

# Problem E

## Telecommunication Deployment

Input file: *testdata.in*

Time limit: 2 seconds

### Problem Description

A country of  $N$  cities recently begins its telecommunication business. Telecommunication *wires* are deployed to connect some of the two cities in a way that every two cities have access to each other through a series of the wires. To be cost-effective, the government of the country wishes to deploy these wires based on the existed power network and without any superfluous wires. That is:

- Every wire can only be deployed between two cities if there is already a *power line* connecting these two cities.
- Removing any one of the deployed wires causes some of the cities unreachable to others through telecommunication.

The power network is composed of  $M$  power lines, each of them connects two distinctive cities, and no two power lines connects the same pair of cities. The power network guarantees that every two cities can transmit power to each other.

There may be several ways of deployment to fulfill the requirement. However, when a city is connected by more than one wire, there should be a switch settled in the city for the routing purpose, which also increases the cost. Being as the adviser of the business, can you tell the government the minimum number of switches required for the deployment?

### Technical Specification

1.  $1 \leq N \leq 12$ .

2.  $1 \leq M \leq \frac{N(N-1)}{2}$ .

## Input Format

There are at most 10 test cases in the input file. Each of the test cases begins with two integers,  $N$  and  $M$ , followed by  $M$  lines of integers pairs to denote the power network connection. The  $N$  cities are numbered as 0 to  $N - 1$ . When there are two integers  $i$  and  $j$  in the one of the  $M$  lines, this indicates that there is a power line connects the city numbered  $i$  and the city numbered  $j$ .

## Output Format

For each test case, print the minimum number of switches required for the deployment.

## Sample Input

```
2 1
0 1
4 4
0 1
0 2
0 3
1 2
```

## Sample Output

0  
1