COMP3211: SOFTWARE ENGINEERING (2021-2022)

Group Project - Monopoly

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1. Introduction

1.1.   Purpose

The purpose of this Requirements specification document is to design and implement the monopoly game in an object-oriented way. This document defines the monopoly game's scope, aims, and objective. Apart from describing non-functional requirements, this paper models the functional requirements using use cases, interaction diagrams, and class models. This document serves as a guide for developing and implementing the monopoly game in an object-oriented language.

1.2.   Intended Audience and Reading Suggestions

This project is useful for people who are interested in playing monopoly using a computer.

1.3.   Project Scope

The purpose of the monopoly game is to serve as a teaching tool, emphasizing the negative consequences of land concentration in private monopolies. The game is based on Python.

2. Glossary

This document uses the following glossary.

OO	Object-oriented
CMD	Command Prompt
OS	Operating System

3. User requirements definition

A maximum of 6, minimum of 2 players are required to play The Monopoly Game, like a typical Monopoly Game, the playstyle is the same, each player will start with 1500 HKD and take turns in rolling the dice and advancing their respective tokens clockwise on the board when a player reached a property, the player can choose whether to buy the property or not, each time a player passes square 1, the "GO" box, the player will get HKD 1500 salary.

The price of each property is described on each box, usually, the higher the price of a property, the higher the rent.

The losing condition is resulted in a negative amount of money after taking a turn.

The "CHANCE" box is like gambling, when the player lands on this box, the player will either gains a random amount (multiple of 10) up to HKD 200 or loses a random amount (multiple of 10) up to HKD 300.

If a player landed on an "Income tax" box, then the player needs to pay 10% of his/her money (cash, rounded down to a multiple of 10) as tax.

The "Free parking" box has no effect, it is here to waste a turn of a player.

i. Monopoly game

If a player hits the "Go to Jail" box, the player immediately goes to the "In Jail" part of the "In Jail / Just Visiting" box. When inside the jail, the player cannot make a move, the player is required to roll two dice three times, each time cost HKD 150, if the player throws a double (both dice coming out the same face up), the player immediately moves forward by both numbers of dice combined of the box, if the player is unlucky, and did not throw a double three times in a row, the player will get out of the jail by moving forward by both numbers of dice combined of the box, with a -HKD 450 of fine.

When a player lands on the "Just Visiting" box, it is just like the "Free Parking" box, and nothing will happen. However, you can say hi to the prisoner if you wish.

Q: How will I be able to play the game?

A: The game can run on any PC with 10 MBs of free space that can run Windows. Permission to run CMD (Command Line Interface) is also required.

Q: What if I want to continue the game later?

A: The game will provide a save and load function.
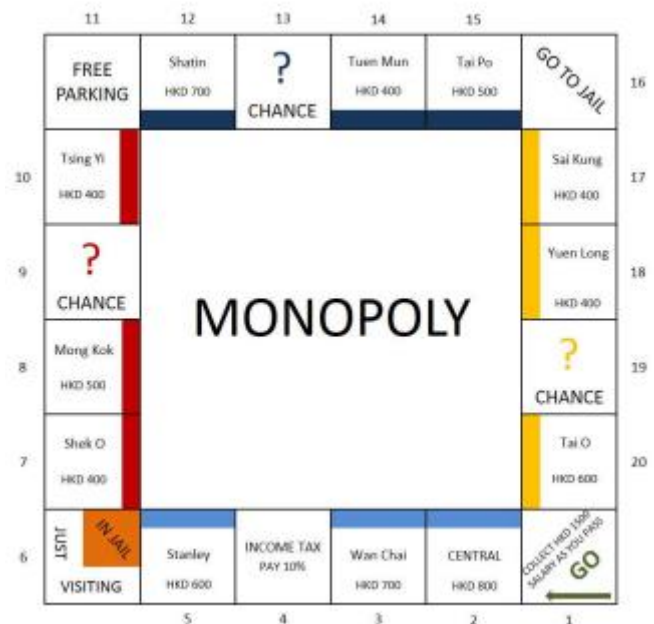
4. System requirements specification

4.1. Functional requirements

- Menu function. The menu would show the game title ('Monopoly'). And provide four options: New Game, Continue, Check Game Rule, and Exit.

- New Game is for starting the new game. After choosing this option, the system would provide 2 to 6 for the user to choose how many players would play the game.

- Continue – the game would read the save file to generate the required objects with the saved data and let the user continue the last game. Only one save is provided.

- Check Game Rule: showing the game rule in-text line by line for the user. Users can press enter to go back to the menu.

- The game will play with the arrow Up, Down, and the Enter keys. The Enter keys are for confirming the choice and go to the next step, and the Up, Down keys are for choosing an option.

- Save/Load function – The game provides a save function during the play process. Users can save the game, and the system would output the current game data into a file. Players can read the file in the menu

- Game Board: the game board would design in a 6 * 6 grid. The outer 20 blocks are the game block.

- Game Stats: The information would display in the middle of the game board. For example, who is the player of the current round, how many turns finished, player's money with ranking, who is in jail, and how many jail turn(s) left.

- Chess. 6 players would have their chess to display the position on the game board. The symbol is '♣' and with 6 different colors. P1(Red), P2(Green), P3(Yellow), P4(Blue), P5(Magenta), P6(Cyan)

- Four-sided (tetrahedral) dice. We provide [1,2,3], [1,2,4], [1,3,4], [2,3,4] four side. The system would make first random the side and random the number, then output as dice result.

- Go Block. It is the starting block of the game. This block would display the salary, Go, and the play direction (Clockwise). A player would get the salary when passing this block.

- Property Block. This block would display the name, price, rent, and owner. Player land on this block can buy and become the owner or pay the money of rent to the owner. If the player is unable to pay the rent, the player is game over. The owner gets all the remaining money from that player.

- Income Tax Block. This block would display the income tax %, and play needs to pay the money (rounded down to a multiple of 10) of tax when land on this block.

- Jail Block. This block would display the Jail and Visiting text. Player land on this block by dice is no effect.

- Chance Block. When the player land on this block. It would be random a number from (-300 to 200) rounded down to a multiple of 10. This player would add this number to its money.

- Free Parking Block: Display Free Parking text, No effect.

- Go To Jail Block. Display Go to Jail text. This block would send the player to Jail Block and add 3 jail turns to the player. Players can either pay $150 or roll 2 dice with the same face to get out if three turns are finished. The player also needs to pay $150.

- Maximum turns are 100, each loop of all players roll the dice count as 1 turn

- It can have more than one player in the same ranking. (e.g., 2 winners)

- When a player's money becomes less than 0. The player loses.

4.2. Non-Functional requirements

- Portability and compatibility

  - Any operating system that supports Python.

  - Permission to run CMD (Command Line Interface).

- Performance

  - Every action to the game must affect immediately.

  - The layout of the game should be clearly present.

- Security

  - Encrypt the save file to prevent the player from editing it. It will ensure the fairness of the game.

- Cost

  - The game is free to play, and more people can enjoy it.

- Localization

  - The game uses English, which is one of the most used languages in the world. Therefore, more people will be able to understand the game and can learn how to play it with ease.

- Accessibility

  - A high-contrast mode will be in the system for users who have some difficulties in reading texts.

  - To ensure the user-friendless of the game, a game board will be printed out.