CodeChef Discussion

USF Editorial

0

PROBLEM LINK:

Practice
Contest

Author: Rahim Mammadi
Primary Tester: Amir Reza PoorAkhavan
Editorialist: Hussain Kara Fallah

DIFFICULTY:

Easy-Medium

PREREQUISITES:

Sieve of Eratosthenes

PROBLEM:

Given an array of **N** integers (all integers are up to 10^6). Let's suppose we have taken a non-empty subset of this array. The magical value of this subset is **(Number of distinct prime numbers that divides every number of the subset * the size of this subset)**. Find the subset with the maximum magical number and output this number.

EXPLANATION:

First of all, **Number of distinct prime numbers that divide every number of the subset** is equivalent to **the number of prime factors of GCD of this subset**.

Let's try all possible **GCDs**. How's that possible?

If you don't know Sieve then stop reading and take a look at this link. After that, try to figure out the solution yourself.

What's the optimal subset for a certain **GCD** (let's say **K**) ?. Clearly, we can take a subset of all of its multiples in the array. Please note that the **GCD** of this subset would be **K** or one of its multiples, but that doesn't affect the answer (Why?). Because we will have the same subset when handling this (multiple of K) which is the real GCD and since it's a multiple of **K**, it has at least the same number of prime factors hence, the answer will be updated for sure. So we can safely assume the the **GCD** is equal to **K** with no problems.

How to loop over the multiples of a number **K**?

```
for(int i = K ; i < MX ; i += K){
    tot += cnt[i]; //you can do anything
}
```

So our code looks like this:

```
for(int G = 2 ; G < MX ; G++){ //loop for every possible GCD
    int subsetSize = 0;
    for(int i = G ; i < MX ; i += G) // counting how many multiples there are
        subsetSize += cnt[i];
}
```

The complexity of this loop is:

$$\sum_{i=1}^{MaxValue} \frac{MaxValue}{i}$$

which is equal to:

$$MaxValue * \sum_{i=1}^{MaxValue} \frac{1}{i}$$

The sum of the series:

$$\sum_{i=1}^{MaxValue} \frac{1}{i} \approx log(MaxValue)$$

So total complexity is $MaxValue * log(MaxValue)$

There is also a part left for you, which is figuring the number of prime factors. This is easy, and can be done also while doing the Sieve approach (left for you), or you can check the codes.

AUTHOR'S AND TESTER'S SOLUTIONS:

AUTHOR's solution:

Follow this question
By Email:
You are not subscribed to this questio
subscribe me
(you can adjust your notification settir on your profile)
By RSS:
Answers
Answers and Comments

Question tags:

easy **×3,652**
sieve **×291**
ltime66 **×38**

question asked: **yesterday**
question was seen: **192 times**
last updated: **3 hours ago**

Related questions

Levy Conjecture, Sieve of Eratosthenes,I problem.
LETSTOSS - Editorial
CHEFPRMS and LEVY help needed
CHEFPRMS - EDITORIAL
IITM4 - Editorial(IITM2016)
CBALLS - Editorial
CHEFHACK - Editorial
BPS Editorial
PRMDIV - Editorial
ENIGMA01 - Editorial

TESTER's solution:

Editorialist's solution:

sieve easy

This question is marked "community wiki".

edited **7 hours ago**

admin ♦♦

[19.6k]●349●497●539

asked **yesterday**

3★ deadwing97

[87]●8●24

accept rate: 0%

One Answer:

oldest answers newest answers **popular answers**

There is no explanation what cnt[i] is. Is it the number of prime factors?

0

And where are the solution links?

link | award points

answered **5 hours ago**

3★ eugalt

[264]●7

accept rate: 5%

for(int i = G ; i < MX ; i += G) // counting how many multiples there are

so it's clear that i is a multiple of G. and we said 2 lines before that we want to take a subset of all the multiples so it's the count of multiples in array.

It's updated anyway

3★ deadwing97 (3 hours ago)

Your answer

[hide preview] community wiki:

Preview

Answer the question