

CSI3108-01

2018. 09. 04

Programming HW#1

Max 40 points

Due on Sept. 10(Mon) 2018, by 5pm

In the minesweeper game provided from the Windows Op Sys, you are given an $m \times n$ 2-d array on which some number of plays have already been made without uncovering a mine. You are to write a Java program to determine the status of the covered cells using the information revealed by the uncovered cells. That is, for each covered cell, determine if it contains a mine or not. Note that there may be some covered cells that cannot be sure if they have mines or not. (30 pts)

[Example] In the following figure, the shaded cells represent covered cells. The cells containing a number are uncovered, and the number each contains indicates the number of neighboring cells that contain mines.

In the left figure, it is clear that the cells marked with '*' contain mines each. We can now determine that the cells marked with a '+' have no mines. But the status of the cell (0,0) cannot be determined. In the right figure, we cannot determine which uncovered cell contains a mine.

	0	1	2	3	4
0		+	+	*	1
1	+	*	2	1	1
2	+	2	1	0	0
3	*	1	0	0	0
4	1	1	0	0	0

	0	1
0		
1	1	1

[Input]

The first line has the number of test cases. Then each test case begins two integers, m and n , where $3 \leq m, n \leq 10$. Following these, there will be one integer for each cell in the array, given in row major order. For a covered cell, the value '-1' is given. For an uncovered cell, the number of neighboring (covered) cells that contain mines is given; a value is between 0 and 8. Assume that there are no mines in uncovered cells. **Each test case has an output of non-empty lists of both cells with and without mines.**

[Output]

For each test case, first print the case number as '# x ', where x is a case number, starting from 1. Then in the second line print a list with the row and column numbers of each cell that contains a mine, and in the third line another list with the row and column numbers of each cell that does not contain a mine. The lists should be printed in a format shown in the sample below (without comments). Ignore printing cells that cannot be determined to have mines

[Sample Input and Output]

Input

```
20 // total test cases
5 5 // test case #1
-1 -1 -1 -1 1
-1 -1 2 1 1
```

```
-1 2 1 0 0  
-1 1 0 0 0  
1 1 0 0 0  
...
```

Output

```
#1  
0 3 1 1 3 0      // (0,3), (1,1), and (3,0) have mines. Do NOT Print comments!!!  
0 1 0 2 1 0 2 0  // (0,1), (0,2), (1,0), and (2,0) have NO mines. Do NOT Print comments!!!  
...
```

- **Submit a REPORT** for the description of your algorithm for the above problem along with its time complexity analysis. (10pts)