

$$p = \frac{\exp(\underline{w} \cdot \phi(x, y))}{\sum_{y'} \exp(\underline{w} \cdot \phi(x, y'))}$$

$$L = \sum_i \log p(y_i | x_i; \underline{w})$$

$$\frac{\partial L}{\partial \underline{w}} = \sum \left(\frac{1}{p} \right)$$

$$\underline{\sum \partial (w \phi - \log(\sum_{y'} \exp(w \phi)))}$$

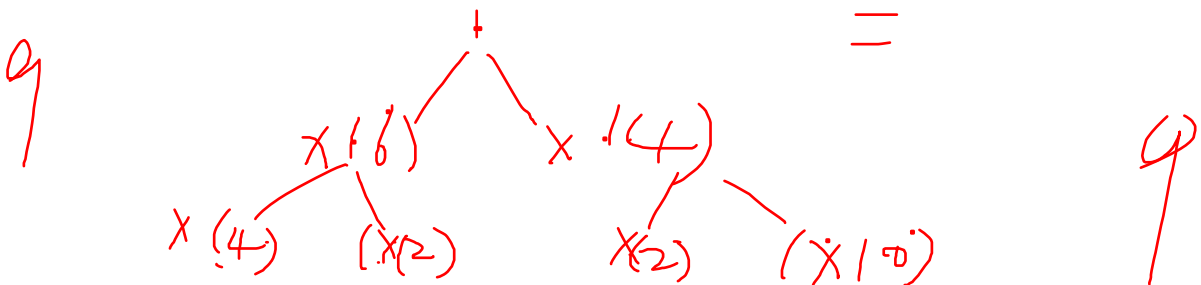
$$= \sum (\phi_j -$$

$$\begin{aligned}
 & \log \sum_{y'} (\exp(w\phi)) \\
 &= \frac{\sum_{y'} \exp(w\phi) \cdot \phi_j}{\sum_{y'} \exp(w\phi)} \\
 &= P(\phi_j)
 \end{aligned}$$

```

static int x(int n)
{
    if (n <= 3)
        return 1;
    else
        return x(n - 2) + x(n - 4) + 1;
}
    
```

x(8)
=



$$\bar{I}/u^S = S \cdot \text{vol}$$

$$V = U \oplus U^2 \oplus \dots \oplus U^k$$

$$\rightarrow \text{II} \quad I([a, b]) = [I(a), b] + [a, I(b)]$$

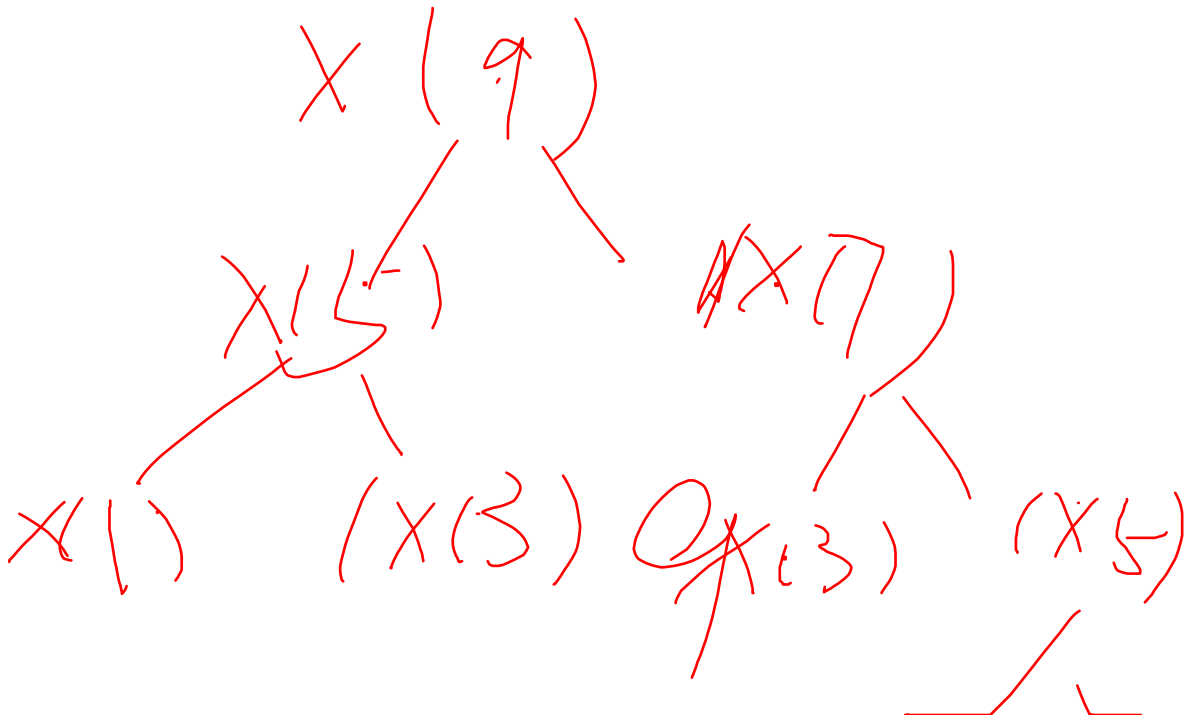
$$a \in U^{a_1}$$

$$b \in U^{a_2}$$

$$\cancel{\mathbb{Z}} \quad a \in U^2$$

$$([u, u], u) \in u^3$$

$$[[u, u], [u, u]]$$



X(11) (13)

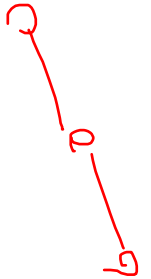
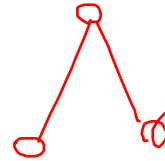
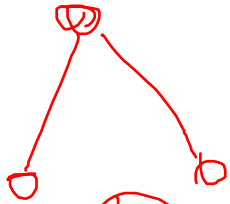
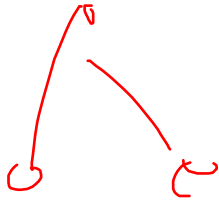
$$g = c'(y) \oplus v$$

$$z(y) = c'(g) \oplus u$$

$$g = c(g) \oplus u \oplus w$$

$$h \stackrel{\Delta}{=} c'(y) \oplus w$$

$$z(h) = c'(g)$$

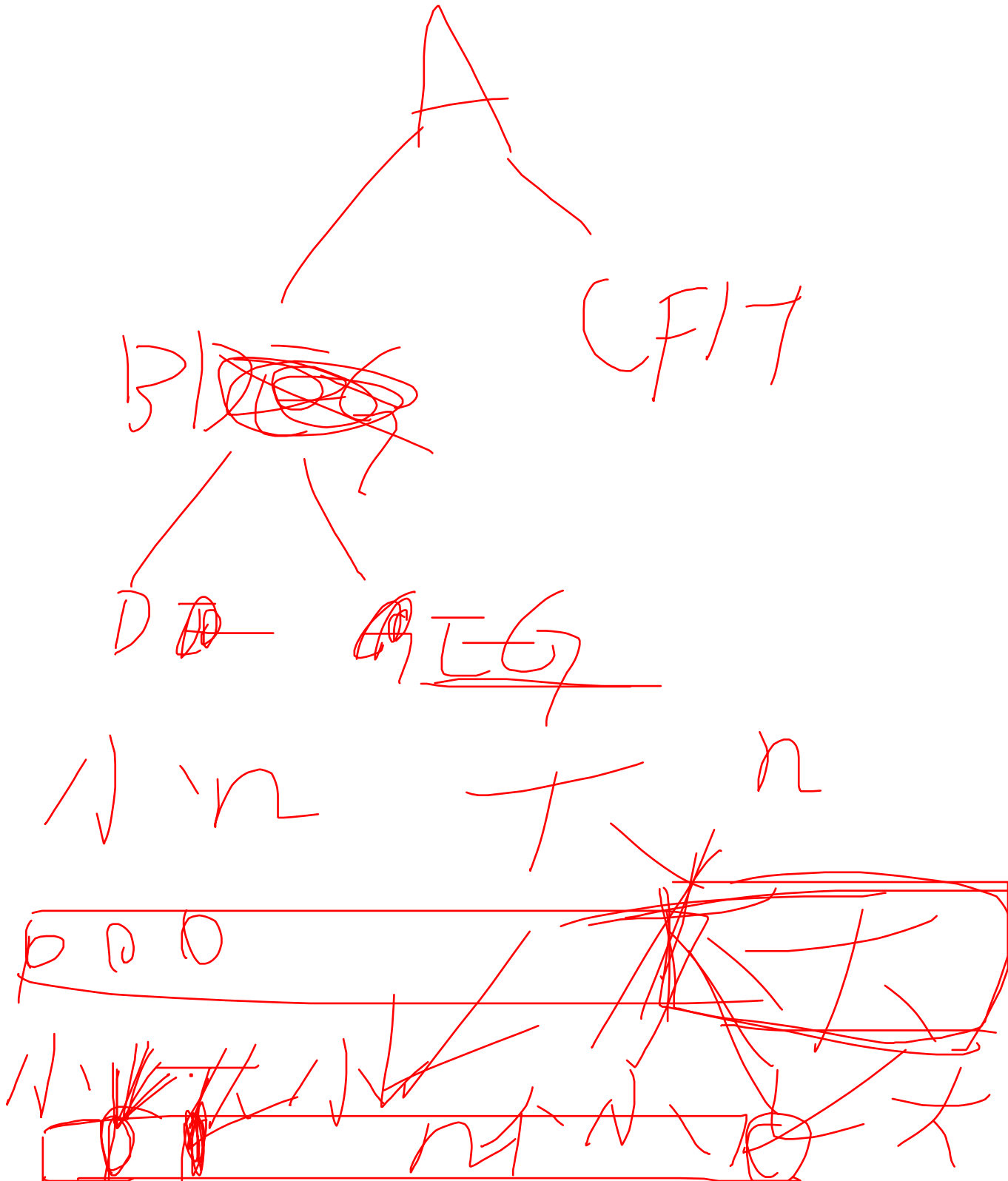


① 左 右

左 右

左

左 右



$$n! \times (n) \times (n-1)$$

$$n = 2 \quad \checkmark$$

$$n = 4$$

~~A B~~

C D

① 6

② 2

③ 12

A B C D

~~2 x 2 x 2~~

④ $5! / 2! = 3 \times 4 \times 5 = 60$

$$1000 = 1000$$

~~$= 499 + 500$~~

~~$\frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ 0 & 1 \end{pmatrix}$~~

$$= 51$$

$= 13$

$$2 \sqrt{100} =$$

$$2 \quad \boxed{5 \rightarrow 0} = 5 \times 5 \times 4$$

$1000 = 2 \times 5 \times 100$

128

1

5

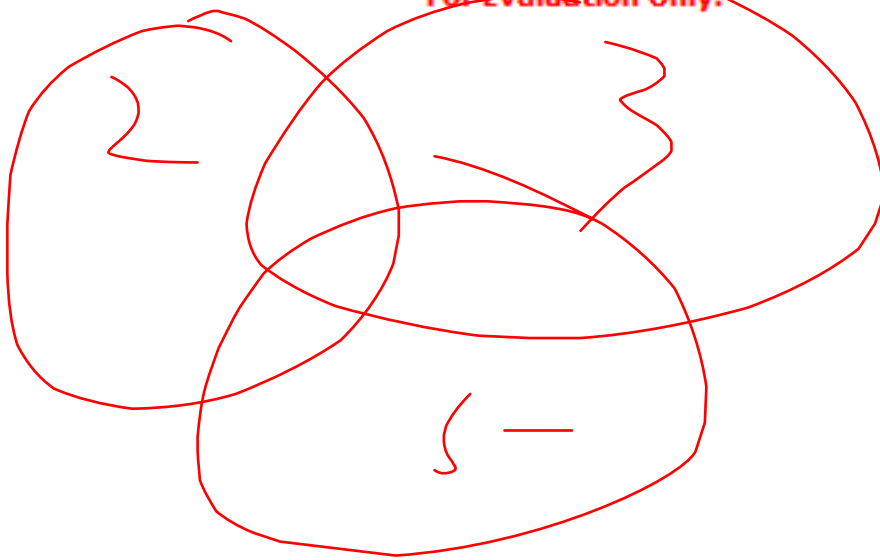
$5 \times 5 \times 5 \times 5$

$2 \times 3 \times 5$

2042

$2^0 \times 3^0 \times 5^0$

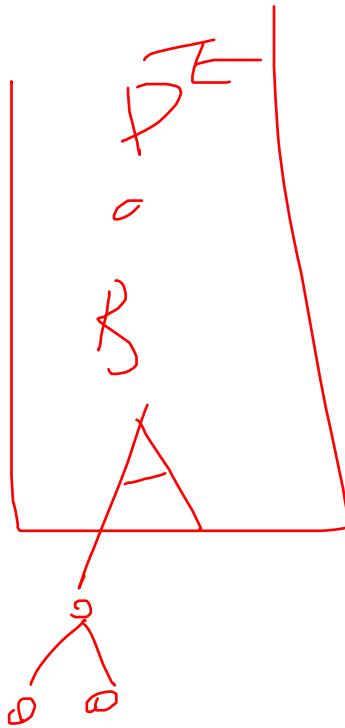
$2 \times 3 \times 5 \times 7 \times 11 \times 13 \times 17 \times 19 \times 23 \times 29 \times 31 \times 37 \times 41 \times 43 \times 47 \times 53 \times 59 \times 61 \times 67 \times 71 \times 73 \times 79 \times 83 \times 89 \times 97$



$$20 \ 40 \text{ — } \overline{10}$$

$$\begin{aligned} & 1020 + 680 + 408 \\ & - \{40 \text{ — } 1\} 6 - 204 + 68 \\ & = 1496 \quad 20 \ 40 \end{aligned}$$

$$\begin{aligned} & 2042 \quad 2043 \quad 2044 \\ & \quad \quad \quad \underline{2045} \end{aligned}$$



$$360$$

$$1 + 2 + 4$$

$$2^0 + 2^1 + \dots + 2^8 = 360$$

$$2^{n+1} - 1 = 360$$

$$2 \left(36 \mid \frac{n+1=9}{n=8} \right)$$

180.5

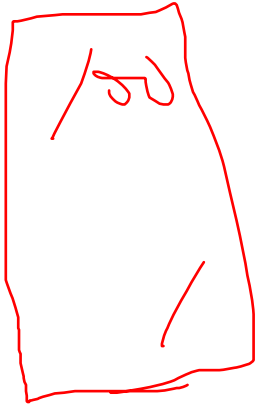
$$2^3 = 8$$

$$2^6 = 64$$

$$2^7 = 128$$

$$2^8 = 256$$

$$2^9 = 512$$



100

|

100

|

100

|

100



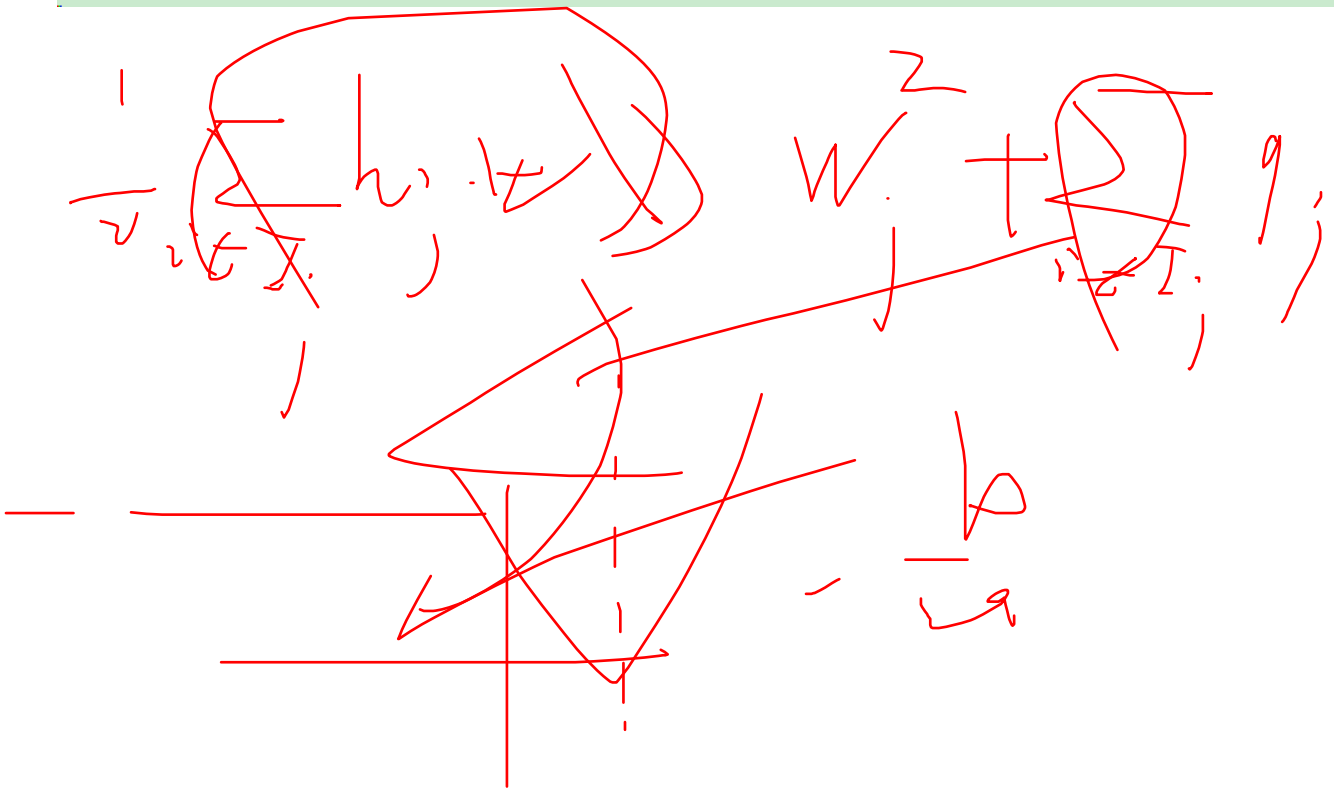
100

100



45-678 Huffman

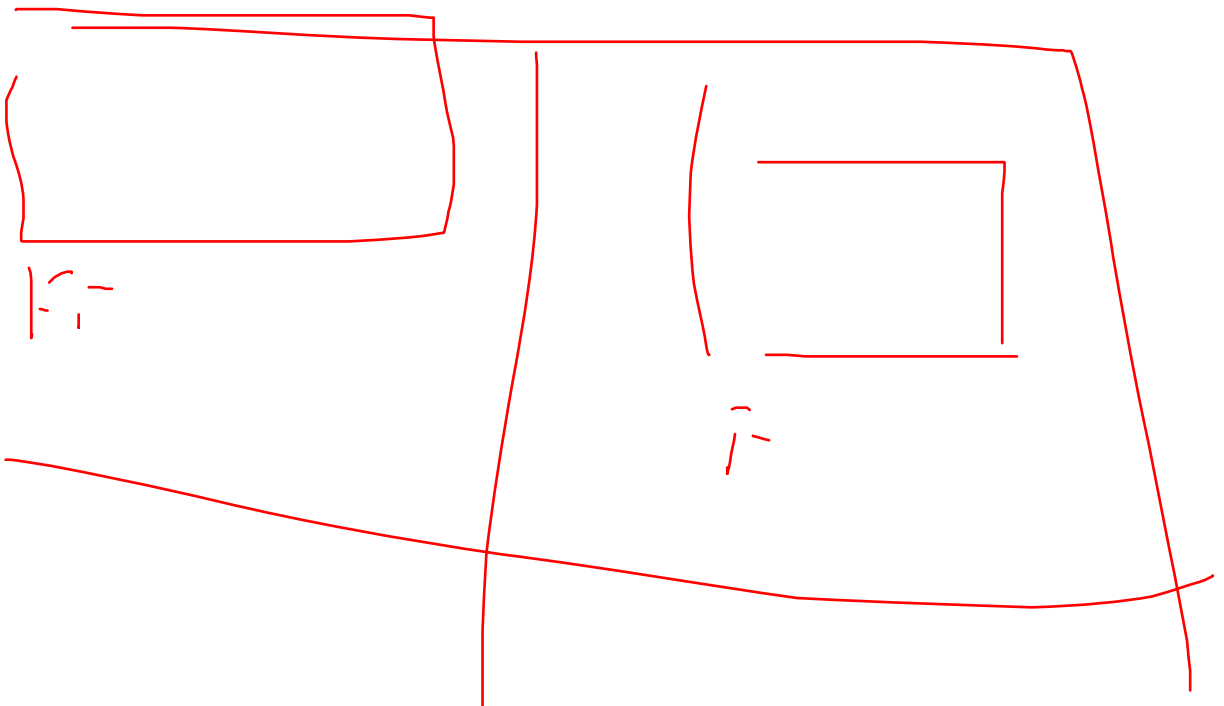
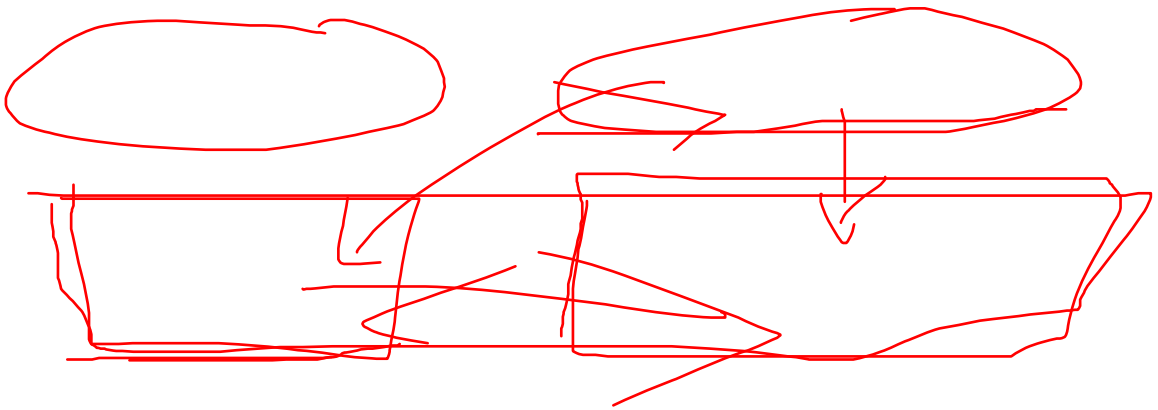
$$= \sum_{j=1}^T [(\sum_{i \in I_j} g_i) w_j + \frac{1}{2} (\sum_{i \in I_j} h_i + \lambda) w_j^2] + \gamma T$$

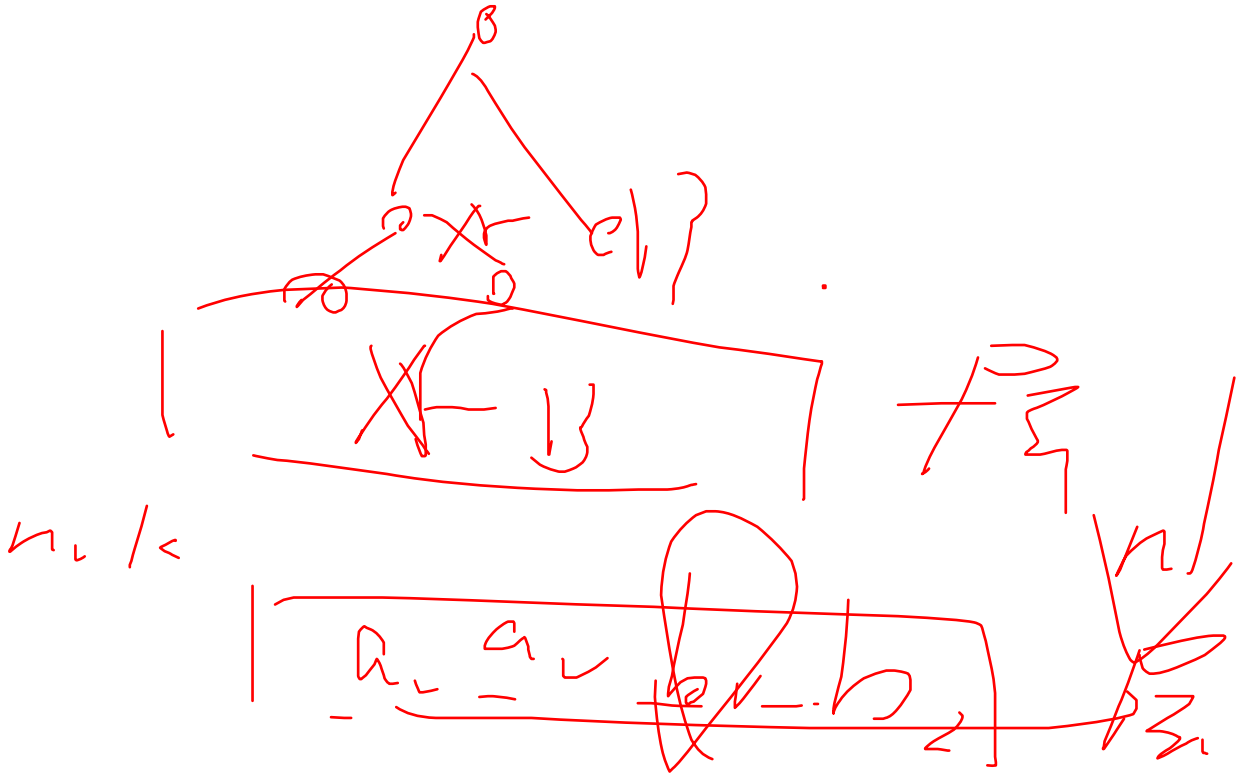


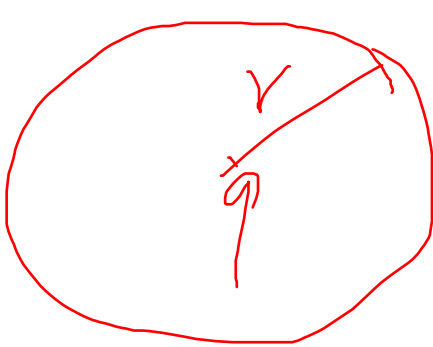
$$ax^2 + bx + c = 0$$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$\left(x + \frac{b}{2a}\right)^2 + \dots$$







M

$\cdot \checkmark$

$$q \sim x + q \sim v \checkmark \geq q \sim x$$

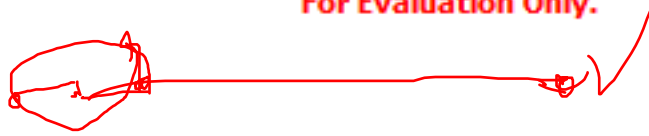
$$\cancel{\frac{1}{x}} \checkmark \leq \cancel{M}$$

$$(x, q) \leq r$$

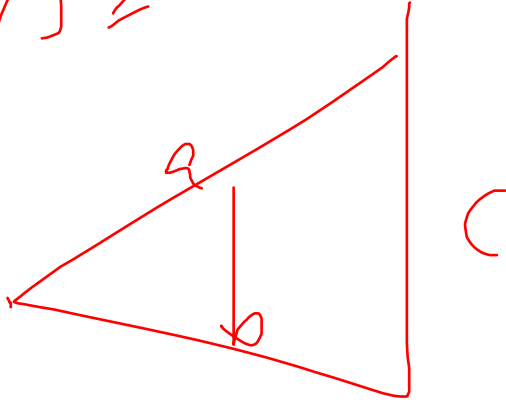
$$(q, v) \geq M - r$$

$$(q, x) \leq r$$

$$\Rightarrow (\cancel{x}, v)$$



$$(x, v) \geq$$



$$|a-c| \leq b \leq a+c$$

$$\frac{1}{2} \cdot \left[\begin{array}{l} (x, 1) \leq v \\ (x, v) \leq M \end{array} \right]$$

$$(q, v) + v \geq M$$

~~aa|bb|cc~~

aa b aab

aa = A

Ab = c

D = cc

AbAb

cc
D

~~Ab~~

a b a b a b a b

$ab = A$ $AAAAA$

$B = AA$ B

$C = BB$

C

