

Easy Luckless Graphical Minesweeper

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Most people are familiar with the computer game minesweeper. Our viewpoint is that minesweeper is a search problem. The problem is to find a specified proper subset of vertices, the "mines," on an arbitrary graph, the "game board," by learning the number of mines in the neighborhoods of non-mine vertices of the graph. This requires both luck and the application of logic. We consider the problem of removing luck as a factor in finding the subset, "winning the game." We do so by providing a solution for the player, (just?) enough information for logic alone to determine the set of non-mines. A game of minesweeper on a graph is *easy* if one solution is just 1) knowing the number of mines, and 2) knowing that merely knowing the number of mines is sufficient information to win the game. This talk will present some necessary conditions for a graph to have an easy game, some sufficient conditions for a specific game to be easy, the obvious algorithm to determine if a specific game is easy, and some heuristics to help find an easy game if a graph has one.

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