IT300 Lab Test 1 (16 Sep 2020)

Problem: We have seen that an *inversion* in a sequence A of numbers is a pair of indices (i,j) such that i < j and A[i] > A[j]. For e.g. the number of inversions in 1,3,9,8,5 is 3 while that in 4,10,8,2,1 is 8.

Let's now define a *b-inversion* as a pair of indices (i,j) such that i<j and A[i] > b.A[j]. For e.g. for b = 3 the sequence 1,3,9,8,5 has no *b-inversions* while 4,10,8,2,1 has 5 *b-inversions* corresponding to the pair of elements (4,1), (10,2), (10,1), (8,2) and (8,1).

Implement a ***O(nlogn)*** *algorithm* to count the total number of *b-inversions* in an input sequence. Read in an **input file** which is of the following form: the first line is the number of test cases in the file. The lines after that are for the test cases. Each test case comprises of two lines. The first line is the sequence of elements separated by space; the next line is the number b.

Sample Input:

```
3
1 3 9 8 5
3
4 10 8 2 1
3
12 7 3 6 1 4
2
```

Sample Output:

```
0
5
7
```