

## Problem MinDAG

Input file        `stdin`  
Output file      `stdout`

An undirected graph with  $N$  nodes and  $M$  edges is given.

Each edge  $(i, j)$  is assigned two costs,  $a$  and  $b$ . It can be directed from  $i$  to  $j$  with a cost of  $a$ , or from  $j$  to  $i$  with a cost of  $b$ .

Choose a direction for each edge such that the resulting directed graph is acyclic and the sum of the costs is minimized.

### Input Data

The first line of the input contains two integers,  $N$  and  $M$ , representing the number of nodes and the number of edges in the graph.

The next  $M$  lines each contain four integers,  $i$ ,  $j$ ,  $a$ , and  $b$ , indicating that there is an edge between nodes  $i$  and  $j$  with the properties described above.

### Output Data

The first line contains the integer  $C$ , representing the required minimum cost.

### Restrictions

- $1 \leq N \leq 24$
- $1 \leq M \leq \frac{N*(N-1)}{2}$
- $1 \leq a, b \leq 10^6$
- $1 \leq i, j \leq N$
- The input edges do not repeat.

#	Points	Restrictions
1	8	$1 \leq N \leq 8$
2	21	$1 \leq N \leq 15$
3	24	$1 \leq N \leq 20$
4	7	$M = N - 1$ and the graph is connected.
5	12	Each node has an exact degree of 2.
6	28	No additional restrictions.

### Examples

Input file	Output file
3 3 1 2 3 5 1 3 7 3 2 3 5 6	12

## Explanations

The edges can be oriented as follows:

- $1 \rightarrow 2$  with a cost of 3
- $3 \rightarrow 1$  with a cost of 3
- $3 \rightarrow 2$  with a cost of 6