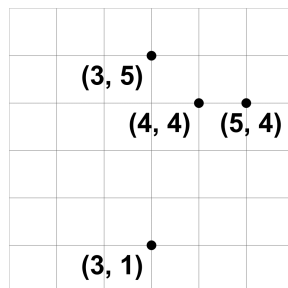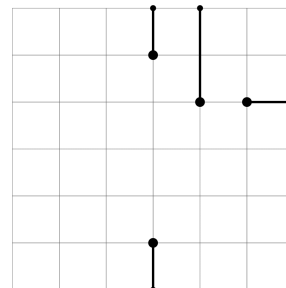# CHIP

A chip is being produced on a square silicon plate.

The chip contains a number of power junctions, each described with a pair of integer coordinates. The first coordinate increases from left to right, while the second increases bottom up. The lower left corner of the chip is marked (0, 0).

For the chip to function properly, each power junction must be **connected to one of the four sides** of the chip using a **single straight** horizontal or vertical wire segment. Additionally, no two wires may overlap, intersect, or even touch.

Sample 6x6 chip with 4 power junctions

Connecting the power junctions to the chip's sides using 5 units of wire

TASK

You will be given the length of the sides of the chip and the locations of all power junctions. Find a way to connect the junctions to the sides, so that the **total length of wire used is the smallest possible**.

This is an output-only task. You will be given 10 input files and only need to produce the matching output files. You may download the input files from the contest system, on the page labeled "Tasks".

You need to submit each output file separately on the contest system. When submitting, the contest system will check the format of your output file. If the format is valid, the output file will be graded; otherwise, the contest system will report an error.

INPUT

The first line of input contains a single integer A ($2 \leq A \leq 30$), the length of the side of the chip.

The second line contains an integer N ($1 \leq N \leq 50$), the number of power junctions.

Each of the following N lines contains two integers X and Y ($1 \leq X, Y \leq A-1$), the coordinates of a power junction. No two power junctions will occupy the same position.

You may assume that there exists a solution for each input file.

OUTPUT

The first line of the output should contain the total length of wire used.

The following N lines should describe the connections. For each power junction, in the order in which they were given in the input, output one of "up", "down", "left" or "right", the direction in which wire runs from that power junction.

If there is more than one optimal solution, output any one of them.

EXAMPLES

input	input
6	10
4	4
3 1	5 1
3 5	5 2
5 4	4 3
4 4	6 3

output	output
5	13
down	down
up	right
right	down
up	right