

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

$$L = \sum_i \log P(y_i | x_i; w)$$

$$\frac{\partial L}{\partial w} = \sum_i \left(\frac{1}{\sum_j \exp(w \cdot \phi)} \right)$$

$$= \sum_i \frac{\partial (\log(\sum_j \exp(w \cdot \phi)))}{\partial w_j}$$

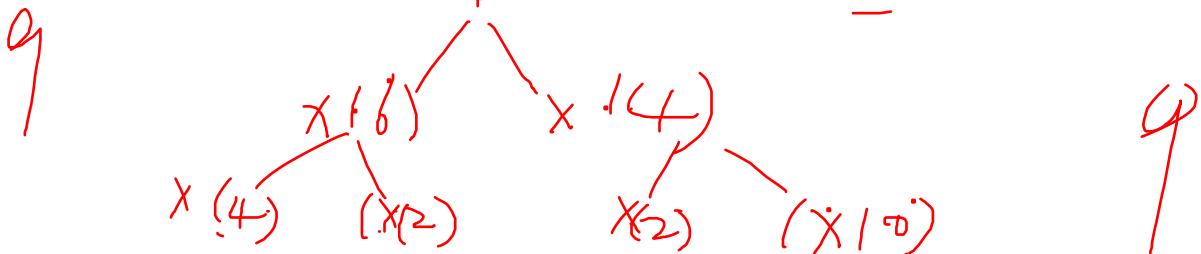
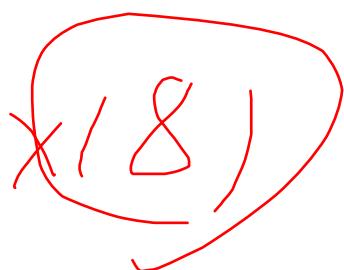
$$= \sum_i (\phi_j -$$

$$\log \sum_{y^i} (\exp(w\phi))$$

$$= \frac{\sum_{y^i} \exp(w\phi) \cdot \phi_j}{\sum_{y^i} \exp(w\phi)}$$

$$= P_i \phi_j$$

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



$$\begin{aligned} X(18) &= X(16) + X(4) + 1 \\ &= X(4) + X(2) + X(2) + X(1) + 1 \end{aligned}$$

$$\begin{aligned} &= \underline{X(2)} + \underline{X(1)} + \underline{X(2)} + \dots \\ &\quad + \cancel{\underline{X(2)}} + \cancel{\underline{X(1)}} + \cancel{\underline{X(2)}} \end{aligned}$$

$$I/u^5 = S \cdot id$$

$$N = u \oplus u^2 \oplus \dots \oplus u^k$$

$$\begin{aligned} \rightarrow I^a & \quad I([a, b]) = [I^{(a)}, b] \\ & \quad + [a, I(b)] \end{aligned}$$

$a \in U^{a_1}$

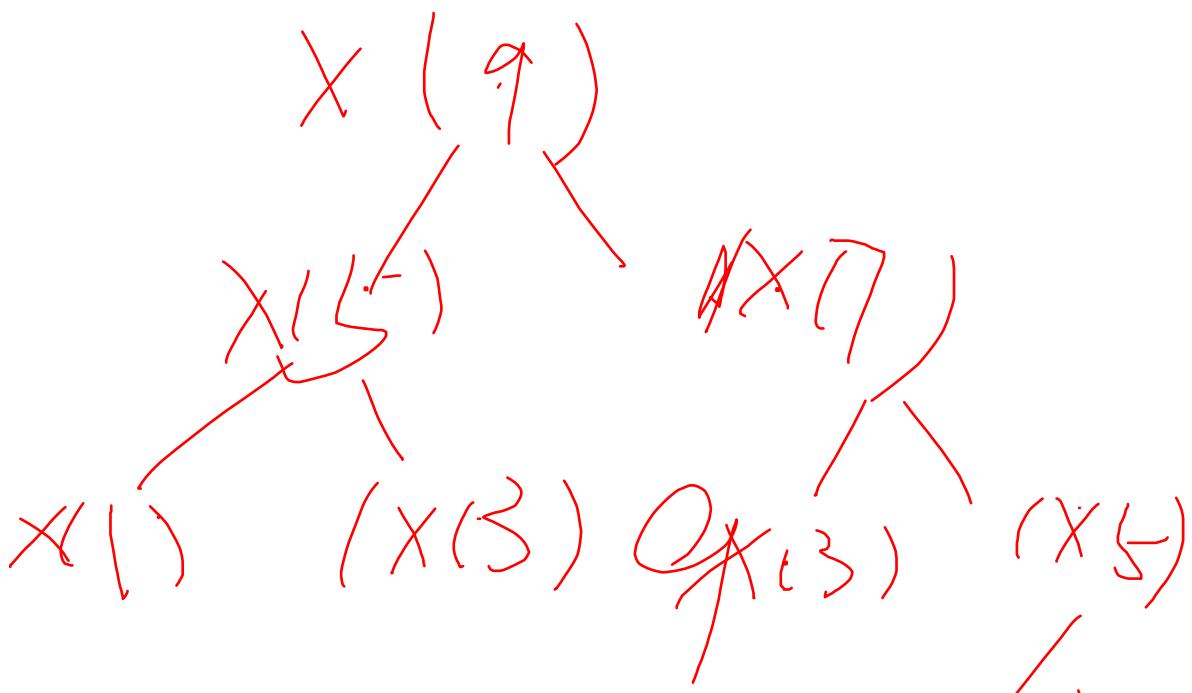
$b \in U^{a_2}$

~~NE~~

$a \in U^2$

$\underline{[U, u], u} \in U^3$

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



X(1)(\beta)

$$g = C'(g) \oplus V$$

$$Z(g) = C'(g) \oplus U$$

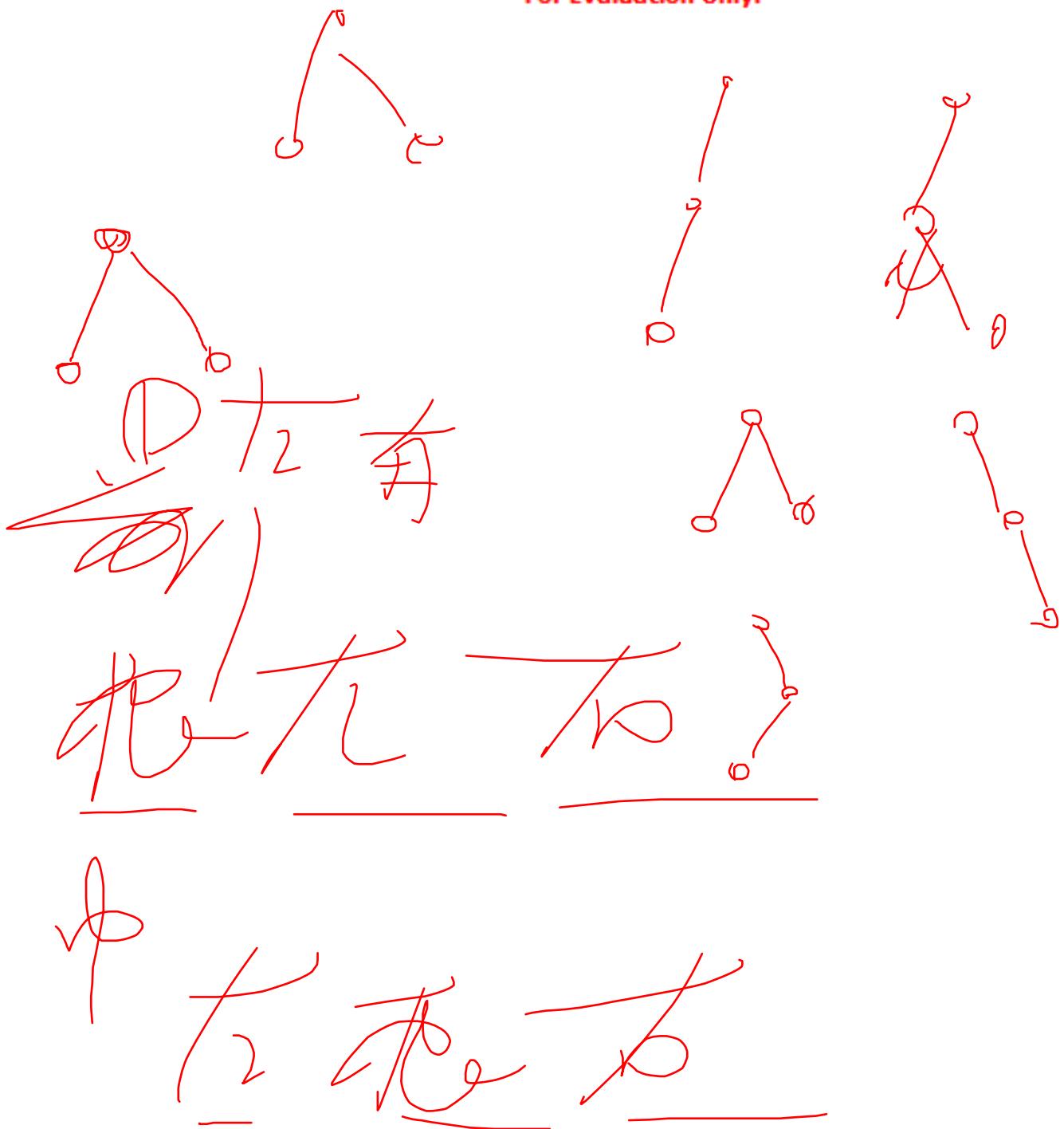
$$\mathcal{I} = C(g) \oplus U \oplus W$$

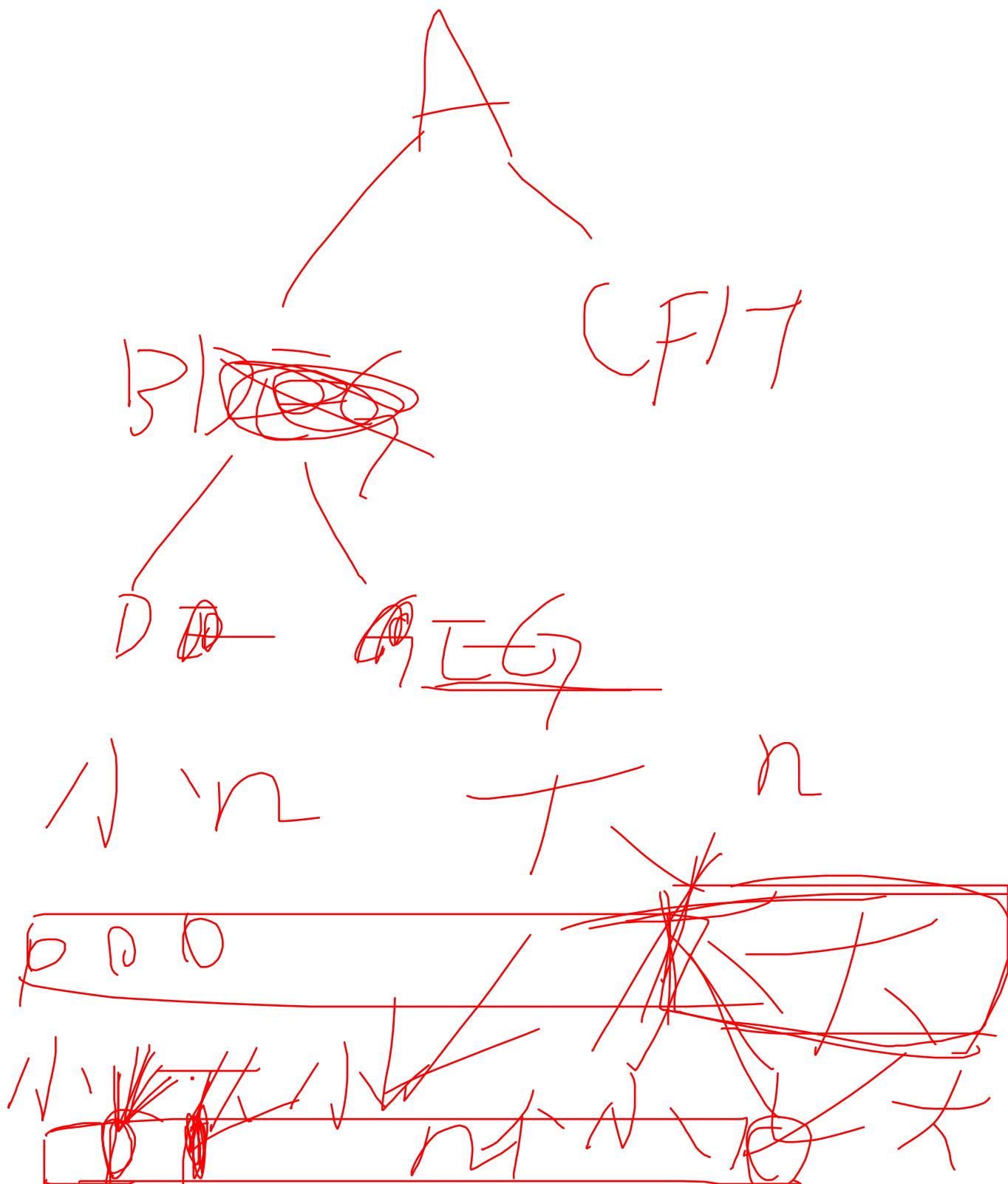
$$L \stackrel{\infty}{=} C'(g) \oplus W$$

$$Z(h) = C'(g)$$

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

$$n = 2 \quad \checkmark$$

$$n = 4$$

A B

C D

P 6

A B C D

~~B X 2 X 2~~

D 2

B 12

$$\cancel{5!} / \cancel{2!} = 3 \times \cancel{4} \times \cancel{3}$$
$$= 6 \times 6$$

$$\begin{aligned} \cancel{1000} &= \cancel{1000} \\ &= \cancel{499 + 500} \\ &= \cancel{\{223\}} \cancel{\{223\}} \\ &= 5 \leftarrow 1 \\ &= 13 \\ &= \end{aligned}$$

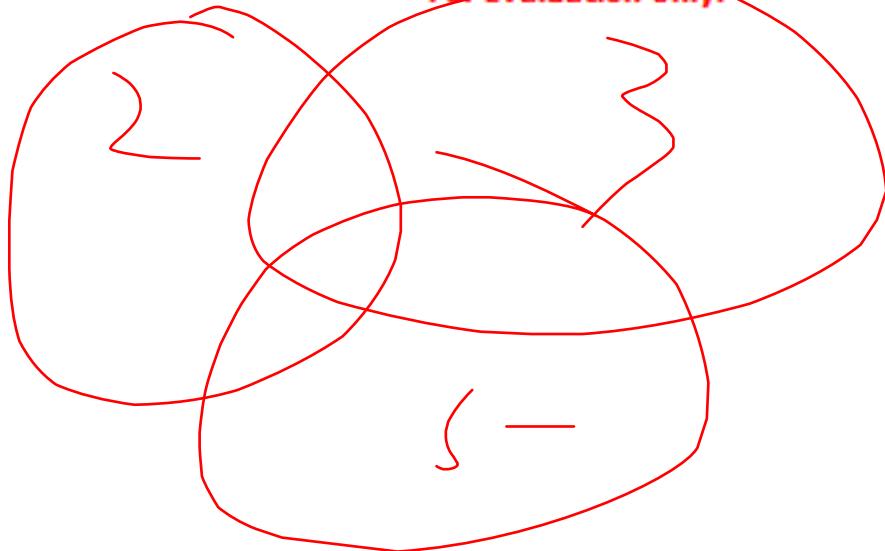
$$\begin{aligned} 2 \cancel{100} &= \\ 2 \cancel{[5 \rightarrow 0]} &= 5 \times 5 \times 4 \\ &= \cancel{+ 5} \end{aligned}$$

100
1 2 3 4 5
1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11 12
1 2 3 4 5 6 7 8 9 10 11 12

2 3 5

2042

2 3 5
X
2/3 3/5 5/3 - 6/5 - 1/5



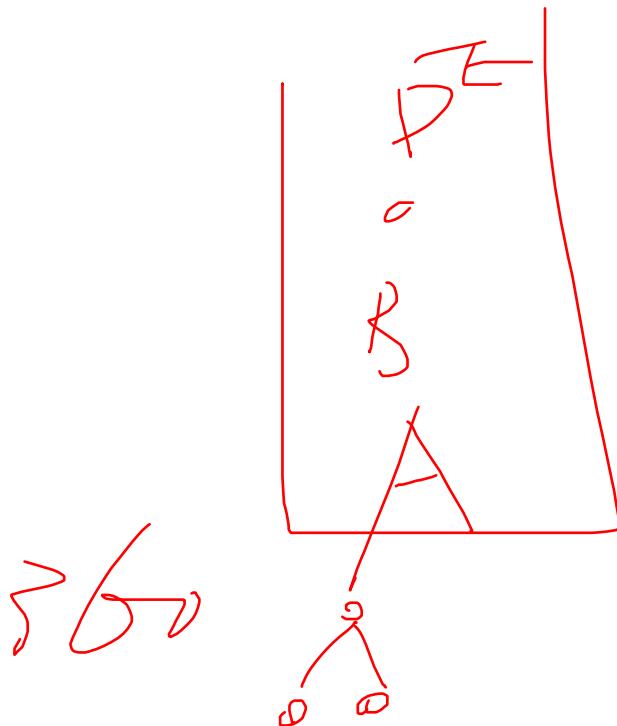
20 40 ~~15~~

$$1620 + 680 + 480$$

$$- \underline{340} + 136 \rightarrow 204 + 68$$

$$= 1496 \quad \underline{2040}$$

2042 \Rightarrow 43 204x
 \Rightarrow 41 -



$$1+2+4$$

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

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

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

180.5

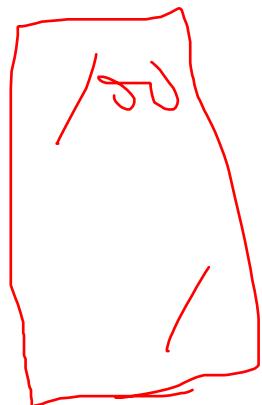
$$2^3 = 8$$

$$2 \cancel{8} = 64$$

$$2 \cancel{7} = 128$$

$$\cancel{2} \cancel{8} = 218$$

$$\begin{array}{r} 9 \\ \cancel{2} \cancel{1} = 4 \dots \\ \hline \end{array}$$



100

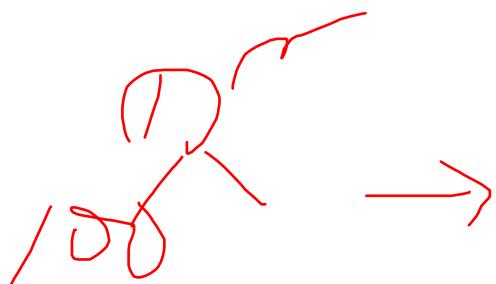
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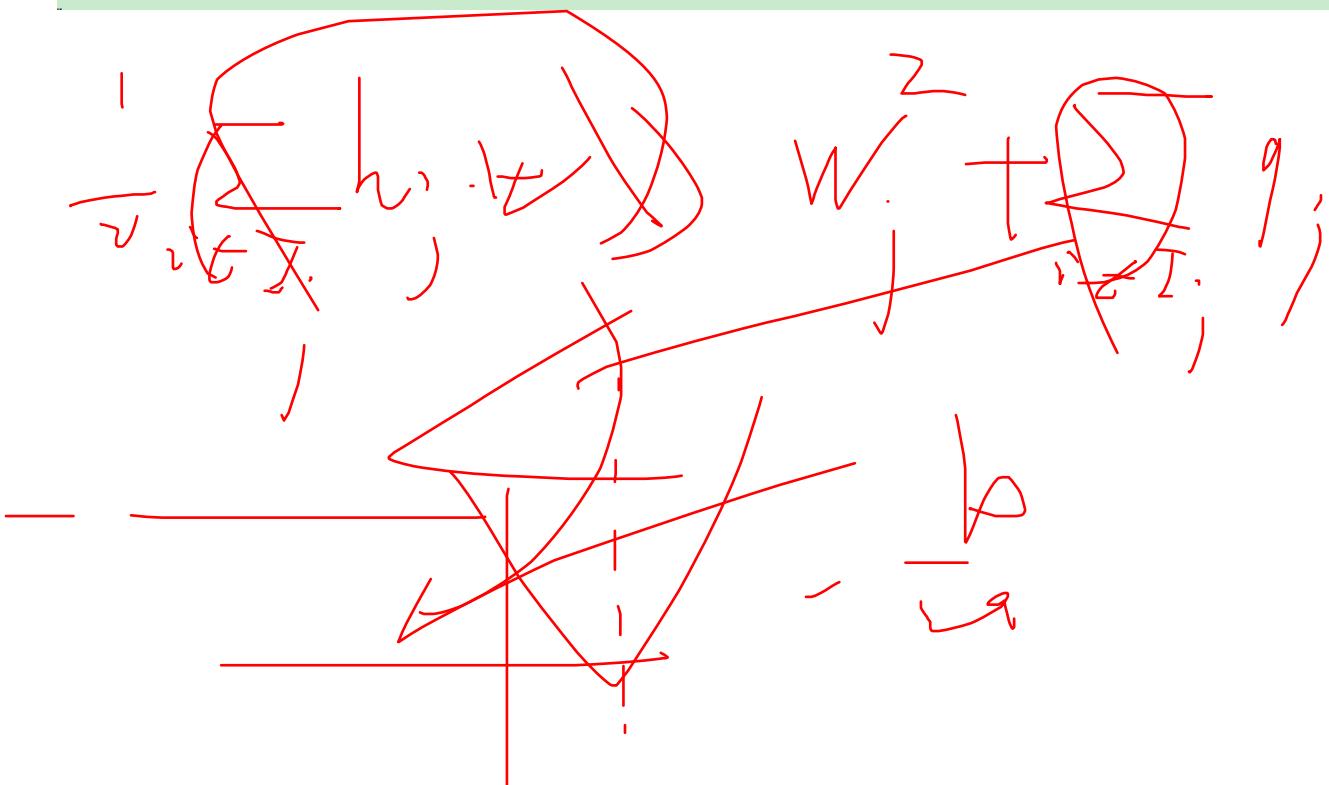


100
100
100

~~4 5 6 7 8~~

~~Huffman~~

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



$$aw + bx + c = 0$$

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

$$\left(x + \frac{b}{2a} \right)^2 + \dots = 0$$

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