

EXPERIMENT :- 01

Ques:- Given the ^{three} integers m , a and b return the n^{th} magical no. Since the answer is very large $10^9 + 7$.

A positive integer is magical no. when no. is divisible by either a or b .

Test cases

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

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

⇒ Algorithm:-

- (i) Find $\min(a, b)$ and $\max(\min(a, b))$
- (ii) Search space $[\min(a, b), \max(\min(a, b))]$
- (iii) Find LCM of (a, b) .
- (iv) Apply binary search on search space.

Find no. of multiples of a upto mid $[A]$.

Find no. of multiples of b upto mid $[B]$.

Find no. of multiples of LCM upto mid $[C]$.

position of mid = $A + B - C$.

If position of mid $> n$
 { $s = \text{mid}$ }

else

 { $s = \text{mid}$ }

return $\text{mid} \% 10^9 + 7$.

Code:

```
class solution {
public:
```

```
    int nthMagicalNumber(int n, int a, int b) {
```

```
        long long mod = 1e9 + 7;
```

```
        long long l = 1, r = (long long)n * min(a, b);
```

```
        long long lcm = (long long)a * b / __gcd(a, b);
```

```
        long long ans = 0;
```

```
        while (l <= r) {
```

```
            long long mid = l + (r - l) / 2;
```

```
            long long count = mid / a + mid / b - mid / lcm;
```

```
            if (count >= n) {
```

```
                ans = mid;
```

```
                r = mid - 1;
```

```
            } else {
```

```
                l = mid + 1;
```

```
            }
```

```
        }
```

```
        return ans % mod;
```

```
    }
```

```
};
```