



Problem A. Dress to Impress

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 512 mebibytes

Ariana is very rich. She has several rings, she buys diamonds for her friends and she cannot resist an impulse to buy a thing once she sees it and likes it.

That is why Ariana has many clothes of different colors. Formally, there are n types of clothes or accessories and m colors for them. Each piece of clothing can be described by its type and color.

Not surprisingly, Ariana likes to be flossy. She calls a set of n pieces of clothing of different types an *attractive set* if it contains clothes of at least k colors. At the beginning of each day she picks an attractive set from the clothes she has. At the end of each day she throws this set away since she has already worn it.

You are given all the clothes Ariana has. Find out the maximal number of days she can go out without buying new clothes if she picks attractive sets optimally (it's not like she cannot afford new clothes, of course, it's just pure curiosity). Additionally, determine what to wear each day to achieve that number.

Input

The first line contains three integers n , m , c and k ($1 \leq n, m \leq 100$, $1 \leq c \leq 5000$, $1 \leq k \leq \min(n, m)$) denoting the number of types of clothing, the number of possible colors, the number of clothes Ariana has and the attractiveness threshold, respectively. The i -th of the next c lines contains two integers x_i and y_i ($1 \leq x_i \leq n$, $1 \leq y_i \leq m$), denoting a piece of clothing of type x_i and color y_i .

Output

On the first line output the only integer d : the answer to the problem.

On i -th of the following d lines print n integers $id_{i,1}, id_{i,2}, \dots, id_{i,n}$ describing the i -th attractive set ($1 \leq id_{i,j} \leq c$). The value $id_{i,j}$ must be the index of a piece of type j from the i -th attractive set. **Note that the order of clothes in an attractive set matters**, because $x_{id_{i,j}} = j$ must hold. Each set must contain pieces of clothing of at least k different colors, and nothing may be used more than once.

If there are several possible lists of attractive sets of size d , print any one of them.



Examples

standard input	standard output
3 3 10 2 3 1 3 3 3 2 2 3 2 2 2 2 3 3 2 1 1 3 1 3	2 9 5 7 10 6 3
3 4 12 3 1 1 1 2 1 3 1 4 2 1 2 2 2 3 2 4 3 1 3 2 3 3 3 4	4 3 6 9 4 7 10 1 8 11 2 5 12