C++ STL Intermediate
Problem Solving 2

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Problem 1

Minimum LCM:

https://codeforces.com/problemset/problem/1765/M

N

a b $(a>0, b>0)$

↳ $a+b=N$

LCM(a, b) ↓

$N = 9$

$a = 1 \quad b = 8 \quad lcm_1$

$a = 2 \quad b = 7 \quad lcm_2$

$\vdots$

$a = 8 \quad b = 1$

N = 4

2 2

N = 7 ⇒ a = 1, b = 6

LCM = 6

(3, 4) ⇒ 12

#1 $a \leq b$ → generalising

↳ $a \leq b$

then $b \geq \frac{n}{2}$

↳ clear ??

#2 $a \le b$

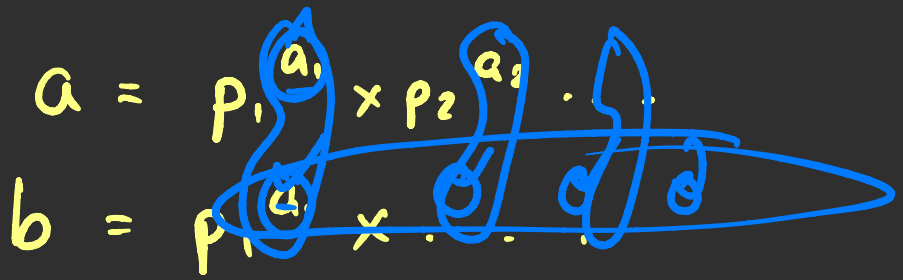
$b \% a == 0$

$b \geq \frac{n}{2}$

$LCM(a, b) = b$

$b < n$

$lcm < n$



#3

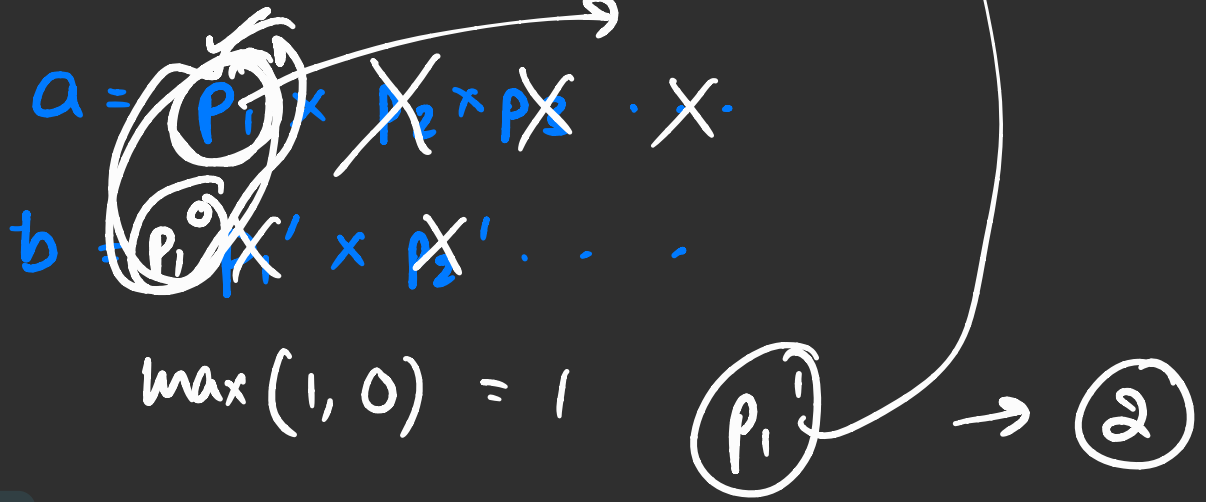
$b \% a != 0$

$b \geq n/2$

$lcm \geq 2 \times (n/2)$

$lcm \geq n$

$LCM(a,b) \geq 2 \times b$



$a \leq b$

$b \,\%\, a == 0$

} → more close to my answer

$lcm(a, b) == b$

$n \,\%\, a == 0$

$a + b = n$

$(a+b) \,\%\, a = n \,\%\, a \Rightarrow (a \,\%\, a + b \,\%\, a) \,\%\, a = n \,\%\, a$

$a \% a = 0$

$b \% a = 0$

$(0 + 0) \% a = n \% a$

$0 \% a = n \% a$

$n \% a == 0$

#1 $a \leq b$

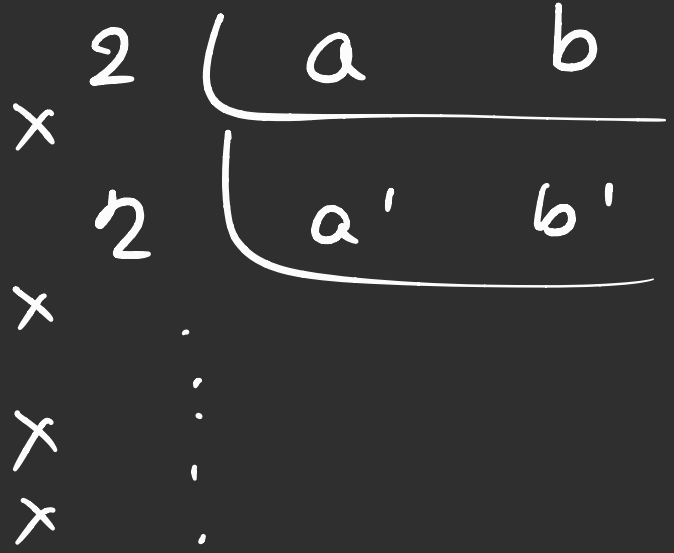
#2 $b \% a == 0$

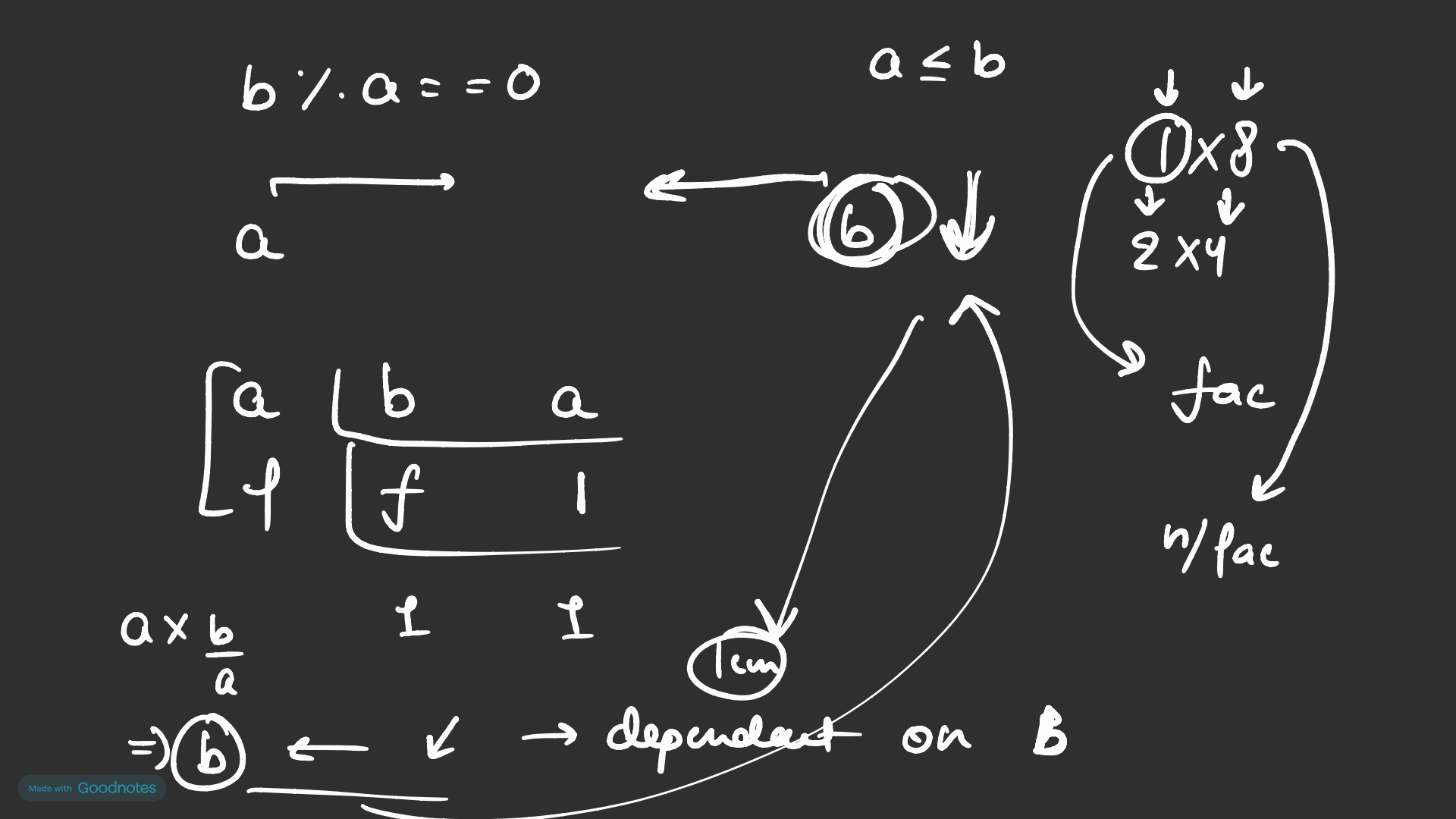
#3 $n \% a == 0$

for(⟶ factor of n)

to find 'a')

a b = n - a




b %. a == 0
a ≤ b
a
b
1 x 8
2 x 4
fac
n/fac
a | b | a
f | f | 1
1 1
a x b/a
lcm
=> b
dependent on B

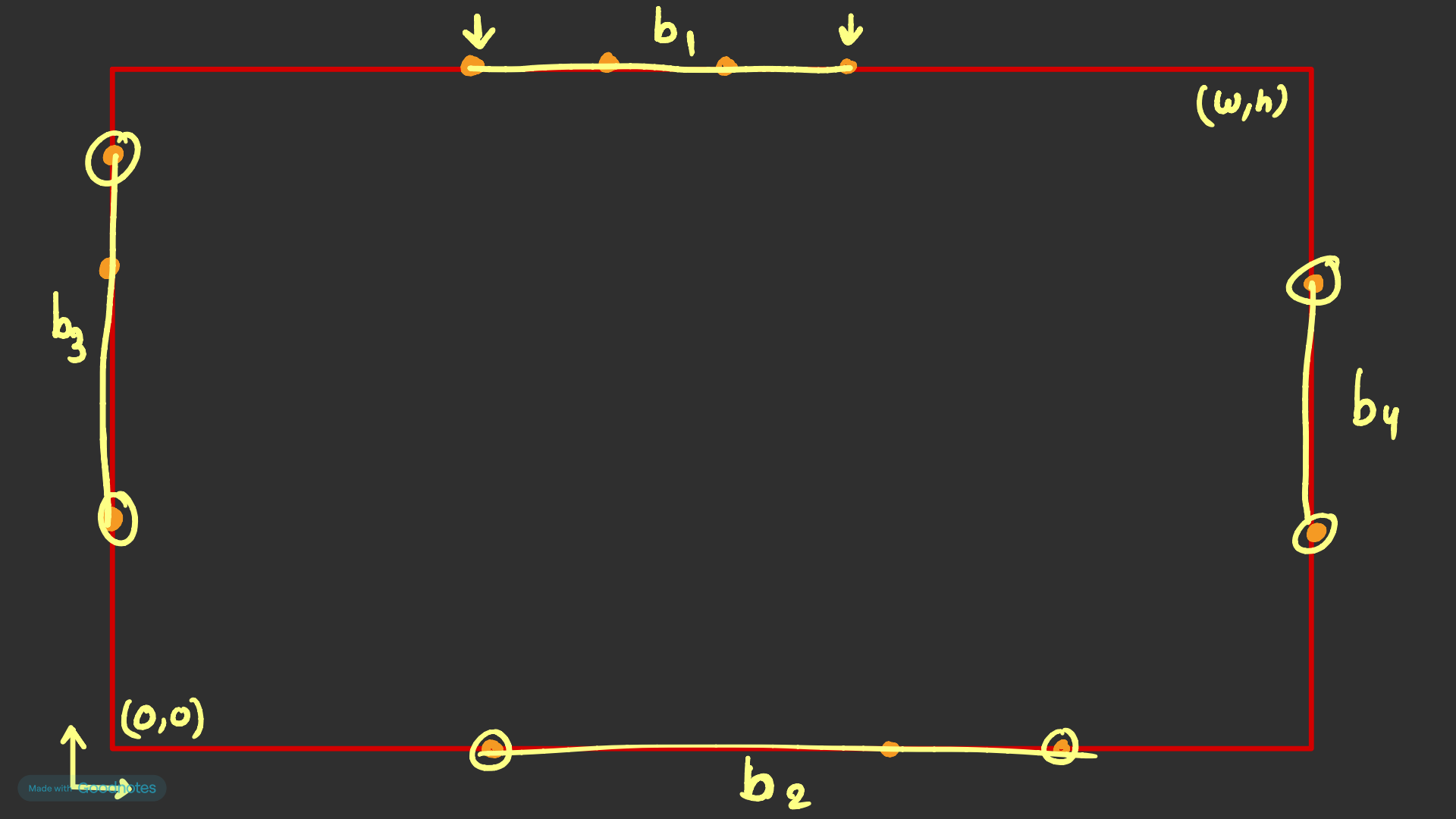
$n/f_{ac} = a$

$b = n - n/f_{ac} \uparrow \downarrow$

Problem 2

Triangles on a Rectangle:

https://codeforces.com/problemset/problem/1620/B


b_1
(w,h)
b_3
b_4
(0,0)
b_2

A ⇒ A x 2 → ans Output

$$\text{Area}(\Delta) = \frac{1}{2} \times b \times h$$

$$2A = (b \times h) \Rightarrow \text{integer}$$

$O(n \log n)$

$O(n)$

$O(n^2)$ X

$$2A = b \times h$$

base ↑ height ↑

$$(b_1 \times h,\ b_2 \times h,\ b_3 \times w,\ b_4 \times w)$$

longest value = ans

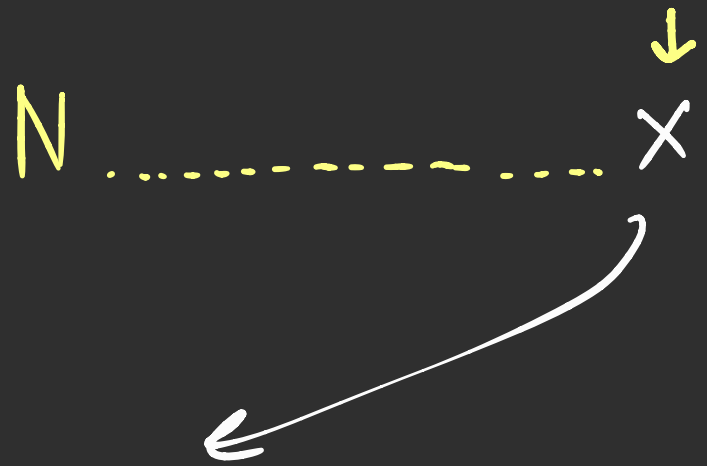
Problem 3

Fair Numbers:

https://codeforces.com/problemset/problem/1411/B

Fair numbers = divisible by each digit in it

102 % 2 == 0
102 % 1 == 0



which is fair

N = 232 .... 288 → X

$$\text{ops/testcase} = \frac{2 \times 10^8}{103} = \underline{\underline{2 \times 10^5}}$$

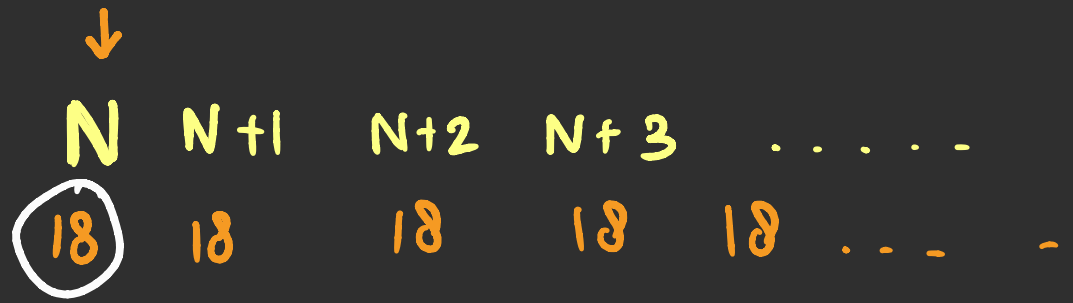
$N \approx 10^{18}$

$O(1)$

$O(\log)$ . ... ✓

else

TLE ✓



limit

2520 no.s after "N"

Check if N is fair

→ go to every digit

→ N % digit == 0

$O(18) \simeq O(1)$

$18 \times 2520 \simeq 4 \times 10^4$

Starter 174 - CC

GCD Min Size

Super fair -

a no. divisble by
all digits from 1 to 9

Think (LCM)

2520 → super fair

↳ lowest

2520 2x2520 3x2520 4x2520 ....

$k * 2520$

↳ multiple is the series

of SUPER FAIR NUMBERS