

A. RSQ

time limit per test: 5.0 s

memory limit per test: 512 megabytes

input: standard input

output: standard output

Beware of large input. Use fast I/O methods.

Use Fenwick tree to solve this problem.

You are given an array, you are to answer queries of sum on a segment and change a single element.

Input

The first line contains two integers n and m ($1 \leq n, m \leq 10^5$) — the size of the array and the number of queries.

The second line contains initial state of the array a_1, a_2, \dots, a_n ($-10^5 \leq a_i \leq 10^5$).

Then m lines follow, each describes a single query in format $t \ x \ y$ ($0 \leq t \leq 1$). If $t = 0$, you are to print the sum of elements on the segment $[x, y]$ ($1 \leq x \leq y \leq n$). If $t = 1$, you are to set the x -th element to y ($1 \leq x \leq n, -10^5 \leq y \leq 10^5$).

Output

Print answers for each query in separate line.

Examples

input

[Copy](#)

```
5 3
1 2 3 4 5
0 1 5
1 1 -14
0 1 5
```

output

[Copy](#)

```
15
0
```

input

[Copy](#)

```
8 2
7 3 -10 4 1 2 5 -6
0 2 4
0 5 7
```

output

[Copy](#)

```
-3
8
```

B. Segments Update

time limit per test: 5.0 s

memory limit per test: 512 megabytes

input: standard input

output: standard output

Beware of large input. Use fast I/O methods.

Use Fenwick tree to solve this problem.

You are given an array a of n integers. Write a program that effectively answers q queries of the following two types:

- Add an integer x to all elements $a[i]$ such that $l \leq i \leq r$,
- Print an integer $a[i]$.

Input

The first line contains two integers n and q ($1 \leq n, q \leq 10^6$).

The second line contains n integers a_1, a_2, \dots, a_n ($-10^9 \leq a_i \leq 10^9$).

The next q lines describe queries. In each line, the first integer t denotes the type of the query.

- If $t = 1$, then three integers l, r, x follow ($1 \leq l \leq r \leq n$, $-10^3 \leq x \leq 10^3$),
- If $t = 2$, then a single integer i follows ($1 \leq i \leq n$).

Output

For each query of the second type, output the answer on a separate line.

Examples

input	Copy
6 7 5 -6 11 2 3 8 2 4 1 2 4 6 2 2 1 1 3 -2 1 2 5 9 2 3 2 4	
output	Copy
2 0 24 17	

C. Number Of Inversions

time limit per test: 4.0 s

memory limit per test: 512 megabytes

input: standard input

output: standard output

Beware of large input. Use fast I/O methods.

Use Fenwick tree to solve this problem.

Write a program that, for a given array $A = [a_1, a_2, \dots, a_n]$, finds the number of pairs (i, j) , such that $i < j$ and $a_i > a_j$.

Input

The first line contains a single integer n ($1 \leq n \leq 500000$) — the size of the array.

The second line contains n distinct non-negative integers, not exceeding 10^6 — the array A .

Output

Print a single integer — the answer to the problem.

Examples

input	Copy
4 1 2 4 5	
output	Copy
0	

input	Copy
4 5 4 2 1	
output	Copy
6	

D. Sparse Sum

time limit per test: 3 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Beware of large input. Use fast I/O methods.

Use Fenwick tree to solve this problem.

You have an infinite array a_1, a_2, \dots . Initially, all elements are set to zero. You are given two types of queries to process:

- Add a given value x to the given position p .
- Compute and print the sum on some subarray a_l, a_{l+1}, \dots, a_r .

Input

The first line contains a single integer q ($1 \leq q \leq 10^5$) — the number of queries.

Each of the next q lines starts with integer query type t ($t = 1$ or $t = 2$). If $t = 1$, two integers p and x follow ($1 \leq p \leq 10^{18}$, $-10^9 \leq x \leq 10^9$), that means you should add x to the element a_p . If $t = 2$, two integers l and r follow ($1 \leq l \leq r \leq 10^{18}$), that means you should compute and print $a_l + a_{l+1} + \dots + a_r$.

You should process queries in online mode, i. e. answer a query before reading the next one.

Output

For each query of the second type, compute and print the answer.

Example

input	Copy
5 1 2 5 2 1 3 2 4 100 1 100 -4 2 1 200	
output	Copy
5 0 1	

E. Number Of Occurrences On Segment

time limit per test: 5 seconds

memory limit per test: 512 megabytes

input: standard input

output: standard output

You are given an array $a[1..n]$ and k queries of two types:

- replace the value in position pos to x , i. e. set $a[pos] = x$,
- find the number of occurrences of x on subarray $a[l..r]$ for given x, l, r .

Answer these queries.

Input

The first line contains integers n, k ($1 \leq n, k \leq 2 \cdot 10^5$).

The second line contains the initial array $a[1..n]$ ($-10^9 \leq a_i \leq 10^9$, a_i is integer).

The next k lines describe queries, one per line. Query of the first type is denoted with "1 pos x " ($1 \leq pos \leq n$, $-10^9 \leq x \leq 10^9$, pos and x are integers), and query of the second type is denoted with "2 l r x " ($1 \leq l \leq r \leq n$, $-10^9 \leq x \leq 10^9$, l, r, x are integers).

Output

Print the answer for each query of the second type.

Examples

input

```
5 4
1 2 3 2 3
2 1 4 2
2 1 4 1
1 1 2
2 1 4 2
```

output

```
2
1
3
```