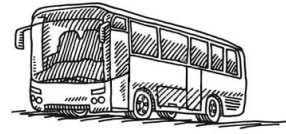




## Task Autobus

In a country there are  $n$  cities. The cities are connected by  $m$  bus routes, where the  $i$ -th route starts in city  $a_i$ , ends in city  $b_i$  and takes  $t_i$  minutes.

Ema loves to travel, but doesn't like transferring between buses. On her trip she wants to use **at most**  $k$  different bus routes.



Help her answer  $q$  questions of the form 'What is the shortest travel time to get from city  $c_j$  to city  $d_j$  (using at most  $k$  different bus routes)?'.

### Input

The first line contains two positive integers  $n$  and  $m$  ( $2 \leq n \leq 70$ ,  $1 \leq m \leq 10^6$ ), the number of cities and the number of bus routes.

The  $i$ -th of the next  $m$  lines contains positive integers  $a_i$ ,  $b_i$  and  $t_i$  ( $1 \leq a_i, b_i \leq n$ ,  $1 \leq t_i \leq 10^6$ ), the terminal cities and the travel time of the  $i$ -th bus route.

The next line contains two positive integers  $k$  and  $q$  ( $1 \leq k \leq 10^9$ ,  $1 \leq q \leq n^2$ ), the maximum number of used routes and the number of queries.

The  $j$ -th of the next  $q$  lines contains positive integers  $c_j$  and  $d_j$  ( $1 \leq c_j, d_j \leq n$ ), the cities from the  $j$ -th query.

### Output

Print  $q$  lines. In the  $j$ -th line print the shortest travel time from the  $j$ -th query, or  $-1$  if there is no trip that satisfies the requirements.

### Scoring

Subtask	Points	Constraints
1	15	$k \leq n \leq 7$
2	15	$k \leq 3$
3	25	$k \leq n$
4	15	No additional constraints.



### Examples

**input**

```
4 7
1 2 1
1 4 10
2 3 1
2 4 5
3 2 2
3 4 1
4 3 2
1 3
1 4
4 2
3 3
```

**output**

```
10
-1
0
```

**input**

```
4 7
1 2 1
1 4 10
2 3 1
2 4 5
3 2 2
3 4 1
4 3 2
2 3
1 4
4 2
3 3
```

**output**

```
6
4
0
```

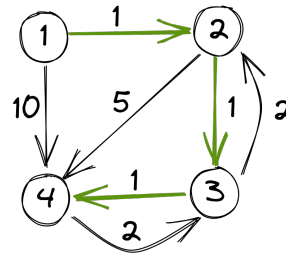
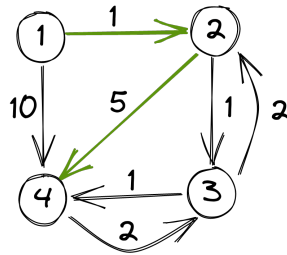
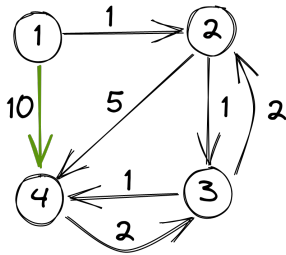
**input**

```
4 7
1 2 1
1 4 10
2 3 1
2 4 5
3 2 2
3 4 1
4 3 2
3 3
1 4
4 2
3 3
```

**output**

```
3
4
0
```

Clarification of the examples:



The answer to the first query from each example is marked on the graph.