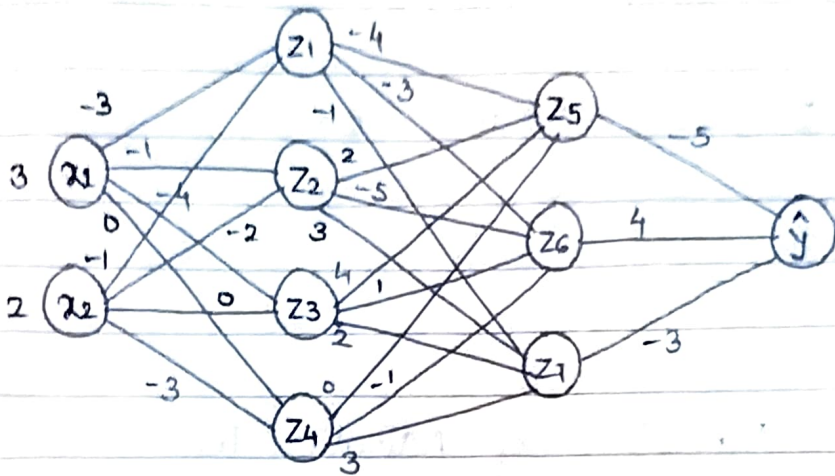Rajas Vivek Divekar
D005

* Assignment - 1 *

$$Z = W_0 + \sum_{i=0}^{n} W_i X_i , \quad Relu = max(0, z),$$

$$Sigmoid = \frac{1}{1 + e^{-z}}$$

Hidden layer 1:

$$Z_1 = 3 + (3 \times -3) + (2 \times -1)$$
$$= 3 + (-9) + (-2)$$
$$\boxed{Z_1 = -8}$$

$$Z_2 = 3 + (2 \times -2) + (3 \times -1)$$
$$= 3 + (-4) + (-3)$$
$$\boxed{Z_2 = -4}$$

$Z_3 = 3 + (3 \times -4) + (2 \times 0)$

$= 3 + (-12)$

$\boxed{Z_3 = -9}$

$Z_4 = 3 + (3 \times 0) + (2 \times -3)$

$= 3 + 0 + (-6)$

$\boxed{Z_4 = -3}$

Application of Activation Func:

$Z_1 = Relu(0, -8) = max(0, -8) = 0$

$Z_2 = Relu(0, -4) = max(0, -4) = 0$

$Z_3 = Relu(0, -9) = max(0, -9) = 0$

$Z_4 = Relu(0, -3) = max(0, -3) = 0$

Hidden Layer 2

$Z_5 = 3 + (0 \times -4) + (0 \times 2) + (0 \times 4) + (0 \times 0)$

$= 3 + 0 + 0 + 0 + 0$

$\boxed{Z_5 = 3}$

$Z_6 = 3 + (0 \times -3) + (0 \times -5) + (0 \times 1) + (0 \times -1)$

$= 3 + 0 + 0 + 0 + 0$

$\boxed{Z_6 = 3}$

$$Z_1 = 3 + (0 \times -1) + (0 \times 3) + (0 \times 2) + (0 \times -3)$$
$$= 3 + 0 + 0 + 0 + 0$$

$$\boxed{Z_1 = 3}$$

Application of Activation Func

$$Z_5 = Relu\ (0, 3) = max\ (0, 3) = 3$$
$$Z_6 = Relu\ (0, 3) = max\ (0, 3) = 3$$
$$Z_7 = Relu\ (0, 3) = max\ (0, 3) = 3$$

$$\therefore \hat{y} = 3 + (3 \times -5) + (3 \times 4) + (3 \times -3)$$
$$= 3 + (-15) + (12) + (-9)$$
$$= -12 + 12 - 9$$

$$\boxed{\hat{y} = -9}$$

$$\hat{y} = \frac{1}{1 + e^{-z}}$$

$$= \frac{1}{1 + e^{-(-9)}}$$

$$= \frac{1}{1 + e^9}$$

$$\boxed{\hat{y} = 0.0001234}$$