

Problem C. Call It What You Want

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 64 mebibytes

Professor Zhang has heard that the longest path problem cannot be solved in polynomial time for arbitrary graphs unless $P = NP$. Now, Professor Zhang would like to solve this problem in polynomial time in some graphs.

The longest path problem is the problem of finding a simple path of maximum length in a given graph. A path is called simple if it does not have any repeated vertices. The length of a path is the number of edges in this path.

Input

There are multiple test cases. The first line of input contains an integer T (about 350) indicating the number of test cases. For each test case:

The first line contains two integers n and m ($3 \leq n \leq 10^4$, $n \leq m \leq n + 4$): the number of vertices and the number of edges.

Each of the following m lines contains two integers a_i and b_i which denotes an edge between vertices a_i and b_i ($1 \leq a_i, b_i \leq n$, $a_i \neq b_i$).

It is guaranteed that the graph is connected and does not contain multiple edges.

The total size of the input is at most 4 mebibytes.

Output

For each test case, output an integer denoting the length of the longest path.

Example

| standard input | standard output |
|----------------|-----------------|
| 3 | 4 |
| 5 5 | 6 |
| 1 2 | 6 |
| 2 3 | |
| 3 4 | |
| 4 5 | |
| 5 1 | |
| 7 7 | |
| 1 2 | |
| 2 3 | |
| 3 4 | |
| 4 5 | |
| 5 1 | |
| 5 6 | |
| 4 7 | |
| 7 10 | |
| 1 2 | |
| 2 3 | |
| 3 4 | |
| 4 5 | |
| 1 5 | |
| 2 5 | |
| 3 5 | |
| 1 6 | |
| 5 6 | |
| 4 7 | |