

Metro

A Game Designed with Object-Orientation Programming

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Group Members



Anbang Li

Game Logic
GUI



Lan Xue

Game Structure
Game Logic
GUI

Game Logic

Choose number of players

1. Decide the number of robots
2. Decide the group of stations belongs and distinguish the by color

Player choose tile:

1. The current tile in the hand
2. random tile from the deck

Limitations: if player choose random tile from deck, he can't choose the current tile in the hand

Place the chosen tile on the board

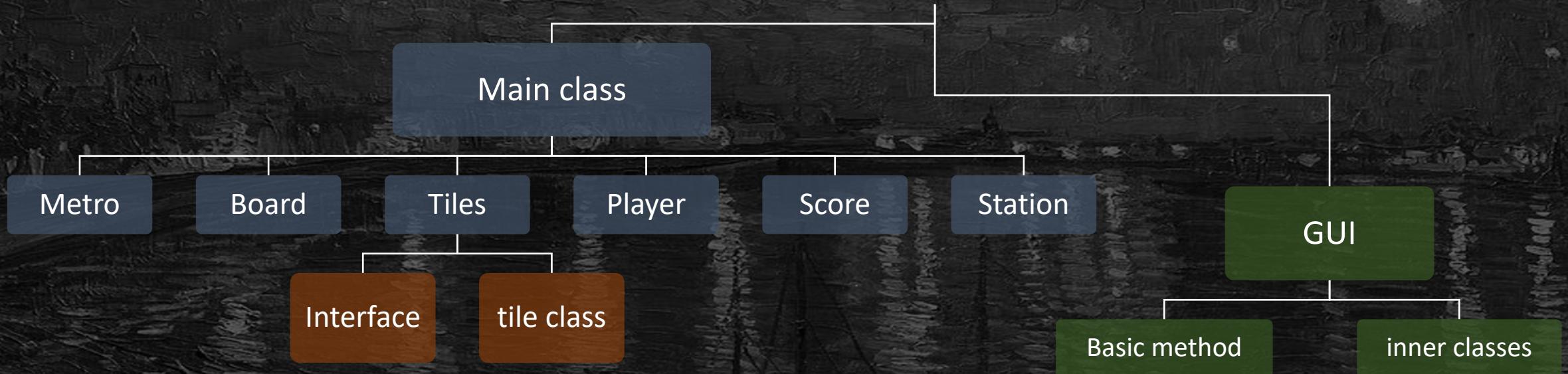
1. Check whether the placement is valid based on the game rules
2. robots will then place the tile automatically
3. Update everyone's score

Game over

1. When the whole board is covered by tiles
2. Announce player's final score and the winner

General Structure

Metro Game



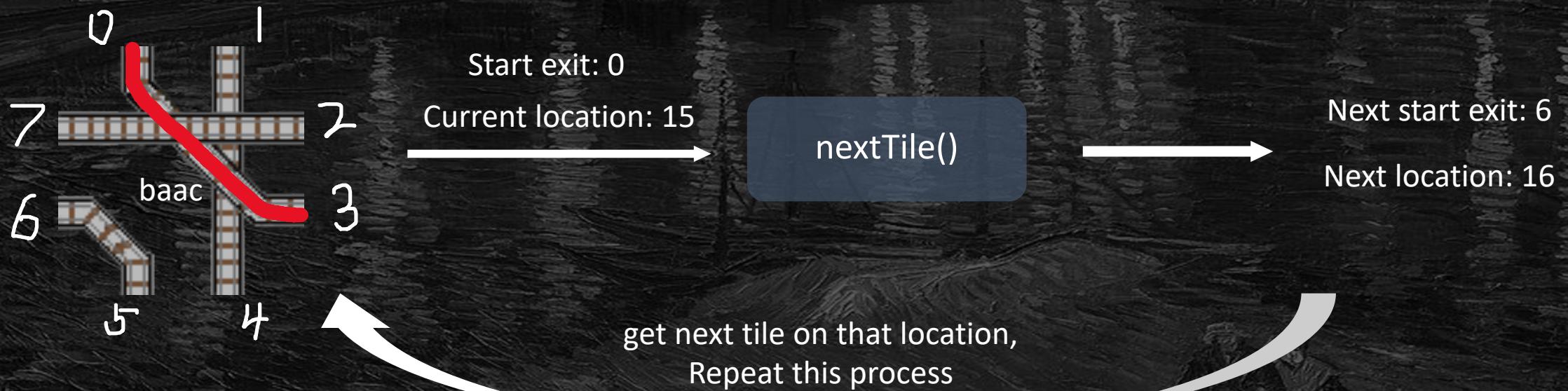
- The objects to be created with methods to implement
- provide static method to as help functions in Metro class
- some basic methods such as placing tile, pop windows
- inner classes for key nodes

Introduction for key classes

Tile Interface

- Key method: abstract method: `nextTile()` —— 24 tile classes to implement this method

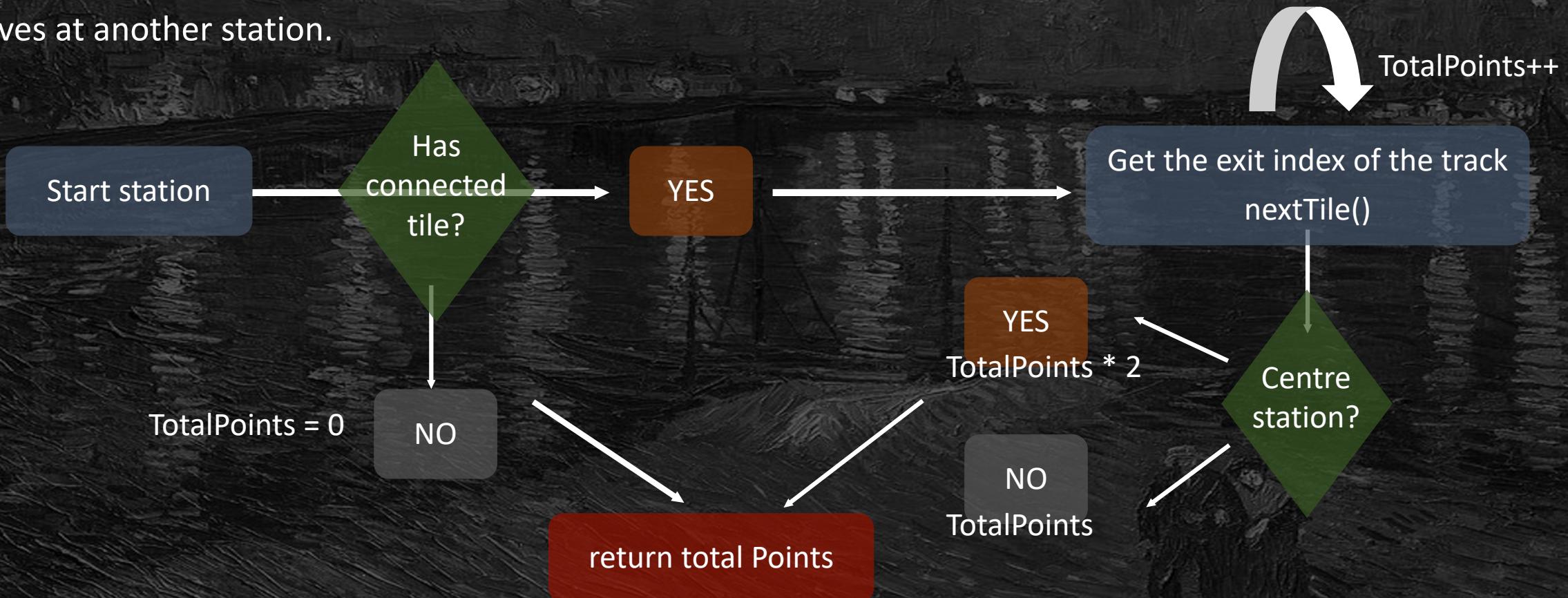
To get the information of the next connected tile including the position and the exit index that the track will start in the next connected tile.



Score

- Key method: `getPoints()`

Starting from the given station, based on the board state, follow the track all the way until the road is cut off or arrives at another station.



Board

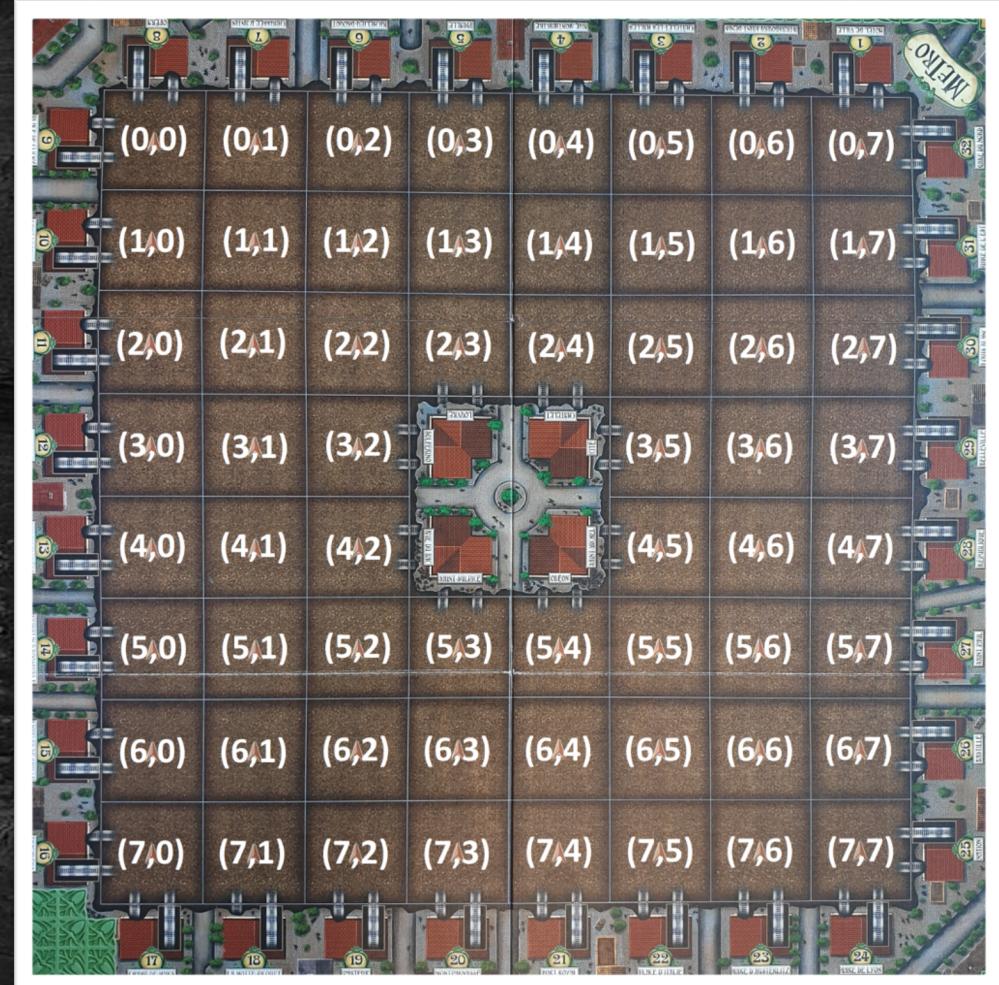
A board contains properties of a board as well as the methods to deal with these properties.

- member variables: placementSequence

Determined the board state

- Key method:

- getRestPosition(): returns the positions on the board that are not placed with a tile.
- getMousePosition(): transfers the java mouse position in the window into the XY position on the board.



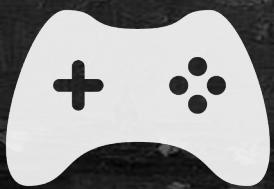
Player



Record the
number of players



Calculate scores for
the player



A robot player to
generate good
move



Decide who is
the winner

Station

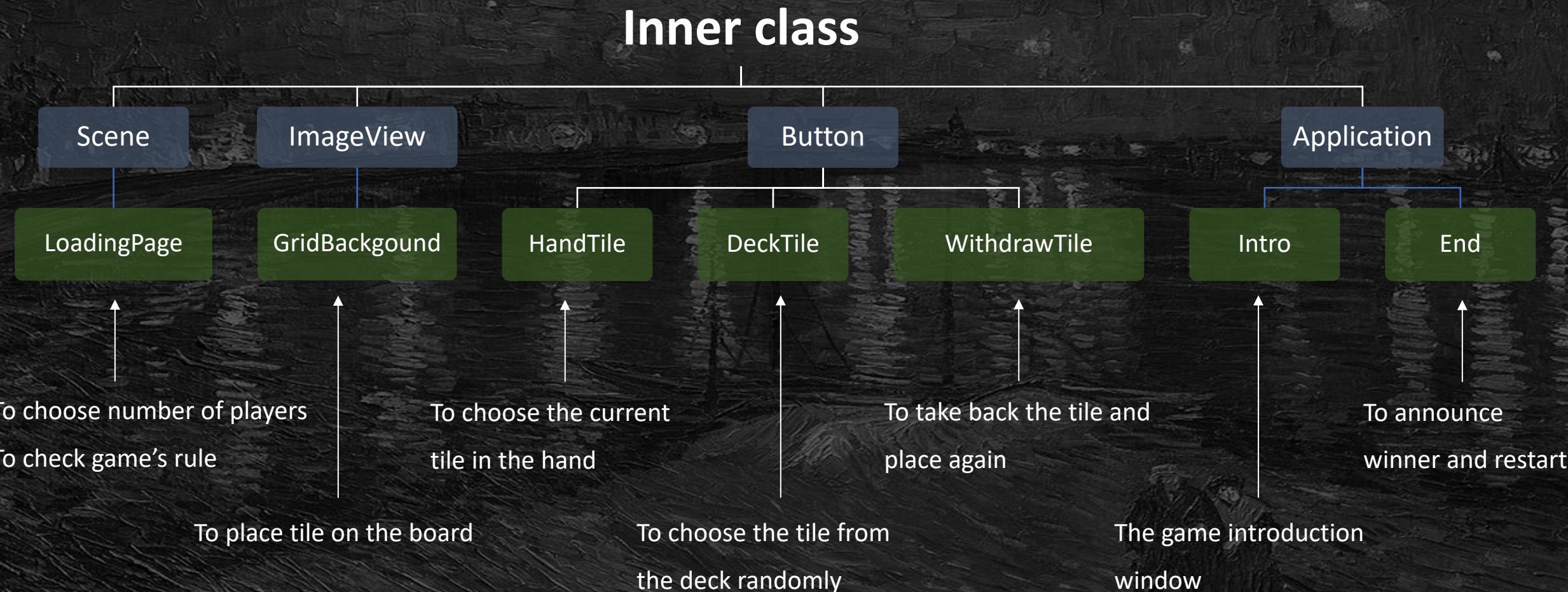
- Key method:
 - `getPlayerStation()`
 - Returns a hashmap that stores the number of players and the stations allocated to each of the players.
 - `isArriveStation() && isArriveCentralStation`
 - Return a Boolean value when inputted the exit value of a tile and the location of the tile. This determines whether the tile is connected to a station.
 - `getConnectedTile()`
 - Gets the index and XY position of a tile connected with a particular station

GUI

GUI is the user interface of the game.
In our version of game, we implemented GUI in a class called Game.

General Structure

- we made some key node as inner classes that extends the property of the respective javaFX element type.



GUI – final look



Player selection Window

Choose Player Numbers

1 player 2 player 3 player 4 player 5 player 6 player

Start Game Introduction

Game Designed

Who will build the longest Metro line?

Metro is a game for 2-6 players, who take turns placing tiles. Each player starts with an empty hand. On their turn, a player draws a tile then place the tile on the board. If they do not wish to place the tile, they may pick up another tile from the deck and place immediately.

There are 4 conditions that must be followed when laying down tiles:

- Each tile must be placed on a square adjacent to another tile or the edge of the board.
- A tile may not be placed next to one of the central station tiles unless it is also adjacent to another tile.
- Tiles cannot be rotated.
- A tile may not be placed so that it connects two stations directly(or loops back to the same station)

Each time the metro line cross a tile, this line get 1 point.
The game ends when all tiles have been placed. The one whose stations have the highest scores won

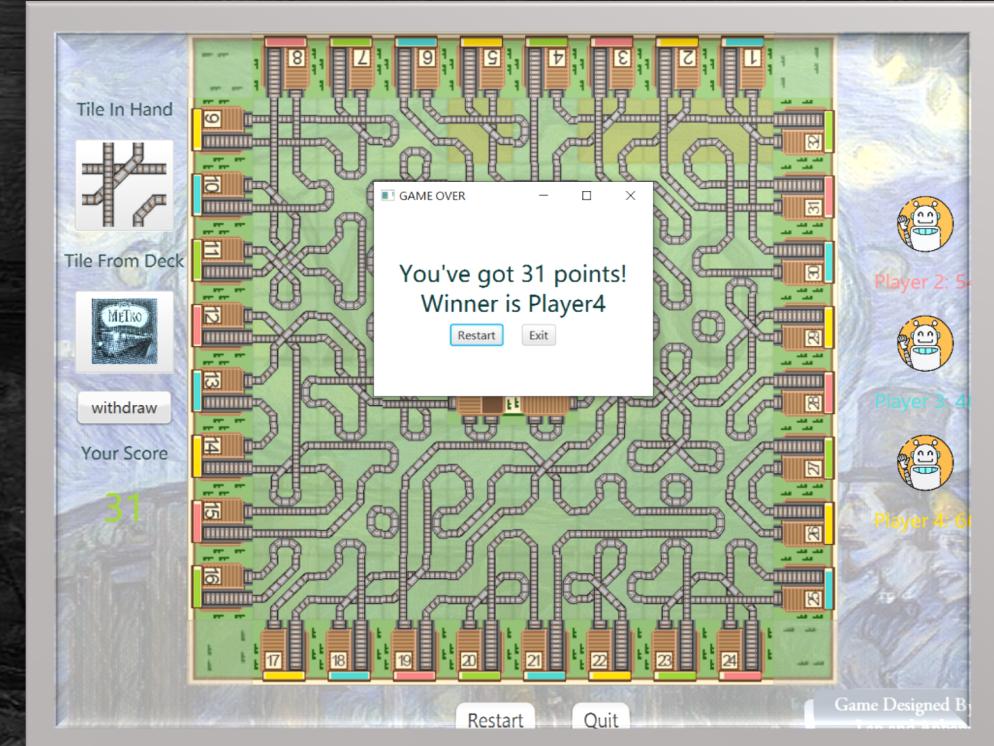
CLOSE

Introduction Window

GUI – final look



Multiplayer screenshot



Game over screenshot

GUI – Extra Features

Tips for the valid placement positions



Withdraw tile



This will help player to quickly decide where to put the tile even if they are not familiar with the game rules.

This will help player have a chance to undo

Advanced AI

A fierce battle with “annoying” robots

General logic for AI



End the player's path early!

- In the Metro game, each track starting from a station is guaranteed to be complete and end in another station. This means that each unfinished track has a potential mark that will become the actual mark.
 - Hence the priority of the AI is to minimize the score obtained by the player's unfinished tracks.
- ✓ Ways to realize:
AI will check the board each time to try to find an unfinished track of player which can be terminated by the tile on its hand, it will do that!



Thank You!