Problem L – Land distribution.

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As you may know, some country groups like 'ICPC' hand over his territories to the best programmers in the world. For every problem solved, they award one square of land. Every programmer in the ICPC group solves easily two problems. If they do not do it, they are expelled from the group.

The ICPC land has a rectangular shape with W width and H height, and is divided into $W \times H$ square territories distributed among the N programmers of the group. Each programmer has his own house that already occupies one square of land and the house is immovable.

The results from the last contest were just published, and the land needs to be redistributed based on these results. The rules to reorder the land are simple:

- The land owned by a programmer must have a rectangular shape.
- The land owned by a programmer must contain his home.
- The area of the land owned by a programmer must be equal to the number of problems the programmer solved in the contest.
- A territory of the land must belong to only one programmer.

As the ICPC head of territory distribution, your task is to find a way to divide the land for the N programmers in the group, following the mentioned rules.

Input

The first line of input contains two integers separated by a space W, H ($1 \leq W, H \leq 12$), representing the width and height of the land to be distributed. The next line contains an integer N ($1 \leq N \leq 24$), the number of programmers in the group. Each of the next N lines contains four integer numbers separated by a space C_i, X_i, Y_i, S_i, where C_i is an upper case letter from the english alphabet that identifies programmer i, X_i and Y_i are the coordinates for the i-th programmer house ($1 \leq X_i \leq W$, $1 \leq Y_i \leq H$), and S_i represents the number of problems solved by the i-th programmer ($2 \leq S_i \leq 20$).

Output

For each test case in the input, print H lines with W characters each, representing the distribution of the land, the character in the i-th line and j-th column should be the upper case letter that identifies the programmer who owns that territory. If you can not distribute the lands according by the rules, print a line with the string "NO MAP". It is guaranteed that if a solution exists, it is unique.

Sample input 1	**Sample output 1**
5 5 4 A 1 1 9 B 1 5 2 C 5 1 6 D 5 5 8	AAABB AAADD AAADD CCCDD CCCDD