
Algorithms Lab

Exercise 2 – Deleted Entries

Thanks to the hard work of the assistants, the infamous lab at the Algorithmic University is getting harder each year. Finally, in 2021 it appears impossible for a single student to cover the whole curriculum. Since the course consists of three independent sections, the teachers decide to split the students into three groups so that each of them learns only a single part. Of course at least someone should participate in each section, so each group should be nonempty.

To “help” the students work independently, members of each group are requested to mutually delete each other’s details from their contact books (if they had their details in the first place). On the other hand, it is very advisable to communicate with the students from other groups, exchanging the acquired abilities and knowledge. What is more, it should be possible for a student to reach any other student in case of emergency.

We say that Alice can reach Bob if:

- She has Bob’s number in her contact book or
- She has the contact details of someone who can reach Bob.

You should determine if it is possible to divide the students into nonempty groups such that each student can reach any other student even after deleting the contact entries inside the groups. Additionally, if such division is possible you should find it.

Input The first line of the input contains $1 \leq t \leq 100$, the number of testcases. Each testcase starts with a line containing $1 \leq n \leq 10^6, 0 \leq m \leq 2 \cdot 10^6$, where n is the number of students and m the number of pairs of students that have each other’s contact details. We assume that the details are exchanged mutually, i.e., if Alice has Bob’s details, then Bob also has her details. We number the students with integers from 0 to $n - 1$. m lines follow, each defining a pair of students that exchanged contact details: $0 \leq a_i < b_i < n$. In each line consecutive numbers are separated with single spaces. No pair of students appears more than once in a testcase.

Output You should output a separate answer for each testcase as follows. If it is not possible to divide the students into the groups as required, you should print `no` on a single line. Otherwise, you should print `yes` on a single line, followed by the description of a correct division in the three following lines. Each of them should start with the number of students in the respective group, followed by a list of the students assigned to the group. If there is more than one correct solution, output any of them.

NOTE The inputs to this problem are huge, make sure your I/O is efficient.

Sample input

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

Sample output

```
yes
1 3
2 1 2
1 0
```

Note that the correct output is not necessarily unique.