7028 Connecting Army Troops

The kingdom of France is about to be at war with one of its neighbouring kingdoms. Both these kingdoms share a long border along which the French army has set up a number of posts. Each post has an army posted on it to protect the kingdom from the enemy attacking at that post. Geographically, the most vulnerable of these army posts is the post by the Sienne river. Therefore it is expected that the first attack from the enemy is going to be on this post of Sienne. The total army strength of France is currently at an all time low. Thus army strength at the post of Sienne is not much and in case of an attack it will need backup from the other army posts. Thus, it is very necessary for the French troops at all the other posts to be able to move quickly to the post of Sienne in case of an attack.

There is a road network connecting the army posts. Each of these roads has an army post at either end. The roads are bidirectional, i.e. the army at any one of these posts can move on the road to reach the post at the other end. The soldiers can also take a sequence of roads to go to the required post for backing it up.

The enemy is suspected to make an attempt to destroy exactly one road of this network so that the post of Sienne can not receive full backup from some or all of the other posts. Fearing this, the French King has asked Leonardo Da Vinci to construct a few more similar roads connecting these army posts. Even if exactly one of the roads gets destroyed by the enemy, this construction must ensure that the post of Sienne can receive backup from all the remaining army posts.

Your goal is to help Leonardo and tell him the minimum number of roads that need to be built to make this possible. You are given the information about the road network connecting the army posts. There are N army posts, labelled $1, 2, \ldots, N$ with the post of Sienne being labelled 1. Currently there are M roads each connecting 2 army posts. At most one road can exist between two army posts. It is possible that with the given set of roads, you cannot reach some army posts from the post of Sienne.

Input

The first line of the input contains an integer T, the number of test cases in the file. Then T test cases follow. The first line of each test case contains two space separated integers N and M. Following next are M lines which indicate the M roads. Of these lines, the i-th line contains two space separated integers a_i and b_i indicating the army posts connected by the i-th road.

Output

For each test case, print in a separate line the minimum number of roads that need to be built to achieve the above goal. If it is not possible print '`-1`'.

Constraints:

- $1 \leq T \leq 13$
- $1 \leq N \leq 5000$
- $0 \leq M \leq 131313$
- $1 \leq a_i, b_i \leq N$
- For no pair i and j $(i \neq j)$ both $a_i = a_j$ and $b_i = b_j$.
- The maximum number of lines in each file would be 500000.

Explanation: Adding road 1, 4 will ensure that each army post is connected to 1 even if any road fails.

Sample Input

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

Sample Output

```
1
```