

2180 Puzzle for Friends and Enemies

In a country, there are N persons, labeled by $1, 2, \dots, N$. The country has exactly two political parties. All of the people in this country belong to at most one of the two political parties. If two persons join the same party, then they are *friends* to each other and are *enemies* if they belong to different parties.

Assume that N is known in advance. Let $p_1, p_2, \dots, p_w, \dots$ be a sequence of operations where each operation p_w is one of the following two types: (1) a pair of persons indicating that these two persons are enemies, or (2) a query asking the set confirmed friends and enemies for a person using the information available in the prefix of sequence p_1, p_2, \dots, p_{w-1} . Your task when N and the sequence is given, is to answer the queries mixed in the sequence one by one in sequence. We use a pair of positive integers (i, j) , $1 \leq i, j \leq N$, to represent a type (1) operation and use the pair $(0, k)$, $1 \leq k \leq N$, to represent a type (2) operation. For example, when $N = 5$ in the following input sequence:

```

p1    1    3
p2    5    2
p3    2    4
p4    0    2
p5    1    4
p6    0    4
      .    .
      .    .
  
```

At p_4 it should show that there are no confirmed friend for person 2 and two confirmed enemies (4 and 5) for person 2 according to all inputs appeared before p_4 . At p_6 it should show that there are two confirmed friends (3 and 5) and two enemies (1 and 2) for person 4.

Given the input sequence, let $p_w = (i, j)$ be a type (1) operation. Then p_w *conflicts* with the previous operations, if it is already confirmed that i and j are friends to each other according to the prefix p_1, p_2, \dots, p_{w-1} . To handle this situation, we should completely ignore this conflict relation and assume that it does not exist. For example, in the following input sequence when $N = 5$, the operations $p_4 = (4, 5)$ and $p_7 = (1, 2)$ should be ignored and p_5 and p_8 will have the same outputs for the queries p_4 and p_6 in the previous input sequence:

```

p1    1    3
p2    5    2
p3    2    4
p4    4    5
p5    0    2
p6    1    4
p7    1    2
p8    0    4
      .    .
      .    .
  
```

Input

The input file contains several test cases each of which separated by a pair of 0's. For each test case, the first line contains the number of persons N , $1 \leq N \leq 30,000$. Then in each of the following input lines, it includes two integers i and j separated by blanks where $0 \leq i \leq N$ and $1 \leq j \leq N$ to denote

an operation. The number of operations for each test case is within 1,100,000. If i is equal to 0 then a query for person j 's current status should be printed out. Otherwise i and j are a pair of enemies. Note the enemy relation between i and j is ignored if a conflict condition occurred. A line consists of a single '0' indicates the end of the file.

Output

For each query of the person k , you should print out one line to list out number of friends and number of enemies for person k known at the current stage as follows:

person k 's status: *number of friends, number of enemies*

Print a blank line after each output of a query. Print a line with ten '='s at the end of each test case.

Sample Input

```
5
1 3
5 2
2 4
0 2
1 4
0 4
0 0
5
1 3
5 2
2 4
4 5
0 2
1 4
1 2
0 4
0 0
0
```

Sample Output

```
person 2's status: 0, 2

person 4's status: 2, 2

=====
person 2's status: 0, 2

person 4's status: 2, 2

=====
```