Software Requirements Specification for Monopoly Board Game

1. INTRODUCTION

The goal of this project is to create a java version of Monopoly Board Game. This game provides several features we can see in the board game version. This SRS document provides non-functional requirements of the Trade game also.

1. USE CASES

UC1 : Enter Player Info

UC2 : Roll Dice

UC3 : Move

UC4 : Pass GO cell

UC5 : Go To Jail

UC6 : Visit Jail

UC7 : Go To Free Parking

UC8 : Purchase Tradable cell

UC9 : Buy House

UC10 : Pay Rent

UC11 : Draw Card

UC12 : Get Out of Jail

UC13 : Switch Turn

UC14 : View Information

UC15 : Trade

UC1 Flow of Events for Enter the Player Info

* 1. Preconditions

None

* 1. Main Flow

Right after the game gets started, the player Information dialog will prompt the Banker to enter the details of the players

E1 : enter the number of players in the game

E2 : name of the each player

* 1. Subflows:

None

* 1. Alternative Flows:

[E1]: The number of players is a integer number between 2 and 8.If the Banker do not enter a integer, or the number is not between 2 and 8, the game asks the player to retype the number of players again

[E2]: The name cannot be an empty string. If a player enters an empty string, the game asks the player to retype his name

[E3]: when the cancel button is pressed, the player information dialog closes and the game ends

UC2 Flow of events for the ‘Roll the Dice’ use case

* 1. Preconditions

It is the player’s turn

* 1. Main Flow

The player rolls the dice by clicking on the Roll Dice button. The Roll Dice dialog pops up to indicate the value of the dice roll. In this game, there are two six-faced dice.

* 1. subflows

None

* 1. Alternative Flows

None

UC3 Flow of the events for MOVE use case

3.1 Preconditions

[PC1]: The players must have entered their information in the information dialog.

[PC2]: The player should have rolled the dice

3.2 Main Flow

The game is turn based. The first player’s turn starts when the players’ information is entered. The movement is based on the player’s dice roll. If the dice roll is 2, the player moves forward 2 steps and if the dice roll is 3, the player moves forward 3 steps etc. What happens to the player depends on the cell the player lands on is decided by [S1]. The new position and information of the player is displayed on the game board. The turn ends when the player hits the end turn button. Then the next player’s turn begins

3.3 SubFlows

[S1]: After the player moves to the new cell, based on the type of the cell, he may proceed to the Jail cell[UC5]; Stop at the Jail cell[UC6]; Stop at Free parking[UC7]; pay Rent to the cell owner [UC10]; Draw a card from community chest or chance cards[UC11]; Purchase an available property or utilities or railroads[UC8]

* 1. Alternative Flows

None

UC4 Flow of events for ‘PASS GO ‘cell use case

4.1 Preconditions

1. it is the player’s turn

2. The player has rolled the dice

4.2 Main Flow

If the player passes the GO cell during their move , or if the player lands on the GO cell after the move , the player gains $200 [E1]

4.3 Sub Flows

None

4.4 Alternative Flows

[E1] if the player passes the GO cell because he is sent to the Jail, the player cannot collect money. A player can be sent to Jail either because he draws a GO to Jail card, or if he lands on the ‘Go to Jail’ cell after his move.

UC5 Flow of events for ‘Go to Jail’ use case

5.1 Preconditions

1. it is the player’s turn

2. The player has rolled the dice and moved

3. The player lands on the Go to Jail cell

5.2 Main Flow

The player is sent to the Jail cell directly. When a player is sent to the jail cell, he is said to be in jail

5.3 Sub Flows

None

5.4 Alternative Flows

None

UC6 Flow of Events for the ‘VISIT JAIL’ use case

6.1 Preconditions

1. It is the player’s turn

2. The player has rolled the dice

3. The player lands on the Jail cell

6.2 Main Flow

The player visits the jail. Nothing happens to the jail visitors

6.3 Sub Flows

None

6.4 Alternative Flows

None

UC7 Flow of Events for ‘Go to FREE Parking’ use case

7.1 Preconditions

1. It is the player’s turn

2. The player has rolled the dice

3. The player lands on the Free Parking

7.2 Main Flow

Nothing happens to a player landing on the Free Parking cell

7.3 Sub Flows

None

7.4 Alternative Floes

None

UC8 Flow of Events for the ‘Purchase Tradable Cell’ use case

8.1 Preconditions

1. It is the player’s turn

2. The player has rolled the dice

3. The player lands on an available Tradable cell

8.2 Main Flow

There are three (3) types of tradable cells in this game: a) Property cell. b) Railroad cell. c) Utility cell. A Tradable cell is available if it has no owner. When a player lands on an available Tradable cell, he may buy the cell by clicking the purchase button [E1]. The price the player needs to pay is the land value of the tradable cell [S1].player’s information displayed on the game board is refreshed to show the tradable cells and the amount of money a player owns.

8.3 Sub Flows

[S1]: The price for a railroad cell or utility cell is fixed. And the price for the Property cell depends on the area (color);

8.4 Alternative Flows

[E1]: Nothing happens if the player does not have enough money for buying the cell or if he doesn’t have interest to buy.

UC9 Flow of Events for the ‘BUY HOUSE’ use case

9.1 Preconditions

1. It if the player’s turn

2. The player has not rolled the dice

3. The player owns one or more color groups.

9.2 Main Flows

When a player has all the tradable cells in a color group, the player may build houses in the property cells in the color groups the player has monopoly on, by pressing the buy house button before he rolls the dice [S1][E1,E2]. The price of the house is determined by the cell. After the buying the house, the status of the player is updated and displayed on the board.

9.3 Sub Flows

[S1]: when the Buy house button clicked, the Buy house dialog shows up. The player selects the monopoly color group and the number of houses he wants to build from that dialog. After clicking on OK in the dialog box, the player pays the money and the houses are built. All the property color group have the same number of houses

9.4 Alternative Flows

[E1]: Nothing happens if the player does not have enough money.

[E2]: The player can build at most five houses in a cell.

UC10 Flow of Events for ‘Pay RENT’ use case

10.1 Preconditions

1. It is the player’s turn.

2. The player has rolled the dice.

3. The player lands on a tradable cell that is owned by another player

10.2 Main Flow

The player pay rent to the owner of the cell. The rate of the rent depends on the type of cell the player lands on [S1-S3] [E1].

10.3 Sub Flows

[S1]: The rent of a property cell is defined in the property attribute. Each cell may have different rent rate. If the cell is in the owner’s monopoly color group, the rent normally doubles.

[S2]: if the cell is a Utility cell, the player rolls the dice again. If the owner owns 1 utility cell, the player pays three times the dice roll (RENT = 3\* DICE ROLL); if the owner owns 2 utility cells, the player pays ten times the dice roll (RENT = 10 \* DICE ROLL).

[S3]: if the cell is a Railroad cell, and the owner owns N railroad cells, RENT = $50 \* 2 pow(N-1);

10.4 Alternative Flows

[E1]: if the player does not have enough money to pay the rent, the player is bankrupt. He needs to give all the tradable cells to the owner and is out of the game.

UC11 Flow of Events for DRAW CARD use case

11.1 Preconditions

1. It is the player’s turn

2. The player has rolled the dice

3. The player lands on a card cell.

11.2 Main Flow

There are two(2) types of card cells in this game : a) Community Chest b) Chance card. Each type of card cell is associated with deck of cards. When the player lands on a card cell, he draws a card by clicking the Draw Card Button. A card is drawn from the top of the Community Chest cards pile or Chance Cards pile, depending on the type of cell the player lands on. The player performs the actions described on the card [S1-S4]. After that, the card is put back to the bottom of the card pile, and the status of the player is updated and displayed.

11.3 Sub Flows

[S1]: if the card says the player can collect some certain amount of money, that amount of money is given to the player by banker.

[S2]: if the card says the player should pay certain amount of money, that much money is deducted from the player [E1]

[S3]: if the card says the player goes to jail, the player is sent to the Jail cell immediately.

[S4]: if the card says the player goes to some cell, the player is sent to that cell immediately

11.4 Alternative Flows

[E1]: If the player does not have enough money, he is bankrupt. He needs to give up all his money and all the tradable cells he owns to the banker and so they become available for the other players.

UC12 Flow of Events for the ‘Get Out of Jail’ use case

12.1 Pre conditions

1. It is the player’s turn

2. The player has not rolled the dice

3. The player is in jail.

12.2 Main Flow

Before the player can roll the dice, he needs to click on Get out of Jail Button. Upon clicking the button, the player pays $50, and is no longer in jail [E1].

12.3 Sub Flows

None

12.4 Alternative Flows

[E1]: If the player does not have enough money, he is bankrupt. He needs to give up all his money and all the tradable cells he owns to the banker and so they become available for the other players.

UC13 Flow of events for ‘Switch Turn’ use case

13.1 Preconditions

1. It is the player’s turn

2. The player has rolled the dice and moved to the new cell

3. The player has completed all the actions he has to do.

13.2 Main Flow

The player’s turn ends when he clicks on the end turn button and turn is switched to another player.

13.3 Sub Flows

None

13.4 Alternative Flows

None

UC14 Flow of Events for the View Information use case

14.1 Preconditions

None

14.2 Main Flow

The players can see their status, including theirs names, money, and properties on the game board. The attributes of the cells, including the names, the owners, the number of houses, and the price, is displayed on the game board, too.

14.3 Sub Flows

None

14.4 Alternative Flows

None

UC15 Flow of Events for the TRADE use case

15.1 Preconditions

1. It is the player’s turn.

2. The player has not rolled the dice.

15.2 Main Flow

The player may ask another player to sell his Tradable cells. If the player wants to trade with another player, he clicks on the Trade button. The Trade property dialog pops up and the player enters the player(seller) he wishes to trade with, the cell he wishes to buy, and the amount of money he wish to pay[E1-E2]. Then another dialog shows up to ask the seller if the seller agrees with the deal. The seller clicks on Yes in the dialog box and the cell is sold to the player for that amount of money[E3].

15.3 Sub Flows

None

15.4 Alternative Flows

[E1]: if the player (buyer) clicks on cancel button, the dialog closes and the deal is cancelled.

[E2]: if the player does not have enough money to buy, the deal is cancelled

[E3]: if the seller says no to this deal, the deal is cancelled.

1. Non Functional Requirements

NR1. Performance

The system shall wait for all user inputs, and execute only the necessary functions given by the user as input to the system. All the functions shall be completed quickly.

NR1.1 User response

The system shall respond to any user input within short time (order of milliseconds)

NR1.2 Update User data

The system shall update user data within short time

NR2 Usability

A user shall be able to determine quickly what player options he has to perform.

NR2.1 Player Options

A user shall only have access to functionality that is allowed to him at a given time.

NR2.2 User Interface

The system shall allow a user to interface with it through mouse by clicking on the buttons and keyboard events on textfields. The amount of user keyboard input shall be minimized by the system to include only entering the number of players, player names, and a trade price.

NR2.3 User Errors

The system shall catch improper input from all text fields in the system.