

IEEEExtreme Türkiye Kampı: Gün 2 CEVIR

Problem

You probably know what a matrix is. A matrix is a rectangular array of elements. We call a matrix with m rows and n columns an m -by- n matrix. For example,

$$A = \begin{pmatrix} 17 & 3 & 2 \\ 0 & 7 & -13 \\ 0 & 0 & 0 \\ 5 & -2 & 11 \end{pmatrix}$$

is a 4-by-3 matrix.

Transpose of a matrix is a matrix that is generated by inverting original matrix's rows and columns. Rows become columns and columns become rows. The element in the i^{th} row j^{th} column of the transpose matrix is the element in the j^{th} row i^{th} column element in the original matrix. The transpose of the above matrix is:

$$A^T = \begin{pmatrix} 17 & 0 & 0 & 5 \\ 3 & 7 & 0 & -2 \\ 2 & -13 & 0 & 11 \end{pmatrix}$$

If the number of non-zero elements are relatively few to the number of zero elements, the matrix is called sparse. In an m -by- n matrix, there exists $m \cdot n$ elements. Storing a sparse matrix in a two-dimensional array requires $m \cdot n$ memory locations, which is not efficient. Storing the rows and columns of non-zero elements is more efficient.

When a sparse matrix is given in a way that is efficient to store sparse matrices, find the transpose of the matrix in the same storage type.

Input

Input contains several cases.

In each case, a single matrix is given. First line of the case contains 2 numbers(m n) m denotes the number of rows, n denotes the number of columns of the matrix. In the next $2 \cdot m$ lines, rows of the matrix is given. Each line pair describes a single row. The first line of a line pair starts with a number r , which is the number of non-zero elements in

the corresponding row. After that, in the same line, r different numbers are given. These numbers denote the column numbers of non-zero elements. In the second line of the pair, non-zero elements are given. Each element's column number is the number given in the previous line in the same order. (r indexes, r elements) For example, matrix A given above is given as following:

```
4 3
3 1 2 3
17 3 2
2 2 3
7 -13
0
```

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

As you can understand from the example, if all elements are 0 in a row, first line of the pair contains a '0' and second line contains nothing.

Matrices will have less than 10000×10000 elements.

Total number of non-zero elements will be at most 1000.

All elements of the matrix will be in range $[-10000, 10000]$.

Each line contains at most 100 characters.

The end of the input will be signalled by $m=0$ and $n=0$.

Output

For each case, print the transpose of the matrix in the form that is described in Input section.

Sample Input

```
4 3
3 1 2 3
17 3 2
2 2 3
7 -13
0
```

```
3 1 2 3
5 -2 11
0 0
```

Sample Output

```
3 4
2 1 4
17 5
3 1 2 4
3 7 -2
3 1 2 4
2 -13 11
```

Time Limit

C/C++/Java: 1 secs, Python: 2 secs

Memory Limit

100 MB