Declaration: I have followed the University Code of Conduct and Student Honor Code. This work was completed entirely by me and my groupmates. I have not used any unauthorized internet help, nor am I aware of any other person violating this code.

1 Analyzing the problem

Minesweeper is a popular puzzle game, released in 1992. The goal of the game is to find out all the non-mine squares in the shortest possible time according to the numbers that appear when you click on the squares, while avoiding stepping on mines, as stepping on a mine means losing everything.

Gray squares, red LED numbers, various colors and small red flags, this is probably what most people remember about the classic game "Minesweeper". But with Windows XP leaving us, Minesweeper is not the game we are familiar with anymore. It was built in the Windows XP operating system, but this game is not installed by default in Windows 10 operating systems.

This program is mainly made for kids and puzzle solving enthusiasts to have fun and kill time.

Suppose a person doesn't have this game installed on his computer, but he wants to play it to kill time. So, I am going to write a similar program in Java with reference to the classic Windows Minesweeper game.

2 Criteria for success / Requirements Specification

The board is divided into cells, with mines randomly distributed. To win, you need to open all the cells. The number on a cell shows the number of mines adjacent to it. Using this information, you can determine cells that are safe, and cells that contain mines. Cells suspected of being mines can be marked with a flag using the right mouse button.

To start a new game, you can click on the happy face at the top of the board or use the space bar. The remaining number of mines is displayed in the left corner, and the game timer is displayed in the right corner.

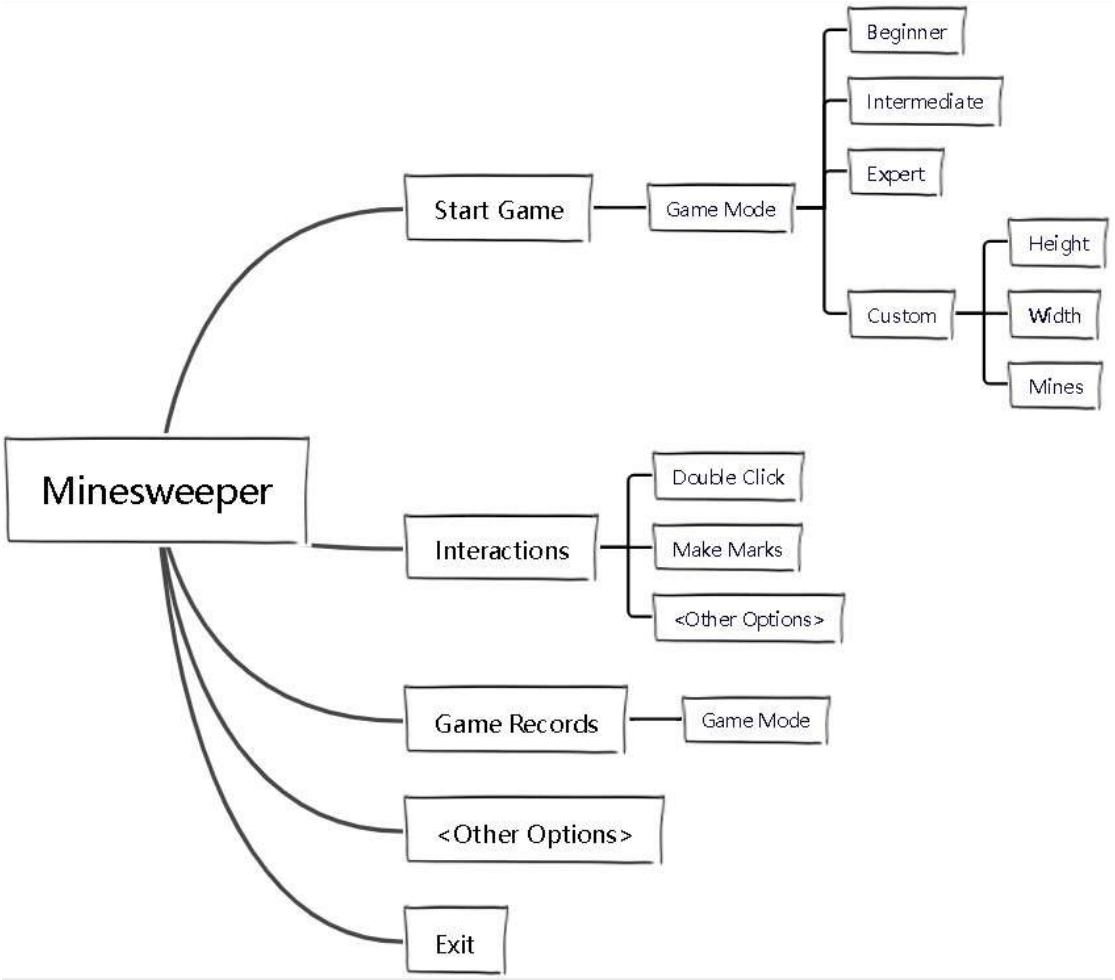
A few key features are listed below:
- Displays an image of a bomb if that square has a bomb on it.
- Displays the number of bombs in surrounding squares if the player clicks the left mouse otherwise.
- Works for a board of any size or shape (customisation).
- Provides several levels of the game.
- Display a red flag if the player single clicks the right mouse.

- Display a question mark if the player double clicks the right mouse.
- Display all bombs and squares with wrong operations if the player fails the game.
- Display all bombs of squares replacing red flags if the player wins the game.

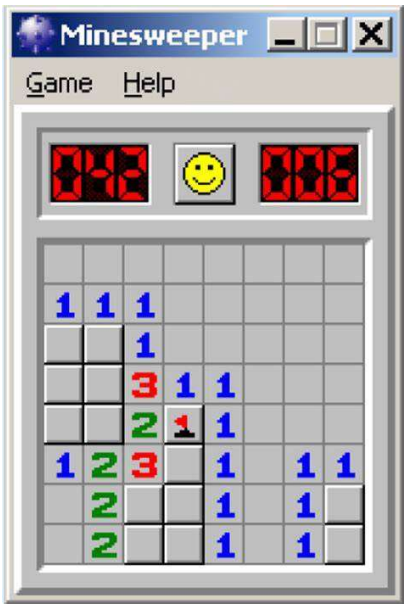
The game is divided into different modes, there are Beginner, Intermediate, Expert and Custom (Height, Width and Mines).

3 Prototype

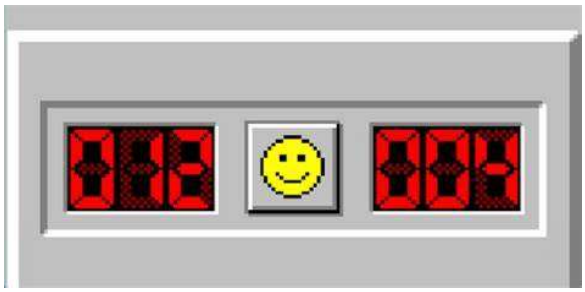
- Initial Design



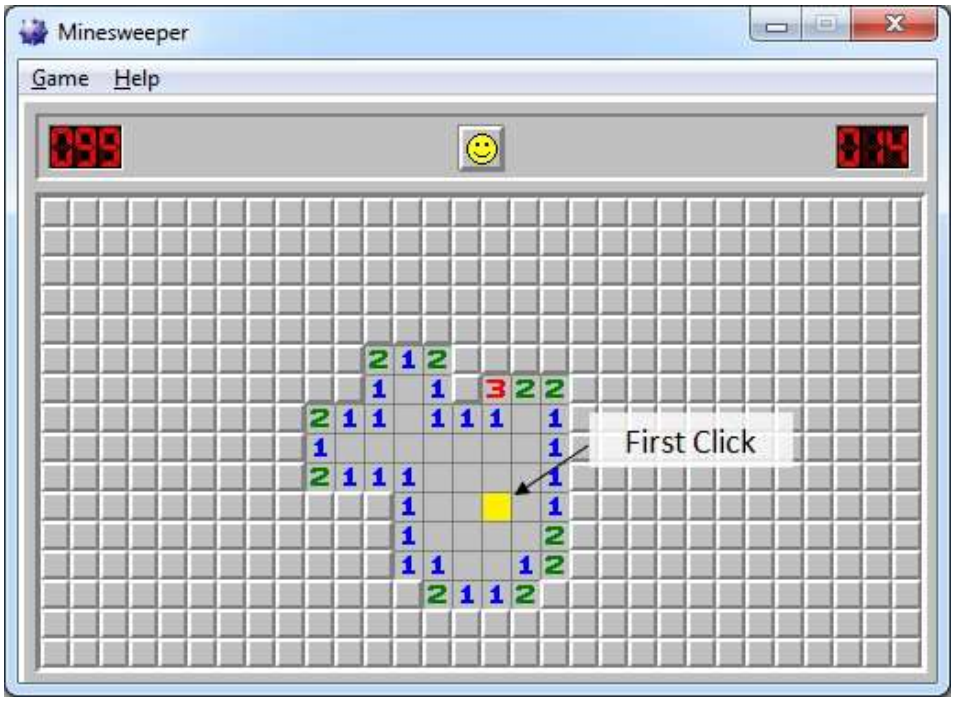
- What the Software Will Look Like



Click menu "Help"->"Copyright information", a mode window will pop up, display the version copyright information in the window.
Click on the menu "Game" -> "Start" to start a new game.
Click on the menu "Game" -> "Beginner" to enter the interface of the beginner.
Click on the menu "Game" -> "Intermediate" to enter the interface of intermediate.
Click menu "Game" -> "Expert" to enter the interface of Expert game.
Click "Game" -> "Customize" to enter the interface of custom game control.



The number on the left represents how many mines are left, and the number on the right shows the game time.



Left-click the minefield unit to expand the current minefield

Right-click the minefield unit, click once to mark the flag, twice to mark the question mark, three times to restore the initial blank minefield.Left and right click on the minefield unit at the same time, if the minefield does not show the number, the interface does not have any response; if the minefield shows the number, the minefield around the 8 grid area to detect whether there are mines, if the surrounding has been explored, open the safe minefield.