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ASSIGNMENT NUMBER: 4

DOCUMENTATION

➢ TASK:

Simulate a simplified Capitaly game. There are some players with different strategies, and a cyclical board with several fields. Players can move around the board, by moving forward with the amount they rolled with two dice.

A field can be a property, service, or lucky field. A property can be bought for 1000 and stepping on it the next time the player can build a house on it for 4000.

If a player steps on a property field which is owned by somebody else, the player should pay to the owner 500, if there is no house on the field, or 2000, if there is a house on it.

Stepping on a service field, the player should pay to the bank (the amount of money is a parameter of the field).

Stepping on a lucky field, the player gets some money (the amount is defined as a parameter of the field).

There are three different kinds of strategies exist. Initially, every player has 10000.

Greedy player: If he steps on an unowned property, or his own property without a house, he starts buying it, if he has enough money for it.

Careful player: he buys in a round only for at most half the amount of his money.

Tactical player: he skips each second chance when he could buy.

If a player must pay, but he runs out of money because of this, he loses. In this case, his properties are lost, and become free to buy.

Read the parameters of the game from a text file. This file defines the number of fields, and then defines them. We know about all fields: the type. If a field is a service or lucky field, the cost of it is also defined. After these parameters, the file tells the number of the players, and then enumerates the players with their names and strategies. In order to prepare the program for testing, make it possible to the program to read the roll dices from the file. Print out which player won the game, and how rich he is (balance, owned properties).

➢ Analysis:

Player:

- **Tactical:** Such players play the game with a tactic that they skip the chance when they could buy a property/house two times. If they have enough money after skipping twice, they start to invest – buy a property/house.

- **Greedy:** Such players do not play with any tactic, meaning that if they have money, they invest immediately without waiting or thinking about.
- **Careful:** Such players play the game much carefully. They buy a property/house if they have twice the amount of the property or house. That way they use the money much wisely.

Field:

- **Property:** Such fields are purchasable and in case of already owning the property, there can be built a house. In case of other players (visitor) visiting an owned property field of a particular player (owner), the visitor pays the specific amount of the money to the owner, depending on the presence of house on that field (the exact amounts are specified in the description of the task).
- **Service:** Such fields are kind of bad luck field for players, such that, if players visit those fields, they are supposed to pay a specific amount of money (depending on the setup input of the game) to the bank.
- **Lucky:** Such fields are lucky fields, since visitor players of this field can earn a particular amount of money (depending on the setup input of the game).

➢ Plan:

In order to solve the given task, we need to define several classes.

The Capitaly Game program has the following classes:

- Abstract **PLAYER** class:
  - implements **playingStrategy** interface
  - Inherited by **TACTICAL** class
  - Inherited by **GREEDY** class
  - Inherited by **CAREFUL** class

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- Abstract **FIELD** class:
  - Implements **ifStepped** interface
  - Inherited **PROPERTY** class
  - Inherited **SERVICE** class
  - Inherited **LUCKY** class
- **ReadInput** class:
  - Reads the input from the input.txt file
- **Capitaly** class:
  - Main program.

➢ **Input file (.txt)**

The first line of the file has the number of fields in the game. It is followed by the fields and their details – the first letter of the categories they have, the name of the field and additional information for Service and Lucky field.

After reading all the information about fields of the game, the next line has the number of players in the game. It is followed by the players and their details – the first letter of the category they have, the name of the player.

The next line has the number of dice figures, which is followed by those dice figures. Also I assumed that there are two dices so the sum of two dices is enumerated in this file.

- **A sample of input file:**

```
4
L Lotto 250
P Miskolc
S Loan 250
P Szeged
3
G Zain
C Aadarsh
T Ali
```

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5

6

2

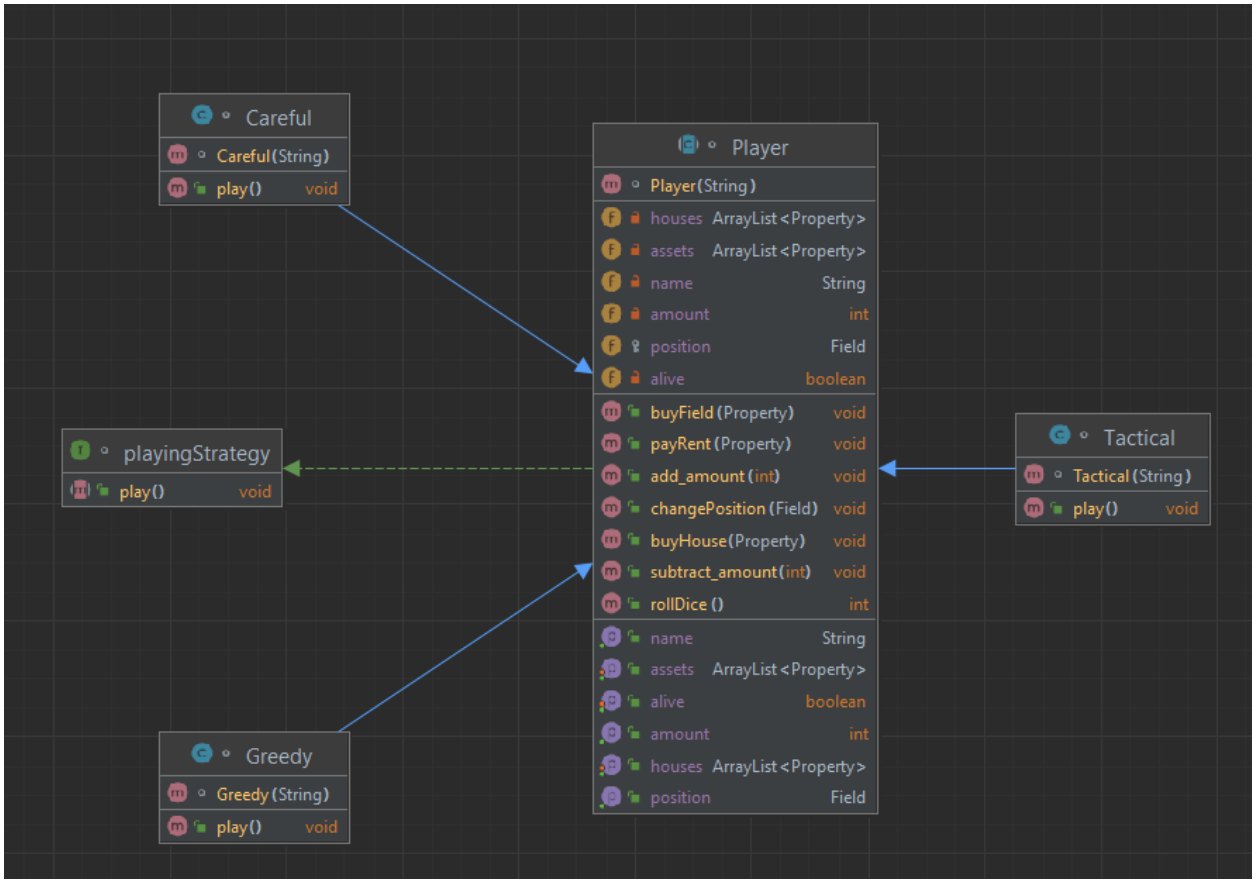
6

3

4

- ## UML CLASS DIAGRAMS:

- ### PLAYER Class and its inherited Children classes:



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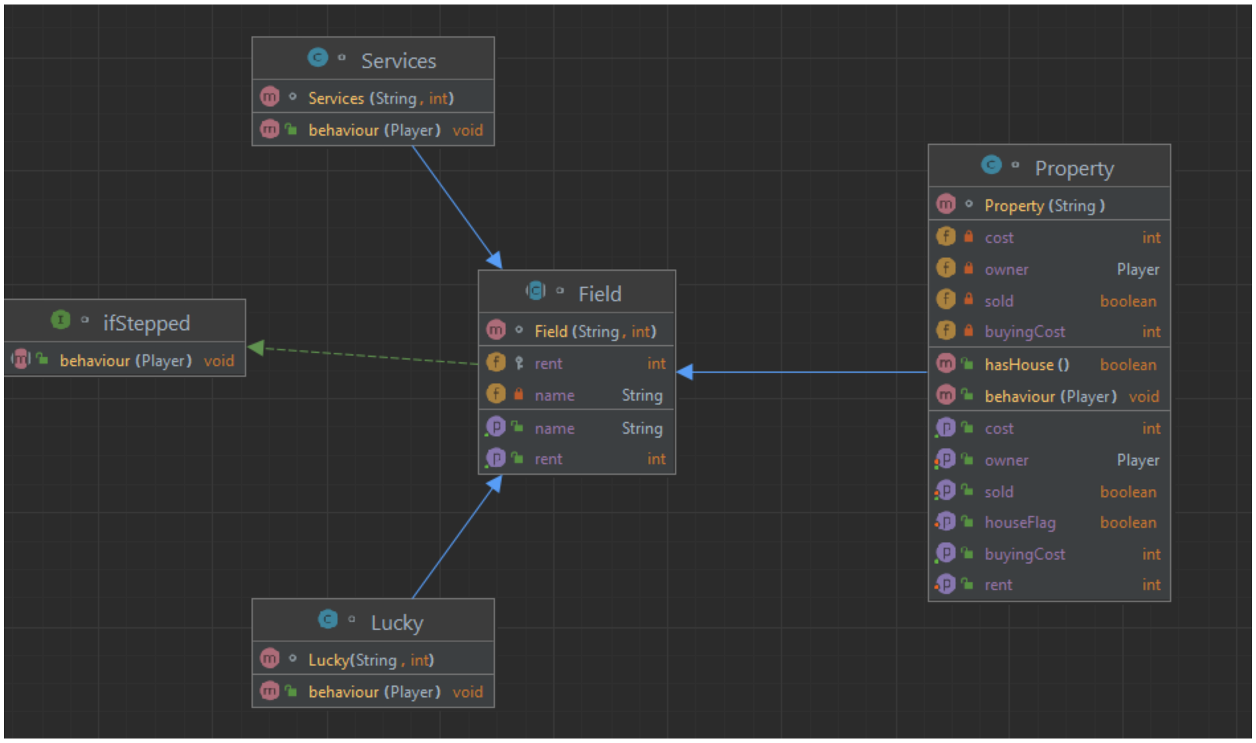
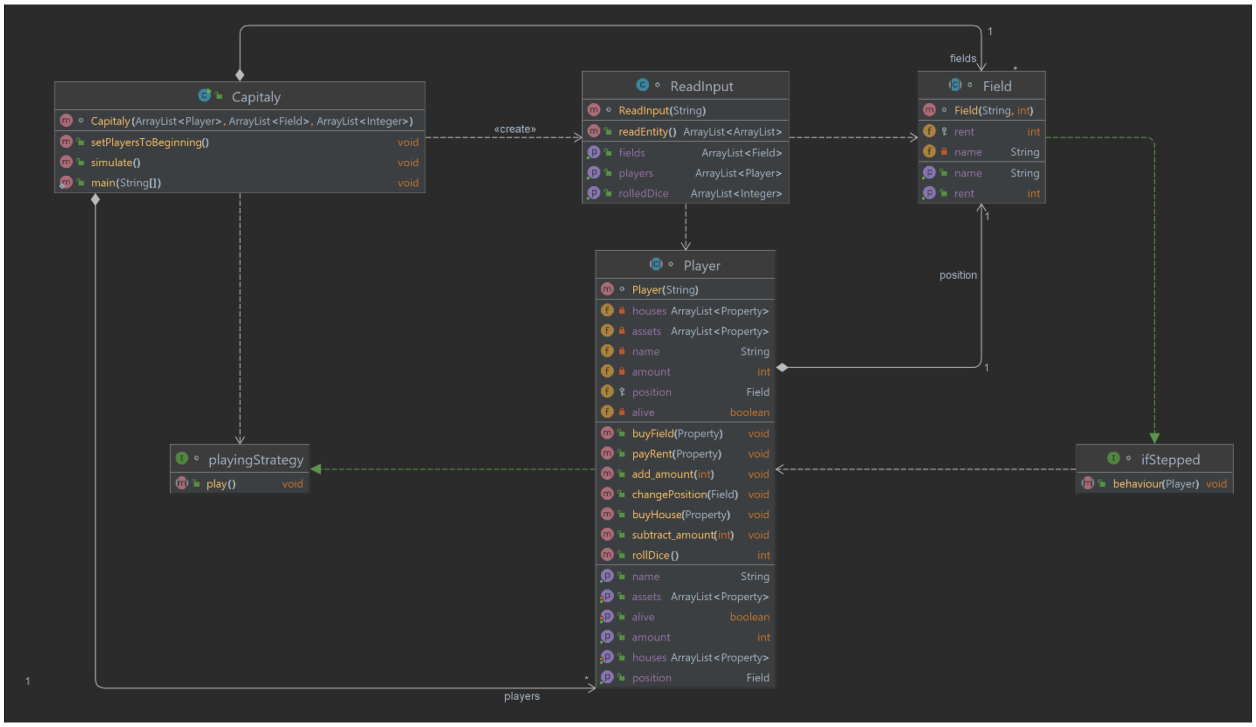
- **FIELD Class and its inherited Children classes:**



➢ **UML CLASS DIAGRAM with Dependencies shown:**



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- **Testing:**
  - **Note :** The rolled dice is actually some of two dice together. And the working for each turn is actually printed so we can also see what is the status of each players in each turn.

1. **Input file input.txt consists of two lucky fields, four Properties, two service and three players:**
   In this test case, The functionality is shown if there are enough rolled dices then it will return the winner whosoever is left at the end.

2. **Input file input1.txt consists of one Lucky field and one Property and and two players:**
   In this test case, The functionality is shown if there are not enough rolled dices then it will return that there is no winner.
3. **Input file input2.txt consists of only property fields The first player is a Greedy player, the other is Tactical.**
   In this case, the Greedy player will have the all properties and his capital is 15000 at the end. The Tactical player will have no property and the last amount he had was 1500 .