

C++ Project Proposal: Rento Fortune Game

1. Introduction

We have chosen to develop **Rento Fortune Game**, a digital adaptation of a well-known board game centered around strategy, luck, and trading properties. This game is famous for its engaging gameplay, where players compete to acquire wealth and dominate the game board. We selected this topic because it is interesting, widely recognized, and a classic in board games.

By implementing this game in C++, we bring a popular game to the digital space and explore various programming concepts such as game logic, multiplayer interactions, and user interface development.

2. Related Work

The idea for this project is inspired by traditional board games, particularly **Monopoly** and its various adaptations, such as the physical version of **Rento Fortune**. These games have stood the test of time due to their simple yet competitive mechanics, involving property acquisition, trading, and wealth accumulation. The digital transformation of these board games introduces new challenges and opportunities, such as multiplayer networking and enhanced game interfaces.

To bring our version of Rento Fortune Game to life, we will rely on several essential resources:

- **Google:** For research on game development techniques, best practices, and troubleshooting.
 - **Physical Monopoly and Rento Fortune Games:** As a reference for rules, game flow, and mechanics.
 - **Game Development Libraries (SFML, SDL):** For rendering graphics, handling user input, and implementing game logic.
 - **Open-source game projects:** We will look into available open-source C++ board game projects for additional insights and optimizations.
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3. Our Work

Game Components

- **Game Board:** The board has several spaces representing cities, railroads, utilities, etc.

Basic rules

Gameplay:

- Players take turns rolling two six-sided dice and move their token forward the number of spaces rolled.
- After moving, the player follows the instructions for the space they land on.

Spaces:

- **Properties:**
 - **Buying:** If a player lands on an unowned property, they can buy it for the listed price.
 - **Renting:** If a player lands on another player's property, they must pay rent. Rent increases if the property has houses or hotels.
- **Utilities (Electric Company, Water Works):**
 - Can be bought like properties.
 - Rent is based on the dice roll, typically a multiple of what was rolled.
- **Railroads:**
 - Can be bought and rented.
 - Rent increases based on the number of railroads owned by the same player.
- **Chance and Community Chest:**
 - When a player lands on one of these spaces, they draw a card from the corresponding deck and follow the instructions, which may involve moving, paying fees, or receiving money. (List of these cards below)
- **Income Tax and Luxury Tax:**
 - Players landing here must pay a fee to the bank.
- **Jail:**
 - Players can land in jail or be sent there by certain cards or spaces. While in jail, players can still collect rent but cannot move until they roll a double, pay a fine (\$50), or use a "Get Out of Jail Free" card.
- **Free Parking:**
 - This is a resting space with no action required.
- **Go to Jail:**
 - If a player lands here, they are immediately sent to jail.
- **Go:**
 - Players receive \$200 every time they pass or land on "Go."

Buying and Developing Properties:

- **Monopolies:** If a player owns all properties of the same color group, they have a monopoly and can charge double rent.
- **Houses and Hotels:** Once a property is obtained, players can build houses and hotels on it, increasing rent.
- **The Bank has infinite cash, but number of houses is limited (32 houses and 12 hotels).** An auction function can be added to the exchange house

Trading:

Players can trade properties, money, or "Get Out of Jail Free" cards. All trades must be mutually agreed upon.

Mortgaging:

If a player is short on cash, they can mortgage properties to the bank to raise money. Mortgaged properties cannot collect rent until the mortgage is repaid.

Bankruptcy:

- Players who cannot pay rent or a fine must sell houses, mortgage properties, or trade with other players to raise money.
- If they still cannot pay, they go bankrupt and are out of the game. Their assets are turned over to the creditor (either the bank or another player).

List of Chance cards:

Reference: <https://monopoly.fandom.com/wiki/Chance>

1. Advance to "Go". (Collect \$200)
2. Advance to Trafalgar Square. If you pass Go, collect \$200.
3. Advance to Pall Mall. If you pass Go, collect \$200.
4. Advance the token to the nearest Utility. If unowned, you may buy it from the Bank. If owned, throw dice and pay the owner ten times the amount thrown.
5. Advance to the nearest Railroad. If unowned, you may buy it from the Bank. If owned, pay the owner twice the rent to which they are otherwise entitled.
6. Bank pays you a dividend of \$50.
7. Get out of jail free. This card may be kept until needed or traded/sold.
8. Go back three spaces.
9. Go directly to jail (Cannot collect \$200 if you pass "GO")
10. Make general repairs on all your property: For each house, pay \$25; for each hotel, pay \$100.
11. Take a ride to King's Cross Station. If you pass Go, collect \$200.
12. Pay Poor Tax of \$15
13. Advance token to Mayfair
14. You have been elected Chairman of the Board. Pay each player \$50.
15. Your building and loan maturity. Collect \$150.

List of Community Chest cards:

Reference: https://monopoly.fandom.com/wiki/Community_Chest

1. Advance to "Go". (Collect \$200)
2. Bank error in your favor. Collect \$200.
3. Doctor's fees. Pay \$50.

4. From the sale of stock, you get \$50.
5. Get out of jail free. This card may be kept until needed or traded/sold.
6. Go directly to jail (Cannot collect \$200 if you pass "GO")
7. Grand Opera Night. Collect \$50 from every player for opening night seats.
8. Holiday Fund matures. Collect \$100.
9. Income tax refund. Collect \$20.
10. It is your birthday. Collect \$10 from every player.
11. Life insurance matures – Collect \$100
12. Hospital fees. Pay \$50.
13. School fees. Pay \$50.
14. Receive a \$25 consultancy fee.
15. You are assessed for street repairs: Pay \$40 per house and \$115 per hotel you own.
16. You have won second prize in a beauty contest. Collect \$10.
17. You inherit \$100.

Highlights

Multiplayer Mode, Rich Game Content, Trading System, Open Source Code

4. Schedule

1. Project planning and design

Description: Finalize the game design, including rules, architecture, and features. Create a detailed project plan.

Estimated completion date: 2024.10.13

2. Game board and components implementation

Description: Develop the game board, player movement, and property system (buying, renting, trading).

Estimated completion date: 2024.11.24

3. Multiplayer and basic game logic

Description: Implement the multiplayer mode, basic game logic (e.g., dice rolling, player turns), and card drawing systems (Chance and Community Chest).

Estimated completion date: 2024.11.24

4. Graphical User Interface (GUI)

Description: Add basic graphics to display the board, player positions, and game status in a straightforward and user-friendly interface.

Estimated completion date: 2024.11.24

5. Testing and debugging

Description: Conduct thorough testing to identify and resolve bugs, ensuring smooth

game flow and functionality.

Estimated completion date: 2024.12.1

6. Project report

Description: A substantial extension of the proposal.

Estimated completion date: 2024.12.8

7. Final adjustments and submission

Description: Finalize the game, polish the user experience, and prepare the project for demonstration.

Estimated completion date: 2024.12.15

5. Team

● Game Logic Developer

○ **Name:** 莫骄阳, 周信言

○ **Student ID:** 123090430, 123090908

○ Responsible for implementing the core game logic, such as rolling dice, player movement, and handling property transactions (buying, selling, and renting). This role also manages the game's rules, including the turn-based system and special actions like going to jail or drawing Chance and Community Chest cards.

● Graphics Developer

○ **Name:** 杨亦尧

○ **Student ID:** 123090733

○ In charge of designing and developing the graphical user interface (GUI). This includes rendering the game board, displaying player positions, and creating visual elements for game components like property cards, money, and dice.

● Multiplayer Developer

○ **Name:** DANG, Huu Quyen

○ **Student ID:** 1155211363

○ Focuses on implementing the multiplayer features, ensuring that players can interact with each other in real time. This includes synchronizing game states, managing player turns, and handling network communications (for local and online play).

● Backend Developer

○ **Name:** 陈庆洋

○ **Student ID:** 123090032

○ Handles the game's backend systems, including setting up the initial game state, managing data storage (e.g., saving player progress), and ensuring the smooth execution of the game's internal processes.

● Tester and Debugger

○ All team members

○ Conducts comprehensive testing of the game, identifying bugs and ensuring that the game mechanics, multiplayer functionality, and graphical interface all work as intended. This role also involves debugging and making final adjustments to ensure smooth gameplay.