

## G. 2^Sort

time limit per test: 1 second  
memory limit per test: 256 megabytes

Given an array  $a$  of length  $n$  and an integer  $k$ , find the number of indices  $1 \leq i \leq n - k$  such that the subarray  $[a_i, \dots, a_{i+k}]$  with length  $k + 1$  (**not** with length  $k$ ) has the following property:

- If you multiply the first element by  $2^0$ , the second element by  $2^1$ , ..., and the  $(k + 1)$ -st element by  $2^k$ , then this subarray is sorted in strictly increasing order.

More formally, count the number of indices  $1 \leq i \leq n - k$  such that

$$2^0 \cdot a_i < 2^1 \cdot a_{i+1} < 2^2 \cdot a_{i+2} < \dots < 2^k \cdot a_{i+k}.$$

### Input

The first line contains an integer  $t$  ( $1 \leq t \leq 1000$ ) — the number of test cases.

The first line of each test case contains two integers  $n, k$  ( $3 \leq n \leq 2 \cdot 10^5, 1 \leq k < n$ ) — the length of the array and the number of inequalities.

The second line of each test case contains  $n$  integers  $a_1, a_2, \dots, a_n$  ( $1 \leq a_i \leq 10^9$ ) — the elements of the array.

The sum of  $n$  across all test cases does not exceed  $2 \cdot 10^5$ .

### Output

For each test case, output a single integer — the number of indices satisfying the condition in the statement.

### Example

| input                                                                                                                                                    | Copy |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 6<br>4 2<br>20 22 19 84<br>5 1<br>9 5 3 2 1<br>5 2<br>9 5 3 2 1<br>7 2<br>22 12 16 4 3 22 12<br>7 3<br>22 12 16 4 3 22 12<br>9 3<br>3 9 12 3 9 12 3 9 12 |      |
| output                                                                                                                                                   | Copy |
| 2<br>3<br>2<br>3<br>1<br>0                                                                                                                               |      |

### Note

In the first test case, both subarrays satisfy the condition:

- $i = 1$ : the subarray  $[a_1, a_2, a_3] = [20, 22, 19]$ , and  $1 \cdot 20 < 2 \cdot 22 < 4 \cdot 19$ .
- $i = 2$ : the subarray  $[a_2, a_3, a_4] = [22, 19, 84]$ , and  $1 \cdot 22 < 2 \cdot 19 < 4 \cdot 84$ .

In the second test case, three subarrays satisfy the condition:

- $i = 1$ : the subarray  $[a_1, a_2] = [9, 5]$ , and  $1 \cdot 9 < 2 \cdot 5$ .
- $i = 2$ : the subarray  $[a_2, a_3] = [5, 3]$ , and  $1 \cdot 5 < 2 \cdot 3$ .
- $i = 3$ : the subarray  $[a_3, a_4] = [3, 2]$ , and  $1 \cdot 3 < 2 \cdot 2$ .
- $i = 4$ : the subarray  $[a_4, a_5] = [2, 1]$ , but  $1 \cdot 2 = 2 \cdot 1$ , so this subarray doesn't satisfy the condition.

Codeforces Round 799 (Div. 4)

Finished

Practice

Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

Submit?

Language: GNU G++20 13.2 (64 bit, win)

Choose file: Choose File No file chosen

Submit

Last submissions

| Submission                | Time              | Verdict  |
|---------------------------|-------------------|----------|
| <a href="#">231321184</a> | Nov/04/2023 14:02 | Accepted |
| <a href="#">231318106</a> | Nov/04/2023 13:35 | Accepted |

Problem tags

data structures dp sortings

two pointers \*1400

No tag edit access

Contest materials

Announcement (en)

Tutorial (en)