Islamic University of Technology
Department of Computer Science and Engineering

Lab 10: Max Flow

CSE 4404: Algorithms Lab
Summer 2023-24

Task A. Download Speed

Time Limit: 2 seconds | *Memory Limit: 512 MB*

Consider a network consisting of n computers and m connections. Each connection specifies how fast a computer can send data to another computer. Kotivalo wants to download some data from a server. What is the maximum speed he can do this, using the connections in the network?

Input Format

The first input line has two integers n and m: the number of computers and connections. The computers are numbered $1, 2, \ldots, n$. Computer 1 is the server and computer n is Kotivalo's computer. After this, there are m lines describing the connections. Each line has three integers a, b and c: computer a can send data to computer b at speed c.

Output Format

Print one integer: the maximum speed Kotivalo can download data.

Constraints

- $1 \leq n \leq 500$
- $1 \leq m \leq 1000$
- $1 \leq a, b \leq n$
- $1 \leq c \leq 10^9$

Examples

Sample Input	Sample Output
4 5 1 2 3 2 4 2 1 3 4 3 4 5 4 1 3	6

Task B. Police Chase

Time Limit: 2 seconds | Memory Limit: 512 MB

Kaaleppi has just robbed a bank and is now heading to the harbor. However, the police wants to stop him by closing some streets of the city. What is the minimum number of streets that should be closed so that there is no route between the bank and the harbor?

Input Format

The first input line has two integers n and m: the number of crossings and streets. The crossings are numbered $1, 2, \ldots, n$. The bank is located at crossing 1, and the harbor is located at crossing n. After this, there are m lines describing the streets. Each line has two integers a and b: there is a street between crossings a and b. All streets are two-way streets, and there is at most one street between two crossings.

Output Format

Print an integer k: the minimum number of streets that should be closed.

Constraints

- $2 \leq n \leq 500$
- $1 \leq m \leq 1000$
- $1 \leq a, b \leq n$

Examples

Sample Input	Sample Output
4 5 1 2 1 3 2 3 3 4 1 4	2

Marks Distribution

Task	**Marks**
Task A	50%
Task B	50%