SOS(Set of Sets)

Description

From the universal set $U = \{0,1,\cdots,n-1\}$ we can construct subsets $S_i \subseteq U$ $(1 \leq i \leq q)$.
For example, with $n = 3$ and $q = 8$, we can have

$$S_1 = \{\} = \emptyset$$
$$S_2 = \{1\}$$
$$S_3 = \{1\}$$
$$S_4 = \{2\}$$
$$S_5 = \{1,2\}$$
$$S_6 = \{0\}$$
$$S_7 = \{0\}$$
$$S_8 = \{1\}$$

Let m_i be the count of exactly the same sets S_i, in $\{S_1, S_2, \cdots, S_i\}$ up to and including the given set.
From the above sets we get

$$m_1 = 1$$
$$m_2 = 1$$
$$m_3 = 2$$
$$m_4 = 1$$
$$m_5 = 1$$
$$m_6 = 1$$
$$m_7 = 2$$
$$m_8 = 3$$

From the given sets $S_1, S_2, \cdots, S_i$, compute the values of $m_1, m_2, \cdots, m_q$.

Input

Your program is to read from standard input. The size of universal set n and the number of sets q are given in the first line $(1 \leq n \leq 17)$ $(1 \leq q \leq 150{,}000)$, separated by space. Each of the next q lines contains information about set S_i. The size of S_i $(\text{i.e.}\ |S_i|)$ is given as the first number of each line, followed by the elements of S_i separated by space. Every element is a member of $U = \{0,1,\cdots,n-1\}$ and the elements in each set S_i are given in an increasing order at all times.

Output

Your program is to write to standard output. Print the value of m_i on ith line.

Sample

Input	Output
3 8 0 1 1 1 1 1 2 2 1 2 1 0 1 0 1 1	1 1 2 1 1 1 2 3