Problem Sequences

Input	`stdin`
Output	`stdout`

Consider a sequence of integers $a_1, \ldots, a_k$. We call the *value* of $a_1, \ldots, a_k$, which we denote by $\text{value}(a_1, \ldots, a_k)$, the maximal integer $2^x = \underbrace{2 \times \ldots \times 2}_{x \text{ times}}$ such that 2^x divides $a_1 + \ldots + a_k$. For example, if $k = 3$ and $a_1 = 8, a_2 = 3, a_3 = 1$ then $a_1 + a_2 + a_3 = 12$ and the value of the sequence is 4.

You are given a sequence of n positive integers $a_1, \ldots, a_n$. Calculate the remainder sum of the value of all the contiguous subsequences of $a_1, \ldots, a_n$ when divided by $10^9 + 7$, which is equal to

$$S(a_1, \ldots, a_n) = \sum_{i=1}^{n} \sum_{j=i}^{n} \text{value}(a_i, \ldots, a_j) \pmod{10^9 + 7}$$

In other words, $S(a_1, \ldots, a_n)$ is the remainder of the sum of $\text{value}(a_i, \ldots, a_j)$ for $1 \leq i \leq j \leq n$ when divided by $10^9 + 7$.

Input data

The first line of the input contains the integer n. The second line of the inputs contains the integers $a_1, \ldots, a_n$, separated by white space.

Output data

The output must contain a single line, which contains the integer $S(a_1, \ldots, a_n)$.

Restrictions

- $1 \leq n \leq 200\,000$.
- $1 \leq a_i \leq 1\,000\,000$.
- $a_1 + \ldots + a_n \leq 1\,000\,000$.

#	Points	Restrictions
1	13	$a_i = 1, n \leq 200$
2	16	$a_1 + \ldots + a_n \leq 200$
3	5	$n \leq 200$
4	20	$n \leq 5\,000$
5	21	$a_1 + \ldots + a_n \leq 200\,000$
6	25	No further restrictions

Examples

Input	Output
3 1 2 3	8
5 2 4 1 2 4	25
20 1 2 3 1 2 3 4 5 6 2 3 3 1 2 3 7 5 1 2 3 2	728

Explanations

First example The values of all the contiguous subsequences are:

- $\text{value}(1) = 1$
- $\text{value}(1, 2) = 1$
- $\text{value}(1, 2, 3) = 2$
- $\text{value}(2) = 2$
- $\text{value}(2, 3) = 1$
- $\text{value}(3) = 1$

Thus $S(1, 2, 3)$ is the remainder of sum of these values when divided by $10^9 + 7$ i.e. 8.

Second example The values of all the contiguous subsequences are:

- $\text{value}(2) = 2$
- $\text{value}(2, 4) = 2$
- $\text{value}(2, 4, 1) = 1$
- $\text{value}(2, 4, 1, 2) = 1$
- $\text{value}(2, 4, 1, 2, 4) = 1$
- $\text{value}(4) = 4$
- $\text{value}(4, 1) = 1$
- $\text{value}(4, 1, 2) = 1$
- $\text{value}(4, 1, 2, 4) = 1$
- $\text{value}(1) = 1$
- $\text{value}(1, 2) = 1$
- $\text{value}(1, 2, 4) = 1$
- $\text{value}(2) = 2$
- $\text{value}(2, 4) = 2$
- $\text{value}(4) = 4$

Thus $S(2, 4, 1, 2, 4)$ is the remainder of the sum of these values when divided by $10^9 + 7$ i.e. 25.