Permutation Inversions

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

There is an unknown permutation $p = (p_1, p_2, \ldots, p_n)$ of the integers $1, 2, \ldots, n$. You are given m pieces of information about this permutation.

Each piece of information consists of an interval $[l_i, r_i]$ and a permutation $q_{i,1}, q_{i,2}, \ldots, q_{i,r_i-l_i+1}$ of the indices in this interval. It states that

$$p_{q_{i,1}} < p_{q_{i,2}} < \cdots < p_{q_{i,r_i-l_i+1}}.$$

Your task is to find a permutation that satisfies all the given information and has the minimum possible number of inversions. If no such permutation exists, output -1.

If several optimal permutations exist, output any of them.

The number of inversions of a permutation p is the number of pairs of indices (x, y) such that

$$1 \le x < y \le n \quad \text{and} \quad p_x > p_y.$$

Input

The first line contains a single integer T ($1 \le T \le 10^6$) — the number of test cases.

For each test case:

- The first line contains two integers n ($1 \le n \le 10^6$) and m ($1 \le m \le 10^6$) — the size of the permutation and the number of constraints.

- Each of the next m lines describes a constraint. The i-th constraint starts with two integers l_i and r_i ($1 \le l_i \le r_i \le n$), followed by $r_i - l_i + 1$ integers $q_{i,1}, q_{i,2}, \ldots, q_{i,r_i-l_i+1}$, which form a permutation of the integers from l_i to r_i.

It is guaranteed that $1 \le \sum n \le 10^6$, $1 \le \sum m \le 10^6$, and $1 \le \sum_{i=1}^{m} (r_i - l_i + 1) \le 10^6$ over all test cases.

Output

For each test case, print a single line:

- If no satisfying permutation exists, print -1.

- Otherwise, print n space-separated integers $p_1, p_2, \ldots, p_n$ representing a valid permutation that minimizes the number of inversions.

If there are multiple optimal permutations, print any of them.

Example

standard input	standard output
4 4 1 2 4 3 2 4 3 2 1 3 1 2 3 1 3 3 2 1 5 2 2 4 4 2 3 2 4 4 2 3 4 2 2 2 2 1 4 2 1 4 3	1 3 2 4 -1 1 3 4 2 5 2 1 4 3