

## D – DJ Darko

*Time limit: 4 s    Memory limit: 256 MiB*

A new DJ is in town. DJ Darko needs to set up his speakers. He has  $N$  speakers in a row with the  $i$ -th speaker volume set to  $A_i$ . Changing the volume is rather difficult so the  $i$ -th speaker requires  $B_i$  units of energy to increase or decrease the volume by the value of 1.

Unfortunatently, Darko's evil twin brother Karko likes to mess with him. There are  $Q$  events that will be happening.

1 l r x  
2 l r

In an event of type 1, Karko changes the volume of all speakers from the  $l$ -th to the  $r$ -th by  $x$ . In an event of type 2, Darko sets all the speakers from the  $l$ -th to the  $r$ -th to the same volume in a way that uses up the minimal amount of energy. If there are multiple ways of doing that, he chooses the one which minimizes the final volume.

As a bystander, you would like to know the volume that Darko set for each event of type 2.

### Input data

The first line contains the number of speakers  $N$  and the number of events  $Q$ . In the second line, there are  $N$  numbers  $A_i$  indicating the current volume of the speakers. In the third line, there are  $N$  numbers  $B_i$ , indicating the energy needed to change the volume of the  $i$ -th speaker by one. In the next  $Q$  lines there are  $Q$  events, formatted in the way described above. All numbers in the input are integers.

### Input limits

- $1 \leq N, Q \leq 200\,000$
- $0 \leq A_i, B_i \leq 10^9$
- $1 \leq l \leq r \leq N$
- $-10^{-9} \leq x \leq 10^9$

### Output data

For each event of type 2, output the volume to which Darko set the speakers.

## Examples

### Input

```
5 5
8 1 6 4 9
3 6 4 1 7
2 2 4
1 1 4 -8
2 1 1
2 1 3
2 4 5
```

### Output

```
1
0
-7
9
```

### Input

```
8 3
4 3 9 3 7 6 4 8
9 5 8 5 2 2 1 8
1 1 7 -10
2 5 5
2 4 7
```

### Output

```
-3
-7
```