

I. Sum Over Subsets (SOS)

Problem Statement

Sum Over Subsets is a well-known dynamic programming technique. It is also known as multi-dimensional prefix-sum in China. Given an initial set and a value for each subset denoted as $c(S)$, this technique finds the sum of values for all subsets of S for all possible subsets S .

However, this problem has nothing to do with the famous technique.

Our beloved **Ji Kuai** has a function $f(S) = |S| \times \prod_{x \in S} x$. Specially, for empty set \emptyset , $f(\emptyset) = 0$.

One day, **Joy** gives a multiset A as a gift to **Ji**. Since **Ji** is a mathematician, he decided to compute the sum over all subsets of A , but quickly realized that this is too trivial. As a talented competitive programmer, he thinks that the ordinary sum is too boring and wants to calculate the sum of $f(S)$ where $S \subseteq A$ in order to impress **Joy**. Since the answer could be quite large, he simply wants to find the answer modulo 998244353.

Ji solved the problem in nanoseconds and you have always envied **Ji**, so you want to solve it to be as handsome as **Ji**!

Formally, given a multiset A , find $ans = \sum_{S \subseteq A} f(S) \pmod{998244353}$ where f is defined above.

Input Format

N $A_1 \ A_2 \ \dots \ A_N$

- N denotes the size of the multiset.
- A_1, A_2, \dots, A_N are elements of the multiset.

Output Format

ans

- ans is described in the problem description.

Constraints

- $1 \leq N \leq 10^6$
- $\forall i, 1 \leq A_i \leq 10^9$
- All inputs are integers

Example

Sample Input	Sample Output
2 2 3	17
4 1 2 3 4	326

Scoring

There are 5 subtasks in this problem. The score and additional constraints of each subtask are as follows:

Subtask	Score	Additional constraints
1	5	$N \leq 20$
2	15	$N \leq 1000$
3	30	$N \leq 10^5$
4	15	$A_i \leq 20$
5	35	No other constraints