

Abstract: Modelling Minesweeper

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This semester, I focused on satisfiability solvers, and used them to model a myriad of real-world systems, ranging from logic puzzles to elevator control algorithms. These models could be then used to verify various properties of the system. For my capstone project, I modelled Minesweeper, the 1989 single-player game, using Forge. The goal in modelling Minesweeper was to recreate the rules by which squares are labelled, as well as to try to create rules by which the model might progress through a game of Minesweeper, with some simple logic. For small boards in a certain configuration, I was able to make such a solver function. I also created a visualisation in Javascript that transforms tabular data into authentic-looking minesweeper boards. While a frivolous pursuit on the surface, this project forced me to think about how we make decisions, and about translating the process of storing multiple tidbits of information in one's brain into a logical algorithm that a computer can follow. An example solve is displayed below, where each subsequent board represents a move by the computer.

