The Keepers Permutations

HackerRank

Long ago, a mysterious mathematician left behind a sealed chest guarded by an enchanted array. This array, A, contains N compartments, all starting with a value of 0. To protect the chest, the mathematician used a hidden key: a permutation P of the numbers 1 through N.

Your task is to master the array's behavior through a sequence of Q commands. Only by interpreting these commands correctly will you uncover the true sums hidden within.

The Four Incantations

The commands come in four types, each with its own effect:

- **Incantation 0:** `0 l r c` — Whisper power c into every compartment from $A[l]$ to $A[r]$.
- **Incantation 1:** `1 l r c` — For each index i from l to r, channel power c into the compartment $A[P[i]]$, where the permutation decides the target.
- **Incantation 2:** `2 l r` — Reveal the combined strength of $A[l] + A[l+1] + \cdots + A[r]$.
- **Incantation 3:** `3 l r` — Reveal the combined strength of $A[P[l]] + A[P[l+1]] + \cdots + A[P[r]]$.

Input Format

- The first line of the scroll contains two integers: N and Q (1 ≤ N, Q ≤ 105).
- The second line holds the N numbers of the secret permutation P , a reordering of 1, 2, . . . , N .
- Each of the next Q lines contains one incantation, as described above.

Constraints

- 1 ≤ N, Q ≤ 105
- P is always a valid permutation of 1 through N
- 1 ≤ l ≤ r ≤ N
- −109 ≤ c ≤ 109

Output Format

For every query (Type 2 or Type 3), inscribe the revealed sum on its own line

Sample Input 0

```
5 8
2 4 1 5 3
0 1 3 5
2 1 5
1 2 4 3
3 2 4
0 2 2 -2
```

```
2 1 5
1 1 1 10
3 1 1
```

Sample Output 0

```
15
14
22
13
```