Sprint 1 Challenge

Mine Sweeper

Preface

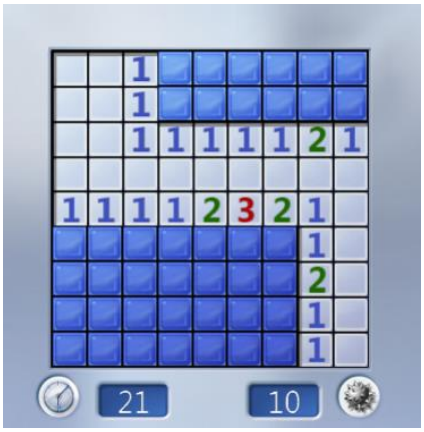
Your challenge is to create the **Minesweeper game**, and it's not an easy one.

Let's practice some breaths.

Good.

Important note: Read the entire document below before starting to code.

Play the game a little bit, get to know it functions and relax



It’s a good thing we studied about Matrices. Isn’t it?

Software Delivery Phases - Instructions

In this sprint we will work alone, please respect the rules!

The Code shall be submitted at 3 delivery events:

1. First day 8:30pm - Partial
2. Second day 8:30pm – Final. The Sprint score will be determined by this delivery (i.e. everything shall be ready in it)
3. Saturday night 10pm – Optional

   In this delivery you can finish what time might not allowed before – both functionality and CSS. These Deliveries will not affect your sprint score however they will be reviewed and will have contribution to the overall understanding of your coding level along the course.

On Sunday morning – all projects will be presented

Delivery of the 3 deliveries shall be done as follows:

1. At your relevant Dropbox folder

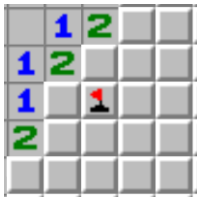
2. Upload each delivery phase to GitHub pages and submit your project link trough a form we will provide. Make sure your project works well using that link. Give Github your name so your link will present your name, i.e. danlevy.github.io

Minesweeper – Basic intro

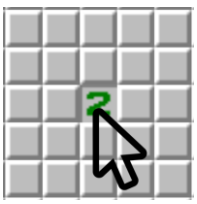
The goal of the game is to uncover all the squares that do not contain mines without being "blown up" by clicking on a square with a mine underneath.
Minesweeper functionality is based on the reference game

Functionality and Features

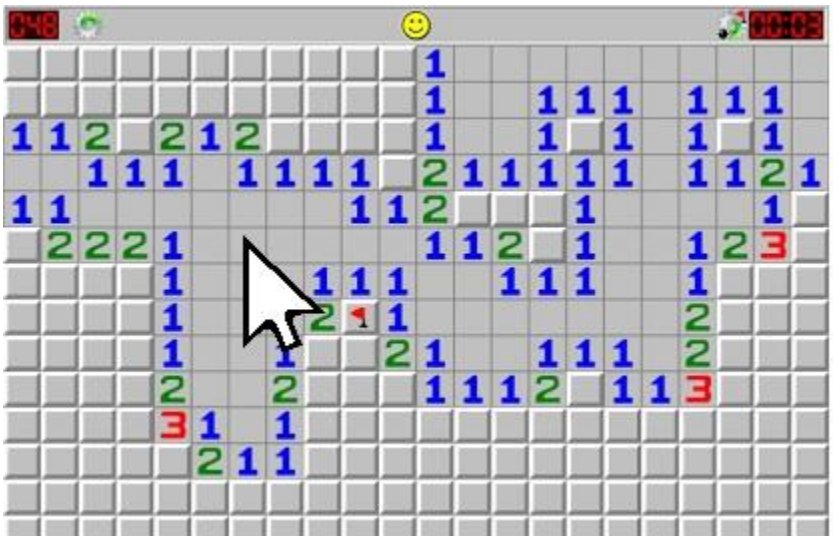
- Show a timer that starts on first click (right / left) and stops when game is over.
- Left click **reveals** the cell's content
- Right click flags/unflags a suspected cell (you cannot **reveal** a flagged cell)



- Game ends when:
  - LOSE: when clicking a mine, all mines should be revealed
  - WIN: all the mines are flagged, and all the other cells are shown
- Support 3 levels of the game
  - Beginner (4*4 with 2 MINES)
  - Medium (8 * 8 with 12 MINES)
  - Expert (12 * 12 with 30 MINES)
- If you have the time, make your Minesweeper look great.
- Expanding: When **left clicking** on cells there are 3 possible cases we want to address:
  - MINE – reveal the mine clicked
  - Cell with neighbors – reveal the cell alone
  - Cell without neighbors – expand it and its 1st degree neighbors



Expanding Bonus: (only if time permits) Expand like in the real game ("Full expand"):



Comment regarding Bonus Tasks: implement the NON-Bonus tasks first. The Non-Bonus tasks represent the level required at the stage. Only if you have time – implement the Bonus tasks.

Development - Tips and Guidelines

As you know, there is usually more than one way to approach a challenge.

But as a guideline, we suggest having the following functions (it is ok to have more functions as needed).

`initGame()`	This is called when page loads
`buildBoard()`	Builds the board Set mines at random locations Call setMinesNegsCount() Return the created board
`setMinesNegsCount(board)`	Count mines around each cell and set the cell's minesAroundCount.
`renderBoard``(board)`	Render the board as a <table> to the page
`cellClicked(elCell, i, j)`	Called when a cell (td) is clicked
`cellMarked``(elCell)`	Called on right click to mark a cell (suspected to be a mine) Search the web (and implement) how to hide the context menu on right click
`checkGameOver()`	Game ends when all mines are marked, and all the other cells are shown
`expandShown``(board, elCell, i, j)`	When user clicks a cell with no mines around, we need to open not only that cell, but also its neighbors. NOTE: start with a basic implementation that only opens the non-mine 1st degree neighbors BONUS: if you have the time later, try to work more like the real algorithm (see description at the Bonuses section below)

Here are the global variables you might be using:

gBoard - A Matrix containing cell objects:
Each cell: {
minesAroundCount: 4,
isShown: true,
isMine: false,
isMarked: true
 	
}
	The model

gLevel = {
SIZE: 4,
MINES: 2
};
	This is an object by which the board size is set (in this case: 4x4 board and how many mines to put)

gGame = {
isOn: false,
shownCount: 0,
markedCount: 0,
secsPassed: 0
}
	This is an object in which you can keep and update the current game state:
	isOn: Boolean, when true we let the user play
	shownCount: How many cells are shown
	markedCount: How many cells are marked (with a flag)
	secsPassed: How many seconds passed

Development – How to start?

Breaking-down the task to small tasks is a key success factor.
In our case – we recommend starting from the following steps:

Step1 – the seed app:

1. Create a 4x4 gBoard Matrix containing Objects. Place 2 mines **manually** when each cell's `isShown` set to `true`.
2. Present the mines using `renderBoard()` function.

Step2 – counting neighbors:

1. Create `setMinesNegsCount()` and store the numbers (`isShown` is still `true`)
2. Present the board with the neighbor count and the mines using `renderBoard()` function.
3. Have a `console.log` presenting the board content – to help you with debugging

Step3 – click to reveal:

1. Make sure your `renderBoard()` function adds the cell ID to each cell and onclick on each cell calls `cellClicked()` function.
2. Make the default "`isShown`" to be "`false`"
3. Implement that clicking a cell with "number" reveals the number of this cell

Step4 – randomize mines' location:

1. **Randomly** locate the 2 mines on the board
2. Present the mines using `renderBoard()` function.

Next Steps: Head back to **Functionality and Features** and then on to **Further Tasks**, and if time permits check out the **Bonus Tasks** section.

UI Guidelines

This sprint is not a UI-centered project. However, we recommend to try implementing the following UI concepts:

1. Board is square and cells are squares
2. Cells keep their size when hovered and when revealed
3. Board keeps its position (shouldn't move) along all game phases (do not add UI elements dynamically above it)
4. Mines look like mines

Further Tasks

First click is never a Mine

Make sure the first clicked cell is never a mine (like in the real game)

HINT: place the mines and count the neighbors only on first click.

Lives

Add support for “LIVES” -

The user has 3 LIVES:

When a MINE is clicked, there is an indication to the user that he clicked a mine. The LIVES counter decrease. The user can continue playing.

The Smiley

Add smiley (feel free to switch icons \ images):

- Normal 😃
- Sad & Dead – LOSE 😵 (stepped on a mine)
- Sunglasses – WIN 😎
- Clicking the smiley should reset the game

Bonus Tasks – if time permits

Add support for HINTS

The user has 3 hints

When a hint is clicked, it changes its look, example: 

Now, when a cell (unrevealed) is clicked, the cell and its neighbors are revealed **for a second**, and the clicked hint disappears.

Best Score

Keep the best score in local storage (per level) and show it on the page

Full Expand

When an empty cell is clicked, open all empty cells that are connected and their numbered neighbors (as is done at the game) this feature is normally implemented using recursion.

Safe click

Add a **Safe-Click** Button:

The user has 3 **Safe-Clicks**

Clicking the **Safe-Click** button will mark a random covered cell (for a few seconds) that is safe to click (does not contain a MINE).

Present the remaining **Safe-Clicks** count

Manually positioned mines

Create a “manually create” mode in which user first positions the mines (by clicking cells) and then plays.

Undo

Add an “UNDO” button, each click on that button takes the game back by one step (can go all the way back to game start).

--- *and that’s it* ---