

Problem M. Zacuscă

Input file: *standard input*
Output file: *standard output*
Time limit: 5 seconds
Memory limit: 256 mebibytes

In Romania, Zacuscă is a vegetable spread made usually from roasted eggplant and peppers, though it can also include onions, tomatoes, oil, and spices.



To make Zacuscă, you need to prepare the ingredients and mix them together. You already have the ingredients, and now is the time for mixing. You start by adding the first ingredient into the mixer. Then you add the second one. Then the third, and so on. Each time, the mixture gets harder to mix. More specifically, there are M relationships of the form (i, j, a, b) . This means that if you add ingredient j to a mixture that already contains a different ingredient i , then the mixer will use a extra units of energy. Similarly, if you add ingredient i to a mixture that already contains ingredient j , then the mixer will use b extra units of energy.

In this problem, assume that the final mixture will be the same regardless of the order in which you add the ingredients (not true in real cooking). Since you need to make quite a lot of Zacuscă, you would like to find the most efficient recipe: the one that uses the least amount of energy to mix everything. Output the minimum amount of energy required.

Input

The first line contains two integers, n and m : the number of ingredients and the number of energy relationships ($2 \leq n \leq 24$, $1 \leq m \leq \frac{n \cdot (n-1)}{2}$).

Each of the following m lines contains four integers: i , j , a , and b ($1 \leq i, j \leq n$, $i \neq j$, $1 \leq a, b \leq 10^6$). No pair (i, j) will appear multiple times. The pairs (i, j) and (j, i) cannot appear simultaneously.

Output

Print one integer, the minimum amount of energy required to mix everything.

Example

<i>standard input</i>	<i>standard output</i>
3 3 1 2 3 5 1 3 7 3 2 3 5 6	12

Note

In the example, we can choose to add the three ingredients in the order 3, 1, 2, which will add to the cost:

- 3 for adding 2 after 1
- 3 for adding 1 after 3
- 6 for adding 2 after 3

The total cost will then be 12, and there is no other order that gives us a smaller cost.