Power of Smurfberries

Difficulty: Easy

Tagline: Measuring Smurfberry Power Across Smurfland.

Problem Statement:

The Smurf Village (also known as Smurfland) is the home residence for the Smurfs. It is located in a forest, the exact location of which is unknown to all but the Smurfs. Smurfs can walk and run, but often move by skipping on both feet. They love to eat sarsaparilla (a species of Smilax) leaves, whose berries the Smurfs naturally call "smurfberries". Smurfberries are rare to find and give a special power to Smurfs.

Smurfette is the only female Smurf in the village full of smelly, blue male smurfs.

As Smurfette was a creation of the evil wizard Gargamel, the Smurfs have a hard time trusting her. Papa Smurf advised that if she can solve the magical equation to find the power of all their smurfberries, the Smurfs will accept her as one of their own.

There are only a limited n number of Sarsaparilla trees in Smurfland, and at a given time the number of Smurfberries in each tree is given as an array of n elements x_1, x_2, ... x_n. For a given number of smurfberries y, subsegments can be formed containing values from y to x_1, y to x_2 ... y to x_n (including the start and end points).

The special power q is defined as the number of subsegments that include value q (denoted by P_q),

Help Smurfette to compute $\sum_{q=1}^{10^9} P_q$ for all $y \in \{x_1, x_2, ... x_n\}$ which would denote the total power of Smurfberries.

Input Format:

- The first line contains the number of test cases t ($1 \leq t \leq 10^4$)
- The first line of each test case contains an integer n ($1 \leq n \leq 2 \cdot 10^5$) — the number of Sarsaparilla trees
- The second line contains n integers x_1, x_2,.. x_n ($1 \leq x_i \leq 10^9$) — the number of Smurfberries in each tree
- It is guaranteed that the sum of the values of n over all test cases does not exceed $2 \cdot 10^5$.

Output Format:

- For each test case, output n integers, where the ith integer is equal to the sum of special powers of all points for y=xi.

In the first test case:

- When y =x_1=1 the subsegments formed are: [1,1] ,[1,4] ,[1,3]

- The special power of the berries will be: P_1= 3, P_2= 2, P_3= 2, P_4= 1, P_5=0…
  The sum of powers of the points: 3+2+2+1+0+⋯+0 = 8

- When y =x_2=4, the subsegments formed are: [1,4] ,[4,4], [3,4]
  and special powers of berries are P_1= 1, P_2=1, P_3= 2 , P_4=3, leading to the sum of 7

- When $y = x_3 = 3$, the subsegments are: $[1,3]$, $[3,4]$, $[3,3]$
  The powers of the points are $P_1 = 1$, $P_2 = 1$, $P_3 = 3$, $P_4 = 1$, leading to the sum of 6