FeetJ

2024/2025 SEASON – SIXTH ROUND

Astro lost his right leg again during a mission. Now he needs to go to the Alley of Legs to get a new one. The alley is a table made up of N rows and M columns.

Astro is currently in the upper left corner which is numbered (1;1). To the right of him is cell (1;2) and below him is cell (2;1) and so forth. In the Alley there are Q legs and leg number i is in cell (x_i;y_i). Astro also knows that there aren't any two legs in the same cell.

Because it is custom for a person to not stick around in the Alley of Legs more than necessary, Astro is planning to take a shortest path to cell (N;M), where the exit is. That means he can only move down or right. Since the legs are radioactive, they stick to Astro as soon as he enters the cell. He's tried walking with more than one leg, but he doesn't like it. That's why he wants to take only one leg before he leaves the Alley.

There are many paths, satisfying Astro's needs and that is why he has sorted them in a certain order. Every path can be represented as a string of the letters R and D, describing the directions Astro takes every moment. Each of these strings has a provable size of N+M-2 and Astro has sorted them lexicographically (letter D is before letter R). Now he wants to move along the path in position K in the sorted order.

However, Astro has lost the order of the paths and asks you for given N,M,K,Q and the coordinates x_i,y_i of the legs, find the K-th path among the shortest paths from (1;1) to (N;M), which go through **exactly one** leg, when all these paths are sorted lexicographically.

Input

The first line of the file **feetJ.in** contains N,M,K and Q – the amount of rows and columns in the Alley, the desired path and the amount of legs. Each of the next Q lines contain two numbers x_i , y_i – the coordinates of the leg.

Output

On the only line of the file **feetJ.out** print a string with length N+M-2, which contains the letters R and D, and represents the path Astro is searching for.

Constraints

$1 \leq N, M \leq 10^3$

$1 \leq Q \leq 2 * 10^5$

$1 \leq x_i \leq N\ , 1 \leq y_i \leq M$

$1 \leq K \leq 10^{16}$

$1 \leq K \leq S, where\ S\ is\ the\ amount\ of\ paths, satisfying\ the\ conditions$

Time Limit: 0.3 sec.

Memory Limit: 256 MB.

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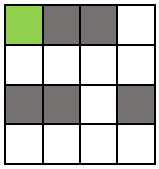
Sample Test

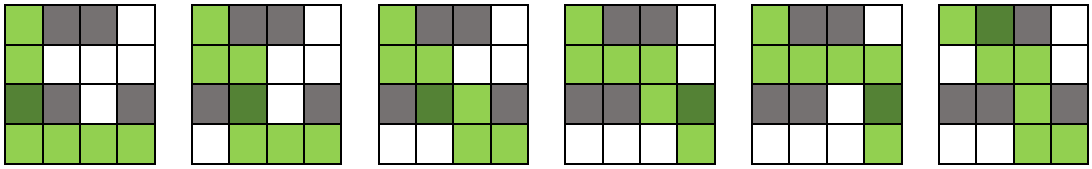
Input (feetJ.in)	Output (feetJ.out)
4 4 3 5 3 1 3 4 1 3 1 2 3 2	DRDRDR

Sample Explanation

The legs are marked in gray and Astro is in green. The alley in the first test looks like this:



The 6 paths, sorted lexicographically, are:



Their respective strings are:

DDDRRR
DRDDRR
DRDRDR
DRRDRD
DRRRDD
RDRDDR