D. The Child and Sequence

time limit per test: 4 seconds
memory limit per test: 256 megabytes

At the children's day, the child came to Picks's house, and messed his house up. Picks was angry at him. A lot of important things were lost, in particular the favorite sequence of Picks.

Fortunately, Picks remembers how to repair the sequence. Initially he should create an integer array $a[1], a[2], ..., a[n]$. Then he should perform a sequence of m operations. An operation can be one of the following:

1. Print operation l, r. Picks should write down the value of $\sum_{i=l}^{r} a[i]$.
2. Modulo operation l, r, x. Picks should perform assignment $a[i] = a[i] \bmod x$ for each i $(l \le i \le r)$.
3. Set operation k, x. Picks should set the value of $a[k]$ to x (in other words perform an assignment $a[k] = x$).

Can you help Picks to perform the whole sequence of operations?

Input

The first line of input contains two integer: n, m $(1 \le n, m \le 10^5)$. The second line contains n integers, separated by space: $a[1], a[2], ..., a[n]$ $(1 \le a[i] \le 10^9)$ — initial value of array elements.

Each of the next m lines begins with a number $type$ $(type \in \{1, 2, 3\})$.

- If $type = 1$, there will be two integers more in the line: l, r $(1 \le l \le r \le n)$, which correspond the operation 1.
- If $type = 2$, there will be three integers more in the line: l, r, x $(1 \le l \le r \le n;\ 1 \le x \le 10^9)$, which correspond the operation 2.
- If $type = 3$, there will be two integers more in the line: k, x $(1 \le k \le n;\ 1 \le x \le 10^9)$, which correspond the operation 3.

Output

For each operation 1, please print a line containing the answer. Notice that the answer may exceed the 32-bit integer.

Examples

input Copy

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

output Copy

```
8
5
```

input Copy

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

output Copy

```
49
15
23
1
9
```

Note

Consider the first testcase:

- At first, $a = \{1, 2, 3, 4, 5\}$.
- After operation 1, $a = \{1, 2, 3, 0, 1\}$.
- After operation 2, $a = \{1, 2, 5, 0, 1\}$.
- At operation 3, $2 + 5 + 0 + 1 = 8$.
- After operation 4, $a = \{1, 2, 2, 0, 1\}$.
- At operation 5, $1 + 2 + 2 = 5$.