



# [CS 11 25.1] Lab 5c – Arrays and Products

Cheatsheet is available here: <https://oj.dcs.upd.edu.ph/cs11cheatsheet/>

## Problem Statement

You are given an array of  $n$  positive integers  $[a_1, a_2, \dots, a_n]$ .

Compute the number of subarrays that have a product less than or equal to  $p$ .

A subarray is a nonempty sequence of consecutive elements of the array.

## Task Details

Your task is to implement a function named `num_subarrays`, which should have the following signature:

```
def num_subarrays(a, p):
```

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The above says that it has two arguments  $a$  and  $p$ .

- $a$  is a sequence of  $n$  integers (`int`s).
- $p$  is an integer.

The function must return an integer denoting the number of subarrays of  $a$  with product  $\leq p$ .

## Restrictions

- The following symbols can be used:
  - `list`, `set`, `dict`, `enumerate`, `append`, `pop`, `extend`,  
`remove`, `sort`, `sorted`, `insert`, `clear`, `reverse`,  
`reversed`, `iter`, `next`, `zip`.
- The following imports are allowed:
  - `count` and `islice` from `itertools`.
- Loops are allowed.
- Generators and comprehensions are allowed.
- Recursion is *disallowed*.
- Your source code must have at most 700 bytes.

## Examples

### Example 1 Function Call

```
num_subarrays((2, 1, 2), 3)
```

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### Example 1 Return Value

```
5
```

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## Constraints

- The function `num_subarrays` will be called at most 70,000 times.
- $0 \leq n \leq 350,000$
- The sum of  $n$  across all calls to `num_subarrays` will be  $\leq 350,000$ .
- $1 \leq a_i \leq 10^{10}$
- $1 \leq p \leq 10^{10}$

## Scoring

**Note:** New tests may be added and all submissions may be rejudged at a later time. (All future tests will satisfy the constraints.)

- You get 15 ❤ points if you solve all test cases where:
  - $p = 1$
  - $n \leq 400$
  - The sum of  $n$  across all calls to `num_subarrays` will be  $\leq 800$ .
- You get 20 💔 points if you solve all test cases where:
  - $n \leq 400$
  - The sum of  $n$  across all calls to `num_subarrays` will be  $\leq 800$ .
- You get 20 💔 points if you solve all test cases where:
  - $p = 1$
  - $n \leq 6,000$
  - The sum of  $n$  across all calls to `num_subarrays` will be  $\leq 6,000$ .
- You get 25 💔 points if you solve all test cases where:
  - $n \leq 6,000$
  - The sum of  $n$  across all calls to `num_subarrays` will be  $\leq 6,000$ .
- You get 25 💔 points if you solve all test cases where:
  - $p = 1$
- You get 50 💔 points if you solve all test cases where:
  - $p \leq 3$
- You get 60 💕 points if you solve all test cases.

## Clarifications

Report an issue

No clarifications have been made at this time.