Problem F. Colored Path

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	256 mebibytes

You have a board of size $n \times n$. Each cell of the board has weight and color. Both weight and color are positive integers. Rows and columns are enumerated from 1 to n. Let (i, j) be j-th cell of i-th row. In one step you can move from cell (i, j) to cells $(i, j + 1)$ and $(i + 1, j)$.

Consider all paths from $(1, 1)$ to (n, n) that obey the rule above. Obviously each such path contains exactly $2n - 1$ cells. Let's define the weight of the path as the sum of the weights of the cells on the path. Let's define the colorness of the path as the number of different colors among the colors of the cells on the path.

Given the weights and the colors of all cells, find the smallest colorness among all paths with weight no more than W or report that there are no such paths.

Input

The first line contains three integers: n ($1 \le n \le 400$), k ($1 \le k \le 10$) which is the number of possible colors, and W ($1 \le W \le 10^9$). Each of the next n lines contains n integers, j-th integer on i-th line is the weight of the cell (i, j) ($1 \le w_{ij} \le 10^6$). The last n lines contain n integers each, j-th integer on i-th line is the color of the cell (i, j) ($1 \le c_{ij} \le k$).

Output

On the first line output the minimal colorness of the path. On the second line output the path with the minimal colorness in the format $i_1\ j_1\ i_2\ j_2\ \ldots\ i_{2n-1}\ j_{2n-1}$. If there are several paths with minimal colorness, output any of them. If there are no paths with weight no more than W, output -1 on a single line.

Examples

standard input	standard output
3 3 10 1 1 1 5 3 1 5 3 1 1 2 3 2 2 1 3 3 2	2 1 1 1 2 2 2 2 3 3 3
1 1 1 2 1	-1
2 6 1000 10 10 1 10 1 1 2 1	1 1 1 1 2 2 2

Note

In the first sample the weight of the path $(1, 1) - (1, 2) - (2, 2) - (2, 3) - (3, 3)$ is $1 + 1 + 3 + 1 + 1 = 7 \le W$ and its colorness is 2. There are obviously no paths with colorness 1.

In the second sample the only path has weight $2 > W$, so the answer is -1.