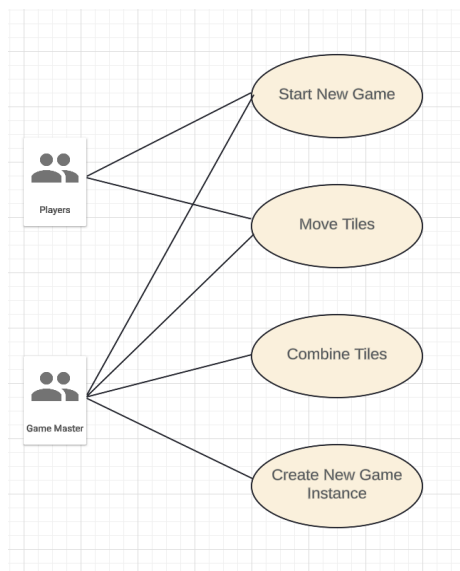


Team 10 2048 User Manual

Introduction

The goal of our project was to recreate the sliding block puzzle game 2048. We chose to implement this game because the team members had an interest in re-creating a puzzle game that many people would know. The team thought this would be a manageable project that would provide rewarding and challenging opportunities to build upon their Java, OOAD, and Scrum knowledge. We had an understanding of core Java API and the software design process when beginning the project. To create an easy to use user interface we needed to expand our knowledge upon JavaFx and how to use Scene Builder, a visual layout tool. In order to do that we completed lab 11 as the first step of our project. When starting the project we immediately noticed problems that we would need to address during the implementation, such as the method of combining tiles and how to handle collisions between tiles that are different numbers and binding observable values to a grid pane. Once we identified these problems we used resources such as StackOverFlow to increase our understanding of the problem. We then planned out how

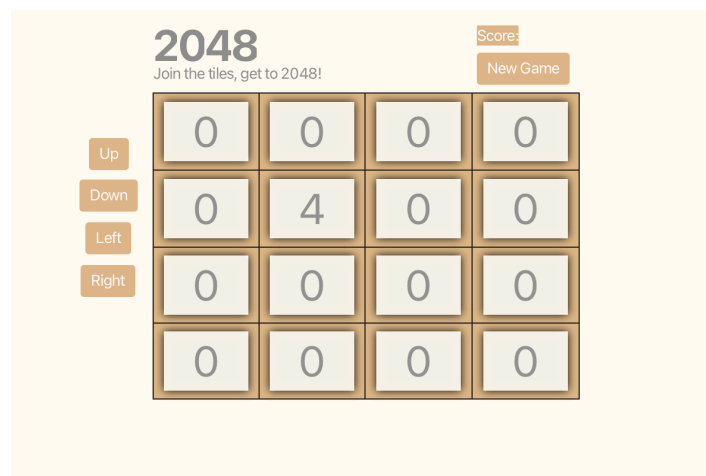


we would code using UML diagrams and began coding once we had a solid understanding of how all the classes should work together. In the figure on the left, the reader can see a basic UML use case diagram created to help visualize the behavior of the system. We can see that the Game Master is responsible for making everything happen in the game, whereas the player is responsible for helping start the game and providing input to move the tiles. With

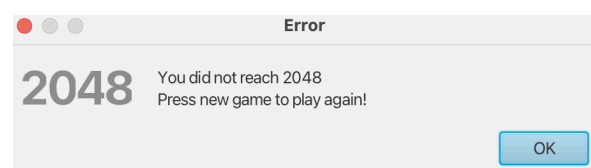
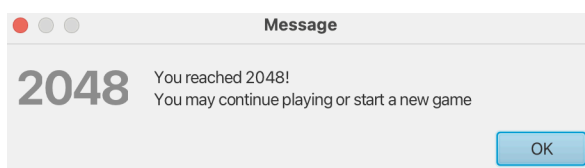
the initial design for the program created our team was able to begin coding in two teams: one focusing on the logic, and one on JavaFX.

Instructions For Use

Our implementation of 2048 closely mirrors the original game's mechanics. The user interface was created using Scene Builder, a JavaFx application. To create the board a 4x4 grid pane of labels with the initial value of 0 was created. Around the board there is a title, brief instructions, a score label, directional buttons, and a new game button as shown below.



The directional buttons include up, down, left and right. These buttons are what move the tiles in the board throughout the grid pane. The score label tracks the total score of all the labeled tiles. The score sums up all the values of the tiles, and it updates after each movement the player makes. The new game button resets the board and score label so that the player can start over from scratch. Once the player either can no longer make a move or they have reached 2048 a message will popup and notify them that they either won or lost and tell them that they can continue playing or start a new game if they won; if they lost they are told to start a new game.



The actual mechanics of the game have several actions going on at the same time. When the user presses a directional button the program first sees if it will collide with another tile or the edge of the grid. If it does collide with a tile and they have the same value then they combine and create a new tile; the value of the new tile is double the value of the original tiles that collided.

Otherwise, if they do not have the same value, then they move in the direction wanted by the player, and the ordering of the values stays the same but moves in the direction desired. At the same time, the board creates a new tile with a value of either 2 or 4 based on a random generator. Then a random empty position is found on the board in order to place the new tile. This new tile is only created when the user's input moves tiles across the board. For instance, if there is only one tile on the far right side of the board and the user tries to move right, a new tile will not be created. Using these game mechanics, the ultimate goal of the game is for the player to strategically move the tiles to ultimately combine enough tiles to reach a tile with the value of 2048. If the player does reach the 2048 tile and chooses to continue playing they will be able to play until they can no longer make any moves, there is no second winning message that pops up when they reach a specific tile. However their score will continue to increase, allowing competitive players to attempt to beat their previous record or the record of a friend who also enjoys playing 2048. Overall the user interface is simple to understand and interact with. The controls are self explanatory to minimize the amount of confusion a user may experience when playing for the first time.