

## Ranks in groups

time limit: 5s

There are  $N$  students. For  $1 \leq i \leq N$ , the  $i$ -th student scores  $i$  points from the exam. These students are divided into groups. In the beginning, each group contains exactly one student. More specifically, initially, the  $i$ -th student is in group  $i$ .

You have write a program that supports the following operations:

(1) Group Merge: in this operation you are given two group numbers  $X$  and  $Y$ , and you want to merge group  $Y$  into group  $X$ . After the merge, every student in group  $Y$  will be in group  $X$ , and group  $Y$  no longer exists.

(2) Query: in this operation you are given an integer  $J$ , and you want to find the rank of the  $J$ -th student in her/his group. In a group, the student who gets the highest score has rank 1, the student with the second highest score has rank 2, and so on.

For each test case, there will be  $L$  operations.

### Input

The first line of the input contains an integer  $T$  ( $T \leq 5$ ) denoting the number of test cases. Then  $T$  test cases follow in the format described next.

- The first line of the test case contains integers  $N$  and  $L$  ( $1 \leq N \leq 100,000$ ;  $1 \leq L \leq 200,000$ ).
- The next  $L$  lines describe the operations in the following format:
  - The first integer  $K$  in the line specifies the type of the operation.
  - If  $K = 1$ , it is the Group Merge operation. Then, on the same line, there will be 2 more integers  $X$  and  $Y$ . You program has to merge students from group  $Y$  into group  $X$ .
  - If  $K = 2$ , it is the Query operation. Then an integer  $J$  is given. You have to output the rank of the  $J$ -th student in her/his group.

### Output

For each test case, you have to output, for every Query operation, the rank of the  $J$ -th student.

### Example

Input	Output
2	1
3 5	2
2 2	2
1 2 3	3
2 2	
1 1 2	
2 2	
4 4	
1 1 2	
1 1 3	
1 1 4	
2 2	