

CodeForces Educational Round 178 E

omeganot

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The coin system means we can achieve any array a' from a as long as $a'_i \geq 2$ for all i , and $\sum a'_i \leq \sum a_i$. This is because we can just subtract 1 from a until it only consists of 2's, and use however many coins we need to achieve a' .

We can also calculate for all i from $1 \leq i \leq 4 \cdot 10^5$, b_i , where b_i is the minimum sum of a needed such that a is beautiful if a is length i . To calculate b_i , we need the minimum sum of i numbers that are all coprime with each other. This is just the sum of the i smallest prime numbers.

As such, we will need to find the $4 \cdot 10^5$ smallest prime numbers, so we must use the Sieve of Eratosthenes up to some number m such that there are at least $4 \cdot 10^5$ elements less than or equal to m . I used $m = 10^7$. With this, we can calculate b .

To know how many elements we must remove, we can simply iterate over i from n to 1 and check if removing elements until a is length i results in a beautiful array. Which elements should we remove? Well, since we want to keep the sum as large as possible we should remove the smallest elements. As such, we can sort array and find the smallest number of elements we must remove until $b_i \leq \sum a_i$. Our Time Complexity is $O(m \log \log m + n \log n)$.