Q7. Minesweeping Field (40 marks):

The rule of Minesweeper game is very simple. To win the game, you must click to open all the cells that do not contain a mine in an M × N minesweeping field, where M is the number of rows and N is the number of columns, as shown in Fig. 1.

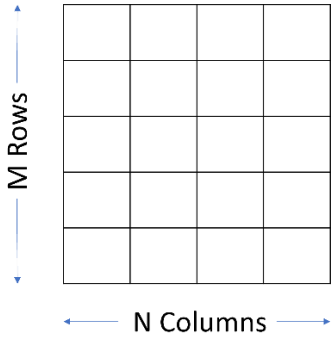

Fig. 1: An M × N minesweeping field

Each cell in the field contains either a mine, or a number that indicate how many mines are adjacent to that cell. Note that each cell can have at most eight adjacent/neighbour cells, as shown in Fig. 2.

Neighbour	Neighbour	Neighbour
Neighbour	**Cell**	Neighbour
Neighbour	Neighbour	Neighbour

Fig. 2: The maximum number of neighbours of a cell is 8

The minesweeping field can actually be represented by M lines of N characters, as shown in Fig. 3. This example shows a 4 × 5 minesweeping field, where each cell with a mine is represented by '*', and each cell without a mine contains a number that indicates the number of mines adjacent to it.

*1011
2211*
1*111
11100

Fig. 3: A 4 × 5 minesweeping field

Let Cell (m, n) denote the n-th character of the m-th line in the above representation, where $0 \le m \le M - 1$, and $0 \le n \le N - 1$.

For the above example, Cell (0, 0) = Cell (1, 4) = Cell (2, 1) = * indicate that there is a mine in each of these cells. On the other hand, Cell (1, 0) = 2 means that there are two mines in its neighbourhood.

Write a programme to

Input, in sequence,

- Three positive integers M, N and Z, where M and N represent the numbers of rows and columns in the minesweeper field, respectively; and Z represents the number of mines in the field. The above inputs satisfy the following conditions:
  $1 \leq M, N \leq 30$
  $1 \leq Z \leq 50$
- Subsequent inputs are Z lines of number pairs, and each pair contains two non-negative integers that represent the coordinate of a mine in the field.

Output, in sequence, M lines of N characters. The n-th character of the m-th line indicates the element of Cell (m, n), whereby it is either a * or a number as defined above.

Note: There must not be any space in between two adjacent characters in a line.

试题 7. 扫雷场（40 分）：

扫雷游戏的规则非常简单。要赢得游戏，您必须点击打开一个大小为 M × N 的扫雷场中所有不包含地雷的格子，其中 M 为行数，N 为列数，如图 1 所示。

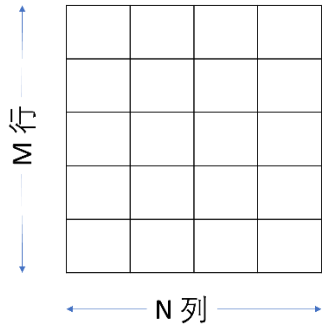

图 1: 一个 M × N 的扫雷场

扫雷场中的每个格子可能包含一个地雷；若无地雷则是一个数字，用以表示与该格子相邻的地雷数量。请注意，每个格子最多能有八个相邻的其他格子，如图 2 所示。

邻居	邻居	邻居
邻居	**格子**	邻居
邻居	邻居	邻居

图 2: 一个格子最多可有 8 个相邻格子

这样的扫雷场实际上可以用 M 行、每一行包含 N 个字符的序列来显示。请参照图 3，本例显示了一个 4 × 5 的扫雷场，其中每个有地雷的格子用'*'表示，没有地雷的格子则包含一个数字，表示与其相邻的地雷数量。

*1011
2211*
1*111
11100

图 3: 一个 4 × 5 的扫雷场

令 Cell (m, n) 表示以上描述中的第 m 行的第 n 个字符，其中 $0 \le m \le M - 1$，以及 $0 \le n \le N - 1$.

参考上面的例子，Cell (0, 0) = Cell (1, 4) = Cell (2, 1) = * 表示这些格子中都有一个地雷。另一方面，Cell (1, 0) = 2 表示其附近有两个地雷。

试写一程式以

依序输入,

- 三个正整数 M、N 和 Z，其中 M 和 N 分别代表扫雷场中的行数和列数；Z 则代表该场地雷的数量。已知以上输入满足以下条件:
  $1 \leq M, N \leq 30$
  $1 \leq Z \leq 50$
- 随后的输入，是 Z 行的数字对，每一组数字对包含两个非 0 整数，用以表示一个地雷的坐标。

依序输出, M 行、每一行 N 个字符的序列。其中第 m 行的第 n 个字符表示在 Cell (m,n) 里的元素。也就是说这可能是 * 的符号，或一个上述定义的数字。

注意：一行中两个相邻字符之间不能有任何空格。

Test Cases:

Input (輸入)	Output (輸出)
6 3 7 0 2 2 0 2 1 2 2 3 0 3 2 5 1	01* 243 *** *5* 232 1*1
5 5 15 0 0 0 1 0 2 0 3 0 4 2 0 2 1 2 2 2 3 2 4 4 0 4 1 4 2 4 3 4 4	***** 46664 ***** 46664 *****
7 9 7 0 0 1 1 2 2 3 3 4 4 5 5 6 6	*21000000 2*2100000 12*210000 012*21000 0012*2100 00012*210 000012*10
11 13 15 0 7 0 8 1 6 1 9 2 3 2 10	0000012**2100 001111*33*210 002*211112*21 002*20000112* 0011111100011 000001*100000 0011112210000

3 3 3 12 5 6 7 7 7 3 8 6 9 5 10 8 10 10	001*112*10000 001122*210000 00001*2212110 00001111*2*10
30 30 20 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 10 10 22 16 13 18 19 19 22 17 20 20 15 15 16 15 20 18 28 29 27 29	11100000000000000000000000000 1*2100000000000000000000000000 12*2100000000000000000000000000 012*2100000000000000000000000000 0012*2100000000000000000000000000 00012*2100000000000000000000000000 000012*2100000000000000000000000000 0000012*2100000000000000000000000000 00000012*2100000000000000000000000000 000000012*2100000000000000000000000000 0000000012*1000000000000000000000000000 00000000011100000000000000000000 000000000000000001110000000000 0000000000000000001*10000000000 000000000000001111110000000000 000000000000002*20000000000000 00000000000002*20000000000000 000000000000001110000000000000 0000000000000000111000000000 00000000000000012*2100000000 0000000000000001*3*100000000 0000000000000012322110000000 0000000000000001**100000000000 0000000000000012210000000000 0000000000000000000000000000 0000000000000000000000000000 0000000000000000000000000011 00000000000000000000000002* 000000000000000000000000002* 00000000000000000000000011
9 6 8 1 1 6 5 3 3 5 1 0 5 8 3 7 2	11101* 1*2111 12*210 012*10 112110 1*1011 12211* 01*221

2 2	012*10
10 10 36 0 0 0 1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0 9 1 0 1 9 2 0 2 9 3 0 3 9 4 0 4 9 5 0 5 9 6 0 6 9 7 0 7 9 8 0 8 9 9 0 9 1 9 2 9 3 9 4 9 5 9 6 9 7 9 8 9 9	********** *53333335* *30000003* *30000003* *30000003* *30000003* *30000003* *30000003* *53333335* **********
9 9 17 4 0 4 1 4 2 4 3 4 4 4 5 4 6	0002*2000 0003*3000 0003*3000 2335*5332 ********* 2335*5332 0003*3000 0003*3000

4 7 4 8 0 4 1 4 2 4 3 4 5 4 6 4 7 4 8 4	0002*2000