Problem I. Donkey, Keep Watch

Time limit: 2 seconds
Memory limit: 512 megabytes

Donkey, Shrek and Puss in Boots have snuck into the Fairy Godmother's potion factory to find a potion that will solve the ogre's marital problems. However, they are unable to find such a potion, so they will have to brew one themselves.

In the factory, there are n potions, with the i-th potion having potency a_i. They have to choose some non-empty subset of potions to brew together so that they create a good potion. The new potion will have the following characteristics:

- Its sweetness, calculated by taking the bitwise XOR of all potencies of the potions in the brew.
- Its aroma, calculated by taking the bitwise AND of all potencies of the potions in the brew.
- Its duration, calculated by taking the bitwise OR of all potencies of the potions in the brew.

A brew is good if and only if the sum of its sweetness and its aroma is equal to its duration. You need to figure out the number of ways Shrek and his friends can brew a good potion.

In other words, find the number of non-empty subsequences s of a such that $\mathrm{XOR}(s) + \mathrm{AND}(s) = \mathrm{OR}(s)$.

Input

The first line of the input contains a single integer n — the number of potions available.

The second line of the input contains n integers — the potencies of the potions.

Constraints

$1 \le n \le 10^6$,

$0 \le a_i \le 15 \cdot 10^3$.

Output

Print a single integer — the number of different ways to brew a good potion. Since this number can be large, print it modulo $10^9 + 7$.

Example

standard input	standard output
5 1 2 3 4 5	11

Note

In the sample case, the ways to create a good potion are by taking the following subsets of potions: $\{1, 2\}$, $\{1, 3\}$, $\{1, 4\}$, $\{1, 5\}$, $\{2, 3\}$, $\{2, 4\}$, $\{2, 5\}$, $\{3, 4\}$, $\{3, 5\}$, $\{4, 5\}$ and $\{1, 2, 4\}$; which is 11 in total. For example, if we take the set $\{1, 2, 4\}$, the bitwise OR is 7, the bitwise AND is 0 and the bitwise XOR is 7, and since $0 + 7 = 7$, this indeed yields a good potion.