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Q Given three integers n, a and b return nth magical no. Since the answer may be very large return $10^9 + 7$ %.

A positive integer is magical if the number is divisible by either a or b

n = 1, b = 3, a = 2
ans = 2

n = 4, a = 2, b = 3
ans = 6

Ans Given n, a, b.

Constraints → n → 1 to 10^9

a, b → 1 to 10^4

Algorithm:

1. Calculate lcm of a, b.
   set l = lcm(a, b)
2. We can binary search on the answer in this range. [min(a, b), min(a, b) × n].
   set low = min(a, b)
   high = n × min(a, b)
3. Binary Search:
   set mid = (a + b) / 2
   count no. of ~~same~~ magical no. < mid.
   set count = mid/a + mid/b + mid/lcm(a,b)
   if count < n:
   Set low = mid + 1
   else:
   set high = mid − 1
4. Ans = low % $10^9 + 7$

Time Complexity: $O(\log(n \times \min(a,b)))$.

Space Complexity: $O(1)$

Explaination:

- We use binary search on the range of the answer.
- We check for the smallest no. which has ~~a~~ magical number count $\geq n$.
- For counting no. of magical numbers,

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

We decrement the nos. counted twice with the use of calculated LCM.

TC1:

$n=1, a=2, b=3$

magical nos = (2) 3 4 6

└ ans = 2.

TC2:

$n=4, a=2, b=3$

magical nos = 2 3 4 (6) 8 9

└ ans = 6.