

Puzzle

SEASON 7 – ROUND FOUR



Lora's job is quite boring and hence she often finds some puzzle game online to entertain her. The latest game has the following simple rules:

The player must place the numbers from 1 to **K** in a grid, given a list of **P** pairs of numbers that describe **all** pairs of numbers that must be in adjacent cells. The player chooses the size of the grid – **N** rows and **M** columns, in such a way so that **K=N*M**. **If a pair of numbers is present in the list, then it is necessary that those two numbers are in adjacent cells, and if a pair is not present in the list, then those two numbers are necessarily not in adjacent cells!**

Help Lora by finding an arrangement of the numbers that satisfies the given requirements. If there is more than one solution, print any.

Note: Two cells are considered adjacent if they share a side.

Input

The first line of the input file `puzzle.in` contains the numbers **K** and **P** – the amount of numbers to arrange and the amount of pairs in the list, respectively. Each of the following **P** lines contain a pair of numbers $1 \leq A, B \leq K$, separated by a space, denoting that those two numbers must necessarily be in adjacent cells in the final arrangement.

Output

On the first line of the output file `puzzle.out` print two space-separated integers **N** and **M** – the amount of rows and columns in the grid, respectively. On each of the following **N** lines print **M** numbers – the filled grid.

Constraints

$$4 \leq K \leq 100\,000$$

$$1 \leq P \leq 200\,000$$

It is guaranteed that there exists a solution in which the size of the grid is $2 \leq N, M \leq 300$

A single pair of numbers will be in the input at most once. ("A B" and "B A" are considered as the same pair and hence will not be simultaneously present in the input)

Time Limit: 1.5 sec

Memory Limit: 256 MB

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Sample test

Input (puzzle.in)	Output (puzzle.out)
4 4 1 2 3 2 4 3 4 1	2 2 1 2 4 3
6 7 3 5 1 2 1 3 4 6 4 2 4 3 5 6	2 3 1 3 5 2 4 6

Clarifications

The given outputs are one of the few valid ones for the given inputs. An alternative valid output for sample test 1 could be:

2 2
3 4
2 1