


Home


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A. Simple Data Structures

Time Limit: 4 s

Memory Limit: 256 MB

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Description

You've got an array a , consisting of n integers a_1, a_2, \dots, a_n . You are allowed to perform four operations on this array:

- 1 $l\ r$: Calculate the sum of current array elements on the segment $[l, r]$, that is, count value $a[l] + a[l+1] + \dots + a[r]$.
 - 2 $l\ r\ x$: Apply the xor(^) operation of the given number x to each array element on segment $[l, r]$
 - 3 $l\ r\ x$: Apply the or(|) operation of the given number x to each array element on segment $[l, r]$
 - 4 $l\ r\ x$: Apply the and(&) operation of the given number x to each array element on segment $[l, r]$
- You've got a list of m operations of the indicated type. Your task is to perform all given operations, for each sum query you should print the result you get.

Input

The first row contains the integer n ($1 \leq n \leq 1e5$)- the size of the array

The second line contains the space-separated integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq 1e6$)- initial array

The third line contains the integer m ($1 \leq m \leq 5e4$)- the operands of the array,

The following m rows are four operations, l, r, x ($1 \leq l \leq r \leq n, 1 \leq x \leq 1e6$)

- 1 $l\ r$: Calculate the sum of current array elements on the segment $[l, r]$, that is, count value $a[l] + a[l+1] + \dots + a[r]$.
 - 2 $l\ r\ x$: Apply the xor(^) operation of the given number x to each array element on segment $[l, r]$
 - 3 $l\ r\ x$: Apply the or(|) operation of the given number x to each array element on segment $[l, r]$
 - 4 $l\ r\ x$: Apply the and(&) operation of the given number x to each array element on segment $[l, r]$
- l, r, x ($1 \leq l \leq r \leq n, 1 \leq x \leq 1e6$)

Output

For each query of type 1 print in a single line the sum of numbers on the given segment. Print the answers to the queries in the order in which the queries go in the input.

Please, do not use the %lld specifier to read or write 64-bit integers in C++. It is preferred to use the cin, cout streams, or the %I64d specifier.

Examples

input :

```
5
1 1 1 1 1
7
1 1 5
2 1 2 2
1 1 2
3 1 2 2
1 1 2
4 1 2 2
1 1 2
```

output :

```
5
6
6
4
```



(<http://112.126.101.92/contest/1/problem/1?locale=zh-cn>)



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