CSES Problem Set

Range Queries and Copies

Time limit: 1.00 s **Memory limit:** 512 MB

Your task is to maintain a list of arrays which initially has a single array. You have to process the following types of queries:

1. Set the value a in array k to x.
2. Calculate the sum of values in range $[a, b]$ in array k.
3. Create a copy of array k and add it to the end of the list.

Input

The first input line has two integers n and q: the array size and the number of queries.

The next line has n integers $t_1, t_2, \ldots, t_n$: the initial contents of the array.

Finally, there are q lines describing the queries. The format of each line is one of the following: "1 k a x", "2 k a b" or "3 k".

Output

Print the answer to each sum query.

Constraints

- $1 \le n, q \le 2 \cdot 10^5$
- $1 \le t_i, x \le 10^9$
- $1 \le a \le b \le n$

Example

Input:

```
5 6
2 3 1 2 5
3 1
2 1 1 5
2 2 1 5
```

Range Queries

...

Pizzeria Queries ✓
Subarray Sum Queries ✓
Distinct Values Queries ✗
Increasing Array Queries -
Forest Queries II -
Range Updates and Sums -
Polynomial Queries -
Range Queries and Copies -

Your submissions

```
1 2 2 5
2 1 1 5
2 2 1 5
```

Output:

```
13
13
13
15
```