D. Jzzhu and Numbers

time limit per test: 2 seconds
memory limit per test: 256 megabytes

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

Jzzhu wonders, how many groups exists such that a_{i_1} & a_{i_2} & ... & $a_{i_k} = 0$ $(1 \le k \le n)$? 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 $(1 \le n \le 10^6)$. The second line contains n integers $a_1, a_2, ..., a_n$ $(0 \le a_i \le 10^6)$.

Output

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

Examples

input Copy

```
3
2 3 3
```

output Copy

```
0
```

input Copy

```
4
0 1 2 3
```

output Copy

```
10
```

input Copy

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

output Copy

```
53
```

Codeforces Round 257 (Div. 1)
Finished
Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
325486229	Jun/21/2025 20:21	Accepted
325485960	Jun/21/2025 20:20	Accepted

→ Problem tags

bitmasks combinatorics dp *2400

No tag edit access

→ Contest materials

- Codeforces Round #257
- Tutorial (en)