Merging Amulets

To solve this problem, we will use the fact that `gcd` changes at most $\log A$ times, where A is the maximum value among a_i. We will find the prefix and suffix `gcd`, denoting them as p_i and s_i, respectively.

We will divide the calculation of the final sum of `gcd` into 3 stages:

1. The segment $[1, n]$, to find the answer we need to calculate the `lcm` of the entire array. This can be done using the Sieve of Eratosthenes and prime factorization of each element;

2. Segments $[i, j]$ such that $p_i = p_{i+1}$ and $s_{j-1} = s_j$. The answer for such segments will be $\texttt{gcd}(p_i, s_j)$, since `lcm` will definitely be divisible by $\texttt{gcd}(p_i, s_j)$, and the final `gcd` cannot exceed this value. Such segments can be counted quickly if we know in advance the positions where p_i and s_j change;

3. The remaining segments, specifically those $[i, j]$ such that $p_i \neq p_{i+1}$ or $s_{j-1} \neq s_j$, since `gcd` changes at most $\log A$ times, there will be at most $O(n \log n)$ such segments. Therefore, they can be counted with a straightforward pass through the array.

The final answer will consist of the sum of all three types of segments.