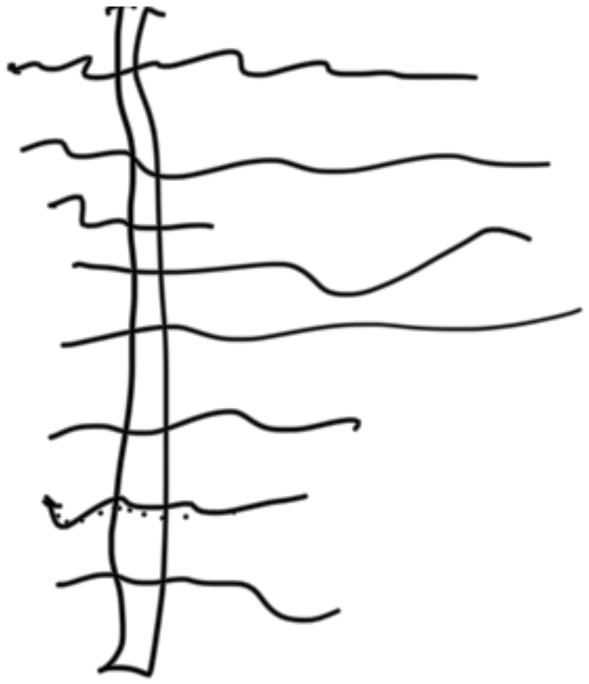
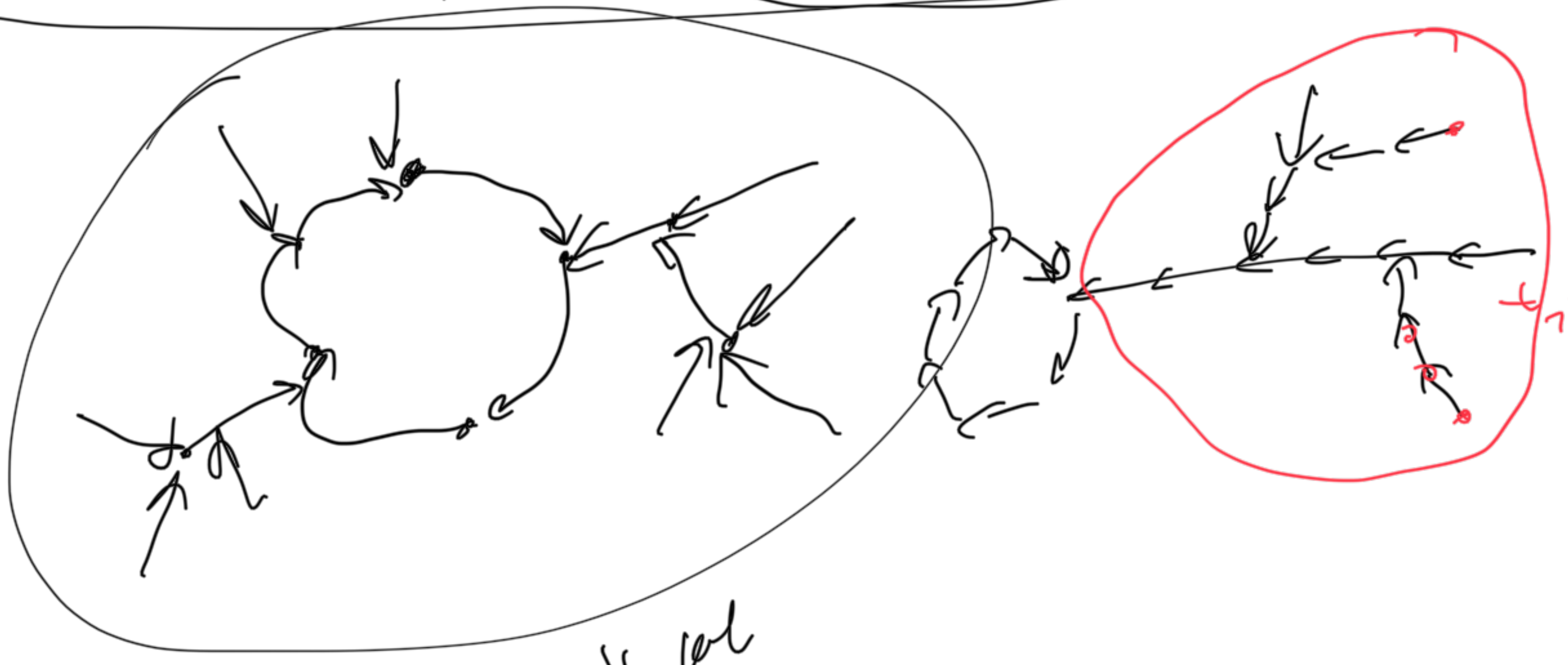
$S = \{ \dots \}$



(i, j)

log / dp

$3^i \Rightarrow S \setminus \{3\} \longrightarrow$



Sub 1 :

$LCM(c_1, c_2, \dots, c_k)$

T ⇒ là thời gian đến hết mọi ∀ đỉnh ∈ vòng

$T = \max(t_1, t_2, \dots, t_k)$

$\underbrace{\max(t_1, t_2, \dots, t_k)}$ $+$ $\underbrace{LCM(c_1, c_2, \dots, c_k)}$

độ sai số cái

AP trên Ug   Số lớn

$*$; $/$; gcd ; LCM

max

$\approx$ $+$ $-$ Min

$a = \{ \boxed{p_1 k_1 ; p_2 k_2 \cdots p_t k_t} \}$

$p_1^{k_1} \cdot p_2^{k_2} \cdots p_t^{k_t}$

$b = \{ \sim \}$

SX trộn (a, b)

$LCM = \{ \boxed{k_2 ; k_3 ; k_J \cdots} \}$

$\{ 0 \ldots 10^5 \}$

$LCM_{rem} = n$

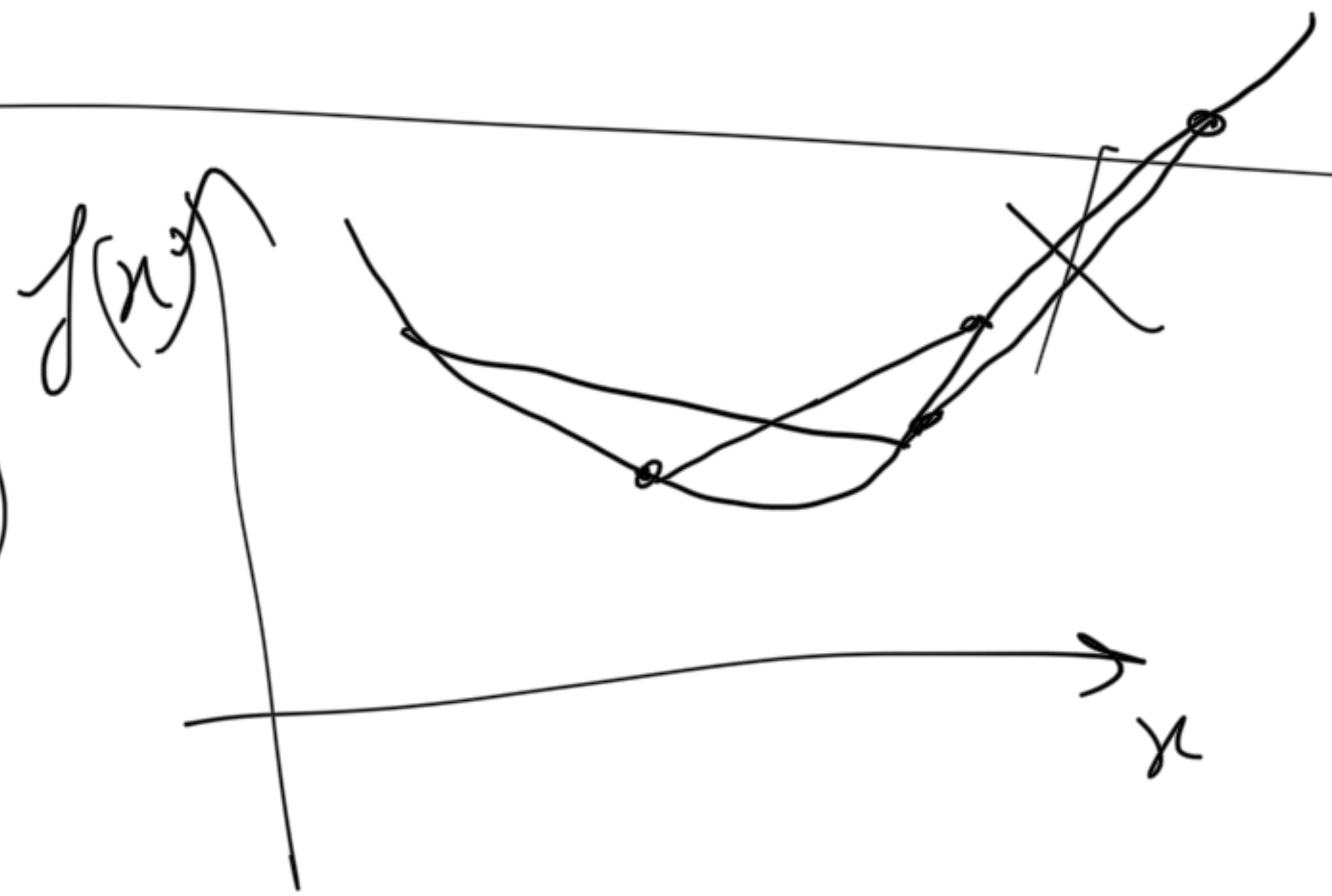
$\Rightarrow \% p$

$\% p - 1$

(+) $f(x) + g(x)$

(+) Chặt tam phân $\to$ min.

(+) Local Min = global Min



(+) $f(x, y)$ lồi

$\Rightarrow g_0(y) = f(x_0, y)$

lồi

$g(x, y_0))$

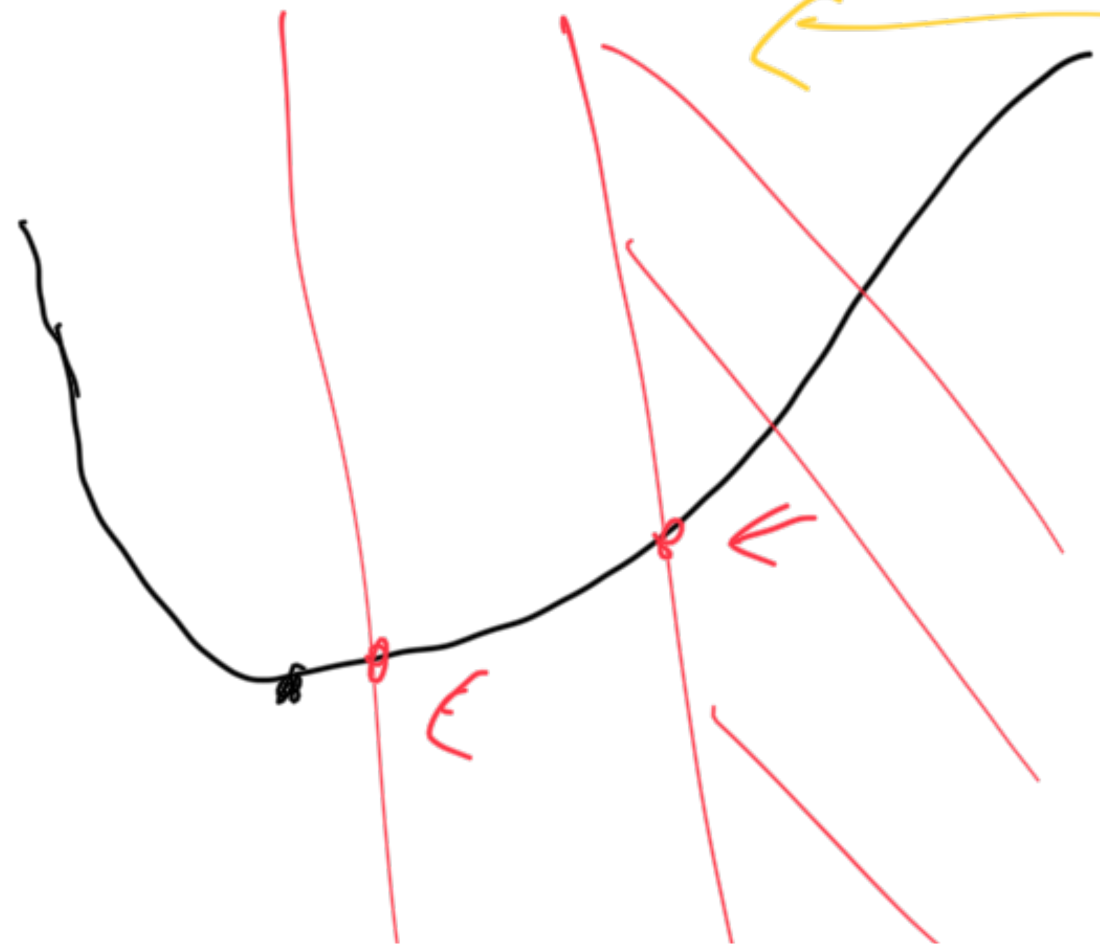
(+) $\min_{x,y} f(x,y)$

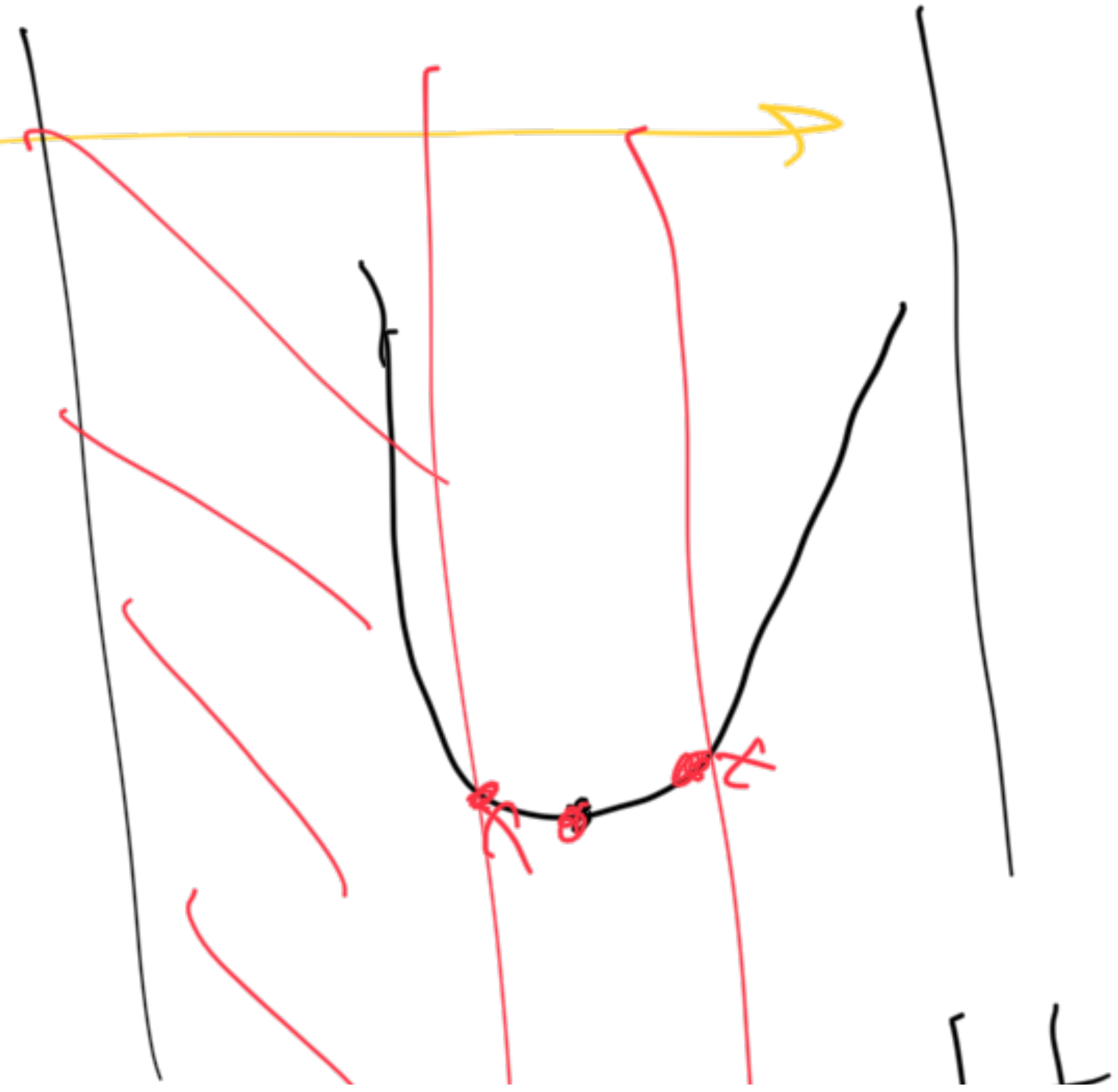
$g(x) = f(x,y)$

$= \min_x \left(\min_y (g_y) \right)$

chặt tam phân 2 lần

$\Rightarrow$





$x_0 \quad x_1$

$\log_3(n)$

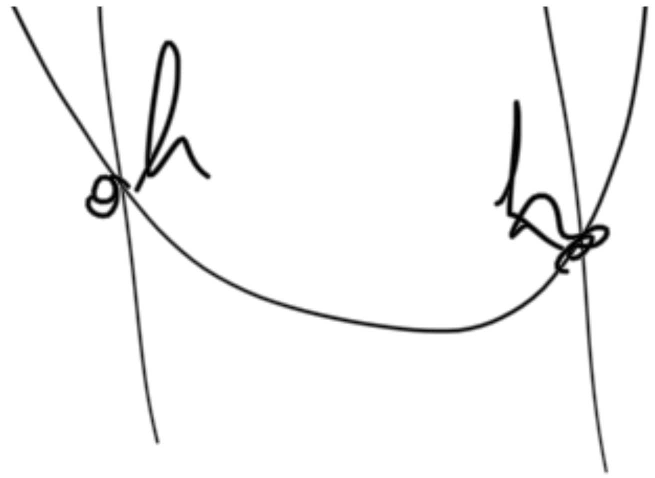
$$f(A) = d(A B_0) + d(A B_1) + d(A B_2) \ldots + d(A, B_n)$$

B_0

$O(n)$

$f(x, y, z)$

$$g(x y) = \min_z (f \, x y z)$$



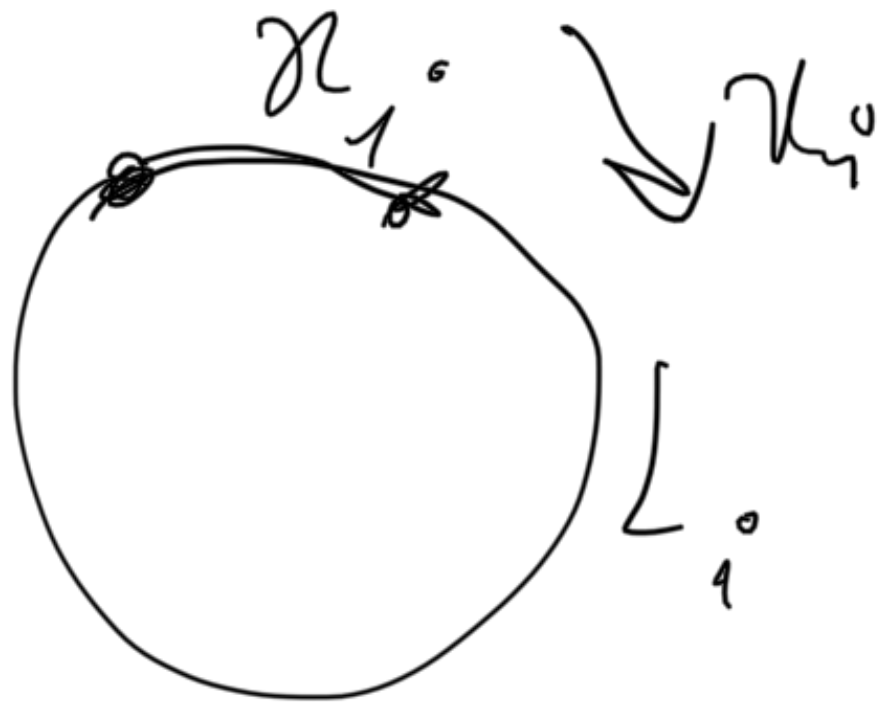
$$h(x) = \min_y g(x,y)$$

$$K_q = \min_x (h(x))$$

---

gọi x là t/g gặp.

$$(x_i + t v_i) \% L_i = 0$$



$$\boxed{\frac{x_i}{v_i}}$$

$$t v_i = x_i$$

$$\boxed{\begin{cases} x \equiv a_1 \ (L_1) \\ x \equiv a_2 \ (L_2) \\ \vdots \\ x \equiv a_n \ (L_n) \end{cases}}$$

$t = -x_i \cdot v_i^{\varphi L_i - 1}$

$a_i = \dfrac{-x_i}{v_i} (\% L_i)$

L_i là số nguyên. $L_i = P_i$

$$l_i \begin{cases} l_i \% P_i = a_i \\ l_i \% P_i = 0 \quad \forall j \neq i \end{cases}$$

$$l_i = a_i \left(p_1 p_2 \dots p_{i-1} p_{i+1} \dots p_n\right)^{-1}_{i}$$

$$l_i \% p_i = a_i$$

$$l_i \vdots p_{j \neq i}$$

$$\Rightarrow x = \left(l_1 + l_2 + \dots + l_n\right) \% P$$

với $P = p_1 p_2 \dots p_n$

$$x = \sum_{i=1}^{n} a_i \left(\frac{p}{p_i}\right)^{p_i - 1} \,\%\, p \qquad (1)$$

$$L_i = p_i^{k_i} \; ; \quad L = L_1 L_2 \cdots L_n$$

$$x = \sum_{i=1}^{n} a_i \left(\frac{L}{L_i}\right)^{\varphi(L_i)} \,\%\, L$$

Li tổ quát :

$$x \equiv a \left(p_1^{k_1} p_2^{k_2} \cdots p_t^{k_t}\right)$$

$$\Rightarrow \begin{cases} x \equiv a \,\%\, p_1^{k_1} & \left(p_1^{k_1}\right) \\ x \equiv a \,\%\, p_2^{k_2} & \left(p_2^{k_2}\right) \\ \vdots \end{cases}$$

$$k_{q_i} = ?\,a_1 + ?\,a_2 + \cdots + ?\,a_n \qquad 1^r$$

if <

f_{ijk} là số lần a_i xh ở kq$_j$ sau k ngày

$h_0 \xrightarrow{k} h_i$

$$P(x) = \left(x + \frac{1}{x}\right)\left(x^2 + \frac{1}{x^2}\right)\left(x^4 + \frac{1}{x^4}\right) \dots \left(x^{2^{k-1}} + \frac{1}{x^{2^{k-1}}}\right)$$

$\Rightarrow$ hệ số của x^i $\quad (i \% n)$

Đặt $y = x^2$

$$P(x) = \frac{1}{x \cdot x^2 \cdot x^4 \cdots x^{2^{k-1}}} \left(y+1\right)\left(y^2+1\right)\left(y^4+1\right)\cdots\left(y^{2^{k-1}}+1\right)$$

$Q(y)$

Q: Chọn cả bi cho 1 số k bit.

$\Rightarrow$ có bao số có k bit mà $\equiv i \pmod{n}$

$$\Rightarrow \left\lfloor \frac{2^k - i}{n} \right\rfloor = Q_i$$

$$ans_i = \sum a_j \cdot \left(\lambda_j \xrightarrow{k} \lambda_i \right)$$

q_i

$x_0 \xrightarrow{k} x_i$

$= \sum a_j \left(x_0 \to (i-j) \right)$

p_i

$ans(x) = p(x) \cdot a(x)$

$a(x)$

$y = x^2$

$a'(y)$

$a'_i = \frac{a_i}{2}$

$y = x^2$

$Q \cdot a'$

$a'(y)$

$y \to x$

$ans_i = \sum a_j \left(x_j \xrightarrow{k} x_i \right)$

$$a_j \left(X_0 \longrightarrow X_{i-j} \right)$$

$$\sum a_j Q_{i-j}$$

$$\Leftrightarrow \; ans_i x^i = x^i \sum a_j Q_{i-j}$$

$$\Leftrightarrow \; ans_i x^i = \sum a_j x^j Q_{i-j} x^{i-j}$$

$$\Rightarrow \; ans(x) = a(x) \cdot Q(x)$$