

Himpunan solusi :

I { item ; item₁ , item₂ , ... , item_n .
 0 1 , ... , 1
 {x₁ , x₂ , ... , x_n} ← Himp solusi
 x_i ∈ {0, 1}

II { 0 ≤ x_i ≤ 1
 Nilai optimal : $\sum_{i=1}^n x_i p_i$

Int. KP. $\left\{ \begin{array}{l} \text{G. By profit} \\ \text{weight} \\ \text{density} \\ (R/w) \end{array} \right\}$

→ Sorting

(1) G by profit

- Sort items by profit descending
- Ambil barang yg profit paling tinggi selama kapasitas masih terpenuhi
- Kapasitas tak terganggu pd itemnya.

Total weight < Kapasitas
jika tdk ada lagi barang
yg bisa diambil

(2) G by weight

- Sort items by weight ascending
- ambil yg paling ringan
kapasitas ok.

- ③ ~~P.O.~~ by density ($\frac{\text{profit}}{\text{weight}}$)
- Sort items by density descending

Pseudocode -

Sorting by technique.

$S = \emptyset$
 $\text{sum} = 0$
 $\text{value} = 0$
for $i = 1$ to n .

if $\text{sum} + w_i \leq K$.

$S \leftarrow S \cup \{x_i\}$

atan

$x_i \leftarrow 1$.

$\text{value} \leftarrow \text{value} + p_i$

Fractional Knapsack

↳ Tujuananya $\sum \text{weight} = K$.

Greedy by density.

$$\frac{P_1}{w_1} \geq \frac{P_2}{w_2} \geq \frac{P_3}{w_3} \geq \dots \geq \frac{P_n}{w_n}$$

	w_i	P_i	P_i/w_i
1	18	25	1.4
2	15	24	1.6
3	10	15	1.5

$$K = 20.$$

Solusi $\{0, 1, \frac{1}{2}\}$

Nilai opt = 31.5

↳ 2

* 1 item₂ → $w_2 = 15$ $P_2 = 24$.

$\frac{1}{2}$ item₃ → $\frac{1}{2} w_3 = 5$ $\frac{1}{2} P_3 = 7.5$.

residu = 5

residu = 0

31.5

Masalah optimisasi

$$\left\{ \begin{array}{l} \text{Max} \\ \text{s.t.} \end{array} \right. \quad F = \sum_{i=1}^n p_i x_i$$

$$\sum_{i=1}^n x_i v_i \leq K$$

$$0 \leq x_i \leq 1 \quad \forall i=1, \dots, n$$

FKR \rightarrow G. by density.
memberi solusi opt.

Coding $\left\{ \begin{array}{l} \text{Encoding: teks} \rightarrow \text{kode} \\ \text{Decoding: kode} \rightarrow \text{teks} \end{array} \right.$

code . 101 0011

Fixed-length encoding.

Variable-length encoding.

SAMA
 ↓ ↓ ↓ ↓

S : 00
 A : 01
 M : 11

0001101 →

0001101
 S A M A

S : 0 01101
 A : 1
 M : 10

0101101
 A A M A

Huffman coding.

Karakter	a	b	c	d	e	f
Frequency	45%	13%	12%	16%	9%	5%

Fixed-length:

Encoding | 000 001 010 011 100 111

Prinsip HC.

↳ Encoding based on frequency

Greedy : karakter diurut berdasar
kan frekuensi

AMABBCMADE

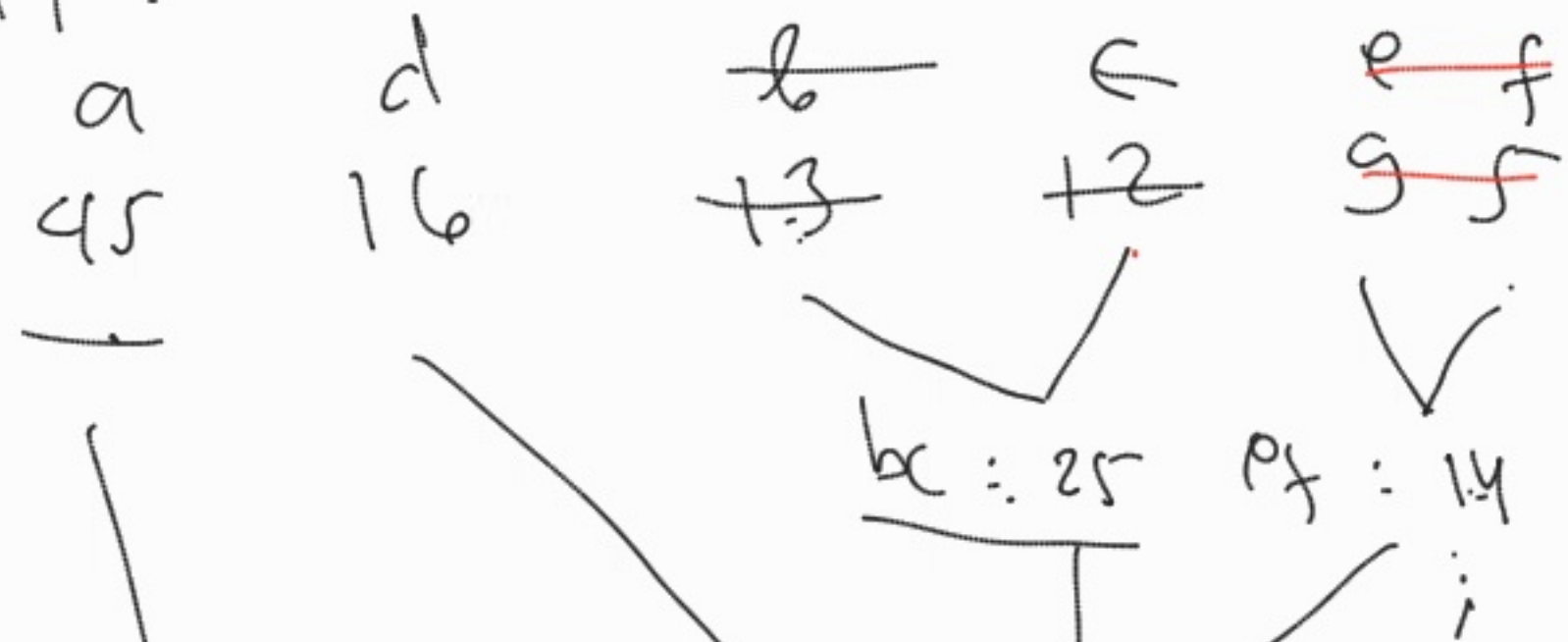
A : C : E :

B : D :

Coding tree,

- * Karakter yg muncul paling sering / freq. terbesar \Rightarrow encode dg menggunakan kode yg pendek
- * Karakter yg jarang muncul \Rightarrow kode yg panjang

Char	a	b	c	d	e	f	
freq	15	13	12	16	9	5	→ 100



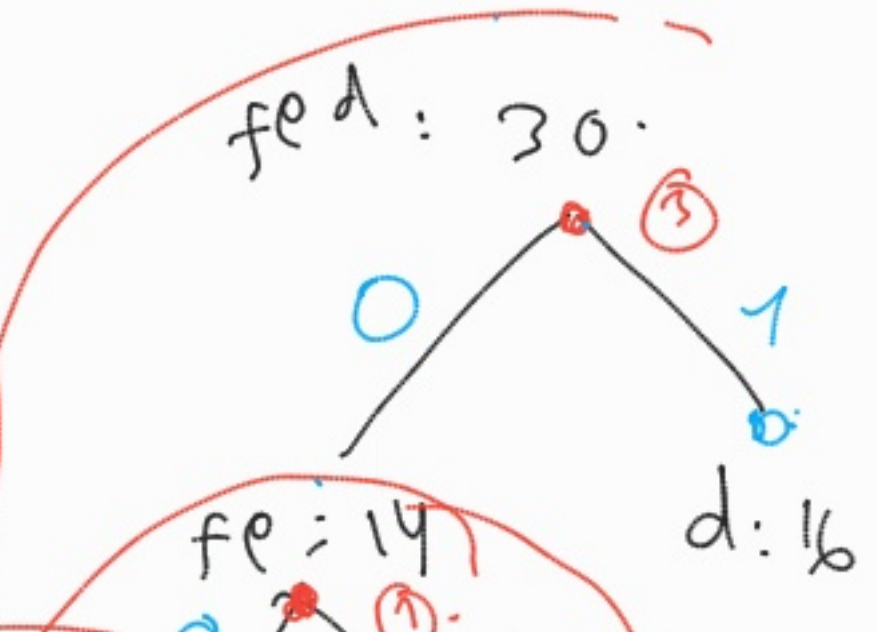
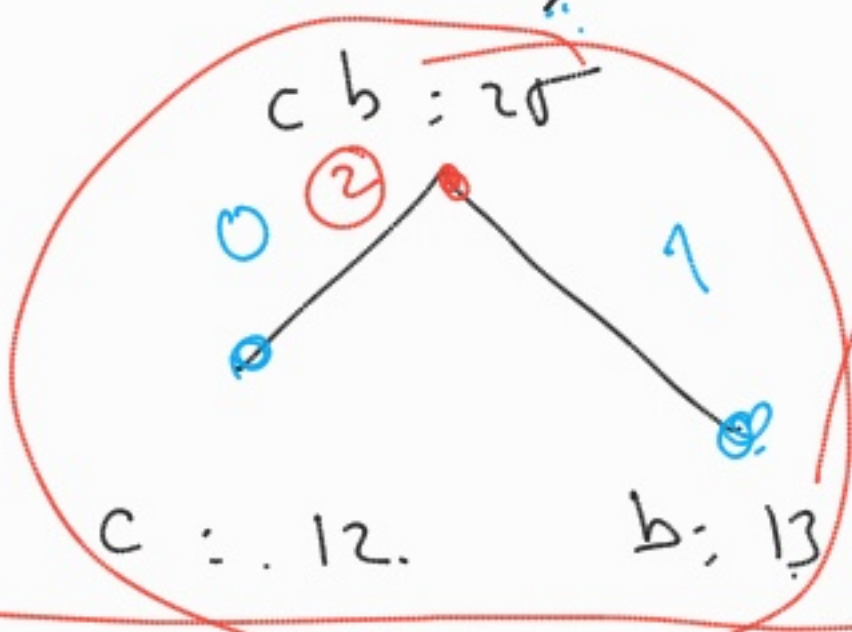
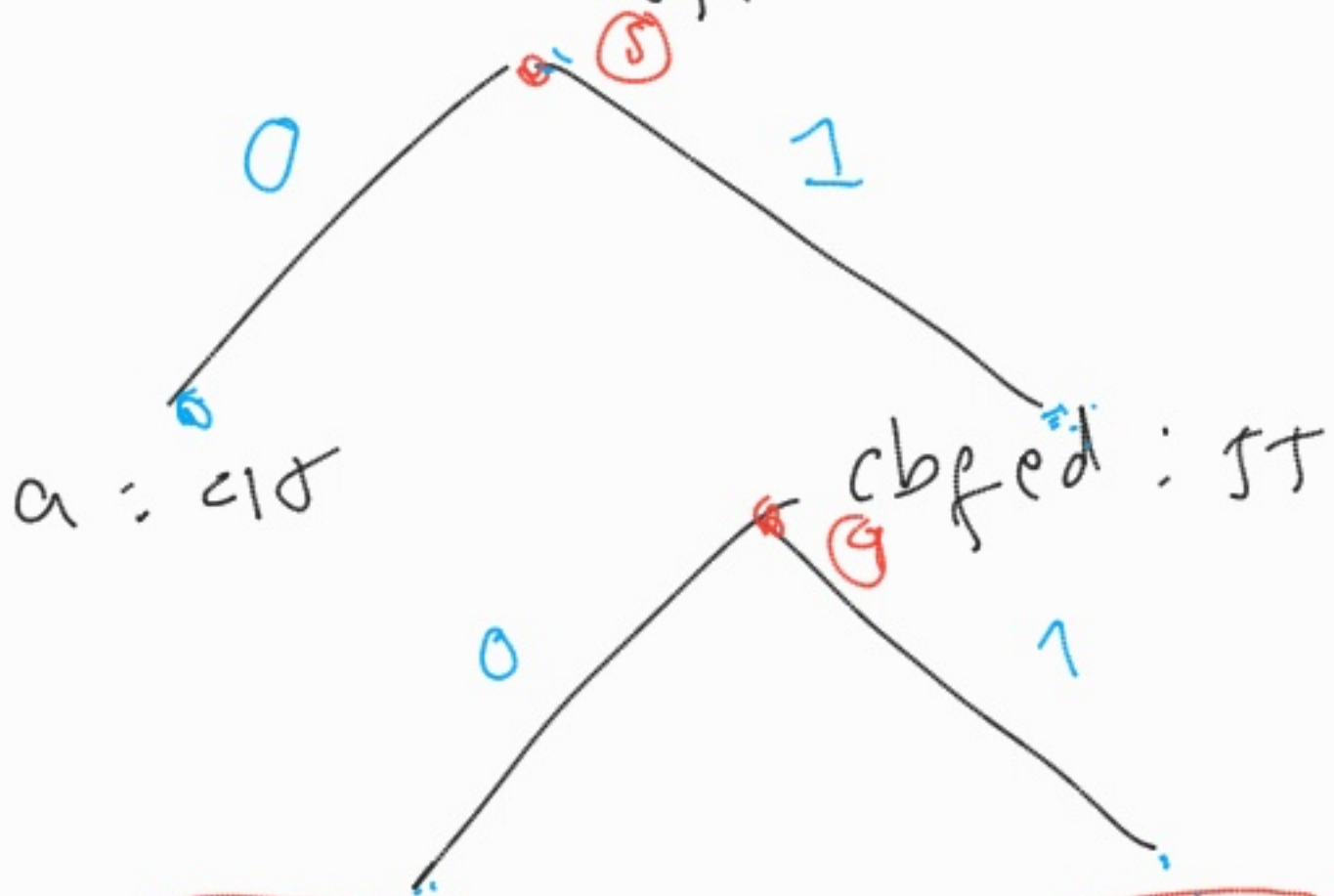
efd :: 30

bc efd :: 55

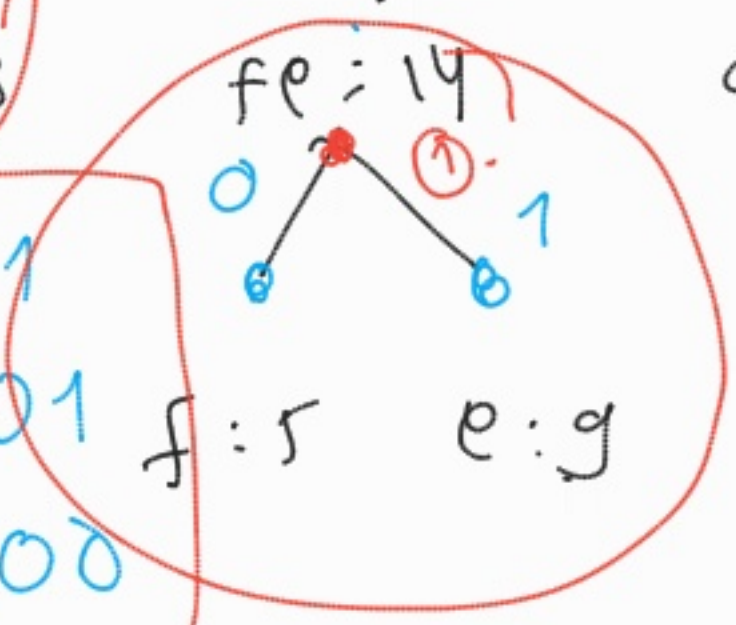
abc efd :: 100

child node (left / right)

acbfed : 150.



41
 11
 12
 a : 0
 b : 101
 c : 100
 d : 111
 e : 1101
 f : 1100



f : 5 e : 9