



Objective

You organize a blind-date party in your school with a particular theme: to bring people from the literature department and the science department together. If you still believe in the possibility of an agreement between literary and scientists, you know that it is still better to make sure of a certain compatibility! For this evening to be a success, you decide to cheat by arranging the first pairs of people in advance.

You have extracted data from a well-known social network about the friendship relationships between the participants. You must determine the series of pairs of people (1 from the literature department / 1 from the science department) that maximizes the total number of friends in common within the formed couples!

Note: it is forbidden here to "match" a participant with several people! In addition, you are guaranteed that there is at least one person in each department.

Data format

Input

Row 1: two whole integers by a space: **N**, the number of the site's users (between 2 and 100), and the number **M** of friendship relationships (between 1 and N^2).

Row 2: **N** integers equal to 0 or 1 separated by spaces indicating whether each participant is from the literature (0) or a science (1) department.

Rows 3 to **M+2**: two integers between 1 and **N** and separated by a space indicating that there is a friendship between the two people identified by each integer (friendships are reciprocal).

Output

A row describing the couples you created: each couple is described by two integers (user identifiers) separated by a space; the different couples are separated by commas. You can use any order for couples and indicate the members of a given couple in the order you want. Finally, if there are several solutions, you can view the one you want.

Examples

Input

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

Output

```
1 3
```

In this case, all possible couples formed from (1, 2) on one side and (3, 4) on the other side have no friends in common. So any couple formed by a member of each department is a solution for example 1 3. Note that 1 3,2 4 is also a solution: instead of having a couple we have 2 but in total they have no friends in common.

Input

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

Output

```
1 4
```

Couple 1 4 is the only couple with a mutual friend (person 5). Moreover 4 1, 5 2 is also a solution. The couple 5 2 does not bring any friend in common, but since the couple 1 4 is present in the solution, it maximizes the number of friends in common.

Input

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

Output

```
1 4, 5 2
```

Couple 1 4 has a friend in common (person 5). Couple 5 2 has a friend in common (person 1). The solution 1 4, 5 2 has 2 friends in common and is the maximum solution.