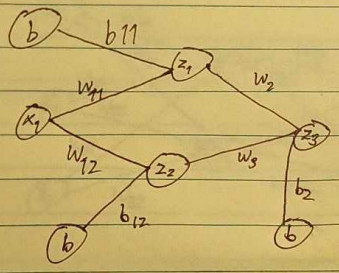
NO.:
DATE: 03/31/25

Pagdanganan, Xavier P. Exercise 1A Deep Learning
COM221



$x_1 = 2$ $b_{11} = -0.85$
$W_{11} = 1.70$ $b_{12} = 0.00$
$W_{12} = 12.6$ $b_2 = -16$
$W_2 = -40.8$
$W_3 = 2.70$

$z_1 = (W_{11})(x_1) + b_{11}$
$= (1.70)(2) + (-0.85)$
$\boxed{z_1 = 2.55}$

$h_1 = \max(0, z_1)$
$= \max(0, 2.55)$
$\boxed{h_1 = 2.55}$

$z_2 = (W_{12})(x_1) + b_{12}$
$= (12.6)(2) + (0.00)$
$\boxed{z_2 = 25.2}$

$h_2 = \max(0, z_2)$
$= \max(0, 25.2)$
$\boxed{h_2 = 25.2}$

$z_3 = (h_1)(W_3) + (h_2)(W_4) + (b_2)$
$= (2.55)(-40.8) + (25.2)(2.70) + (-16)$
$= 104.4 + 68.04 + (-16)$
$\boxed{z_3 = -52}$

$\hat{p} = \max(0, z_3)$
$= \max(0, -52)$
$\boxed{\hat{p} = 0}$

	Value
z_1	2.55
z_2	25.2
z_3	-52
h_1	2.55
h_2	25.2
$\hat{p}$	0

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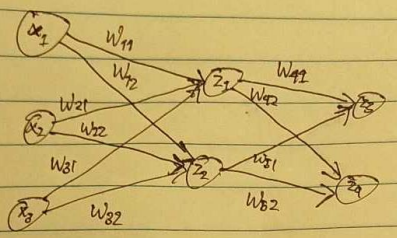
Exercise 1B

Deep Learning



$x_1 = 10$

$x_2 = 30$

$x_3 = 20$

$W_{11} = 0.2$

$W_{12} = 0.7$

$W_{21} = -0.1$

$W_{22} = -1.2$

$W_{31} = 0.4$

$W_{32} = 1.2$

$W_{41} = 1.1$

$W_{42} = 3.1$

$W_{51} = 0.1$

$W_{52} = 1.7$

$z_1 = (W_{11})(x_1) + (W_{21})(x_2) + (W_{31})(x_3)$

$= (0.2)(10) + (-0.1)(30) + (0.4)(20)$

$\boxed{z_1 = 7}$

$z_2 = (W_{52})(x_1) + (W_{22})(x_2) + (W_{32})(x_3)$

$= (1.7)(10) + (-1.2)(30) + (1.2)(20)$

$\boxed{z_2 = -5}$

$z_3 = (W_{41})(h_1) + (W_{31})(h_2)$

$= (1.1)(0.9991) + (0.1)(0.0067)$

$\boxed{z_3 = 1.09968}$

$z_4 = (W_{42})(h_1) + (W_{32})(h_2)$

$= (3.1)(0.9991) + (1.7)(0.0067)$

$\boxed{z_4 = 3.1086}$

$h_1 = \frac{1}{1+e^{-z_1}}$

$= \frac{1}{1+e^{-7}}$

$\boxed{= 0.9991}$

$h_2 = \frac{1}{1+e^{-(-5)}}$

$\boxed{h_2 = 0.0067}$

$\hat{p}_1 = \frac{1}{1+e^{-1.09968}}$

$\boxed{\hat{p}_1 = 0.7502}$

$\hat{p}_2 = \frac{1}{1+e^{-3.1086}}$

$\boxed{\hat{p}_2 = 0.9572}$

	Value
z_1	7
z_2	-5
z_3	1.09968
z_4	3.1086
h_1	0.9991
h_2	0.0067
$\hat{p}_1$	0.7502
$\hat{p}_2$	0.9572