

## The Ultimate Device

### Solution sketch:

The problem eventually boils down to, given  $n$  distinct integers between 2 and 500, you have to find the sum of lcm of all possible subsets having at least two integers.  $n \leq 100$ . For example,

$n = 3$  and the integers are 2 6 7

subset:

2 6 lcm = 6

2 7 lcm = 14

6 7 lcm = 42

2 6 7 lcm = 42

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result = 104

The solution is a bit tricky. If we observe carefully we see that the integers are between 2 and 500. So, if we prime factorize the numbers,

If we get maximum powers of the prime numbers in 500 we get:

2 8

3 5

5 3

7 3

11 2

13 2

17 2

19 2

Other than this, all the primes will have powers 1. So, we can easily calculate all possible states using these integers leaving  $9 * 6 * 4 * 4 * 3 * 3 * 3 * 3$  states which is nearly 70000.

Now for other integers we can make dp like the following:

$dp[70000][i]$

where  $i$  can be 0 to 100. However as  $dp[i]$  will be dependent on  $dp[i-1]$  so,  $dp[70000][2]$  is enough. Leaving the complexity to  $n * 70000$  which is feasible.