Deadline: 11/03 23:59

# Problem C. エガクミライ

Time limit 1000 ms Memory limit 256MB

### **Problem Description**

MyGO!!!!! has a brand-new single "エガクミライ" and needs to travel from RiNG to Isshiki Coast to shoot the MV.

The city's traffic can be modeled as a graph with n crossroads and m bidirectional roads. RiNG is at the crossroad 1, and Isshiki Coast is at the crossroad n.

Each road i is associated with four values:  $u_i, v_i, w_i$  and  $t_i$ . Road i connect crossroad  $u_i$  and  $v_i$ . The value  $w_i$  is the time needed to traverse road i. The city operates in discrete time with a maintenance period of length k. At any moment when the current time modulo k equals  $t_i$ , road i is closed. You may wait at any crossroad for any non-negative amount of time.

If you start traversing road i at time t, you will occupy the road during the integer times  $t, t+1, ..., t+w_i-1$ . If any moment in this set satisfies  $x \mod k = t_i$ , you cannot depart at time t. You must wait longer and try again later. If  $t_i = -1$ , road i is never under maintenance and may be traverse at any time.

Anon, the member of MyGO!!!!!, wants to know the minimum number of time units required to travel from crossroad 1 (RiNG) to crossroad n (Isshiki Coast). Compute this minimum arrival time, or output -1 if it is impossible to reach crossroad n.

## Input format

The first line contains three integer n, m, k ( $2 \le n \le 2 \cdot 10^5$ ,  $n-1 \le m \le 2 \cdot 10^5$ ,  $1 \le k \le 10^9$ ) — the number of crossroads, roads, and the length of maintenance period.

Each of the next m lines contains four integers  $u_i, v_i, w_i, t_i$   $(1 \le u_i, v_i \le n, u_i \ne v_i, 1 \le w_i \le 10^9, -1 \le t_i < k)$  — the values associate with road i.

It is guaranteed that the given graph is connected.

## **Output format**

Output one integer — the minimum arrival time from crossroad 1 to crossroad n. If it is impossible to reach crossroad n, output -1.

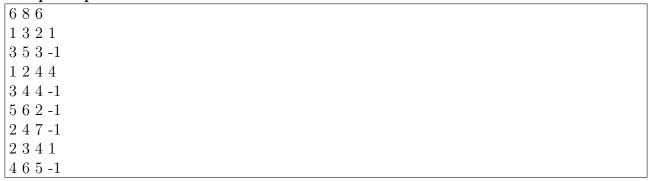
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### Subtask score

Subtask	Score	Additional Constraints
1	12	$n, m, k \le 500$
2	19	m=n-1
3	31	$t_i = -1$
4	38	No constraints

# Sample

Sample Input 1



Sample Output 1

Sample Input 2

5 5 7	
4 2 2 6	
1 3 5 1	
2 5 1 4	
3 2 1 6	
3 4 4 6	

Sample Output 2

9

Sample Input 3

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5 5 4	
3 4 1 0	
4 1 1 3	
5 4 7 3	
5 3 5 1	
2 5 3 2	

Sample Output 3

-1

#### **Notes**

https://www.youtube.com/watch?v=55QclsX-8dg