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Review Article

2048 Game Using Core JAVA

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I N F O

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A B S T R A C T

2048 is a puzzle game that is usually a meditation game. Java is a master language, class-based, systematic. Played on a 4 × 4 plain, it is loaded with numbered tiles as the player moves them using arrow keys. 2048 is a very cool puzzle game where we must move the tiles to make the numbers match to reduce the full boxes. This game can be played by any age group of people. Gameplay consists of swiping the tiles up, right, down, left, any tiles that match in the direction and adjacent spot will combine in the direction swiped. This paper is an attempt at showing the game in a different light and help students to learn mathematics in an interesting way by applying the concepts learned in the classroom. To conclude, 2048 is a popular mobile phone game. It is played by abiding by several rules.

Keywords: Puzzle, JAVA, Game

Introduction

2048 is a puzzle game that is usually a meditation game. This game can be played by any age group of people. Played on a 4 × 4 plain, it is loaded with numbered tiles as the player moves them using arrow keys. Each time you open it, a new tile appears periodically in the empty space on the board with a value of 2 or 4. Tiles can be as far as possible on the selected side until it is fixed by another tile or grid edge. If two tiles of the same number collide while moving, they will be equal to the tile and the total number of two tiles colliding. The resulting tile cannot merge with another tile in the same direction. High- scoring tiles will light up a bit; very high tile 131,072. If movement causes three consecutive tiles of the same value to slip together, then only two consecutive tiles will collide. If all four spaces in a row or column are filled with tiles of the same value, the corresponding move/ line will combine the first two and the last pairs. The top right board keeps user points. User score increases whenever two tiles are combined, with the value of the new tile. When the player completes 2048, the game is won. Players can continue without reaching high scores. If a player has no blank spaces and no adjacent tiles of the same value, the game ends. The main language used in this game is Java. Java is a master language, class-based, systematic.

2048 is a very cool puzzle game where we must move the tiles to make the numbers match to reduce the full boxes. The main idea after the 2048 game is that we should keep the high numbers without disturbing the lower set of numbers or use what is called the Corner Strategy. Therefore, we usually need more spaces so that smaller numbers can fit into larger ones. In this project we will try to add new fonts, new tones while sliding tiles, new interface / UI and much more. But the rules would be the same for the games as before from the beginning. We will change the whole UI so that it does not look as sharp as in other games, it would be much easier and more modest with a soft touch of different colors. We will add some new features to this game as we improve in the future.

Game Design

This game can be played by any age group of people. Played on a 4 × 4 plain, it is loaded with numbered tiles as the

player moves them using arrow keys. Each time you open it, a new tile appears periodically in the empty space on the board with a value of 2 or 4. Tiles can be as far as possible on the selected side until it is fixed by another tile or grid edge. If two tiles of the same number collide while moving, they will be equal to the tile and the total number of two tiles colliding. The resulting tile cannot merge with another tile in the same direction. High- scoring tiles will light up a bit; very high tile 131,072. If movement causes three consecutive tiles of the same value to slip together, then only two consecutive tiles will collide. If all four spaces in a row or column are filled with tiles of the same value, the corresponding move / line will combine the first two and the last pairs. The top right board keeps user points. User score increases whenever two tiles are combined, with the value of the new tile. When the player completes 2048, the game is won. Players can continue without reaching high scores. If a player has no blank spaces and no adjacent tiles of the same value, the game ends. The main language used in this game is Java. Java is a master language, class-based, systematic. If all four spaces in a row or column are filled with tiles of the same value, the corresponding move/ line will combine the first two and the last pairs.

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1. The interface is made on an FXML file with some changes left to make it more attractive
2. The main file, FXML file and controller are connected
3. The contents of the menu bar are ready
4. The blocks of number 2 are added randomly
5. Further logical programming for the game is left.

Discussion

In 2048, you combine like-numbered tiles numbered with powers of two until you get a tile with the value of 2048. Gameplay consists of swiping the tiles up, right, down and left, any tiles that match in the direction and adjacent spot will combine in the direction swiped. The game is deceptively simple as the basic mechanics are just moving tiles around, but underneath it is a complex and strategic puzzle game. While it is fun to play, winning is even better. If you want to win the 2048 game, you need a strategy. The strategy described below is just one option and it works very well. Employing these tactics will help you win and allow you to get further even when the random nature of the game works against you.

Hypothesis

The paper has successfully shown that behind the simple game, there lies a world of mathematics to explore. Mathematical concepts helped us to analyze the game and understand how to form an optimum strategy and maximize our score. The above analysis can be taken forward to develop an Artificial Intelligence Agent to maximize the score. This paper is an attempt at showing the game in a different light and help students to learn mathematics in an interesting way by applying the concepts learned in the classroom. At the same time, it is hoped that it will inspire researchers to explore the relatively newer and emerging fields for applied mathematics.

Problems in Research

This article first proposes the Extreme Value Extension algorithm to solve the 2048 problem. This algorithm obtains the optimal solution through a static evaluation function. However, in the process of implementation, there is a phenomenon of redundancy. When there are too many steps to move the grid, it is difficult to find a good evaluation function, which reduces the efficiency of the Extreme Value Extension algorithm. Subsequently, this paper adopts the Alpha-Beta algorithm, which is an improvement of the former. In the case of the same number of search nodes, the search depth can be doubled. The above model is improved by Monte Carlo evaluation. It conducts many simulations on each optional point in the current situation to obtain the corresponding statistical characteristics of victory and defeat. In simple cases, the point with a higher winning rate can be considered as a better point for selection. Since the UCT algorithm can continuously adjust the strategy according to the previous results, it chooses which one can be evaluated first. Therefore, the UCT algorithm is used to improve the convergence speed based on Monte Carlo. The probability can be obtained as 100%.

Model Evolution

1. First, we decided how our game's field will look to our users. It should not be too flashy as it will strain eyes if the user plays the game for a long time.
2. We took a soft colour that is skin color and made it our base colour as it's not too flashy for eyes.
3. Then Area of the game field was decided in terms of length and width in pixels.
4. Colors of boxes with respective numbers that is 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048.
5. After that the size of the grid and its colour was decided.
6. The thickness of the grid has been decided to be more than the original game so players can get a clearer view of division of boxes than the original game.
7. Outlines of the field of game are thicker than usual.

Acknowledgement

The research was carried out by our team individually in respective problems and then discussed through many processes and time in terms of how we can solve the problem more efficiently in less time. Our team leader Muskan Sharma did a very good job in distributing to each team member the roles by which we successfully completed this project in time.

Conclusion

2048 is a popular mobile phone game. It is played by abiding by several rules as follows: There is a 4*4 matrix which can be filled with any number. Initially, any two random cells are filled with the number 2.

- When a player gets the number 2048, he/she will win the game
- 2048 is a perfect combination of fun and using your brain at the same time.

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