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 ($2 \le n \le 10^5$, $1 \le m \le min(\frac{n \cdot (n-1)}{2}, 2 \cdot 10^5)$).

Next m lines each contain three integers v_i, u_i, w_i ($1 \le v_i, u_i \le n$, $1 \le w_i \le 50$, $u_i \ne v_i$). 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

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

output Copy

```
0 98 49 25 114
```

input Copy

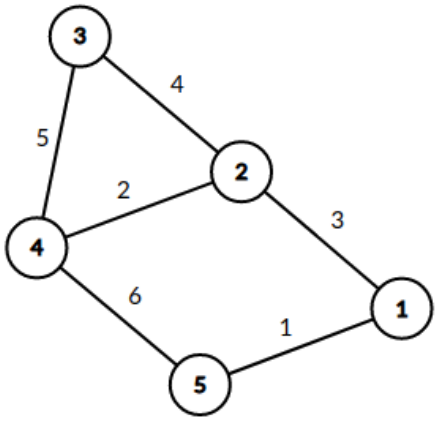
```
3 2
1 2 1
2 3 2
```

output Copy

```
0 -1 9
```

Note

The graph in the first example looks like this.



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