Problem A. Maximal Matching in Graph

Input file:	system input
Output file:	system output
Time limit:	2 seconds
Memory limit:	256 megabytes

You are given an undirected graph without loops and each edge appears in the graph at most once. Find a maximal matching in it.

Input

The first line of the input contains two integers n and m ($1 \le n \le 17$, $0 \le m \le \frac{n \cdot (n-1)}{2}$) — the number of vertices and edges.

Each of the next m lines contains the description of an edge: two integers a and b ($1 \le a, b \le n$).

Output

The first line of the output should contain k — the size of the maximal matching.

Next k lines should contain the edges of the matching.

Examples

system input	system output
5 5 1 2 2 3 3 4 4 5 5 1	2 2 1 4 3

Problem B. Maximal Matching in Bipartite Graph

Input file:	system input
Output file:	system output
Time limit:	2 seconds
Memory limit:	256 megabytes

You are given unweighted bipartite graph. Find a maximal matching in it.

Input

The first line contains three integers n, m and k ($1 \le n, m \le 200, 1 \le k \le n \times m$) — the number of vertices in the first and the second parts, and the number of edges. Each of the next k lines contains the description of an edge: two integers a and b ($1 \le a \le n, 1 \le b \le m$) — an edge is between vertex a of the first part and vertex b of the second part.

Output

The first line of the output should contain k — the size of the maximal matching.

The next k lines should contain the edges one per line.

Examples

system input	system output
3 3 5 1 1 1 3 2 1 2 2 3 2	3 2 1 3 2 1 3

Problem C. Rooks

Input file:	system input
Output file:	system output
Time limit:	2 seconds
Memory limit:	256 megabytes

All the cells of the square table $n \times n$ are enumerated in some order by the numbers from 1 to n^2. Petya makes steps following rules. At the first step, he places a rook in any cell. During each of the next steps he can place a new rook or move some rook from a cell with number a horizontally or vertically to a cell with number higher than a.

When the rook gets to a cell this cell is immediately painted out. It is forbidden to move a rook to a painted cell. What is the minimal number of rooks Petya needs to paint all the cells.

Input

The first line of the input contains one integer n ($1 \le n \le 40$). The enumeration of the cells is set by n lines with n integers each.

Output

The sole line of the output should contain one integer k — the minimal number of rooks.

Examples

system input	system output
2 3 4 1 2	2

Problem D. Dominoes

Input file:	system input
Output file:	system output
Time limit:	2 seconds
Memory limit:	256 megabytes

You are given a field of size $n \times m$, some of which cells are cut out. It costs a to pave two neighbouring cells with a domino and it costs b to pave one cell.

What is the minimal amount you should pay to pave all the cells.

Input

The first line of the input contains four integers n, m, a, b ($1 \le n, m \le 100$, $|a| \le 1\,000$, $|b| \le 1\,000$).

Each of the next n lines contains m characters: "." represents a cutted cell, "*" represents a normal cell.

Output

The sole line of the output should contain one integer — the answer on the problem.

Examples

system input	system output
2 3 3 2 .** .*.	5

Problem E. Array and Operations

Input file:	system input
Output file:	system output
Time limit:	2 seconds
Memory limit:	256 megabytes

You wrote out an array of n integers $a[1], a[2], \ldots, a[n]$ and m good pairs $(i_1, j_1), (i_2, j_2), \ldots, (i_m, j_m)$. Each good pair satisfies: $i_k + j_k$ is odd and $1 \le i_k < j_k \le n$.

At one operation you could perform the following steps:

1. choose a good pair (i_k, j_k) and an integer v ($v > 1$) that divides both $a[i_k]$ and $a[j_k]$;
2. divide $a[i_k]$ and $a[j_k]$ by v.

What is the maximal number of operations could be performed. Note, that you could choose each good pair more than once.

Input

The first line of the input contains two integers n and m ($2 \le n \le 100$, $1 \le m \le 100$).

The second line contains n integers $a[1], \ldots a[n]$ ($1 \le a[i] \le 10^9$).

The next m lines provide a description of m pairs. k-th line contains two integers i_k and j_k ($1 \le i_k < j_k \le n$, $i_k + j_k$ — odd number). It is guaranteed that all good pairs are different.

Output

The sole line of the output should contain one integer — the answer on the problem.

Examples

system input	system output
3 2 8 3 8 1 2 2 3	0
3 2 8 12 8 1 2 2 3	2

Problem F. Chess

Input file:	system input
Output file:	system output
Time limit:	2 seconds
Memory limit:	256 megabytes

Each cell of the board is colored in black or white. At each turn you could color some diagonal in one color.

Find the minimal number of turns to color the board in chess coloring.

Input

The first line of the input contains two integers n and m ($1 \le n, m \le 100$) — the number of rows and columns of the board.

Next n lines describe the board. i-th line contains the description of i-th row — m characters. "W" means white cell, "B" means black cell.

Output

The first line of the output should contain one integer k — the minimal number of turns. Each of the next k lines should contain the description of the turns. Each turn is represented by four

integers: the type of the diagonal (1 or 2), the coordinates of some cell that lies on this diagonal and the color (W or B).

Examples

system input	system output
3 3 WBB BWB BBW	1 1 3 1 W
3 3 WBW WWB WWW	1 2 2 1 B