

Shortest Path Query

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 512 megabytes

There is an undirected graph with n vertices and m edges. The vertices are labelled by $1, 2, \dots, n$. The i -th edge connects the u_i -th vertex and the v_i -th vertex, the length of which is w_i . Here, u_i 's binary representation is always a prefix of v_i 's binary representation. Both binary representations are considered without leading zeros. For example, $u_i = 2_{10} = \mathbf{10}_2$, $v_i = 5_{10} = \mathbf{101}_2$.

You will be given q queries. In the i -th query, you will be given two integers s_i and t_i . Please write a program to figure out the length of the shortest path from the s_i -th vertex to the t_i -th vertex, or determine there is no path between them.

Input

The input contains only a single case.

The first line of the input contains two integers n and m ($1 \leq n \leq 100\,000$, $1 \leq m \leq 200\,000$), denoting the number of vertices and the number of edges.

In the next m lines, the i -th line ($1 \leq i \leq m$) contains three integers u_i, v_i and w_i ($1 \leq u_i < v_i \leq n$, $1 \leq w_i \leq 10^9$), describing the i -th edge. It is guaranteed that u_i 's binary representation is a prefix of v_i 's binary representation.

In the next line, there contains a single integer q ($1 \leq q \leq 200\,000$), denoting the number of queries.

In the next q lines, the i -th line ($1 \leq i \leq q$) contains two integers s_i and t_i ($1 \leq s_i, t_i \leq n$, $s_i \neq t_i$), describing the i -th query.

Output

For each query, print a single line containing an integer, denoting the length of the shortest path. If there is no path, print “-1” instead.

Examples

standard input	standard output
5 6 1 2 4 1 3 2 1 4 5 1 5 8 2 4 3 2 5 2 4 2 3 1 4 1 5 4 5	6 5 6 5
3 1 1 2 100 3 1 2 1 3 2 3	100 -1 -1