Design Document - Tetris

Introduction:

For this project the members of the development team are Shen Wang, Yunxiao Cui and Yue Yu. We will write a Tetris game by JAVA and make sure it will be running well follow the requirements of CS 342 Programming Project 5.

Section 1 - Purpose:

The purpose of the project is to write a JAVA application to play Tetris. The game rule is same as the classical Tetris. There are 7 different Tetrominoes in this game. User can through the game interface to move these pieces left, right rotate or down to the bottom. When user fills a row perfectly, the score will increase and that row will be removed. Higher score will make the game to a higher level. It means the user will have less respond time, and the game will be harder. This game would not be end until the user overstep the top of the game area. So letting users have fun from this game that would be our ultimate aim.

Section 2 - High Level Entities:

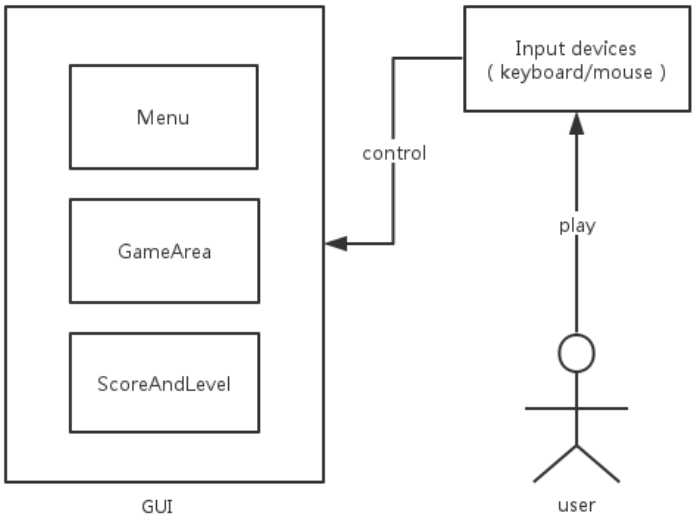

Figure 1

This is a game program, so the game interface(GUI) is the most obvious part of this program. A good GUI design will give users good impression at the first sight. The game area could be made of a grid 20x10 labels on the left side of GUI. The user's operations will be displayed on this place. The menu will perform some important operations on the top of GUI. It includes *Quit* button, *About* button,

Help button and *Start/Restart* button. On the right side of GUI, there are some information would be showed. The user can see the current score and the level of game. The next piece would be on the right side too. The program will use keyboard and mouse for user input. Keyboard will do operations on pieces like moving and rotating. Mouse will work on menu.

Section 3 - Low Level Entities:

For the low level entities of the project, we will use several classes implement the Tetris. And we also add two different patterns on this program.

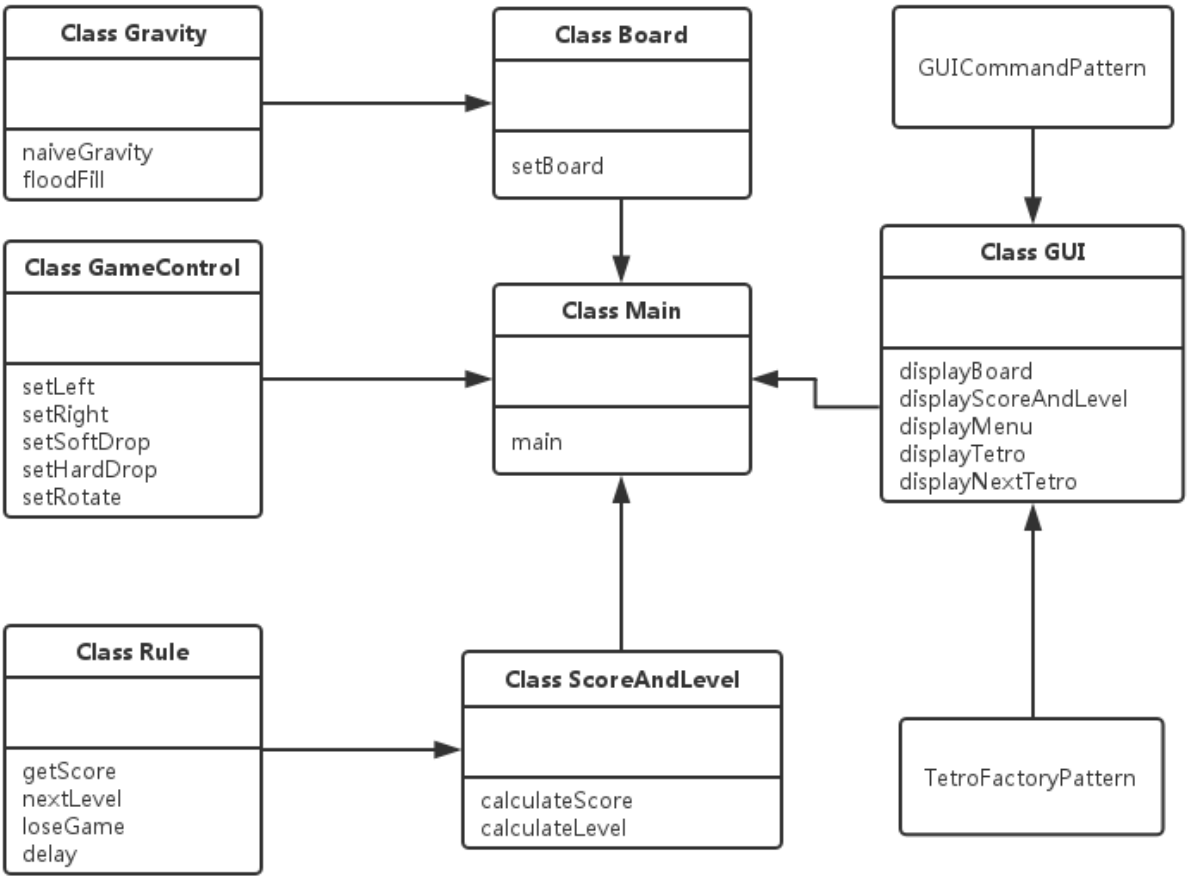

Figure 2

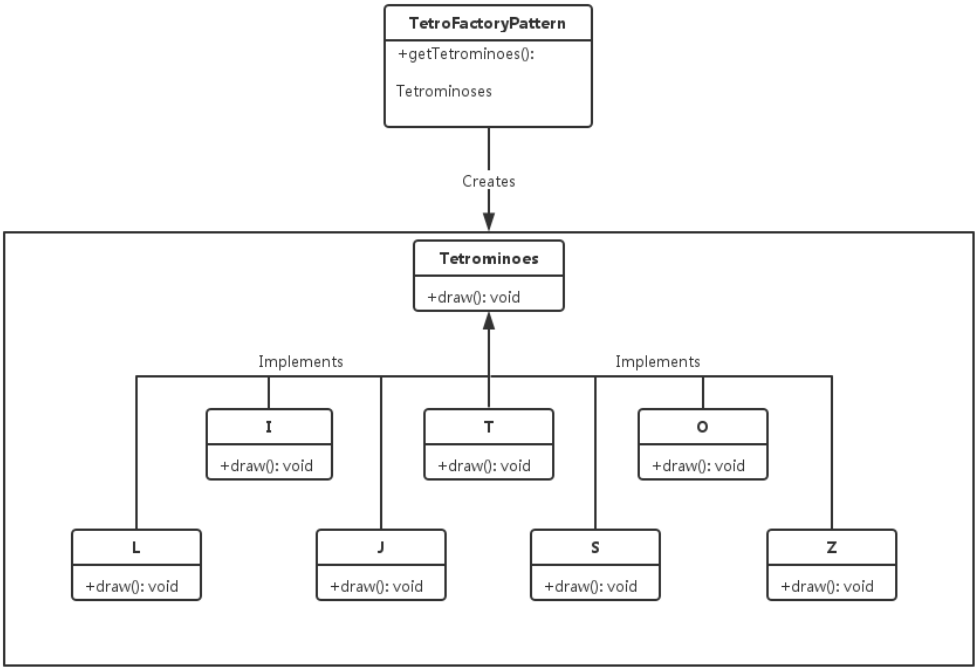

Figure 3

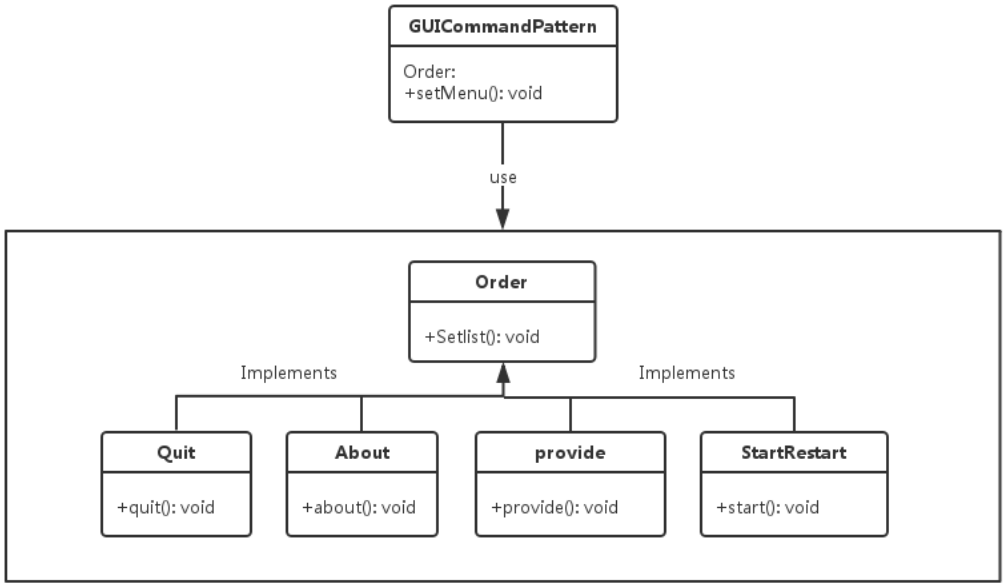

Figure 4

Usage:

As the Figure 2 shows, the first class we will define is the Main class. This will be the class that initiates the program and calls the required classes. The GUI class will be used to displayed the game to the user. The Board glass will create the game area as a grid 20x10 labels. The Gravity class will create to game mode for this game;

one is naive gravity; the another one is flood fill. The GameControl class will set the basic operations of this game like moving left, moving right, rotate and two different ways of dropping. The ScoreAndLevel class will calculate the score and the level of the current game. The Rule class will determine playing ways like getting score, going to the next level and the game over. There are two design patterns in this program. GUICommandPattern(Figure 4) is the pattern what sets command of the menu of GUI. TetroFactory Pattern (Figure 3) is the pattern what produces 7 different Tetrominoes for this game.

Interaction:

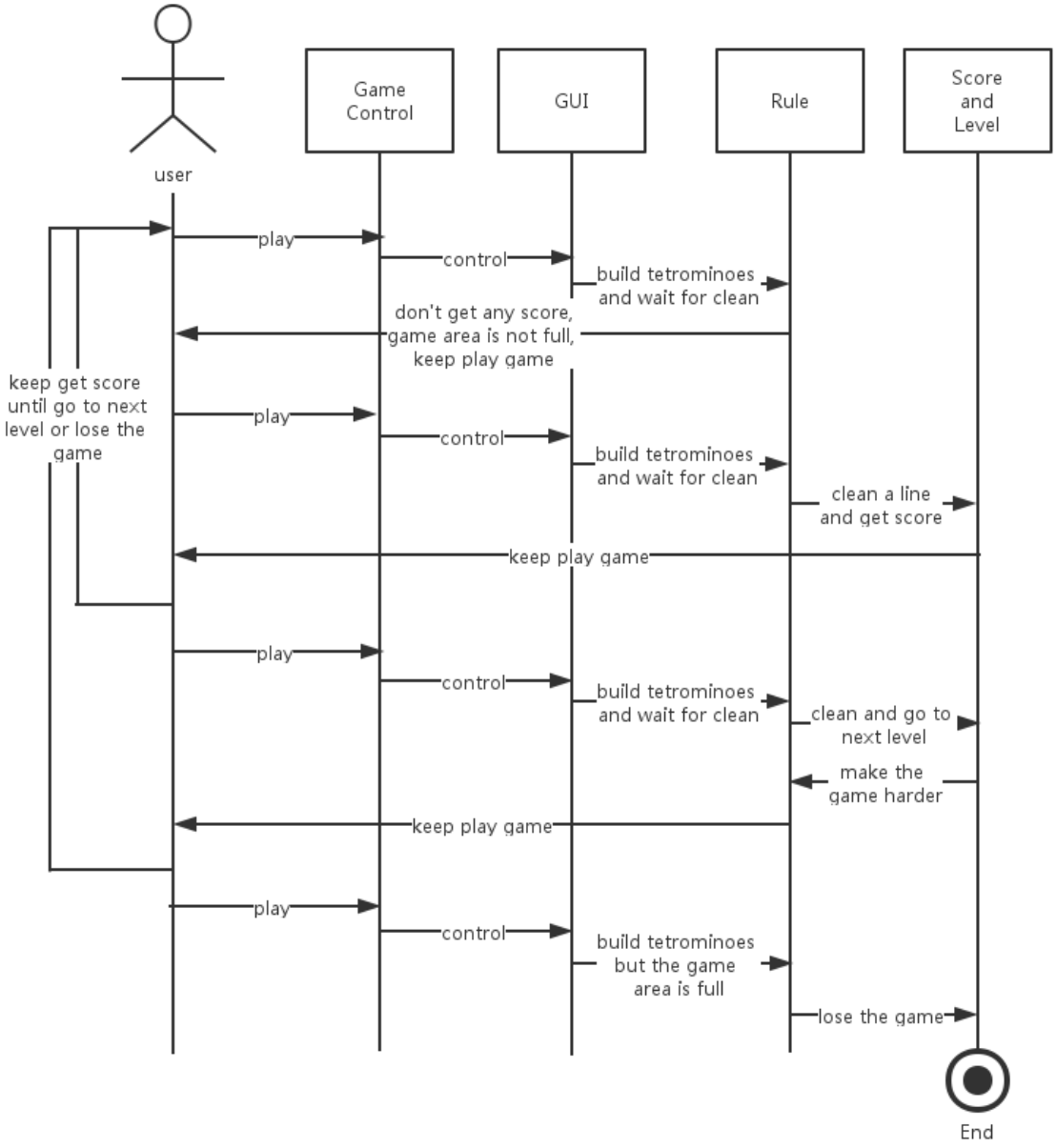

Figure 5

Figure 5 shows the interaction of how the game works. The game only allows one user to play. The user can't beat the game, so the end of this game is always game over.

Section 4 - Benefits, Assumptions, Risks/Issues:

For this game program, we will use design patterns to achieves some important functions. Good design patterns will also work well on other similar programs without any coding changes. Using designing pattern would be the biggest benefit. Second point, GUI will make this program more simply to use. It is quick and easy to get started.
There are also have some weaknesses in this program. This game will not have innovative parts like special item, achievement system, multiplayer game or other things. So it might be boring after plying couple times. Only two parts of this program what will be made as design patterns. Most of the code is still not clear enough for other developers.