

Problem P

Can I Graduate?

Problem ID: canigraduate

If you're a student, you will often want to know whether you've fulfilled the graduation requirements of your program. Sometimes, figuring this out can be tricky. First of all, degree programs offer many classes, and these classes often have prerequisites. For example, consider the following course catalog:

Course	Prerequisites
101	None
102	101
110	102
201	102
203	102
204	102
300	None
310	110, 300
354	201
400	None
501	204, 354

A student can take course 101, 300, or 400 without taking any previous courses. However, if a student wanted to take course 102, they'd have to take course 101 first. If they wanted to take course 110, they have to take course 102 *and* course 101 (because, while 101 is not explicitly listed as a prerequisite for 110, it *is* a prerequisite for 102, which you need to take 110). If a class has multiple prerequisites, that means that a student must take all the prerequisite classes first (e.g., a student who wants to take 310, must have taken 110 and 300 first).

To graduate from the program, a student has to fulfil the program's *graduation requirements*, which is just a subset of the courses in the course catalog. As long as you've taken all the courses listed in the graduation requirements (and all the prerequisites of those courses), the student will be allowed to graduate.

So, a student will usually come up with a *course plan* (the list of courses they plan to take) and will want to know whether they will be able to graduate if they take those courses. For simplicity, we will assume this is an unordered list of courses: the student isn't interested in knowing the exact order in which to take the courses but, rather, whether coming up with a schedule that includes all the courses in the course plan will allow the student to graduate.

More specifically, a course plan is valid if:

1. It includes all the courses listed in the graduation requirements, along with the prerequisites of such courses.
2. For each course in the course plan, all the prerequisites of the course are also in the course plan, regardless of whether the course (or its prerequisites) are needed to graduate.

In this problem, you will determine whether a course plan is valid based on the requirements listed above. If a course plan is not valid, you must determine what courses are missing from the course plan (for either of the two reasons listed above).

Input

The input begins with a line that contains three integers, each separated by a single space: the number of courses N in the course catalog, the number of courses G in the graduation requirements, and the number of courses P in the course plan. You may assume $(1 \leq N, G, P \leq 200)$.

The input is followed by N lines representing the course catalog. Each line contains a course identifier, a number of prerequisites R ($0 \leq R \leq 199$), and the course identifiers of the prerequisites, each separated by a single space. A course identifier is always a three-digit integer. You may assume that no course identifier appears more than once in a single course's prerequisites. If R is 0, then no prerequisite courses are listed, and the line ends right after R .

The input is followed by two lines representing the graduation requirements and the course plan, respectively. The first line contains G course identifiers, and the second line contains P course identifiers. In both lines, each course identifier is separated by a single space. You may assume that no course identifier appears more than once in the graduation requirements; you may assume the same about the course plan.

You may assume that all course identifiers are valid: any course identifier that appears in a list of prerequisites, in the graduation requirements, or in the course plan is guaranteed to be in the course catalog. You may also assume that the course catalog doesn't include any prerequisite cycles (i.e., it will never be the case that two courses will end up having each other as a prerequisite, nor can a course have itself as a prerequisite).

Output

If the course plan is valid, as defined above, the output will be a single line with the string OK.

If the course plan is *not* valid, the output will be a single line starting with the string MISSING, followed by the course identifiers of the missing courses, each separated by a single space. *This list of courses must be printed in numerical order.*

Sample Input 1

```
11 8 8
101 0
102 1 101
110 1 102
201 1 102
203 1 102
204 1 102
300 0
310 2 110 300
354 1 201
400 0
501 2 204 354
101 102 201 203 204 300 354 501
101 102 201 203 204 300 354 501
```

Sample Output 1

```
OK
```

Sample Input 2

```
11 9 8
101 0
102 1 101
110 1 102
201 1 102
203 1 102
204 1 102
300 0
310 2 110 300
354 1 201
400 0
501 2 204 354
101 102 201 203 204 300 354 400 501
101 102 201 203 204 300 354 501
```

Sample Output 2

```
MISSING 400
```

Sample Input 3

```
11 7 8
101 0
102 1 101
110 1 102
201 1 102
203 1 102
204 1 102
300 0
310 2 110 300
354 1 201
400 0
501 2 204 354
101 102 201 203 204 354 501
101 102 201 203 204 310 354 501
```

Sample Output 3

```
MISSING 110 300
```