

team 35

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Implementation of Functionalities

To implement all milestone 2 requirements , we added some new functions additionally to our existing functions in each class.

1. Card Class and Subclasses

The Card class serves as the base for three specific types of cards: StandardCard, BonusCard, and PenaltyCard. Each card has attributes like a unique number, face-up state, and methods to control its behavior:

- **Functions:**
 - reveal() flips the card face-up.
 - hide() resets the card to face-down.
 - display() shows the card's state (* if hidden, or the card's number if revealed).

2. Player Class

The Player class manages the player's name and score, with methods to update these attributes:

- **Functions:**
 - increaseScore(points) adds points for successful actions.

- `decreaseScore(points)` deducts points for penalties.
- `displayScore()` prints the player's current name and score.

3. Deck Class

The Deck class manages the grid of cards and all card-related functionalities. It dynamically allocates cards in a 4x4 grid with a mix of standard, bonus, and penalty cards.

- **Functions:**
 - `shuffle()`. Implemented in milestone 1 to shuffle cards in a grid.
 - `displayGrid()` shows the grid with hidden and revealed cards.
 - `revealCard(x, y)` and `hideCard(x, y)` manage the flipping of individual cards on the grid, taking coordinates as an input.
 - `deleteCard(x, y)` removes a card from the grid once matched.

The grid is continually updated

4. Game Class

- **Gameplay Flow:**
 - Players alternate turns, revealing two cards by entering grid coordinates.
 - Cards are checked for matches, bonuses, or penalties, and the grid is updated accordingly.
 - Scores are adjusted dynamically based on card interactions.
 - The game ends when all cards are matched and removed, with the winner announced based on the final scores.
- **Functions:**
 - `initializeGame()` sets up the deck, shuffles cards, and displays the grid.
 - `playTurn()` manages a single turn for the current player, including card selection, score updates, and grid updates. The player first enters coordinates of a card, and we check if the coordinates are valid. If the cards are valid, the card is revealed.
 - `announceWinner()` declares the game result based on players' scores.

Special Card Behaviors and Their Impact on Gameplay

1. BonusCard (Number 7):

- a. Revealing one Bonus Card along with a Standard Card gives the player +1 point.
 - b. Revealing two Bonus Cards offers a choice:
 - i. Gain +2 points.
 - ii. Gain +1 point and take another turn.
 - c. Both revealed Bonus Cards are removed from the grid, while unmatched Standard Cards are flipped back.
- 2. PenaltyCard (Number 8):**
- a. Revealing one Penalty Card with a Standard Card causes the player to lose 1 point.
 - b. Revealing two Penalty Cards offers a choice:
 - i. Lose 2 points.
 - ii. Lose 1 point and skip the next turn.
 - c. Both revealed Penalty Cards are removed from the grid, while unmatched Standard Cards are flipped back.
- 3. Combination of Bonus and Penalty Cards:**
- a. Revealing one Bonus Card and one Penalty Card cancels their effects. Both cards are simply removed from the grid without affecting the score.

The `isValidIndex()` Function

The `isValidIndex()` function is a helper method used to validate the coordinates entered by the players. It checks whether the entered row and column values are within the bounds of the grid size. This function ensures that players cannot select cards that are out of range.