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.

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

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1 l r x
2 l r
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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	Output
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	1 0 -7 9

Input	Output
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	-3 -7