

Problem C. Checkered Fabric

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 1024 mebibytes

A friend of mine purchased a piece of fabric, green with a white checkered pattern. When she showed it to us, a classmate with a deep passion for Go remarked, “Ah, it resembles a Go board.” “To me, it looks more like manuscript paper,” I added. “It really reminds me of pieces of mung bean cake,” chimed in another classmate, known as “The Big Eater.” We couldn’t help but burst into laughter. The same fabric, yet each of us perceived it differently. The friend hurriedly wrapped the fabric in paper, thinking to herself that fabric is simply fabric — not a Go board, not manuscript paper, and certainly not mung bean cake.

She first dyed the entire piece of fabric white. Now, she wants to apply a colorful pattern that she designed.

The fabric can be seen as a grid of N rows and M columns, and each cell of the grid has its own color. Each color is represented by an integer between 0 and 10^9 . Initially, all cells have color 0, which is white.

Each time the fabric is dyed, she must first choose a specific color, then select a row or a column of the fabric to dye. After the operation, the colors of the cells on the selected row or column will be replaced by the chosen color, regardless of their former color.

The friend shows you the pattern she wishes to dye onto the fabric. Please write a program to determine the sequence of operations needed to dye the fabric into the desired pattern, or determine if it is impossible.

Note that you don’t need to minimize the number of operations, but it should not exceed $N + M$.

Input

The first line contains two integers N and M , the size of the fabric ($1 \leq N \times M \leq 10^5$).

The next N lines, each containing M integers $c_{i,1}, c_{i,2}, \dots, c_{i,M}$, describe the desired color pattern of the fabric. The cell in the i -th row and j -th column should be dyed with color $c_{i,j}$ ($0 \leq c_{i,j} \leq 10^9$).

Output

If it is impossible to achieve the desired pattern within $N + M$ operations, output -1 .

Otherwise, on the first line, output an integer K , the number of operations to be performed ($0 \leq K \leq N + M$). In the i -th of the next K lines, output an uppercase letter d_i and two integers, p_i and s_i , describing the i -th operation in sequence ($d_i \in \{\mathbf{R}, \mathbf{C}\}$; $0 \leq s_i \leq 10^9$). If the letter d_i is \mathbf{R} , it means the operation is to dye the p_i -th row of the fabric with color s_i (and $1 \leq p_i \leq N$); if the letter d_i is \mathbf{C} , it means the operation is to dye the p_i -th column of the fabric with color s_i (and $1 \leq p_i \leq M$).

Examples

<i>standard input</i>	<i>standard output</i>
3 3 0 1 0 2 2 2 0 1 0	2 C 2 1 R 2 2
3 3 3 1 4 1 5 9 2 6 5	-1
3 4 0 0 0 0 0 0 0 0 0 0 0 0	0