Date .....

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Class : KRG_1B
Subject : CC

1) Given three integers x, a, b return xth magical no. Since the ans may be very large return $10^9 + 1$ %.

Approach

1) We count no. of multiples of a $<= X$ (X is a trial value)
   ie X/a
2) Same way we count multiples of $b <= x$
   ie X/b
3) No. of multiples of both a and b
   ie $X/lcm(a,b)$

So
total numbers that are $<=X$

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

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

Set low = 1
high = x * min(a,b)

mid = (low + high)/2

Spoal

L=108 R=109 lcm = $\frac{a \times b}{gcd}$

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for mid
compute

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

if count >= r:
    mid could be ans-
    search left side
else
    search right side
return the find ans.

Time complexity:

Binary search runs in = O(log(r × min(a,b)))