Technical Documentation

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ICF Project

INTRODUCTION

The mission of the 2048 game is to exercise the player's intelligence, in a very limited grid, with a large number of number squares to piece together the number 2048.

2048 is played on a 4x4 grid, and the numbered tiles slide as the player moves them using the a, s, d, and w four keys. With each move, a new card randomly appears in an empty space on the board with a value of 2 or 4. All cards slide as far as possible in the chosen direction until they are hit by another card or the edge of the grid. If two cells with the same number collide while moving, they will merge into one cell, the union of the two numbers. Newly generated tiles cannot be merged with another tile again in the same move.

Planning

cases:

Input	Output/expectation
Enter the game	Start the game
Finish the game	know whether to win or lose
Enter the game again	Start the new game

Features of "2048“ are basic graphics, easy to distinguish the color of numbers, make players feel at ease while playing, and interesting game rules. It is a wonderful game suitable for players to enjoy in their spare time. The goal is to get a single grid to be 2048.

Design

I use C++ for my project because C++ is suitable for developing and making video games. It gives me full control over every aspect of the program and can manage it manually. In addition, it can alert users to technical errors and prevent them, eliminating side effects. I have different settings for the grid, the grid gap, and the color of the different numbers. The spaces are blue-green, the squares are purple-red, and each number has a different color. As each number changes, the color changes.

Implementation

The process of creating this game: After the game starts, a certain number of numbers appear in the grid, and the numbers and their positions are random.

First, set the number, width and interval of the grid, and set different colors for different numbers. The colors are represented by numbers. Before that, list all the numbers that will appear. Next, use the equation to determine that each new number is 2 or 4, and it is random. Then there are the page colors for making the game, and controlling the movement of the numbers. To control the movement we need to establish 4 equations, namely up, down, left and right. Finally put them together to create a 2048 game.

My algorithm builds on the Expectimax algorithm, which is a variation of the Minimax algorithm, and additionally weights the results of each of our actions based on the probability of the action occurring.

Conclusion

When I started this project, I was very anxious, because I had no opinion on what to do, so I kept thinking about what subject I should be. It took me a long time to decide what I was going to do. In the process of doing it, I also encountered many obstacles, and I kept revising them. Because some errors are hard to find, I have to keep trying. Finally completed the project and won. It also taught me to make up my mind. Although the project is complete, there are still many areas that can be improved, such as saving game records. If I don't need to spend so much time making a decision, I think I can do a better project.