H. Path Counting

time limit per test: 5 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a rooted tree. Let's denote $d(x)$ as depth of node x: depth of the root is 1, depth of any other node x is $d(y) + 1$, where y is a parent of x.

The tree has the following property: every node x with $d(x) = i$ has exactly a_i children. Maximum possible depth of a node is n, and $a_n = 0$.

We define f_k as the number of unordered pairs of vertices in the tree such that the number of edges on the simple path between them is equal to k.

Calculate f_k modulo $10^9 + 7$ for every $1 \le k \le 2n - 2$.

Input

The first line of input contains an integer n ($2 \le n \le 5\,000$) — the maximum depth of a node.

The second line of input contains $n - 1$ integers $a_1, a_2, \ldots, a_{n-1}$ ($2 \le a_i \le 10^9$), where a_i is the number of children of every node x such that $d(x) = i$. Since $a_n = 0$, it is not given in the input.

Output

Print $2n - 2$ numbers. The k-th of these numbers must be equal to f_k modulo $10^9 + 7$.

Examples

input
4 2 2 2

output
14 19 20 20 16 16

input
3 2 3

output
8 13 6 9

Note

This the tree from the first sample: