



Multi-key Sorting

Input file: keys.in
Output file: keys.out
Source Code: keys.pas/.c/.cpp

100 points
Time limit: 6 sec
Memory limit: 10 MB

Consider a table with rows and columns. The columns are numbered from 1 to C . For simplicity's sake, the items in the table are strings consisting of lower case letters.

Col. 1	Col. 2	Col. 3
apple	red	sweet
apple	green	sour
pear	green	sweet
banana	yellow	sweet
banana	brown	rotten

Table 1

Col. 1	Col. 2	Col. 3
banana	brown	rotten
apple	green	sour
pear	green	sweet
apple	red	sweet
banana	yellow	sweet

Table 2

Col. 1	Col. 2	Col. 3
apple	green	sour
apple	red	sweet
banana	brown	rotten
banana	yellow	sweet
pear	green	sweet

Table 3

You are given the operation $\text{Sort}(k)$ on such tables: $\text{Sort}(k)$ sorts the rows of a table in the order of the values in column k (while the order of the columns does not change). The sort is stable, that is, rows that have equal values in column k , remain in their original order. For example, applying $\text{Sort}(2)$ to Table 1 yields Table 2.

We are interested in sequences of such sort operations. These operations are successively applied to the same table. For example, applying the sequence $\text{Sort}(2); \text{Sort}(1)$ to Table 1 yields Table 3.

Two sequences of sort operations are called equivalent if, for any table, they have the same effect. For example, $\text{Sort}(2); \text{Sort}(2); \text{Sort}(1)$ is equivalent to $\text{Sort}(2); \text{Sort}(1)$. However, it is not equivalent to $\text{Sort}(1); \text{Sort}(2)$, because the effect on Table 1 is different.

Task

Given a sequence of sort operations, determine a shortest equivalent sequence.

Input

The first line of the text file `keys.in` contains two integers, C and N . C ($1 \leq C \leq 1\ 000\ 000$) is the number of columns and N ($1 \leq N \leq 3\ 000\ 000$) is the number of sort operations. The second line contains N integers, k_i ($1 \leq k_i \leq C$). It defines the sequence of sort operations $\text{Sort}(k_1); \dots; \text{Sort}(k_N)$.

Output

The first line of the text file `keys.out` contains one integer, M , the length of the shortest sequence of sort operations equivalent to the input sequence (Subtask A). The second line contains exactly M integers, representing a shortest sequence (Subtask B). You can omit the second line if you solve only Subtask A.

Example

keys.in	keys.out
4 6	3
1 2 1 2 3 3	1 2 3