G. Sum the Fibonacci

time limit per test: 4 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given an array s of n non-negative integers.

A 5-tuple of integers (a, b, c, d, e) is said to be valid if it satisfies the following conditions:

- $1 \le a, b, c, d, e \le n$
- $(s_a \mid s_b)$ & s_c & $(s_d \wedge s_e) = 2^i$ for some integer i
- s_a & $s_b = 0$

Here, '|' is the bitwise OR, '&' is the bitwise AND and '^' is the bitwise XOR operation.

Find the sum of $f(s_a|s_b) * f(s_c) * f(s_d \wedge s_e)$ over all valid 5-tuples (a, b, c, d, e), where $f(i)$ is the i-th Fibonnaci number ($f(0) = 0, f(1) = 1, f(i) = f(i - 1) + f(i - 2)$).

Since answer can be is huge output it modulo $10^9 + 7$.

Input

The first line of input contains an integer n ($1 \le n \le 10^6$).

The second line of input contains n integers s_i ($0 \le s_i < 2^{17}$).

Output

Output the sum as described above, modulo $10^9 + 7$

Examples

input
2 1 2
output
32

input
3 7 4 1
output
3520

input
10 1 3 0 7 3 7 6 5 7 5
output
1235424

input
10 50 9 11 44 39 40 5 39 23 7
output

```
113860062
```