Chandrima and XOR

Chandrima likes the XOR operation very much and keeps finding and solving related problems. One day she comes across a problem and gets stuck on it, which makes her sad. You being her friend decide to help her out by writing a code for the same.

Consider a list of all natural numbers. Now you remove all numbers whose binary representation has at least two consecutive 1 bits, from the list, hence generating a new list having elements $1, 2, 4, 5, 8, \ldots$ and so on. Now you are given N numbers from this newly generated list. You have to find the XOR of these numbers.

Input Format

The first line has an integer N, denoting the number of integers in list A.
The next line contains N space-separated integers. A_i represents the A_i^{th} number of the generated list.
Since the answer can be very large, print the answer modulo $(10^9 + 7)$.

Output Format

Just print one line containing the final answer.

Constraints

$1 \leq N \leq 5 \cdot 10^5$
$1 \leq A_i \leq 10^{18}$

Sample Input 1

```
3
1 2 3
```

Sample Output 1

```
7
```

Sample Input 2

```
3
1 3 4
```

Sample Output 2

```
0
```

Explanation

Sample 1:
The values to be considered are $1, 2, 4$, and the answer is $1 \oplus 2 \oplus 4 = 7$.

Sample 2:
The values to be considered are $1, 4, 5$, and the answer is $1 \oplus 4 \oplus 5 = 0$.