Problem E: Manganese Dioxide

Time limit: 5s; Memory limit: 256 MB

Manganese Dioxide (chemical formula MnO_2) is a blackish or brown solid. Although looking harsh, its properties are wonderful and popularly used in batteries. Similarly, this problem may look difficult, but its solution contains beautiful insights. Let's see if it's true!

Given an array of integers $a_1, a_2, \dots, a_n$, and an integer k. For every $i = 1, 2, \dots, k$, calculate the sum of their i-th powers: $f(i) = a_1^i + a_2^i + \cdots + a_n^i$.

Input:

The first line contains two natural numbers, n, k $(1 \le n \le 10^5, 1 \le k \le 10^5)$

The second line contains n real numbers $a_1, a_2, \dots, a_n$ $(0 \le a_i < 998244353)$.

Output:

Print k lines, containing $f(1), f(2), \dots, f(k)$, each on one line. Since they may be too big, print them after taking modulo 998244353.

Sample:

Input	Output
3 3 1 2 3	6 14 36
4 5 87 535 808 5026	6456 26207334 864427735 110742109 992865564

Explanation:

In sample 1, $1 + 2 + 3 = 6, 1^2 + 2^2 + 3^2 = 14, 1^3 + 2^3 + 3^3 = 36$

Bonus: Find out what MnO_2 facts that correspond to numbers in sample 2. Good luck!