

E. Paired Payment

time limit per test: 4 seconds
 memory limit per test: 512 megabytes
 input: standard input
 output: standard output

There are n cities and m bidirectional roads in the country. The roads in the country form an undirected weighted graph. The graph **is not guaranteed to be connected**. Each road has it's own parameter w . You can travel through the roads, but the government made a new law: you can only go through two roads at a time (go from city a to city b and then from city b to city c) and you will have to pay $(w_{ab} + w_{bc})^2$ money to go through those roads. Find out whether it is possible to travel from city 1 to every other city t and what's the minimum amount of money you need to get from 1 to t .

Input

First line contains two integers n, m ($2 \leq n \leq 10^5$, $1 \leq m \leq \min(\frac{n \cdot (n-1)}{2}, 2 \cdot 10^5)$).

Next m lines each contain three integers v_i, u_i, w_i ($1 \leq v_i, u_i \leq n$, $1 \leq w_i \leq 50$, $u_i \neq v_i$). It's guaranteed that there are no multiple edges, i.e. for any edge (u_i, v_i) there are no other edges (u_i, v_i) or (v_i, u_i) .

Output

For every city t print one integer. If there is no correct path between 1 and t output -1 . Otherwise print out the minimum amount of money needed to travel from 1 to t .

Examples

input	Copy
<pre>5 6 1 2 3 2 3 4 3 4 5 4 5 6 1 5 1 2 4 2</pre>	
output	Copy
<pre>0 98 49 25 114</pre>	
input	Copy
<pre>3 2 1 2 1 2 3 2</pre>	
output	Copy
<pre>0 -1 9</pre>	

Note

The graph in the first example looks like this.

Codeforces Round #703 (Div. 2)

Contest is running

00:19:33

Contestant



→ Submit?

Language: GNU G++14 6.4.0

Choose file:

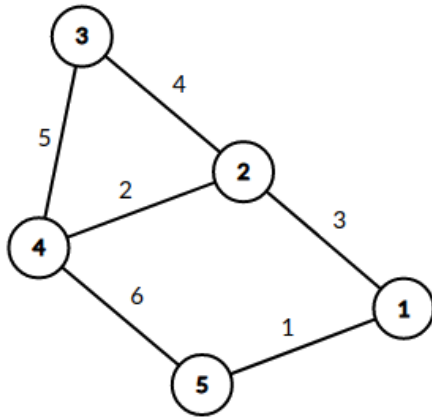
Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

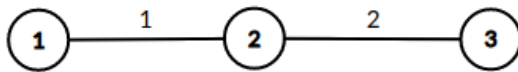
→ Score table

	Score
Problem A	270
Problem B	540
Problem C1	405
Problem C2	405
Problem D	945
Problem E	1215
Problem F	1620
Successful hack	100
Unsuccessful hack	-50
Unsuccessful submission	-50
Resubmission	-50

* If you solve problem on 01:55 from the first attempt



In the second example the path from 1 to 3 goes through 2, so the resulting payment is $(1 + 2)^2 = 9$.



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