
Problem A. Distance

Input file: `standard input`
Output file: `standard output`
Time limit: 6 seconds
Memory limit: 1024 megabytes

There are n points on a horizontal line, labelled with 1 through n from left to right.
The distance between the i -th point and the $(i + 1)$ -th point is a_i .
For each integer k ranged from 1 to n , you are asked to select exactly k different given points on the line to maximize the sum of distances between all pairs of selected points.

Input

The input contains several test cases, and the first line contains a positive integer T indicating the number of test cases which is up to 1000.
For each test case, the first line contains an integer n indicating the number of points, where $2 \leq n \leq 10^5$.
The second line contains $(n - 1)$ positive integers $a_1, a_2, \dots, a_{n-1}$, where $1 \leq a_i \leq 10^4$.
We guarantee that the sum of n in all test cases is up to 10^6 .

Output

For each test case, output a line containing n integers, the i -th of which is the maximum sum of distances in case $k = i$. You should output exactly one whitespace between every two adjacent numbers and avoid any trailing whitespace in this line.

Example

standard input	standard output
1 5 2 3 1 4	0 10 20 34 48

Note

The figure below describes the sample test case.



The only best selection for $k = 2$ should choose the leftmost and the rightmost points, while a possible best selection for $k = 3$ could contain any extra point in the middle.