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Bear and Clique Distances

Problem Code: CLIQUED



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Bearland consists of N cities, numbered 1 through N . Cities are connected with bidirectional roads.

Cities 1 through K were built a long time ago, when citizens liked order and regularity. Each pair of those old cities is connected with a road of length X . Note that this description generates $K*(K-1)/2$ roads.

There are M newer roads, not necessarily of the same lengths. The i -th of them connects cities a_i and b_i and has length c_i .

There is no road that connects a city to itself. All $M+K*(K-1)/2$ roads are distinct (ie. no two of them connects the same pair of cities). It's guaranteed that it's possible to get from every city to every other city, using one or more roads.

Limak, a bear, lives in the city S . In order to plan a trip to some other city, for every city he wants to know how quickly he can get there. Can you help him and find the distance from S to every city?

The distance between two cities is the minimum total length of a path (sequence of roads) between the two cities.

Input

The first line of the input contains an integer T denoting the number of test cases. The description of T test cases follows.

The first line of each test case contains five integers N , K , X , M and S , denoting the number of cities, the number of old cities, the length of a road between every two old cities, the number of newer roads, and the city where Limak lives, respectively.

Each of the following M lines contains three integers a_i , b_i and c_i , denoting a road of

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Output

For each test case, output a single line containing **N** integers. The *i*-th of them should denote the distance from the city **S** to the city *i*. The distance from **S** to **S** is simply 0.

Constraints

- $1 \leq T \leq 3$
 - $2 \leq K \leq N \leq 10^5$
 - $0 \leq M \leq 10^5$
 - $1 \leq S, a_i, b_i \leq N$
 - $1 \leq X, c_i \leq 10^9$
-

Subtasks

- Subtask #1 (45 points): $2 \leq K \leq 500$
 - Subtask #2 (55 points): Original constraints.
-

Example

Input :

```
3
5 4 100 2 3
1 5 50
5 3 160
5 4 100 2 3
1 5 50
5 3 140
8 3 15 7 5
3 4 10
4 5 20
5 6 10
6 1 7
3 7 1000
7 8 50
3 5 1000000000
```

Output :


```
100 100 0 100 150
100 100 0 100 140
17 32 30 20 0 10 1030 1080
```

Explanation

Test case 1. There are **N** = 5 cities. The first **K** = 4 of them are all connected with each other with roads of length **X** = 100. There are **M** = 2 extra roads:

- Cities 1 and 5 are connected with a road of length 50.
- Cities 5 and 3 are connected with a road of length 160.

We are asked to compute distances to all cities from the city **S** = 3. Note that the distance from a city to itself is 0, and this is why the third number in the output is 0.

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Editorial: <https://discuss.codechef.com/problems/CLIQUED>

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Date Added: 3-04-2017

Time Limit: 1 secs

Source Limit: 50000 Bytes

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Your IP: 169.54.6.221

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