

EXPERIMENT - 01

Ques 1 :- Given the integers n^{th} , 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

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

$$\text{out} = 2$$

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

$$\text{out} = 6$$

⇒ Algorithm :-

- (i) Find $\min(a,b)$ and $n \times \min(a,b)$
- (ii) Search space $[\min(a,b), n \times \min(a,b)]$
- (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 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;
```

```
}
```

y

```
return ans % mod;
```

y

y;