2715   Classmates

The ABC class of 2003 consists of all outgoing students of ABC Institute of Information Technology of the year 2003. The class is engaged in developing a web site that aims to provide free services of various kinds. Considering the fact that people often lose contact with their old classmates and are eager to establish the lost contact after long years of separation a link has been kept in the web site for users to register and provide information about last school/college/university they attended and classmates they remember. Information gathered from users is included in a database that is used to process personalized queries related to information about classmates.

In order to attract users, the site aims to display, while responding to personalized queries, some statistical information related to the database. In particular it is of interest for the users to know the largest number of classmates that exists in the database, who studied together in the same institution/institutions, viz.,

1. *the same school (S),*

2. *the same college (C),*

3. *the same university (U),*

4. *the same school and the same college (SC),*

5. *the same school and the same university (SU),*

6. *the same college and the same university (CU), and*

7. *the same school, the same college and the same university (SCU).*

The ABC class of 2003 seeks your help in writing a program to compute the seven statistics stated above. Assume that all registered users and classmates for whom information is given by a user are recorded in the database by name and associated school, college, university and years. However each one of them is also identified uniquely by an integer assigned arbitrarily. The integer representation is used in input/output.

It should be noted that when a user A is listed as a classmate by another user B the user A may or may not list B as classmate. Further if A and B are classmates at a given level (school/college/university) then all classmates of A (or B) are classmates of B (or A) and A, B and their classmates attended the same institution at that level.

Input

The input may contain multiple test cases.

For each test case the first line contains two integers K and N. The integer K is the case number and $N(< 5000)$ is the total number of users who have registered at the site and provided information voluntarily.

Data from each of N users appear in four lines. The first line identifies the user who has registered and provided information about classmates. The second, the third and the fourth lines list classmates of the user in school, college and university respectively. The input is illustrated in sample input.

The entire input set terminates with an input '0' for each of K and N.

Output

For each test case in the input print two lines. The first line contains the test case number K and the next line contains the seven statistics mentioned above in the order in which they are listed, viz., S, C, U, SC, SU, CU and SCU.

The output is illustrated in sample output.

Sample Input

```
1 3
31
42 90 18 19
34 15 19
42 13
42
26 80 90
53 17 20
31 79
11
14 15 19
79 80
34 80 19
0 0
```

Sample Output

```
1
10 4 4 3 3 2 2
```