Kings problem

Input file: `standard input`
Output file: `standard output`
Time limit: 3 seconds
Memory limit: 512 megabytes

Auto translated. We will try to get Bulagrian statements as soon as possible.

Most recently, a new road network was built in Berland. There are one-way roads between some pairs of cities, i-th of which leads from the city u_i to the city v_i, and its length is w_i. The two main cities of Berland have numbers a and b.

The King of Berland loves his country very much. In particular, he loves to count all sorts of characteristics in it. It calls *beauty* of some path, the bitwise exclusive OR the lengths of all roads on that path. And he calls the beauty of his country the bitwise exclusive OR the beauty of all paths from the city a to the city b. Note that there can be infinitely many such paths, and they can pass through the same city several times.

The king wants to know what the beauty of his country is equal to, and therefore he turned to you for help and asks you to calculate this value or say that it is impossible to calculate the beauty of the country.

A bitwise exclusive OR of set of numbers is called a bitwise exclusive OR of all nonzero numbers in this set. If there are infinitely many nonzero numbers in the set, then it is impossible to calculate the bitwise exclusive OR.

Input

Each test consists of several sets of input data. The first line contains a single integer t ($1 \le t \le 40\,000$) — number of input data sets.

The first line of each input data set contains two integers n and m ($1 \le n, m \le 200\,000$) — the number of cities and the number of roads in Berland.

The following m lines each contain three integers u_i, v_i and w_i ($1 \le u_i, v_i \le n$, $0 \le w_i \le 2^{30} - 1$) — start and end cities of i-th road and its length.

The last line of each input data set contains two integers a and b ($1 \le a, b \le n$) — the numbers of the beginning and end of the paths that interest the king.

Let's denote for $\sum n$ the sum of n, and for $\sum m$ the sum of m for all sets of input data in one test. It is guaranteed that $\sum n \le 200\,000$ and $\sum m \le 200\,000$.

Output

For each set of input data, output one integer — the beauty of Berland. If there is no answer, then print -1.

Example

standard input	standard output
5 1 1 1 1 0 1 1 3 5 1 2 0 1 2 1 1 2 3 2 3 5 2 3 2 1 3 2 2 1 2 1 2 1 2 1 2 3 3 1 2 7 2 3 0 3 1 7 2 3 4 5 1 1 0 1 2 3 2 2 0 2 3 1 3 4 1 1 4	0 7 -1 0 -1

Scoring

The tests for this task consist of 6 groups. Points for each group are given only when passing all the tests of the group and all the tests of some of the previous groups. **Offline-check** means that the results of testing your solution on this group will be available only after the end of the competition.

Group	Points	Constraints			Required	Comment
		$\sum n$	$\sum m$	w_i		
0	0	–	–	–	–	Samples
1	16	–	–	–	–	$n = m$ $u_i = i, v_i = i + 1$ for $i < n$ $u_n = n, v_n = 1$
2	17	–	–	$w_i \le 1$	–	$u_i < v_i$
3	15	–	–	–	2	$u_i < v_i$
4	19	$\sum n \le 1000$	$\sum m \le 1000$	$w_i \le 2^{10} - 1$	0	
5	14	–	–	$w_i \le 1$	2	
6	19	–	–	–	0 – 5	**Offline-check.**