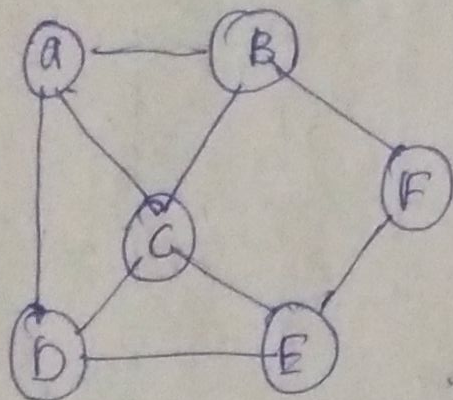
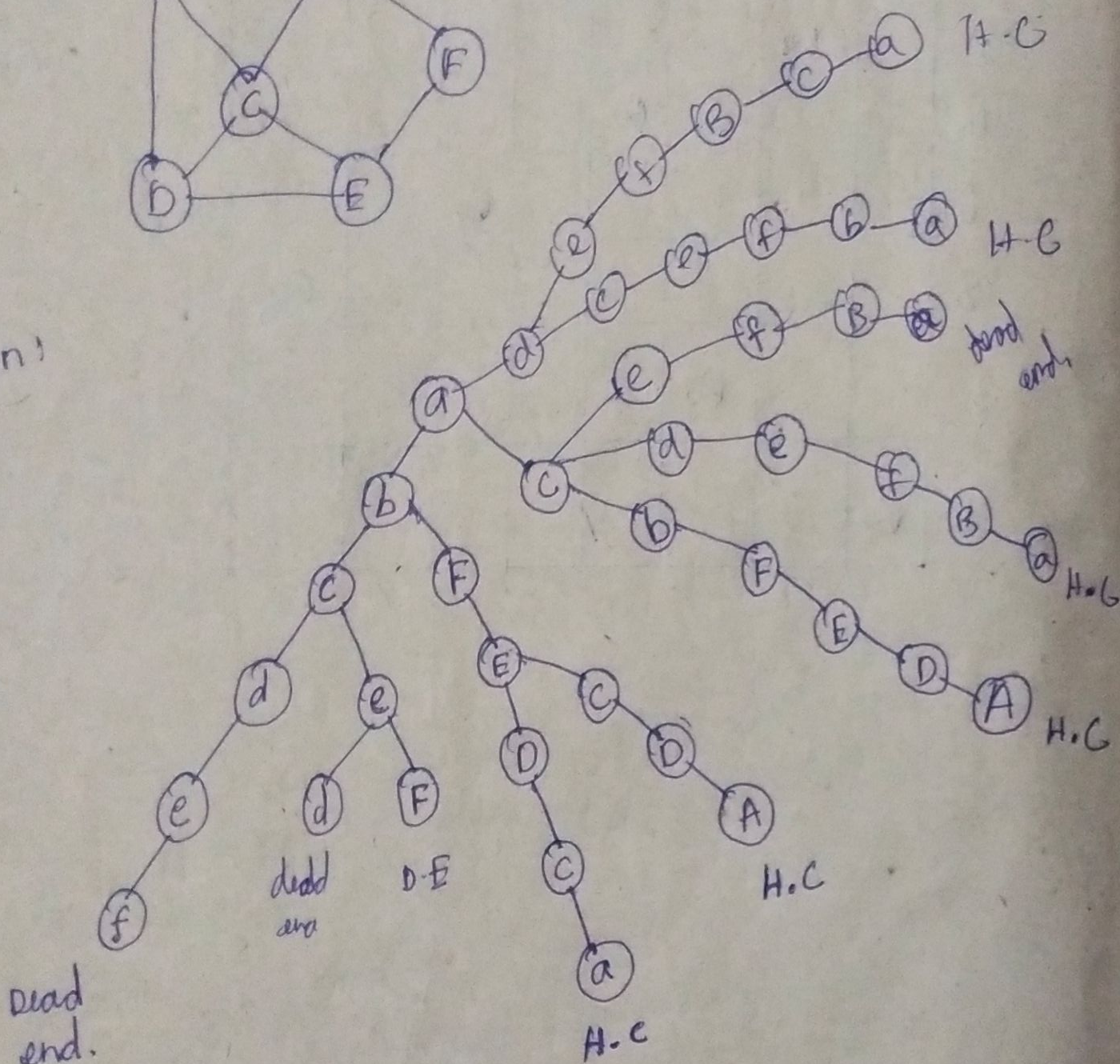


# Hamiltonian Problem.

1)



Soln:





# Branch & Bound:

## 1. Knapsack.

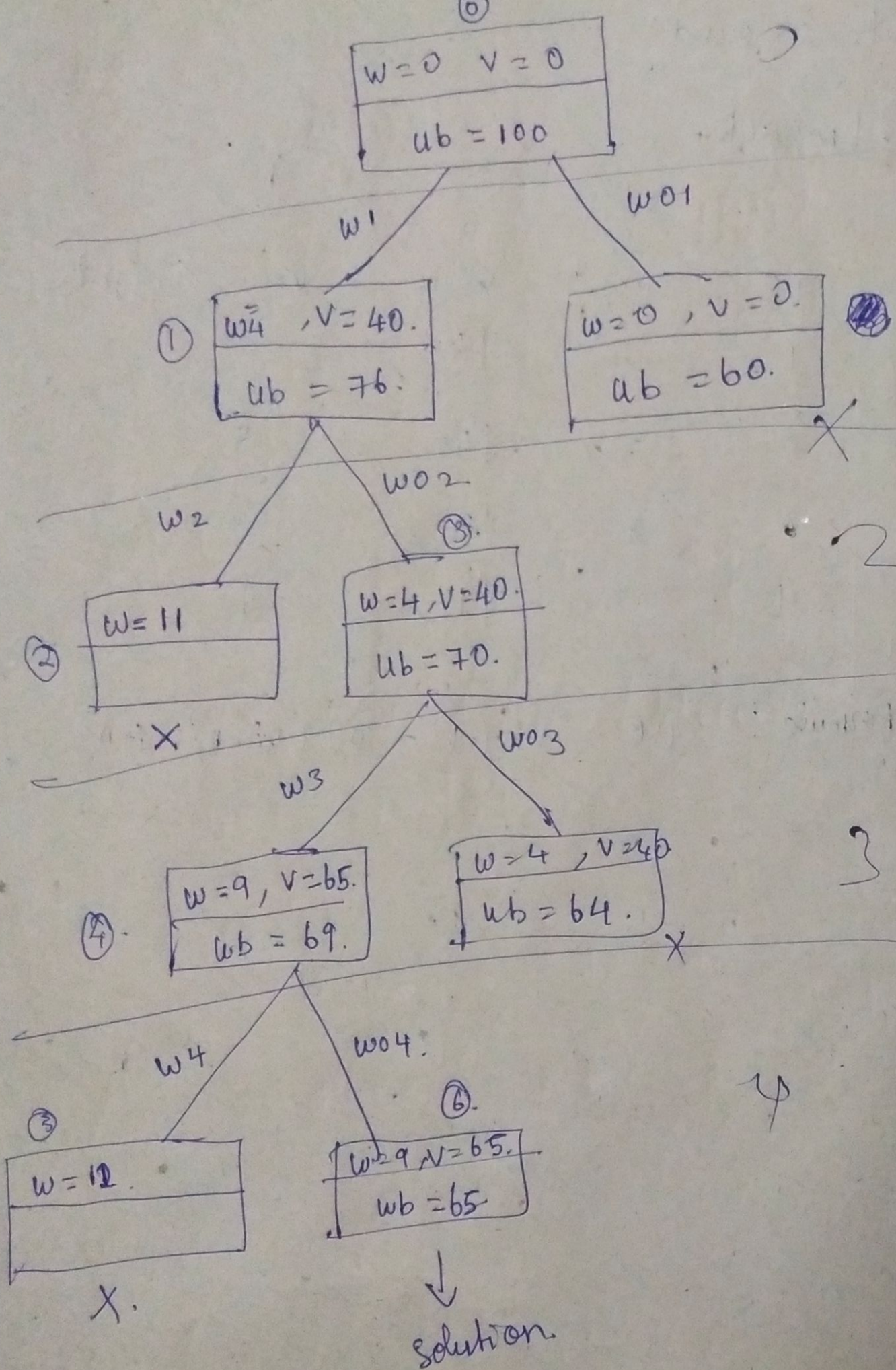
$$W = 10$$

Q. >

s.no	weight	value	value / weight
1	4	\$40	10
2	7	\$42	6
3	5	\$25	5
4	3	\$12	4

Formula:  $UB = V + (W - w) (v_{i+1} / w_{i+1})$







Node 0 :-

$$I = 0, W = 0, V = 0.$$

$$ub = V + (W - w) (V_{(i+1)} / W_{(i+1)}).$$

$$= 0 + (10 - 0) (10).$$

$$= 100.$$

Node ①.

$$I = 1, W = 4, V = 40.$$

$$ub = V + (W - w) (V_{(i+1)} / W_{(i+1)}).$$

$$= 40 + (10 - 4) (6).$$

$$= 40 + 6 = 4(6 \times 6) = 76.$$

Node 3:

$$I = 2, W = 4, V = 40.$$

$$ub = V + (W - w) (V_{(i+1)} / W_{(i+1)}).$$

$$= 40 + (10 - 4) (5).$$

$$= 40 + 30 = 70.$$



node 4:

$$v = 65, \quad w = 9, \quad I = 3$$

$$ub = v + (w - w') (v_{i+1} / w_{i+1})$$

$$= 65 + (10 - 9) (4)$$

$$\leq 69$$

node 6:

$$v = 65, \quad w = 9, \quad I = 4$$

$$ub = v + (w - w') (v_{i+1} / w_{i+1})$$

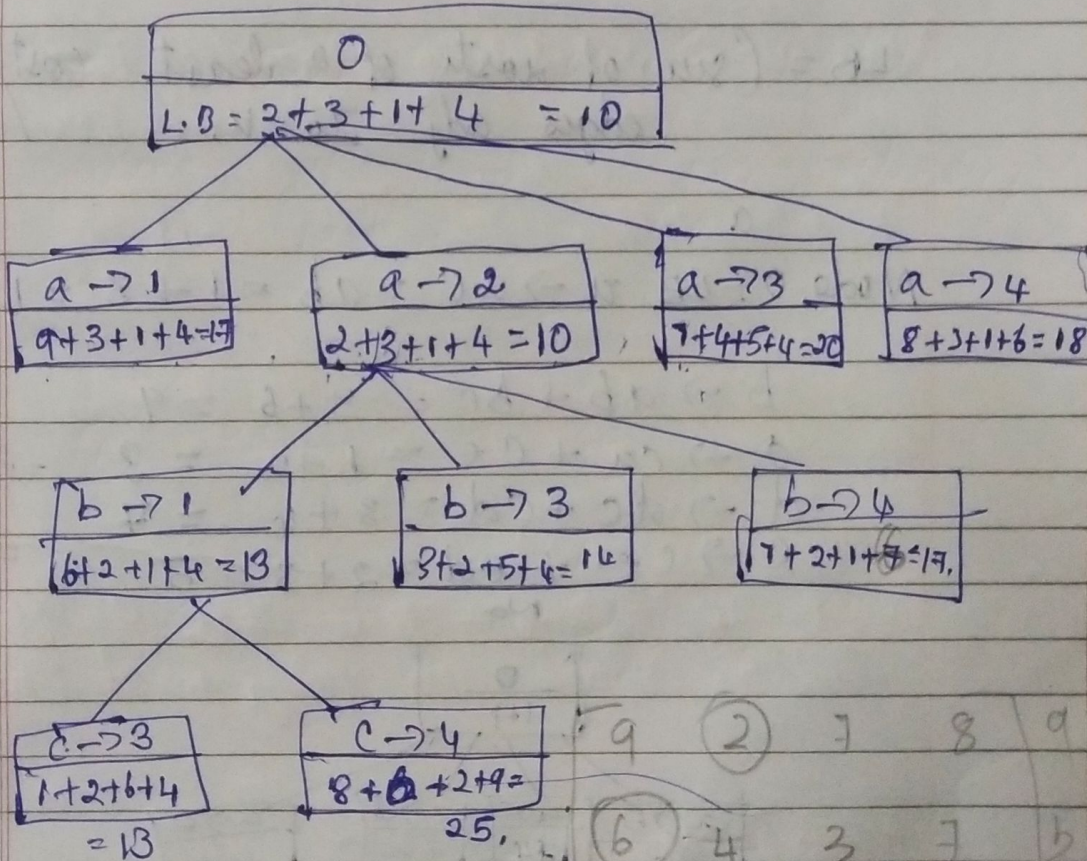
$$= 65 + (1) (0)$$

$$\geq 65$$



# Assignment Problem.

	J <sub>1</sub>	J <sub>2</sub>	J <sub>3</sub>	J <sub>4</sub>
a	9	②	7	8
b	①	4	3	7
c	5	8	①	8
d	7	6	9	④



c → 3  
d → 4

Solution →

a	②	7	8	a
①	4	3	7	b
5	8	①	8	c
7	6	9	④	d