

Name \rightarrow Anmol preet Singh
Class \rightarrow KRG-1A

UID \rightarrow 23RCS11616

Q. \rightarrow Given the three integers n , a and b return the n^{th} magical number. Since the answer is very large return $10^9 +$.
A positive integer is magical no. when number is divisible by either a or b .

Test case: $n=1, a=2, b=3$
outcome = 2

$n=4, a=2, b=3$
outcome = 6

Approach \rightarrow (1) Counting magical numbers $\leq x$

(2) Binary Search on answer

(3) Search boundaries

left = 1

Right = $n * \min(a, b)$

(4) Binary search steps

(5) Modulo

```

Code :- Class solution:
def nthMagical(n, int a, int b):
    h(1) = 10**9 + 7
    def gcd(x, y):
        while y:
            x, y = y, x % y
        return x
    lcm = a * b // gcd(a, b)
    left, right = 1, n * min(a, b)
    while left < right:
        mid = (left + right) // 2
        count = mid // a + mid // b - mid // lcm
        if count < n:
            left = mid + 1
        else:
            right = mid
    return left % mod

```

print(Solution().nthMagical(5, 2, 3))

Output :- 8

Time complexity $\rightarrow O(\log(n * \min(a, b)))$

Space complexity $\rightarrow O(1)$

```

105
106 class Solution:
107     def nthMagicalNumber(self, n: int, a: int, b: int) -> int:
108         MOD = 10**9 + 7
109
110         def gcd(x, y):
111             while y:
112                 x, y = y, x % y
113             return x
114
115         lcm = a * b // gcd(a, b)
116
117         left, right = 1, n * min(a, b)
118
119         while left < right:
120             mid = (left + right) // 2
121             count = mid // a + mid // b - mid // lcm
122
123             if count < n:
124                 left = mid + 1
125             else:
126                 right = mid
127
128         return left % MOD
129
130
131 print(Solution().nthMagicalNumber(5, 2, 3))
132

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```

● anmolpreetssingh@Anmolpreets-MacBook-Air Code % python3 -u "/Users/anmolpreetssingh/Desktop/Code/ui.py"
8
○ anmolpreetssingh@Anmolpreets-MacBook-Air Code % █

```