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1 (a) 1122, $(A_1 (A_2 (A_3 A_4)) A_5)$

(b) B = 6

C = 16

	A_1	A_2	A_3	A_4	A_5
Dim	30 X 6	6 X 20	20 X 16	16 X 20	20X10

	1	2	3	4	5
1	0	3600 (1)	4800 (1)	7440 (1)	6840 (1)
2		0	1920 (2)	3840 (3)	5040 (5)
3			0	6400 (3)	6400 (3)
4				0	3200 (4)
5					0

$m[1,2] = A_1 \cdot A_2 = 3600$ (30 X 6 X 20)

$m[2,3] = A_2 \cdot A_3 = 6 \times 20 \times 16 = 1920$

$m[3,4] = A_3 \cdot A_4 = 20 \times 16 \times 20 = 6400$

$m[4,5] = A_4 \cdot A_5 = 16 \times 20 \times 10 = 3200$

$m[1,3] = A_1 \cdot A_2 \cdot A_3 = \min\{\alpha, \beta\} = \alpha$

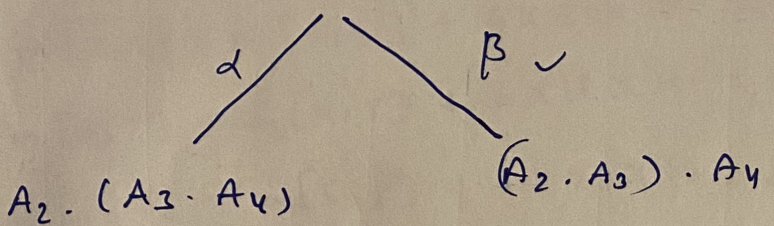
α / \ β

$A_1 \cdot (A_2 \cdot A_3)$ $(A_1 \cdot A_2) \cdot A_3$

$\alpha = m[1,1] + m[2,3] + 30 \times 6 \times 16 = 0 + 1920 + 2880 = 4800$ ✓

$\beta = m[1,2] + m[3,3] + 30 \times 20 \times 16 = 3600 + 0 + 9600 = 13200$

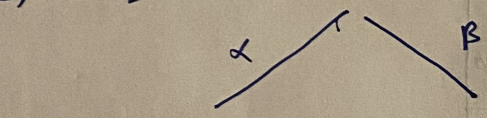
$m[2,4] = A_2 \cdot A_3 \cdot A_4 = \min(\alpha, \beta) = \beta$



$\alpha = m[2,2] + m[3,4] + 6 \times 20 \times 20 = 0 + 6400 + 2400 = 8800$

$\beta = m[2,3] + m[4,4] + 6 \times 16 \times 20 = 1920 + 0 + 1920 = 3840$ ✓

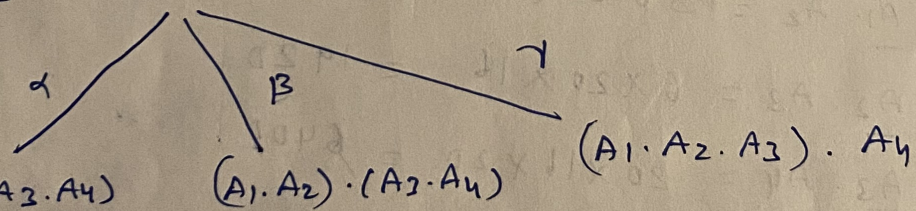
$m[3,5] = A_3 \cdot A_4 \cdot A_5 = \min\{\alpha, \beta\} = \alpha$



$\alpha = m[3,3] + m[4,5] + 20 \times 16 \times 10 = 0 + 3200 + 3200 = 6400$

$\beta = m[3,4] + m[5,5] + 20 \times 20 \times 10 = 6400 + 0 + 4000 = 10,400.$

$m[1,4] = A_1 \cdot A_2 \cdot A_3 \cdot A_4 = \min\{\alpha, \beta, \gamma\} = \alpha$

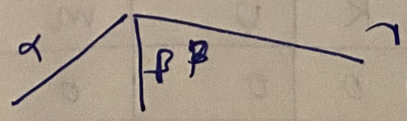


$\alpha = m[1,1] + m[2,4] + 30 \times 6 \times 20 = 0 + 3840 + 3600 = 7440$ ✓

$\beta = m[1,2] + m[3,4] + 30 \times 20 \times 20 = 3600 + 6400 + 12000 = 22,000$

$\gamma = m[1,3] + m[4,4] + 30 \times 16 \times 10 = 4800 + 0 + 4800 = 9600$

$m[2,5] = A_2 \cdot A_3 \cdot A_4 \cdot A_5 = \min\{\alpha, \beta, \gamma\} = \alpha$ ②



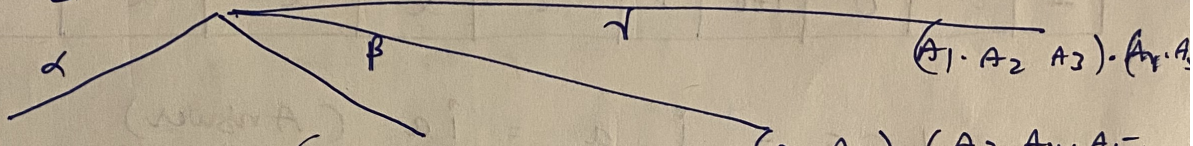
$A_2 \cdot (A_3 \cdot A_4 \cdot A_5)$ $(A_2 \cdot A_3)(A_4 \cdot A_5)$

$\alpha = m[2,2] + m[3,5] + 6 \times 20 \times 10 = 0 + 6400 + 1200 = 7600$

$\beta = m[2,3] + m[4,5] + 6 \times 16 \times 10 = 1920 + 3200 + 960 = 6080$

$\checkmark\gamma = m[2,4] + m[5,5] + 6 \times 20 \times 10 = 3840 + 0 + 1200 = \underline{5040}.$

$m[1,5] = A_1 \cdot A_2 \cdot A_3 \cdot A_4 \cdot A_5 = \min\{\alpha, \beta, \gamma, \delta\} = \alpha$



$A_1 \cdot (A_2 \cdot A_3 \cdot A_4 \cdot A_5)$ $(A_1 \cdot A_2 \cdot A_3 \cdot A_4) \cdot A_5$ $(A_1 \cdot A_2) \cdot (A_3 \cdot A_4 \cdot A_5)$

$\alpha = m[1,1] + m[2,5] + 30 \times 6 \times 10 = 0 + 5040 + 1800 = \underline{6840}$

$\beta = m[1,4] + m[5,5] + 30 \times 20 \times 10 = 7440 + 0 + 6000 = 13,440$

$\gamma = m[1,2] + m[3,5] + 30 \times 20 \times 10 = 3600 + 6400 + 6000 = 16,060$

$\delta = m[1,3] + m[4,5] + 30 \times 16 \times 10 = 4800 + 3200 + 4800 = 12,800$

From table:

$A_1 \cdot A_2 \cdot A_3 \cdot A_4 \cdot A_5$

$(A_1 \cdot (A_2 \cdot A_3 \cdot A_4 \cdot A_5))$

$(A_1 \cdot ((A_2 \cdot A_3 \cdot A_4 \cdot) \cdot A_5))$

$\boxed{6840, (A_1 \cdot (((A_2 \cdot A_3) \cdot A_4) \cdot A_5))}$

2.

		s	i	v	a	k	u	m	a
	0	0	0	0	0	0	0	0	0
b	0	0	0	0	0	0	0	0	0
u	0	0	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0	0
i	0	0	1+0	1	1	1	1	1	1
a	0	0	1+0	1	1+1	2	2	2	2
1	0	0	1+0	1	2	2	2	2	2

LCS = i, a = ia (Answer)

3. (a) No. of BST (6 keys) = $\frac{2n C n}{n+1} = \frac{12 C 6}{7} = 132$

(b)

key	1	2	3	4
key value	10	20	30	40
Freq	6	4	5	1

i/j	1	2	3	4	
1	6	14 (1)	26 (2)	29 (2)	
2		4	13 (3)	15 (3)	
3			5	7 (3)	
4				1	
5					

* I reffered another text book
* Algo. is same, table implemented in diff. way

Case 1: Considering one node at a time

$l = 1$.

case 2: Considering two nodes at a time ($l = 2$)

$A[1,2] = (6+4) + \min \begin{cases} [1] \rightarrow 4 \\ [2] \rightarrow 6 \end{cases} = 10 + 4 = 14$ (1)

$A[2,3] = (4+5) + \min \begin{cases} [2] \rightarrow 5 \\ [3] \rightarrow 4 \end{cases} = 9 + 4 = 13$ [3]

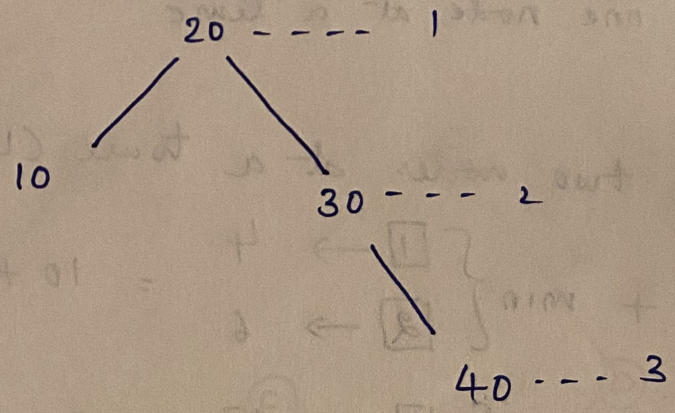
$A[3,4] = (5+1) + \min \begin{cases} [3] \rightarrow 1 \\ [4] \rightarrow 5 \end{cases} = 6 + 1 = 7$ (3)

case 3: Considering 3 nodes at a time ($l = 3$)

$A[1,3] = (6+4+5) + \min \begin{cases} [1] \rightarrow 13 \\ [2]^{\checkmark} \rightarrow 6+5 \\ [3] \rightarrow 14 \end{cases} = 15 + 11 = 26$

$A[2,4] = (4+5+1) + \min \begin{cases} [2] \rightarrow 7 \\ [3]^{\checkmark} \rightarrow 4+1 \\ [4] \rightarrow 13 \end{cases} = 10 + 5 = 15$

$A[1,4] = (6+4+5+1) + \min \begin{cases} [1] \rightarrow 15 \\ [2] \rightarrow 6+7 \checkmark \\ [3] \rightarrow 14+1 \\ [4] \rightarrow 26 \end{cases} = 16 + 13 = 29.$



$$Cost = (1 * 4) + 2 * (6 + 5) + 3 * 1$$

$$\boxed{Cost = 4 + 22 + 3 = 29.}$$

④ 0/1 knapsack

W

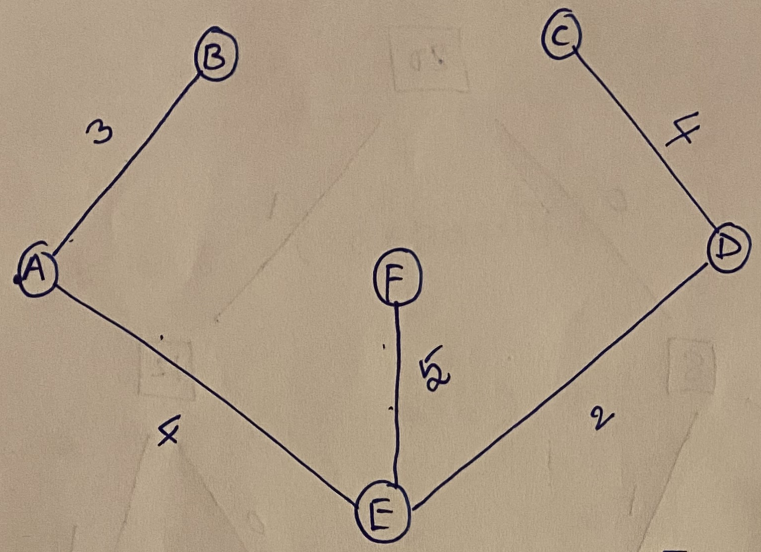
w_i	P_i	i/w	0	1	2	3	4	5	6
		0	0	0	0	0	0	0	0
3	10	1	0	0	0	[10]	10	10	10
2	60	2	0	0	60	60	60	[70]	70
4	20	3	0	0	60	60	60	70	80
1	90	4	0	90	90	150	150	150	[160]

$$x_i = (1 \quad 1 \quad 0 \quad 1)$$

$$\text{profit} = 1*10 + 1*60 + 0*20 + 1*90 = 10 + 60 + 90 = 160$$

(5)

(4)



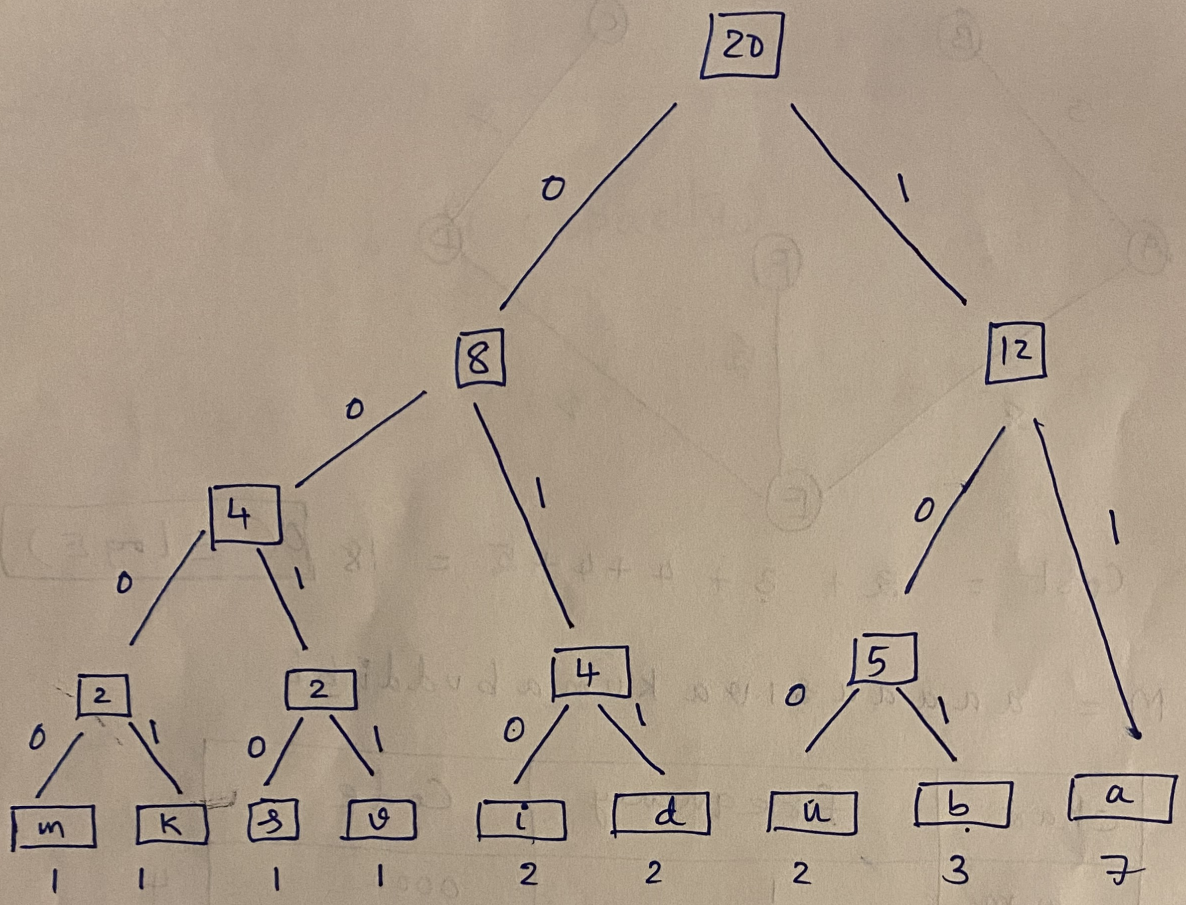
Cost = 2 + 3 + 4 + 4 + 5 = 18 $O(E \log E)$

(6) M = aaaaasivakumabuddibb

char	frequency	Code	
m	1	0000	4
k	1	0001	4
s	1	0010	4
v	1	0011	4
i	2	010	6
d	2	011	6
u	2	100	6
b	3	101	9
a	7	11	14

a = 7, s = 1, i = 2, v = 1, m = 1, b = 3, d = 2

u = 2 K = 1.



Total bits = message-size + Table-size

message_size = (4 * 4) + (6 * 3) + (9 * 1) + (14 * 1)

= 57 bits

Table_size = (9 * 8) + 30 = 102 bits

Total-bits = 159 bits < 160 bits.

⑦ P/w = 3 4 20 50 50

weight = 8 ml.

max.
Prof : $(1 * 50) + (? * 20) + (5 * 5)$ (5)

max. Prof. $50 + 40 + 25 = 90 + 25 = 115$

(8) $L = 6$ (capacity)

$(6 * 5) + (1 * 6) + (6 * 2) +$

$(1 * 4) + (4 * 3) = 64$

(9) $$U = \sum_{i=1}^{n} \frac{C_i}{P_i} \leq 1$$

$$U = \underbrace{(2/5) + (4/7)}_{0.97} \leq 1 \quad \checkmark \text{ Schedule.}$$

Bounding Test: $B(2) = 2.(2^{1/2} - 1) = 2 * 0.414.$

$= 0.82.$

$\cdot U > B(2) \Rightarrow$ $\boxed{0.97 > 0.82}$.

So. it is inconclusive ($U > B(2)$) & schedulable ($0.97 \leq 1$)