The 2nd Japanese Olympiad in Informatics for Girls (JOIG 2021/2022)
Spring Training Camp/Qualifying Trial
March 20–23, 2022 (Komaba, Tokyo)

Contest 2 – Reconstruction Project

Reconstruction Project

JOI Town is an industrial area which had flourished some time ago. In order to transport products, many stations and railway tracks were constructed. Though it declined, there remain the stations and the railway tracks which are not used any more.

There are N stations in JOI Town, numbered from 1 to N. There remain M railway tracks. The i-th railway track ($1 \leq i \leq M$) connects the station A_i and the station B_i bidirectionally. The width of the i-th railway track is W_i. It is possible to travel from any station to any other station using railway tracks.

You are the mayor of JOI Town. You are planning to attract a railroad company using the remaining stations and railway tracks, and revive the JOI Town as the town of railway. Then, Q railroad companies applied for this revival project. However, the width of the railway track for trains varies for different companies. It turns out that they need to reconstruct the railway tracks so that the width of the railway tracks of JOI Town matches the width of the railway tracks for the trains of a company.

The width of the railway tracks for the trains of the railroad company j ($1 \leq j \leq Q$) is X_j. To attract the railroad company j, it is required that the following condition is satisfied.

Condition It is possible to travel from any station to any other station using railway tracks of width X_j only.

In order to satisfy the above condition, you can reconstruct the railway tracks as many times as needed.

Reconstruction You choose a railway track. Then you reconstruct the chosen track so that its width will be increased or decreased by 1. The cost is 1. However, if the width of a railway track is 1, it is impossible to decrease the width further.

In order to decide on the company to be attracted, you want to estimate the minimum cost to attract each railroad company.

White a program which, given information on the stations, the railway tracks, and the railroad companies, calculates the minimum cost to attract each railroad company.

Input

Read the following data from the standard input. Given values are all integers.

N M
A_1 B_1 W_1
A_2 B_2 W_2
$\vdots$
A_M B_M W_M
Q
X_1
X_2
$\vdots$
X_Q

Output

Write Q lines to the standard output. The j-th line ($1 \leq j \leq Q$) of output should contain the minimum cost to attract the railroad company j.

Constraints

- $2 \leq N \leq 500$.
- $N - 1 \leq M \leq 100\,000$.
- $1 \leq Q \leq 1\,000\,000$.
- $1 \leq A_i < B_i \leq N$ ($1 \leq i \leq M$).
- $1 \leq W_i \leq 1\,000\,000\,000$ ($= 10^9$) ($1 \leq i \leq M$).
- $(A_i, B_i, W_i) \neq (A_j, B_j, W_j)$ ($1 \leq i < j \leq M$).
- It is possible to travel from any station to any other station using railway tracks.
- $1 \leq X_j \leq 1\,000\,000\,000$ ($= 10^9$) ($1 \leq j \leq Q$).
- $X_j < X_{j+1}$ ($1 \leq j \leq Q - 1$).

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Subtasks

1. (9 points) $M \leq 16$, $Q \leq 10$.
2. (11 points) $Q \leq 10$.
3. (18 points) $B_i = A_i + 1$ $(1 \leq i \leq M)$.
4. (23 points) $M \leq 1\,000$.
5. (28 points) $Q \leq 20\,000$.
6. (11 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
5 10	8
1 2 8	2
1 3 13	5
1 4 5	10
1 5 11	9
1 5 3	21
2 3 7	
2 4 15	
3 4 6	
3 5 6	
4 5 2	
6	
3	
6	
8	
10	
13	
17	

For example, to attract the railroad company 1, it will cost 8 if you reconstruct the railway tracks as follows.

1. Decrease the width of the 6-th railway track by 4. The cost is 4.

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2. Decrease the width of the 9-th railway track by 3. The cost is 3.

3. Increase the width of the 10-th railway track by 1. The cost is 1.

It is impossible to attract the railroad company 1 at cost less than 8. Therefore, output 8 in the first line.

This sample input satisfies the constraints of Subtasks $1, 2, 4, 5, 6$.

Sample Input 2	Sample Output 2
3 4	1
1 2 1	1
1 2 4	2
2 3 2	0
2 3 4	
4	
1	
2	
3	
4	

This sample input satisfies the constraints of all the subtasks.

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Sample Input 3	Sample Output 3
10 20	1121073688
6 7 914727791	761832468
1 8 771674531	1026806785
3 5 632918108	1316097872
5 9 329296846	1321500065
1 7 237501112	1445238392
4 9 303328173	1637513141
2 6 216298255	1621778548
2 10 504024991	1733953031
3 8 158236886	1738749711
1 10 10176179	
8 9 918271145	
3 6 217165898	
3 6 624543444	
4 9 70147274	
8 9 976983490	
6 9 210108505	
2 9 972711062	
1 10 564567289	
3 7 411395464	
4 7 952470985	
10	
115721165	
198969744	
356664401	
429802521	
513343279	
610443927	
741016686	
786597783	
898772266	
903568946	

This sample input satisfies the constraints of Subtasks $2, 4, 5, 6$.