Monopoly Board Game Requirement Analysis

CSE3063 Object Oriented Software Design
Marmara University

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1.Introduction

Vision: The objective of the project is the implementation of the monopoly board game Java based object-oriented software design approach. The project is designed and developed by a team of 4 members. Team members are Göksel Tokur, Zahide Taştan, Merve Ayer. Ertuğrul Sağdıç.

Scope: Monopoly simulation

Figure 1: Sample Monopoly Board

Special Requirements

- Java
- Visual Studio Code
- IntelliJ
- Git
- GitLab
- SSH Secure File Client

Stakeholders:

Murat Can GANİZ (Customer)

Serap KORKMAZ (Customer)

Göksel TOKUR

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2.Requirement Specifications

2.1 Must Have Requirements

Implement a text based console of the Monopoly Game Simulation for this requirement a consistent implementation of the Monopoly that can be played by two to eight players.

- The observer input and game output will be via terminal.
- Provide some observer commands that control the simulation.

Simulated computer players

- Simulated players must obey by the rules of the game.
- Computer players are going to challenge with themselves.

2.2 Could Have Requirements

Improved artificial intelligence of the simulated player.

2.3 Non-Functional Requirements

Reliability

Improvable software

Efficiency in terms of response time and memory

Maintainability

2.4 Game Specifications (or Rules)

This is an insight into the way the group aims to achieve the implementation of the text based console version of the game. This is not a comprehensive list; it will be updated once the team has prepared the detailed design, class diagram and the sequence diagrams for the game.

2.4.1 Start-Up:

The Monopoly has been played in a series of rounds. During a each cycle each player takes one turn.

- The Bank gives to each player 10000. The remaining Money will be kept in the Bank until required.
- Each player rolls two dice. The player who rolled the biggest integer from faces of the dice, will start at first. The rest will be started regarding to their rolls.
- In each turn, players need to roll two dice, and players move their own pieces.
    - Every turn, the name of the player and current location of the player's piece will be displayed.
- The piece belongs to player, will stay on the board and it will continue from that square.

2.4.2 Landing on specific squares

There are several different squares, such as start square, tax square, property squares and go to jail square.

If a player lands on start square or passes through that square, player takes wage which has been set at the beginning of the game by the observer.

If a player lands on tax square, the player has to pay the amount which has been set at the beginning of game.

If a player lands on the property square that do not have an owner, player can buy that square. If property has an owner, landed player should pay rent amount.

If player lands on the go to jail square, he/she goes to jail and can not play 3 turns.

3. Glossary

- **Board:** The Monopoly game-board consists of 40 squares
- **Square:** Containing twenty-eight properties, four railroads, three Chance spaces, a Tax space, and the four corner squares: GO, (In) Jail/Just Visiting, Free Parking, and Go to Jail etc
- **Dice:** Player rolls the dice and his/her pawn is moved according to the sum of dices' faces.
- **Player:** A bot that is behave like human. This game can be played by 2 to 8 players.
- **Piece:** Piece is a token of a player. Each player has a unique piece.
- **Houses:** When a player owns all the properties in same color group,they may buy a houses by paying specific price for house. The owner receives more rent value if buy the house according to the house of number.
- **Hotels:** When a player has four houses on each property of a same color group, they may buy a hotel by paying specific price for hotel. That allows the owner to get more rent value.
- **Bankruptcy:** These means that player left the game because player's Money is under the $0. When the player's Money under the $0, player is bankruptcy.
- **Money:** Monopoly money is a type of play money used in the board game.

4.Types of Squares

- **Start Square:** The Square that each player locates at the starting of the game, players collect moneys when they passed over it.
- **Tax Square:** The Square that if a player landed on, they have to pay tax to the bank.
- **Free Parking Square:** The Square that corner square on the board and if player lands on, nothing happens they move on the game next turn.

- **Go To Jail Square:** The Square that corner square on the board and if player lands on, they must move their piece to Jail Square. They can't pass Go Square and they can't get sallary from Go Square. Player turn ends.
- **Jail Square:** The Square that one of the corner square on the board. And if the player in Jail, a player's turn is suspended 3 turns. A player may gets out of Jail early by rolling doubles on any of that player's next tree turns in Jail.
- **Property Square:** The Squares that players can buy it. When a player buys any property square, that player receives the property's title deed. This means, when the player lands on a property square that is owned by another player, the owner collects rent from landed player. According to the specific rent values. Its depends on property's name or number of houses on the that Property Square.
- **Railroad Square:** The Squares that types of Property Square. Difference between Property Square and Railroads is they can't developed by the addition of houses and hotels. When a player lands on that is owned by another player, owner collects rent from landed player.
- **Utility Square:** The Squares that same as Railroads without fixed rents. The Utility Square's rent value is incremental value based on the, number of utilities have owner player. When the player lands on a Utility Square, that is owned by another people, the player rolls dice. If owner have one Utility Square, the number in the dice multiplies by 4, the owner collects that value. If owner have two Utility Square, the number in the dice multiplies by 10 than owner collects that value as a rent.

5.Use Case Model

Actors of the game are simulated players. In other words, the software is run as a computer simulation watched by an observer. Game simulation will be controlled by an observer. Observer decide how many players will play and then start a game. Simulated players are going to start playing the game.

1. The user determines the number of players who will play the game via terminal input. Two to eight players can play the game.
2. Observer starts a game.

3. The system shows turn and cycle counter.
4. The system shows name, location information, money of the player which takes a turn.
5. Player toss the dice, after tossing dices the system will output face values and sum of faces.
6. The player will go to the new location.
7. The system shows the name and the type of the location, name of the owner if exists, type and number of properties in the square, the amount of rent or fee if any and current balance of the user.
8. At the end of each cycle the system shows the list of all simulated users' information. And properties ordered by their balance.