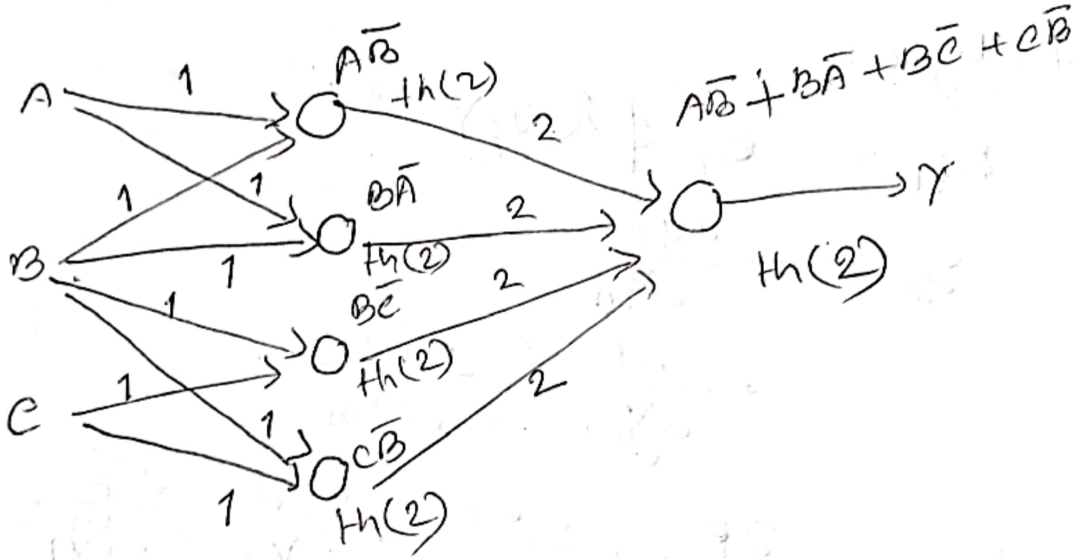
ID : 18101234

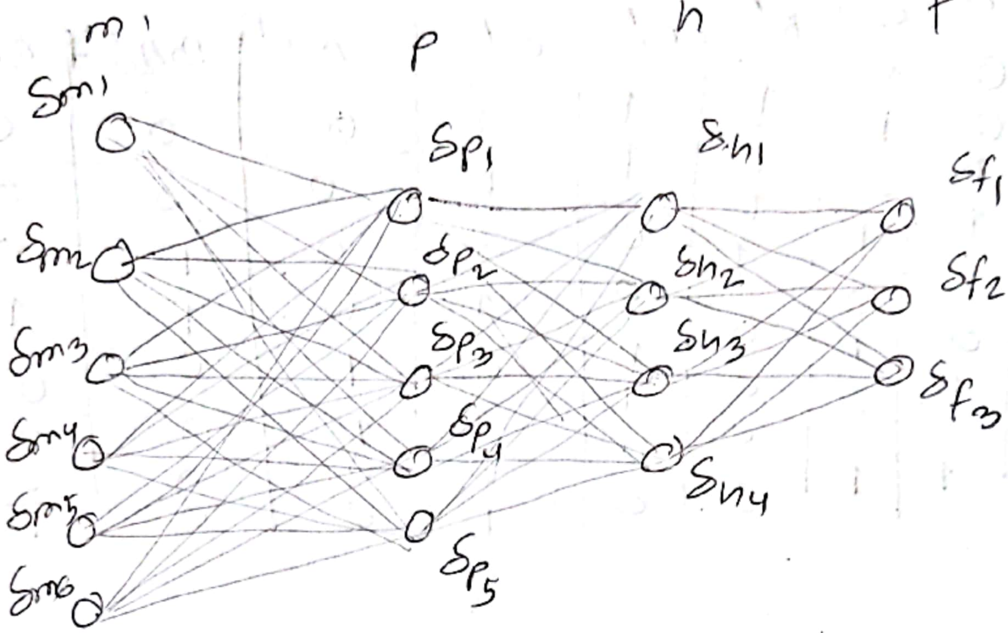
Ans. to the Ques. No - 7

A	B	C	A'	B'	C'	AB'	+ BA'	+ BC'	+ CB'	F
0	0	0	1	1	0	0	0	0	0	0
0	0	1	1	1	1	0	0	0	1	1
0	1	0	1	0	0	0	1	0	0	1
0	1	1	1	0	1	0	1	1	0	1
1	0	0	0	1	0	1	0	0	0	1
1	0	1	0	1	1	1	0	0	1	1
1	1	0	0	0	0	0	0	0	0	0
1	1	1	0	0	1	0	0	1	0	1



So, From the above perceptron network we can see that it has 2 layers. We can see that it is a multilayer perceptron network. We know multilayer perceptron classifies non linear boolean function. Therefore, this function is non linear and can not be linearly seperable.

Ans. to the Ques No. - 2



4 - layer :

$$\delta_{f1} = e_f \, \phi'(v_f)$$

$$\delta_m = -\frac{\partial E}{\partial v_m}$$

$$= -\frac{\partial E}{\partial y_m} \cdot \frac{\partial y_m}{\partial v_m}$$

$$\frac{\partial E}{\partial y_m} = \frac{\partial E}{\partial e_f} \cdot \frac{\partial e_f}{\partial y_f} \cdot \frac{\partial y_f}{\partial v_f} \cdot \frac{\partial v_f}{\partial y_h} \cdot \frac{\partial y_h}{\partial v_h} \cdot \frac{\partial v_h}{\partial y_p} \cdot \frac{\partial y_p}{\partial v_p} \cdot \frac{\partial v_p}{\partial y_m}$$

$$E = \frac{1}{2} \sum_f e_f^2$$

$$\therefore \frac{\partial E}{\partial e_f} = e_f$$

$$e_f = d_f - y_f$$

$$\frac{\partial e_f}{\partial y_f} = \frac{\partial(d_f - y_f)}{\partial f} = (-1)$$

$$y_f = \phi'(y_f)$$

$$\therefore \frac{\partial y_f}{\partial v_f} = \frac{\partial(\phi'(y_f))}{\partial v_f} = \phi''(v_f)$$

$$v_j = \sum_{f}^{1} w_f y_i, \text{ for } h \text{ layer, } v_f = \sum_{f}^{1} w_{fh} y_h$$

$$\frac{\partial v_f}{\partial y_h} = w_{fh}$$

$$y_h = \phi''(v_h)$$

$$\therefore \frac{\partial y_h}{\partial v_h} = \phi'''(v_h)$$

$$v_h = \sum_{h}^{1} w_{hp} y_p$$

$$\therefore \frac{\partial v_h}{\partial y_p} = w_{hp}$$

$$\therefore y_p = \phi'''(v_p)$$

$$\therefore \frac{\partial y_p}{\partial v_p} = \phi''''(v_p)$$

$$v_p = \sum_{p}^{1} w_{pm} y_m$$

$$y_m = \phi'(v_m)$$

$$\therefore \frac{\partial v_p}{\partial y_m} = \cancel{\phi''(v_m)}\, W_{pm}$$

$$y_m = \phi'(v_m)$$

$$\frac{\partial y_m}{\partial v_m} = \phi''(v_m)$$

$$\frac{\partial E}{\partial y_m} = e_f \cdot (-1)\, \phi''(v_f)\, W_{fh} \cdot \phi'''(v_h)\, W_{hp} \cdot \phi''''(v_p)\, W_{pm}$$

$$\cancel{= -e_f W_{fh} W_{hp} W_{pm} \phi''(v_f)\, \phi'''(v_h)\, \phi''''(v_p)}$$

$$\cancel{= -\delta_f W_{fh} \phi}$$

$$\cancel{\delta_m} =$$

$$\delta_m = \phi''(v_m) \cdot \sum e_f\, \phi''(v_f) \cdot W_{fh}\, \phi'''(v_h)\, W_{hp}\, \phi''''(v_p)\, W_{pm}$$