Let's start at 9:02 - 9:04PM

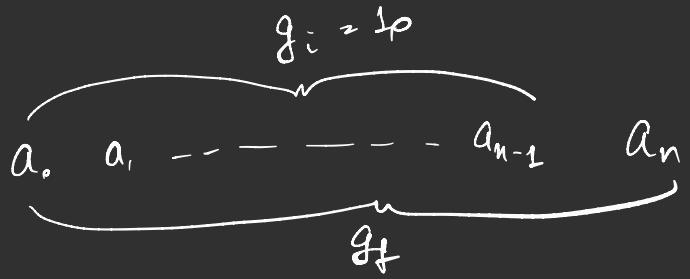
L52
Number Theory Problem Solving - 1

Join Discord - https://bit.ly/ly-discord

RECAP

1. Min Deletions

$g_f = \gcd(g_i, a_n)$



A) $g_f \geq 10$

C) $g_f > 10$

B) $g_f \leq 10$

D) $g_f < 10$

E) Don't know

a number is added

gcd

a number is removed

gcd

$a_0\ a_1\ a_2\ a_3\ a_4\ a_5\ a_6\ a_7\ a_8\ a_9$

$a_9 \geq a_{10}$

2. Sup Pow

$b = [2, 1, 5, 3, 4]$

a^{21534}

$20000 + 1000 + 500 + 30 + 4$

$\Rightarrow a$

$\Rightarrow a^{20000} * a^{1000} * a^{500} * a^{30} * a^{4}$

$\Rightarrow (a^{10000})^{2} * (a^{1000})^{1} * (a^{100})^{5} * (a^{10})^{3} * (a^{1})^{4}$

$$(a * a) \% m \Rightarrow \left((a \% m) * (a \% m)\right) \% m$$

$$(a * a * a * a * a * a) \% m \Rightarrow \left((a \% m) * (a \% m) * (a \% m) * \cdots\right) \% m$$

$$\left(a^b\right) \% m \Rightarrow \left((a \% m)^b\right) \% m$$

$a = 2$

$\Rightarrow (a^{10000})^2 * (a^{1000})^1 * (a^{100})^5 * (a^{10})^3 * (a^1)^4$

$ans = 2^4 * (2^{10})^3 * (2^{100})^5 * (2^{1000})^1 * (2^{10000})^2$

$a = 2^{100000}$

$\Rightarrow 2^{21534} \mod m$

$b = [2, 1, 5, 3, 4]$

3. Largest GCD

N = 5

[3, 14, 15, 7, 9]

(14, 15) ⇒ 1 | (15, 7) ⇒ 1

(14, 7) ⇒ 7 | (15, 9) ⇒ 3

(14, 9) ⇒ 1 | (7, 9) ⇒ 1

(3, 14) ⇒ 1

(3, 15) ⇒ 3

(3, 7) ⇒ 1

(3, 9) ⇒ 3

1 to 10^6 ⟹ ans = [1, 10^6]

2

$L \log L$

N = 5

[3, 14, 15, 7, 9]

gcd(15) ⇒ 1

gcd(14) ⇒ 1

13 ⇒ 0

12 ⇒ 0

11 ⇒ 0

10 ⇒ 0

9 ⇒ 1

8 ⇒ 0

7 ⇒ 2

{

9 : 1

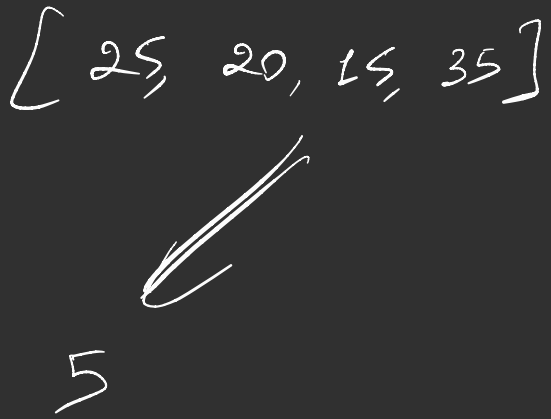
7 : 1

15 : 1

14 : 1

3 : 1

}



Thank You!

Reminder: Going to the gym & observing the trainer work out can help you know the right technique, but you'll muscle up only if you lift some weights yourself.

So, PRACTICE, PRACTICE, PRACTICE!