

Problem F. Fraissette

Input file: *standard input*
 Output file: *standard output*
 Time limit: 2 seconds
 Memory limit: 256 mebibytes

You are given a directed graph with n vertices and m edges. It may contain loops and multiple edges. Your task is to find if it is possible to change direction of some edges to make the graph an Eulerian graph. If it is possible, you also have to find the minimum possible number of direction changes.

A directed graph is called Eulerian if there exists a directed cycle that uses every edge exactly once.

Input

First line contains one integer T ($1 \leq T \leq 1000$), the number of test cases. T test cases follow.

The first line of each test case contains two integers n and m ($1 \leq n \leq 1000$, $0 \leq m \leq 5000$).

Each of next m lines contains description of one edge: two integers *from* and *to* ($1 \leq from, to \leq n$).

It is guaranteed that the sum of n in all test cases isn't greater than 1000.

It is guaranteed that the sum of m in all test cases isn't greater than 5000.

Output

For each test case, print one number on a separate line: the minimum number of edges which need to have their direction changed, or -1 if it is impossible to obtain an eulerian graph regardless of the number of changes.

Example

standard input	standard output
3	1
3 3	-1
1 2	0
2 3	
1 3	
3 2	
1 2	
2 3	
3 3	
1 2	
2 3	
3 1	