Problem Statement 1:

Minesweeper

The objective of the Minesweeper game is to clear an abstract minefield without detonating a land mine. The player is initially presented with a n*n grid of squares. Some randomly-selected squares, unknown to the player, are designated to contain mines. On each turn, the player has to select a square (x,y) by indicating if it contains a mine (flagging) or if it is safe, thereby opening it. If
the square containing a mine is revealed, the player loses the game. If it does not contain a mine, a digit is instead displayed in the square, indicating how many adjacent squares contain mines; if no mines are adjacent, the square displays '0'. Two squares are adjacent to each other only if they share at least one side.

The player uses this information to deduce the contents of other squares, and may either safely reveal each square or flag the square as containing a mine. The game is won when all mine-free squares are revealed, because all mines have been located.

Sample Input:

Enter the minefield layout : xxm,xmx,xxx

(This represents a 3*3 minefield with mines located in 0,2 and 1,1 locations. The program should then display the grid as shown below with all squares concealed.)

xxx
xxx
xxx

Enter option : o(0,0)

(this options specifies to open location 0,0. The program should then display the grid as shown below.)

0xx
xxx
xxx

Enter option : o(0,1)

(this options specifies to open location 0,1. The program should then display the grid as shown below. 2 is displayed in 0,1 since there are 2 mines adjacent to it in 0,2 and 1,1.)

02x
xxx

xxx

Enter option : f(0,2)

(this options specifies to flag location 0,2. The program should then display the grid as shown below.)

02f
xxx
xxx

Enter option : o(1,1)

(this options specifies to open location 1,1. Since there is a mine, the player loses. The output will be as shown below.)

02f
xmx
xxx

Oops, you stepped on a mine ! Game over !

If the player opens all the locations that do not have mines, the player wins the game. In such a case, the output will be as shown below.

02f
1f2
010

Wow, you cleared the minefield ! Game over !

Note that the player has to open all locations that do not contain a mine. If some squares are flagged but do not contain a mine, he still has to continue and open the squares that don't have mines. If he requires, he can open a location that has already been flagged.

Extension: Allow a player to quickly "clear around" a revealed square once the correct number of mines have been flagged around it. If the player does this before identifying all the mines around the square the user could lose the game if an adjacent square contains a mine.