Problem B: Sumthing

Has it ever happened to you that, having worked on a problem for a long time, it starts to pop up in your conscious mind when you least expect it? Just the other day I was singing that old song that goes *"Something in the way she moves..."*, but before I knew it, I replaced part of the lyrics with *"Sum-thing in the way she woos me..."*. The only explanation I have for this is that I had been working recently on a curious mathematical problem concerning sums. It goes something like this:

Consider a list A with n positive integers, $A_1, A_2, A_3, \ldots, A_n$. A function S is defined as follows, for $1 \leqslant k \leqslant n$:

$$S(k) = 2^{k-1} \sum_{i_1=1}^{n} \sum_{i_2=i_1+1}^{n} \sum_{i_3=i_2+1}^{n} \cdots \sum_{i_k=i_{k-1}+1}^{n} A_{i_1} A_{i_2} A_{i_3} \cdots A_{i_k}$$

For example, if $A = (1, 2, 3)$, then the possible values of S are:

$$S(1) = 1 + 2 + 3 = 6$$
$$S(2) = 2 \cdot ((1 \cdot 2) + (1 \cdot 3) + (2 \cdot 3)) = 2(2 + 3 + 6) = 22$$
$$S(3) = 4 \cdot (1 \cdot 2 \cdot 3) = 4 \cdot 6 = 24$$

What the problem asks is, given the list A, find the sum:

$$\Phi = \sum_{k=1}^{n} S(k)$$

Input

Input starts with an integer T, the number of test cases. Each test case starts with an integer n in the first line. The second line of each case contains n positive integers, separated by spaces, that form the set A.

$T \leqslant 10$; $1 \leqslant n \leqslant 10^5$; $1 \leqslant A_i \leqslant 10^9$ for $1 \leqslant i \leqslant n$

Output

For each test case, print the value of Φ, modulo 1000000009 $(10^9 + 9)$ on a single line.

Sample Input	Output for Sample Input
2 3 1 2 3 5 2 3 5 7 11	52 66412