Problem B
Shortest Paths with Negative Weights

Time limit: 1 second
Memory limit: 2048 megabytes

Problem Description

You are given a directed graph with n vertices and m directed edges, where the vertices are numbered from 1 to n. Each edge in the graph is associated with a weight w_i.

Your objective is to compute the total sum of the shortest path lengths between all pairs of vertices such that the second vertex is reachable from the first one. To clarify, let $dist(u, v)$ represent the shortest distance between vertices labeled u and v if v is reachable from u, and $dist(u, v) = 0$ otherwise. Your program needs to output the sum of these distances computed over all vertex pairs: $\sum_{i=1}^{n} \sum_{j=1}^{n} dist(u, v)$. Your program also has to detect negative-weight cycles if there is any.

Input Format

The first line of the input contains two integers n and m. Each of the following m lines contains three integers u_i, v_i and w_i, where the i-th line denotes that there is a directed edge from vertex u_i to v_i in the graph.

Output Format

Output the sum $\sum_{i=1}^{n} \sum_{j=1}^{n} dist(u, v)$ in one line. If there is at least one negative-weight cycle uin the graph, print `Negative-weight cycle found`.

Technical Specification

- $1 \leq n \leq 3000$
- $0 \leq m \leq 3000$
- $1 \leq u_i, v_i \leq n$ and $u_i \neq v_i$ for $i = 1, 2, \ldots, m$
- $-10^8 \leq w_i \leq 10^8$ for $i = 1, 2, \ldots, m$

Scoring

1. (40 points) $w_i > 0$ for $i = 1, 2, \ldots, m$.
2. (40 points) $n \leq 300$.
3. (20 points) No additional constraints.

Sample Input 1

```
5 6
1 2 5
2 3 -3
3 4 3
4 1 -2
2 4 1
4 3 4
```

Sample Output 1

```
18
```

Sample Input 2

```
3 3
1 2 -1
2 3 -2
3 1 -3
```

Sample Output 2

```
Negative-weight cycle found
```

Sample Input 3

```
3000 0
```

Sample Output 3

```
0
```

Sample Input 4

```
5 6
1 3 -4
3 5 -6
2 4 -1
4 5 -2
4 5 -3
1 2 -2
```

Sample Output 4

```
-33
```