

Bus

Time limit: 2 sec.

Memory limit: 512MB

Description

Minkyu has been kidnapped and is thrown in a faraway city. Panicking, he tries to get back to his hometown by bus. There is a total of n cities, and there are m one-way buses that run from one city to another. But Minkyu got hit in the head hard by his kidnapper, so he doesn't remember which city his home is in. So he just decides to calculate the cost it takes to go to every city. Minkyu is a poor poor guy, so he tries to minimize his expense. What is the minimum amount of money Minkyu must spend to get back to each city?

Input

The first line contains two integers, the number of cities n , and the number of one-way buses m . The cities are numbered from 1 to n . ($1 \leq n \leq 2000$, $1 \leq m \leq 1000000$)

The second line contains an integer, the number of Minkyu's kidnapped city s . ($1 \leq s \leq n$)

The next m lines contain three integers each, x , y , and v . This denotes there exists a one-way bus that runs from city x to city y (but possibly not in the other way), and this bus has a cost of v .

Output

Print n lines. In the i -th line, print the minimum cost it takes to get from city s to city i . If there is no way, print "INF" instead.

Sample I/O

Input(s)	Output(s)
5 4	0
1	10
1 2 10	7
1 3 7	14
2 4 5	INF
3 4 7	