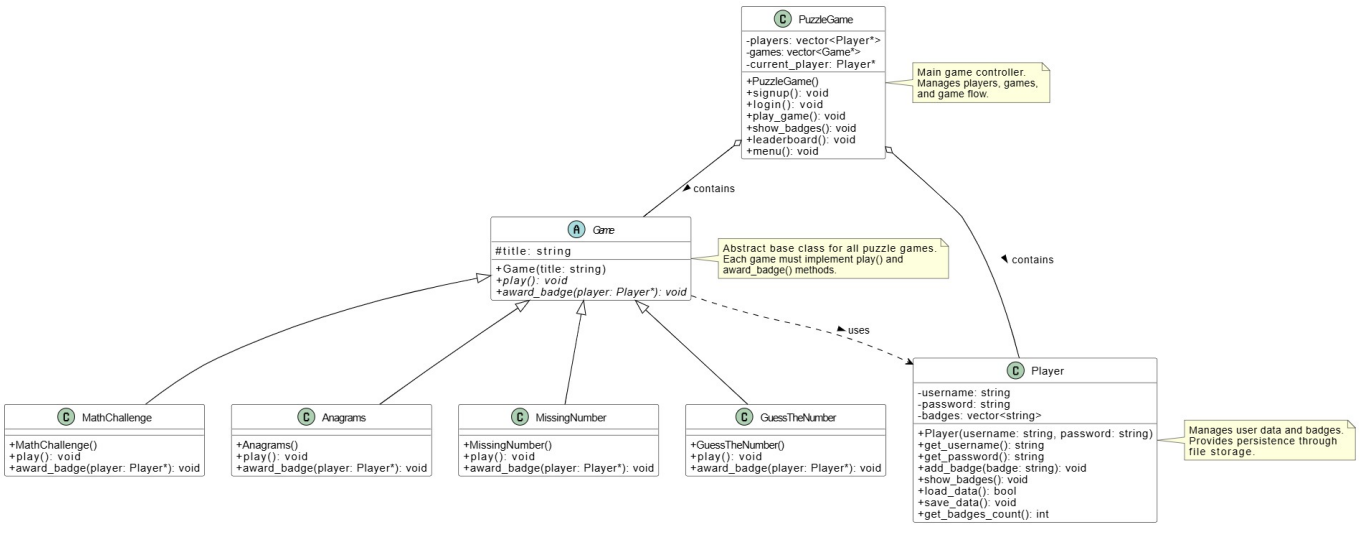
Object Oriented Programming (OOP)

1. Introduction

The Puzzle Challenge Game is a console-based application where players solve random puzzles to earn badges. The game supports player accounts and persistent storage for badges, enabling players to track their progress and compare rankings on a leaderboard. It provides an engaging way to test and improve problem-solving skills.

2. Class Diagram

The class diagram below provides an overview of the application's design. It uses an object-oriented approach with inheritance and virtual functions for flexibility.



3. Notes on Significant Design Decisions

1. Modular Design: The application uses a base Game class and derived classes for individual puzzles, promoting modularity and reusability.

2. Persistence: Player data, including badges, is stored in files, ensuring that progress is retained between sessions.

3. Leaderboard: A centralized ranking system adds a competitive element to the game.

4. Virtual Functions: The play() and award_badge() methods in the base Game class are implemented using virtual functions, enabling dynamic dispatch and flexibility.

5. Randomized Gameplay: The system ensures that puzzles are presented randomly, keeping the gameplay unpredictable and engaging.

4. Gameplay Description

1. Players can sign up and log in with a username and password.

2. After logging in, they can:

   a. Play a random puzzle (Math Challenge, Anagrams, Missing Number, etc.).

   b. View their badges, which are persistent across sessions.

   c. Check the leaderboard showing player rankings based on badges earned.

3. Each puzzle awards a unique badge upon completion, encouraging players to explore all puzzles.

5. Features Overview

1. Player Management:

   - Sign up and log in functionality.

   - Persistent badge tracking.

2. Puzzles:

   - Math Challenge: Solve random arithmetic problems.

   - Anagrams: Unscramble words.

   - Missing Number: Find the missing number in a sequence.

- Custom games: Integrate games designed by other teams.

3. Leaderboard:

- Displays player rankings based on total badges earned.
- Allows comparison across all players.

6. Technical Implementation

1. The application uses a base Game class with virtual functions for flexibility.
2. Inherited classes implement specific puzzles with unique gameplay mechanics.
3. Player data and badges are stored persistently to enable continuation across sessions.
4. The leaderboard aggregates badge counts to rank players.
5. All features are implemented as text-based interactions on the console.