A *matrix* is a rectangular array of elements, most commonly numbers. A matrix with m rows and n columns is said to be an m-by-n matrix. For example,

$$A = \begin{pmatrix} 1 & 3 & 2 \\ 0 & 4 & -1 \\ 0 & 0 & 0 \\ 5 & -2 & 11 \end{pmatrix}$$

is a 4-by-3 matrix of integers.

The individual elements of a matrix are usually given lowercase symbols and are distinguished by subscripts. The ith row and jth column of matrix A is usually referred to as a_{ij}. For example, $a_{23} = -1$. Matrix subscripts are 1-based.

The *transpose* of a matrix M, denoted M^T, is formed by interchanging the rows and columns of M. That is, the ij-th element of M^T is the ji-th element of M. For example, the transpose of matrix A above is:

$$A^T = \begin{pmatrix} 1 & 0 & 0 & 5 \\ 3 & 4 & 0 & -2 \\ 2 & -1 & 0 & 11 \end{pmatrix}$$

A matrix is said to be *sparse* if there are relatively few non-zero elements. As a m-by-n matrix has mn number of elements, storing all elements of a large sparse matrix may be inefficient as there would be many zeroes. There are a number of ways to represent sparse matrices, but essentially they are all the same: store only the non-zero elements of the matrix along with their row and column.

You are to write a program to output the transpose of a sparse matrix of integers.

Input

You are given several sparse matrix in a row, each of them described as follows. The first line of the input corresponds to the dimension of the matrix, m and n (which are the number of rows and columns, respectively, of the matrix). You are then given m sets of numbers, which represent the rows of the matrix. Each set consists of two lines which represents a row of the matrix. The first line of a set starts with the number r, which is the number of non-zero elements in that row, followed by r numbers which correspond to the column indices of the non-zero elements in that row, in ascending order; the second line has r integers which are the matrix elements of that row. For example, matrix A above would have the following representation:

```
4 3
3 1 2 3
1 3 2
2 2 3
4 -1
0

3 1 2 3
5 -2 11
```

Note that for a row with all zero elements, the corresponding set would just be one number, '0', in the first line, followed by a blank line.

You may assume:

- the dimension of the sparse matrix would not exceed 10000-by-10000,
- the number of non-zero element would be no more than 1000,
- each element of the matrix would be in the range of -10000 to 10000, and
- each line has no more than 79 characters.

Output

For each input case, the transpose of the given matrix in the same representation.

Sample Input

```
4 3
3 1 2 3
1 3 2
2 2 3
4 -1
0

3 1 2 3
5 -2 11
```

Sample Output

```
3 4
2 1 4
1 5
3 1 2 4
3 4 -2
3 1 2 4
2 -1 11
```