C. XOR-Excluding Sets

Limits: 1.5 sec., 512 MiB

We say that a set S of non-negative integers is *XOR-excluding* if the XOR of all elements in S is not in the set S itself.

Given an initially empty set A, we add n distinct positive elements a_i to it one by one. After each addition, find the number of XOR-excluding subsets of A.

Since the answer can be very large, output it modulo $10^9 + 7$.

Input

The first line of the input contains a single integer n – the number of elements to add.

The following n lines each contain a single integer a_i – the i-th element to add to the set.

Output

Print n lines. On the i-th line, print the number of XOR-excluding subsets of A after adding the first i elements, modulo $10^9 + 7$.

Constraints

$1 \le n \le 2 \cdot 10^5$,
$1 \le a_i \le 2^{60} - 1$,
all a_i are distinct.

Samples

Input (*stdin*)	Output (*stdout*)
5 1 2 3 4 5	1 2 5 11 22

Notes

After adding 1, the only XOR-excluding subset is $\{\}$ (the empty set has XOR equal to 0).

After adding 2, the XOR-excluding subsets are $\{\}$ and $\{1, 2\}$ (which has XOR equal to 3).

After adding 3, the XOR-excluding subsets are $\{\}$, $\{1, 2\}$, $\{1, 3\}$, $\{2, 3\}$ and $\{1, 2, 3\}$.

After adding 4, the XOR-excluding subsets are $\{\}$, $\{1, 2\}$, $\{1, 3\}$, $\{1, 4\}$, $\{2, 3\}$, $\{2, 4\}$, $\{3, 4\}$, $\{1, 2, 3\}$, $\{1, 2, 4\}$, $\{1, 3, 4\}$ and $\{2, 3, 4\}$. Note that $\{1, 2, 3, 4\}$ has XOR equal to 3, so it is not XOR-excluding.