Competitive Coding Experiment 3

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KRG 2-A

Q Given 3 integers n, a, b return n^{th} magical number since the answer may be very large return modulo 1e9+7.

n = 1, a = 2, b = 3 output :- 2

Magical number is no. divisible by either a or b.

Brute:- Run a loop till cnt < k check it cnt is divisible by a or b, increment cnt.

T.C :- O(N x min(a,b))

Optimal :- we count number of optimal multiples a $a \leq x$ i.e x/a.

then count multiples of b i.e x/b

No. of multiples of both a and b $x / lcm(a,b)$

So, total number that are $<= X$

$$count(X) = \frac{X}{a} + \frac{X}{b} - \frac{X}{lcm(a,b)}$$

Now we need smallest X such that count(x) >= r

set low = 1 , high = r x min(a,b)

mid = low + high / 2;

for mid compute count = $\frac{mid}{a} + \frac{mid}{b} - \frac{mid}{lcm}$

if count $\leq$ r :

mid could be ans

search left side.

else search right side

return ans;

Time Complexity :- O (r x min(a,b))