Don't Detect Cycle

Input file: `standard input`
Output file: `standard output`
Time limit: 2 seconds
Memory limit: 1024 megabytes

You are given a graph G consisting of N vertices numbered $1, 2, \ldots, N$. Initially, G has no edges.

You will add M undirected edges to G. The final shape of the graph is predetermined, and the i-th edge to be added ($1 \le i \le M$) connects vertices u_i and v_i. We will refer to this as edge i. It is guaranteed that the resulting graph will be simple.

Determine if there exists a permutation $(P_1, P_2, \ldots, P_M)$ of $(1, 2, \ldots, M)$ that satisfies the following conditions, and if such a permutation exists, show an example.

Conditions

You must be able to add all M edges to G by following this procedure:

- For $i = 1, 2, \ldots, M$, repeat the following:
  1. If there is already a cycle in G containing either vertex u_{P_i} or vertex v_{P_i}, the condition is not satisfied, and the procedure ends.
  2. Add edge P_i (the undirected edge connecting u_{P_i} and v_{P_i}) to G.

You are given T test cases; solve each of them.

Input

The input is given in the following format:

T
case_1
case_2
$\vdots$
case_T

Here, case_i ($1 \le i \le T$) represents the i-th test case. Each test case is given in the following format:

N M
u_1 v_1
u_2 v_2
$\vdots$
u_M v_M

- All input values are integers.
- $1 \le T \le 2000$
- For each test case:
  - $2 \le N \le 4000$
  - $1 \le M \le 4000$
  - $1 \le u_i, v_i \le N$ $(1 \le i \le M)$
  - The graph formed by adding all given edges is simple.

- The sum of N over all test cases is at most 4000.
- The sum of M over all test cases is at most 4000.

Output

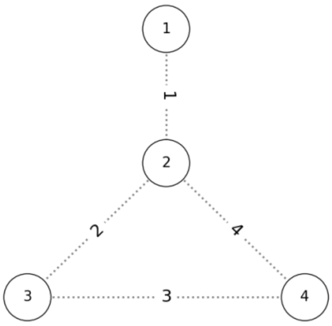
For each test case, if a permutation $(P_1, P_2, \ldots, P_M)$ satisfying the conditions exists, output such a P separated by spaces. If no such permutation exists, output `-1`.

Examples

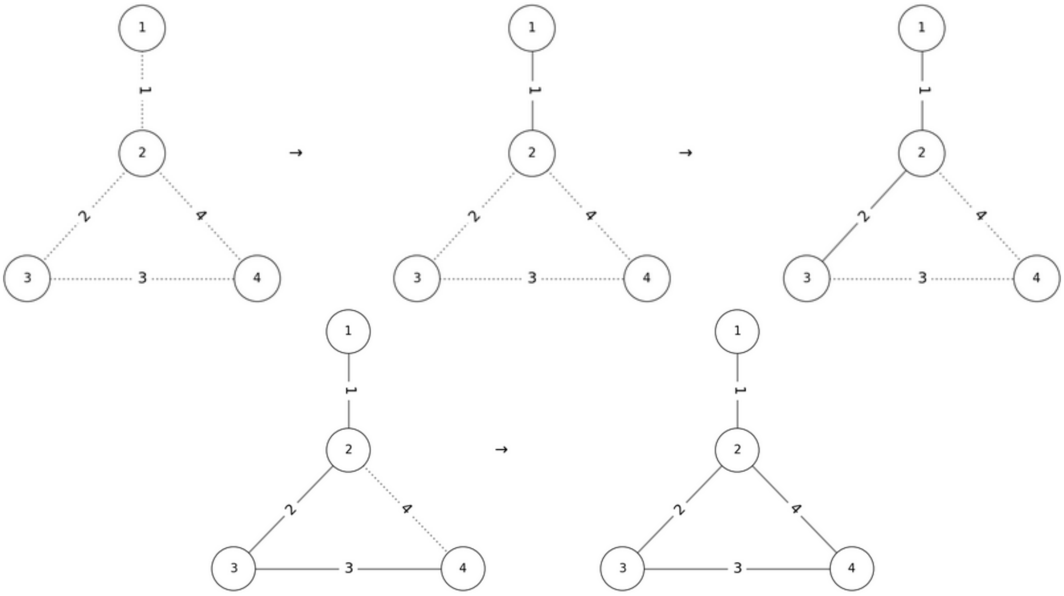
standard input	standard output
1 4 4 1 2 2 3 3 4 4 2	1 4 3 2
4 4 5 1 2 2 3 3 4 3 1 1 4 5 3 1 2 2 3 3 4 9 10 3 5 1 8 5 8 4 9 6 7 7 9 1 2 1 4 2 4 4 6 8 10 1 4 3 8 2 5 3 4 1 5 5 8 2 8 5 7 4 5 3 7	-1 1 2 3 1 2 3 4 8 9 10 7 6 5 -1

Note

In the first example, the given graph has the following shape:

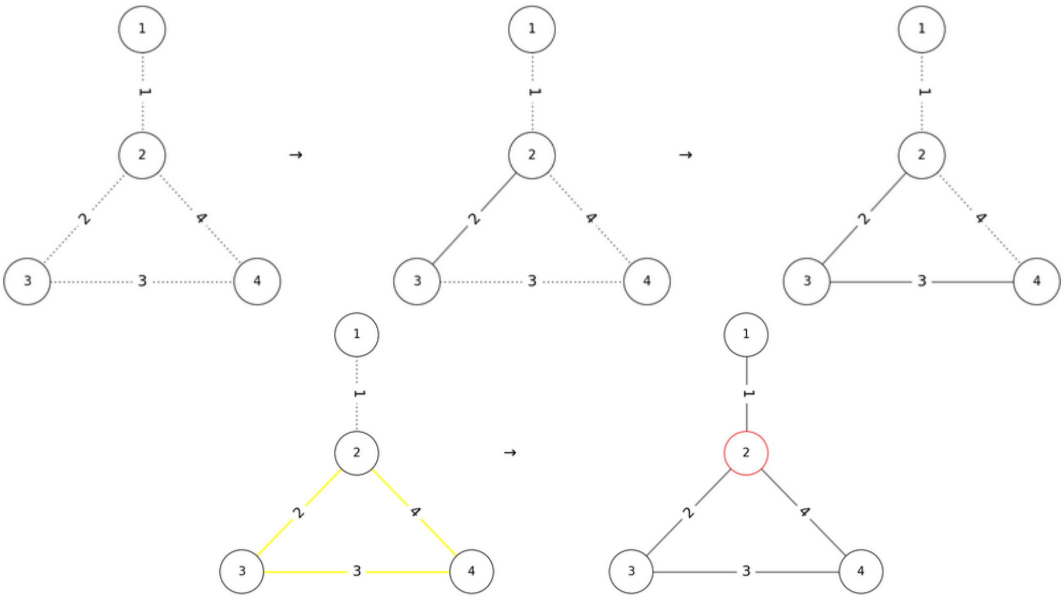


If we add the edges in the order $P = (1, 2, 3, 4)$, the conditions are satisfied as shown below:



Thus, “`1 2 3 4`” is one valid output.

However, if we add edges in the order $P = (2, 3, 4, 1)$, a cycle containing vertex 2 is created before edge 1 can be added, so the conditions are not satisfied.



Other valid outputs include $P = (1, 4, 3, 2)$ or $P = (2, 4, 1, 3)$.

Note that the graph is not necessarily connected.