Kick Start 2020 - Round C

Perfect Subarray

Problem

Cristobal has an array of **N** (possibly negative) integers. The i-th integer in his array is $\mathbf{A_i}$. A contiguous non-empty subarray of Cristobal's array is *perfect* if its total sum is a perfect square. A perfect square is a number that is the product of a non-negative integer with itself. For example, the first five perfect squares are 0, 1, 4, 9 and 16.

How many subarrays are *perfect*? Two subarrays are different if they start or end at different indices in the array, even if the subarrays contain the same values in the same order.

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. The first line of each test case contains the integer **N**. The second line contains **N** integers describing Cristobal's array. The i-th integer is $\mathbf{A_i}$.

Output

For each test case, output one line containing `Case #x: y`, where `x` is the test case number (starting from 1) and `y` is the number of perfect subarrays.

Limits

Memory limit: 1 GB.
$1 \leq \mathbf{T} \leq 100$.
$-100 \leq \mathbf{A_i} \leq 100$, for all i.

Test Set 1

Time limit: 20 seconds.
$1 \leq \mathbf{N} \leq 1000$.

Test Set 2

Time limit: 30 seconds.
For up to 5 cases, $1 \leq \mathbf{N} \leq 10^5$.
For the remaining cases, $1 \leq \mathbf{N} \leq 1000$.

Sample

Sample Input

```
3
3
2 2 6
5
30 30 9 1 30
```

Sample Output

```
Case #1: 1
Case #2: 3
Case #3: 9
```

```
4
4 0 0 16
```

In sample case #1, there is one perfect subarray: `[2 2]` whose sum is 2^2.

In sample case #2, there are three perfect subarrays:

- `[9]`, whose total sum is 3^2.
- `[1]`, whose total sum is 1^2.
- `[30 30 9 1 30]`, whose total sum is 10^2.

In sample case #3, there are nine perfect subarrays:

- `[4]`, whose total sum is 2^2.
- `[4 0]`, whose total sum is 2^2.
- `[4 0 0]`, whose total sum is 2^2.
- `[0]`, whose total sum is 0^2.
- `[0 0]`, whose total sum is 0^2.
- `[0 0 16]`, whose total sum is 4^2.
- `[0]`, whose total sum is 0^2.
- `[0 16]`, whose total sum is 4^2.
- `[16]`, whose total sum is 4^2.

Note: We do not recommend using interpreted/slower languages for the test set 2 of this problem.