D. Jzzhu and Numbers

Jzzhu have n non-negative integers $a_1, a_2, ..., a_n$. We will call a sequence of indexes $i_1, i_2, ..., i_k$ $(1 \leq i_1 < i_2 < ... < i_k \leq n)$ a group of size k.

Jzzhu wonders, how many groups exists such that a_{i_1} & a_{i_2} & ... & $a_{i_k} = 0$ $(1 \leq k \leq n)$? Help him and print this number modulo 1000000007 $(10^9 + 7)$. Operation x & y denotes bitwise AND operation of two numbers.

Input

The first line contains a single integer n $(1 \leq n \leq 10^6)$. The second line contains n integers $a_1, a_2, ..., a_n$ $(0 \leq a_i \leq 10^6)$.

Output

Output a single integer representing the number of required groups modulo 1000000007 $(10^9 + 7)$.

Examples

input

```
3
2 3 3
```

output

```
0
```

input

```
4
0 1 2 3
```

output

```
10
```

input

```
6
5 2 0 5 2 1
```

output

```
53
```