G - AtCoder Express 4

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Time Limit: 2.5 sec / Memory Limit: 1024 MiB

Score : 625 points

Problem Statement

In AtCoder Kingdom, there is a railway line extending east-west, and this line has stations $1, 2, \ldots, N$. Station i $(1 \leq i \leq N)$ is located at coordinate x_i $(x_1 < x_2 < \ldots < x_N)$.

On this line, AtCoder Express company operates M types of express trains.

The i-th type of express train operates as follows:

- You can board this train at one of the stations $l_i, l_i + 1, \ldots, r_i$.
- You can get off this train at one of the stations $L_i, L_i + 1, \ldots, R_i$. Here, the train travels in one direction, either east or west, satisfying $r_i < L_i$ or $R_i < l_i$.
- The fare consists of a base fare of c_i plus an amount based on the distance from the boarding station to the destination station. Specifically, when traveling from station s $(l_i \leq s \leq r_i)$ to station t $(L_i \leq t \leq R_i)$, the fare is $c_i + |x_s - x_t|$.

You are currently at station 1. For each k $(2 \leq k \leq N)$, determine whether you can travel from station 1 to station k by transferring between express trains, and if you can travel, find the minimum total fare required for the travel.

Constraints

- $2 \leq N \leq 10^5$
- $1 \leq M \leq 10^5$

- $0 \leq x_1 < x_2 < \ldots < x_N \leq 10^{12}$
- $1 \leq l_i \leq r_i \leq N, 1 \leq L_i \leq R_i \leq N$
- $r_i < L_i$ or $R_i < l_i$.
- $1 \leq c_i \leq 10^{12}$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{array}{lllll}
N & M & & & \\
x_1 & x_2 & \ldots & x_N & \\
l_1 & r_1 & L_1 & R_1 & c_1 \\
l_2 & r_2 & L_2 & R_2 & c_2 \\
\vdots & & & & \\
l_M & r_M & L_M & R_M & c_M
\end{array}
$$

Output

Output the answer in the following format:

$$
\begin{array}{llll}
\mathrm{ans}_2 & \mathrm{ans}_3 & \ldots & \mathrm{ans}_N
\end{array}
$$

ans_i is the answer for $k = i$. If you can travel from station 1 to station i, ans_i is the minimum total fare required for the travel; otherwise, ans_i is -1.

Sample Input 1 Copy

Copy

```
6 3
0 20 50 90 110 150
1 2 5 6 100
1 1 2 3 10000
6 6 1 2 30
```

Sample Output 1 Copy

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```
410 10050 -1 210 250
```

You can travel to station 2 as follows:

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1. Board the 1st express train at station 1 and get off at station 6. The fare is $c_1 + |x_1 - x_6| = 100 + |0 - 150| = 250$.
2. Board the 3rd express train at station 6 and get off at station 2. The fare is $c_3 + |x_6 - x_2| = 30 + |150 - 20| = 160$.

The total fare in this case is 410, which is the minimum.

You cannot travel to station 4.

Sample Input 2 Copy

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```
10 5
4427 6839 17992 39701 46954 76602 81804 91814 95651 95895
3 4 10 10 60978
1 1 4 4 30037
9 10 7 8 66643
4 4 1 2 50872
8 10 3 7 23949
```

Sample Output 2 Copy

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```
149045 284335 65311 255373 225725 220523 253207 -1 182483
```

'#telegram)

url=https%3A%2F%2Fatcoder.jp%2Fcontests%2Fabc414%2Ftasks%2Fabc414_g%3Flang%3Den&title=G%20-

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