

21-51-02

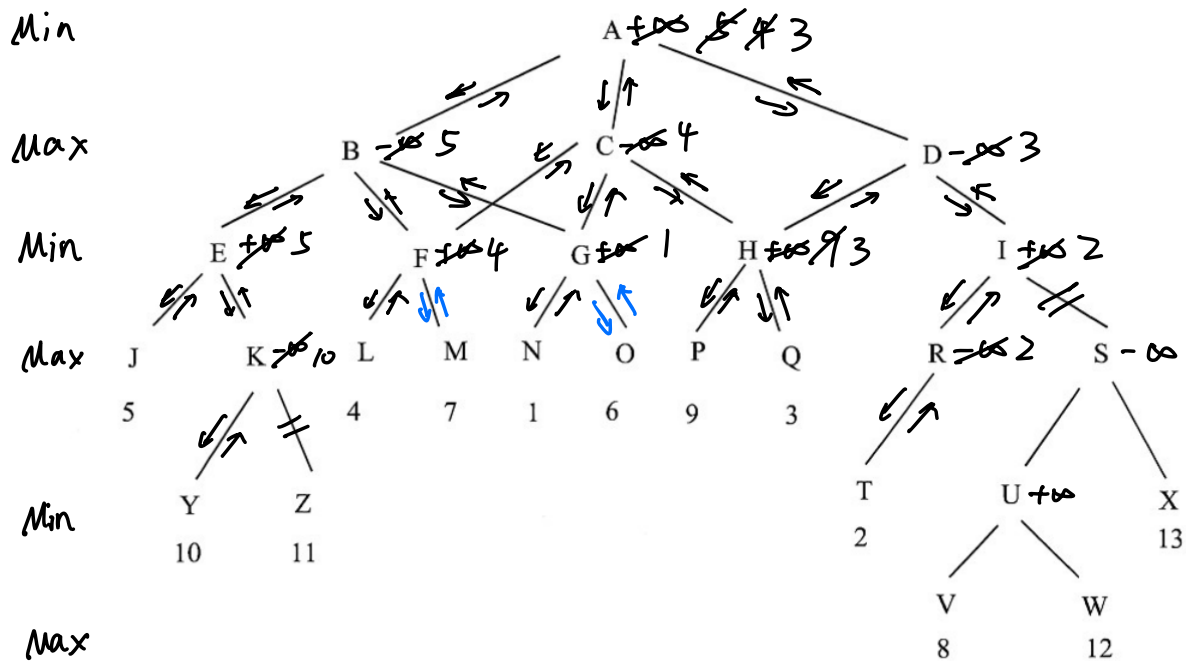
(a)

(i) $\propto P$

(ii) NBE

(b) Bp

Solution (a)(i)



cii) Z, S, U, X, V, W

(b) (i) ① O_2

$$net_2 = 0.8 \times 1 + 0.3 \times 1 = 1.1$$

$$O_2 = \sigma(net_2) = 1.1$$

② O_3

$$net_3 = 0.1 \times 1 + 0.6 \times 1 = 0.7$$

$$O_3 = \sigma(net_3) = 0.7$$

③ O_4

$$\begin{aligned} net_4 &= 1 \times 1 + 0.9 \times 1.1 + 0.3 \times 0.7 + 0.2 \times 1 \\ &= 2.4 \end{aligned}$$

$$O_4 = \sigma(net_4) = 2.4$$

④ O_5

$$\begin{aligned} net_5 &= 0.5 \times 1.1 + 0.2 \times 0.7 - 0.9 \times 1 \\ &= -0.21 \end{aligned}$$

$$O_5 = \sigma(net_5) = 0.1 \times (-0.21) = -0.021$$

(ii) ① $\delta_k = \sigma'(net_k)(t_k - O_k)$

$$\textcircled{2} \delta_j = \sigma'(net_j) \sum_k \delta_k w_{kj}$$

(iii) $\delta_4 = \sigma'(net_4)(t_4 - O_4)$

$$= 1 \times (0.2 - 2.4)$$

$$= -2.2$$

$$\delta_5 = \sigma'(net_5)(t_5 - O_5)$$

$$= 0.1 \times (0.8 - (-0.021))$$

$$= 0.0821$$

$$\delta_2 = \sigma'(\text{net}_2) (\delta_4 w_{42} + \delta_5 w_{52})$$

$$= 1 \times (-2.2 \times 0.9 + 0.0821 \times 0.5)$$

$$= -1.93895$$

$$\delta_3 = \sigma'(\text{net}_3) (\delta_4 w_{43} + \delta_5 w_{53})$$

$$= 1 \times (-2.2 \times 0.3 + 0.0821 \times 0.2)$$

$$= -0.64358$$

$$(iv) \textcircled{1} \Delta w_{ji} = \eta \delta_j o_i$$

$$\Delta w_{21} = \eta \delta_2 o_1$$

$$= 0.5 \times (-1.93895) \times 1$$

$$= -0.969475$$

$$\textcircled{2} \Delta w_{4b} = \eta \delta_4 o_b$$

$$= 0.5 \times (-2.2) \times 1$$

$$= -1.1$$