Note:
1. Tutorial problems are provided to help you understand the materials discussed in the class, and to improve your skills in solving AI problems.
2. Tutorial problems will not be graded. However, you are highly encouraged to do them for your own learning. Moreover, we hope you get the satisfaction from solving the problems 😊
3. You’ll get the best learning outcome when you try to solve these problems on your own first (before your tutorial session), and use your tutorial session to ask about the difficulties you face when trying to solve this problem set.

Minesweeper. Minesweeper is a popular computer game in the ‘80s and ‘90s. The goal of the game is to clear a minefield without detonating any mine. The minefield is a grid world of size $m \times n$. The mines lie in several random grid cells. Initially, the player does not have any information of where the mines are. However, at each step, the player can select to examine a grid cell. If the player happens to examine a grid cell that contains a mine, the player is “blown up” and loses the game. Otherwise, the player receives information on the number of mines that lie directly adjacent (8 wind directions) to the grid cell being examined. Suppose the game state is as shown in the right figure.

1. Please represent the rules of the game using propositional logic.
2. Please represent the current state of the game using propositional logic.
3. Please use resolution refutation to prove the cell marked by flag contains a mine, while the cell directly to the right of the flagged cell does not contain any mine.