DEEP LEARNING

*** ASSIGNMENT-1 ***

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COURSE: M.TECH (DATA SCIENCE 2021-2023)

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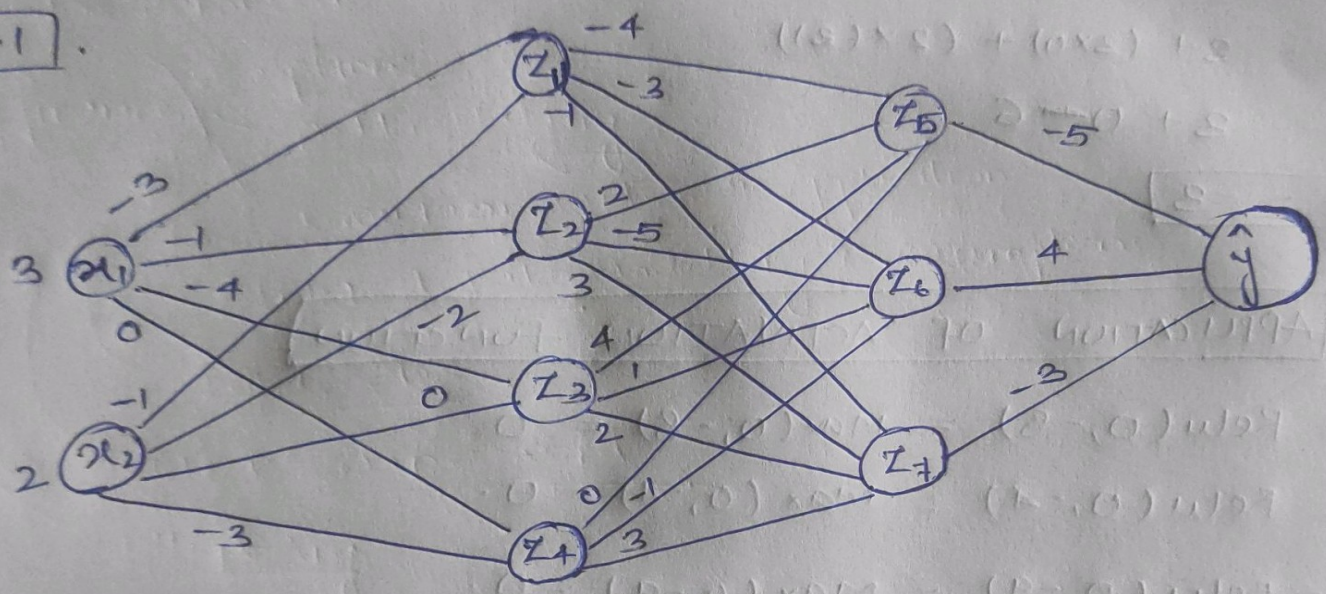
Q.1.



Solution:

$$z = w_0 + \sum_{i=0}^{n} w_i x_i \quad , \qquad \text{Relu} = \max(0, z)$$

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

HIDDEN LAYER 1

$$z_1 = 3 + (3 \times (-3)) + (2 \times (-1))$$

$$z_1 = 3 + (-9) + (-2)$$

$$\boxed{z_1 = -8}$$

$Z_2 = 3 + (2 \times (-2)) + (3 \times (-1))$

$Z_2 = 3 + (-4) + 3$

$\boxed{Z_2 = -4}$

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

$Z_3 = 3 + (-12)$

$\boxed{Z_3 = -9}$

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

$Z_4 = 3 + 0 - 6$

$\boxed{Z_4 = -3}$

APPLICATION OF ACTIVATION FUNCTION

$Z_1 = \text{Relu}(0, -8) = \text{Max}(0, -8) = 0$

$Z_2 = \text{Relu}(0, -4) = \text{Max}(0, -4) = 0.$

$Z_3 = \text{Relu}(0, -9) = \text{Max}(0, -9) = 0.$

$Z_4 = \text{Relu}(0, -3) = \text{Max}(0, -3) = 0.$

HIDDEN LAYER 2

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

$\boxed{Z_5 = 3}$

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

$\boxed{Z_6 = 3}$

$Z_7 = 3 + (0 \times (-1)) + (0 \times 3) + (0 \times 2) + (0 \times (-3))$

$\boxed{Z_7 = 3}$

(#) APPLICATION OF ACTIVATION FUNCTION

$Z_5 = \text{Relu}(0,3) = \text{Max}(0,3) = 3$

$Z_6 = \text{Relu}(0,3) = \text{Max}(0,3) = 3$

$Z_7 = \text{Relu}(0,3) = \text{Max}(0,3) = 3$

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

$\therefore \hat{y} = 3 - 15 + 12 - 9$

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

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

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

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

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