The Mulk

This afternoon Lea went to an art showing by Cruce Canner in downtown New Tempolis. She did not really like the art and told the artist that she thinks it is pretentious and compared to M.N. Cut's work almost trivial (M.N. Cut is a very famous artist in Templonia). Canner did not take the critique very well, got angry and stormed out the door. A few minutes later, the news showed *The Mulk*, a big yellow raging monster, in front of the art gallery, at which point Lea remembered why the name Cruce Canner somehow sounded familiar.

Realizing that she was the only person in town who knew where *The Mulk* was headed (M.N. Cut's art gallery obviously), she called the town major and offered her assistance in catching *The Mulk*. He told her that they have a lot of roadblocks which can be deployed within seconds at any point in town (this is not their first Mulk-related incident), however, two rules need to be respected:

- Since the roadblocks are very expensive, as few of them as possible should be used - even at the expense of a few cars or houses. In particular this means, that we can let *The Mulk* run around for a bit before trapping him.
- Article 126.7a of the Mulk Defense Act of 2004 states that "in order not to disturb local wildlife too much, all roadblocks must be deployed at the same time".

Can you help Lea figure out how many roadblocks have to be used in the worst case to keep *The Mulk* from reaching M.N. Cut's gallery?

Input

The first line of the input contains an integer t. t test cases follow, each of them separated by a blank line.

Each test case begins with two integers n and m. n is the number of road-crossings numbered from 1 to n on the map, m is the total number of roads between road crossings. m lines follow describing the map. Each line contains two integers u and v and describes a road between the crossings u and v.

The Mulk starts at crossing 1 and wants to reach crossing n.

Output

For each test case output one line containing "Case #i: x" where i is its number, starting at 1, and x is the number of roadblocks that need to be used to trap *The Mulk* in the worst case.

Constraints

- $1 \leq t \leq 20$
- $2 \leq n \leq 120$
- $n \leq m \leq 10000$

Sample explanation

In the first sample input we are given 8 crossings with 9 roads in between them. The resulting graph looks this:

Now, we could decide to place roadblocks right away, for example as shown in figure 2. This uses up 3 roadblocks.

However, if we allow *The Mulk* to run around a bit, we can see, that a better solution is possible: In the first step, he has to decide between going to node 2,3 or 4. When we place the roadblocks after *The Mulk* has made his first step, we can place them for example as shown in figure 3, which results in only 2 roadblocks being used. Hence the correct answer is 2.

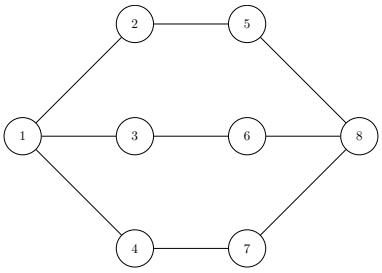

Figure 1: Graph for the first sample input

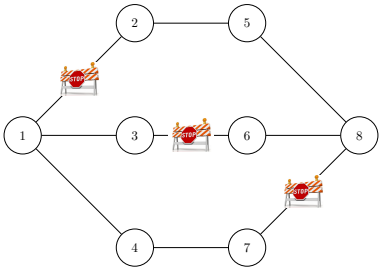

Figure 2: Non-optimal way of placing the roadblocks.

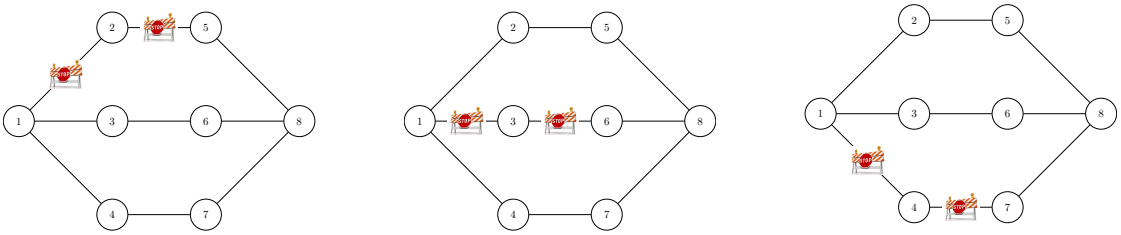

Figure 3: Optimal roadblocks for all paths from node 1 to node 8.

Sample Input 1	Sample Output 1
3 8 9 1 2 1 3 1 4 2 5 3 6 4 7 5 8 6 8 7 8 5 7 1 5 1 2 1 4 5 3 5 4 5 2 3 4 2 2 1 2 1 2	Case #1: 2 Case #2: 3 Case #3: 2