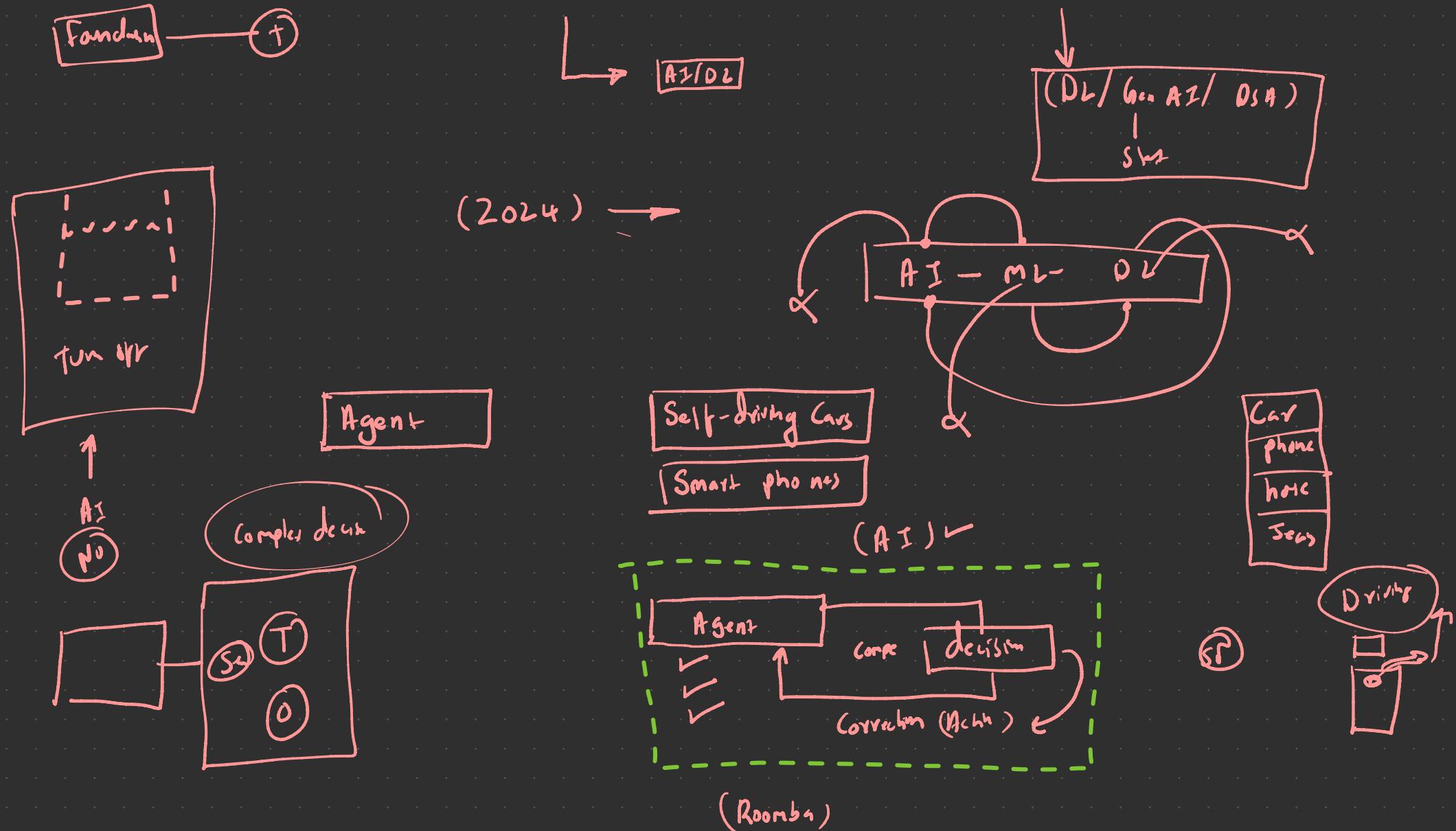
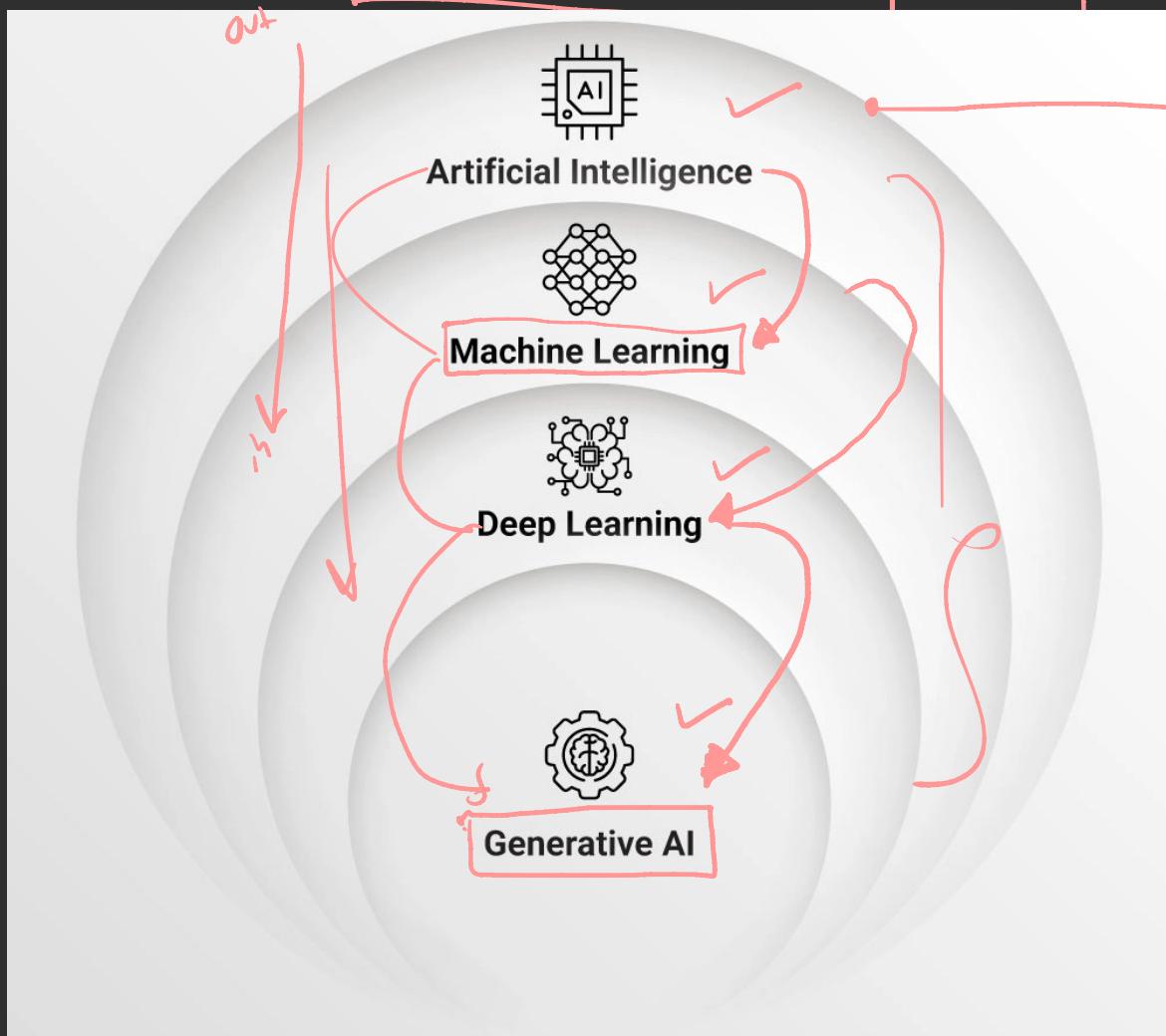


Rudra Sharma — (AvP) — (NBSc) (10)

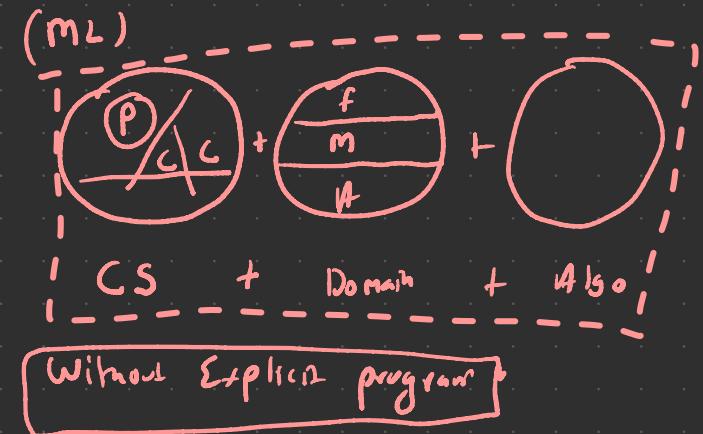
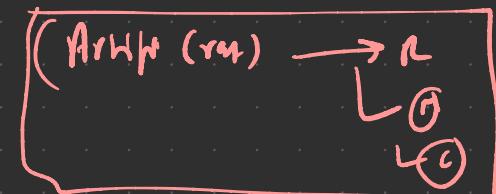


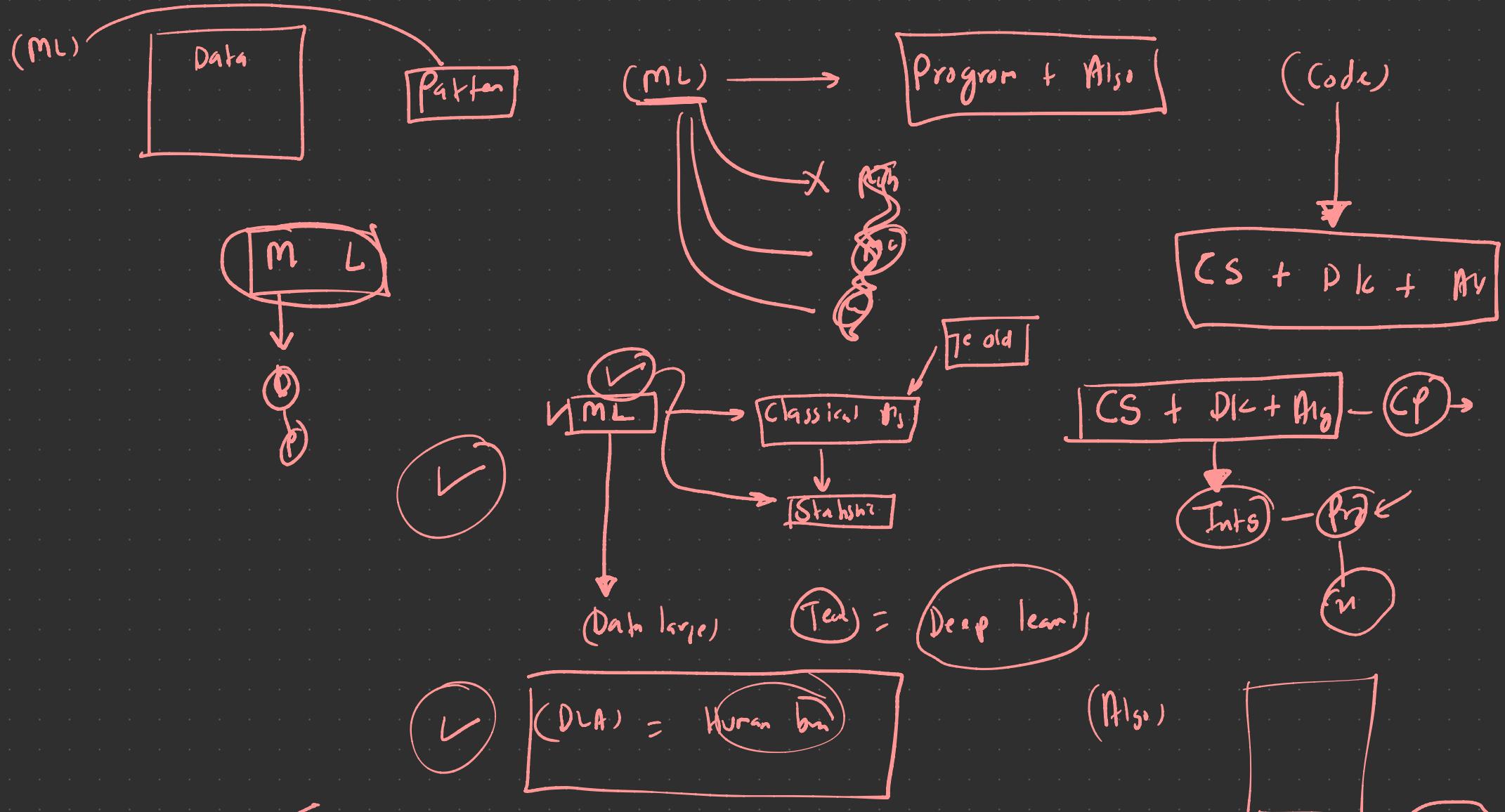


(Value) =

(Robot)

(Sf) + (m)





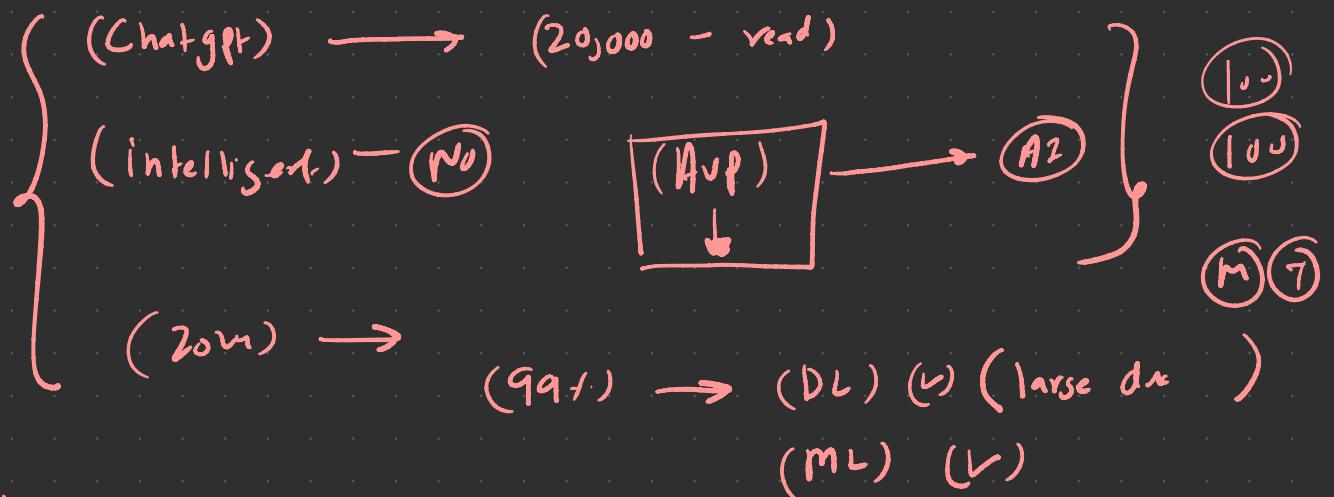
Deep learning is a subset of machine learning, DL is inspired by human brain, hence it uses an algorithm called neural networks that have the capability to work with very very very large data unlike classical machine learning algorithms and are even more effective and efficient than classical algorithms. the neural network have been inspired by the actions and decision making capability of human brain.



$$(Final) = (NDF)$$

$$(300) - (300)$$

(Days plus d_i)

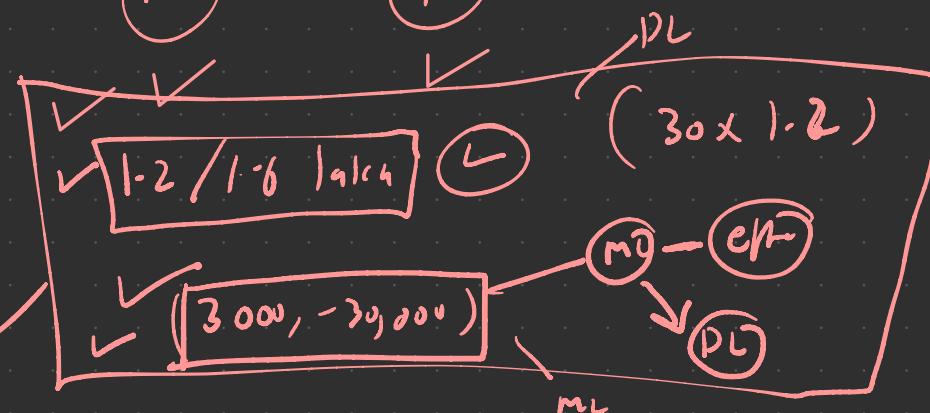


$\left| \begin{array}{|c|c|c|c|} \hline \text{Age} & \text{Cibil} & \text{Salary} & \text{DPD} \\ \hline \end{array} \right| \rightarrow (\text{loan /n})$

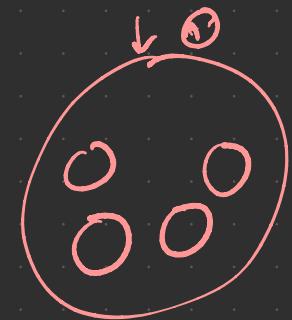
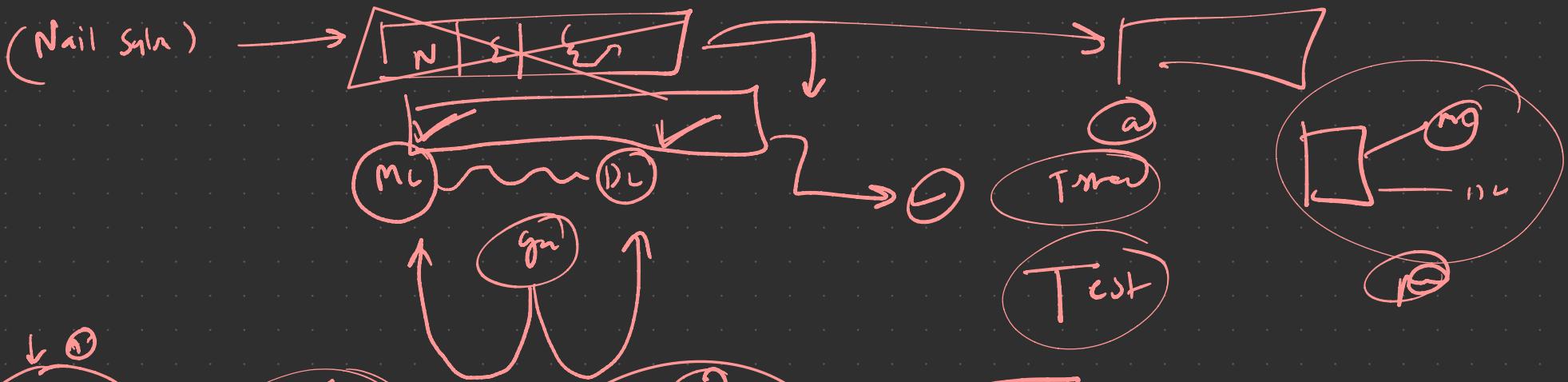
$\left\{ \begin{array}{l} \text{ML (Small)} \rightarrow \text{ML (V)} \\ \text{DL (4, w)} \rightarrow (\text{DL}) \end{array} \right\}$



$$(\text{loan}) \rightarrow (30,000)$$



goal



$$\begin{array}{r} \checkmark \\ \text{Jan - 4} \\ \hline \checkmark \\ \text{Can - 4} \end{array}$$

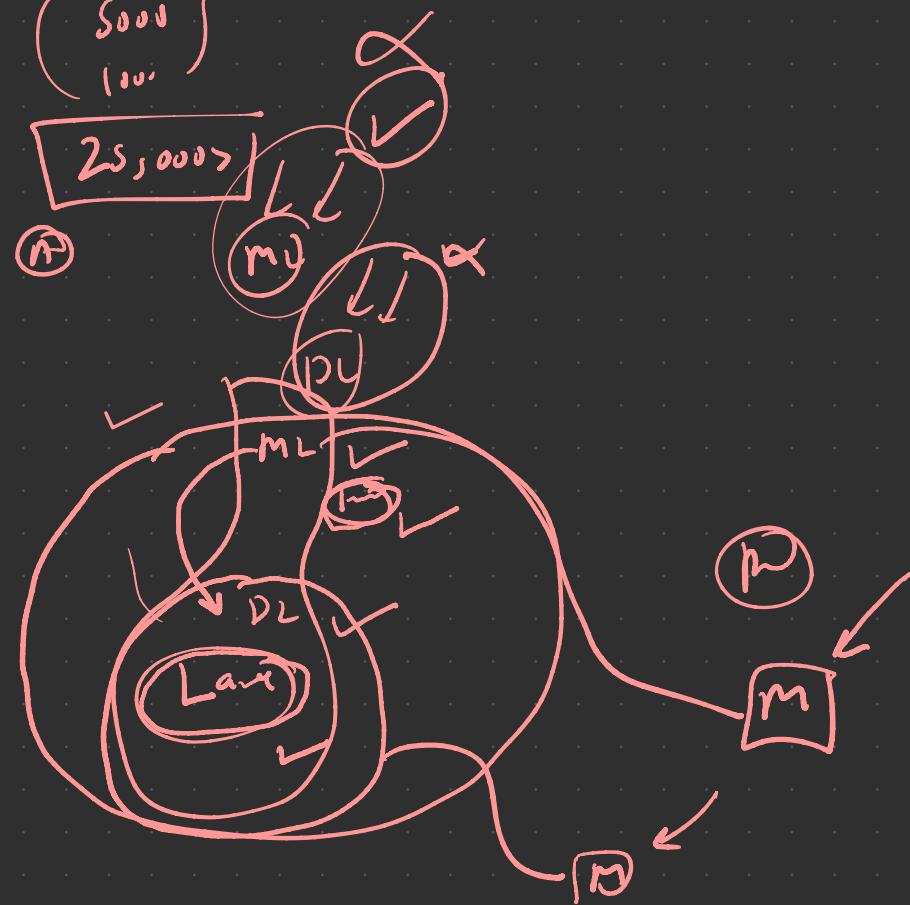
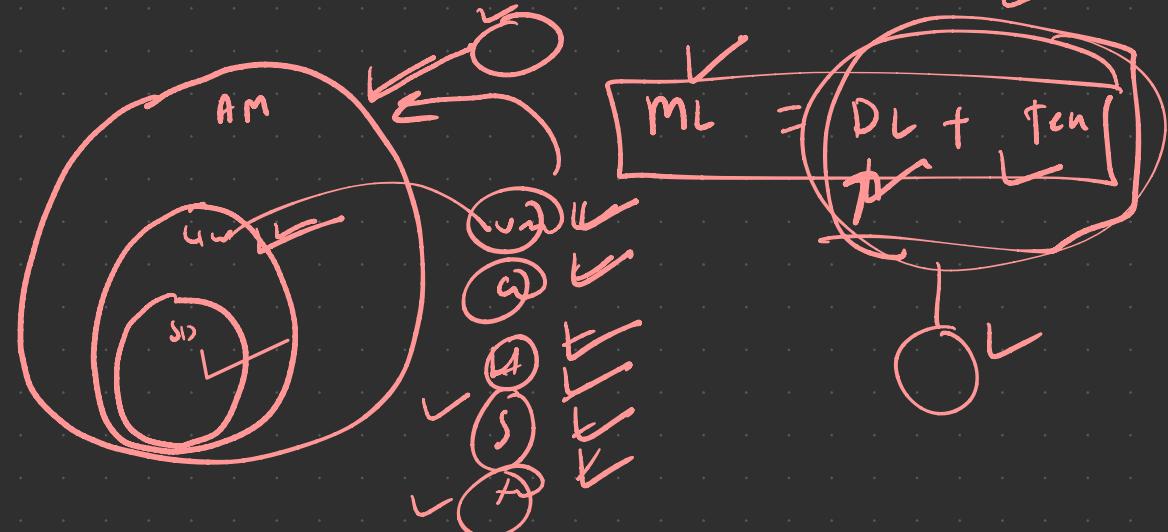


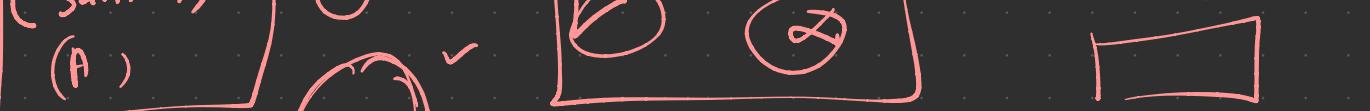
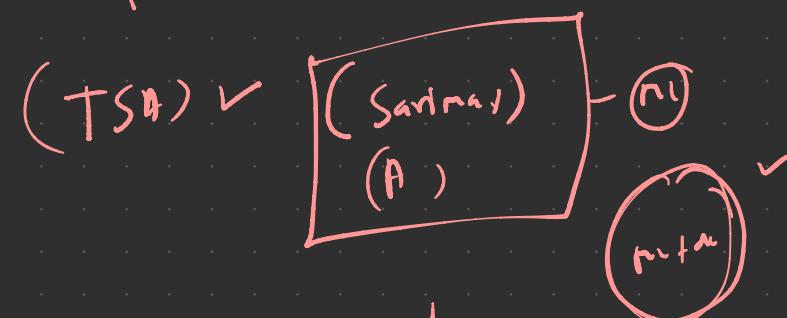
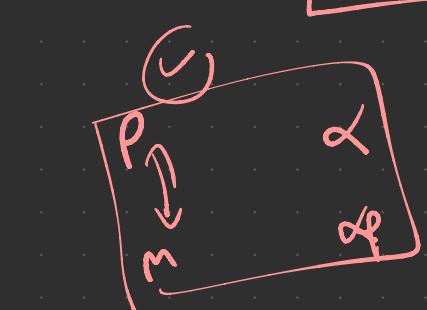
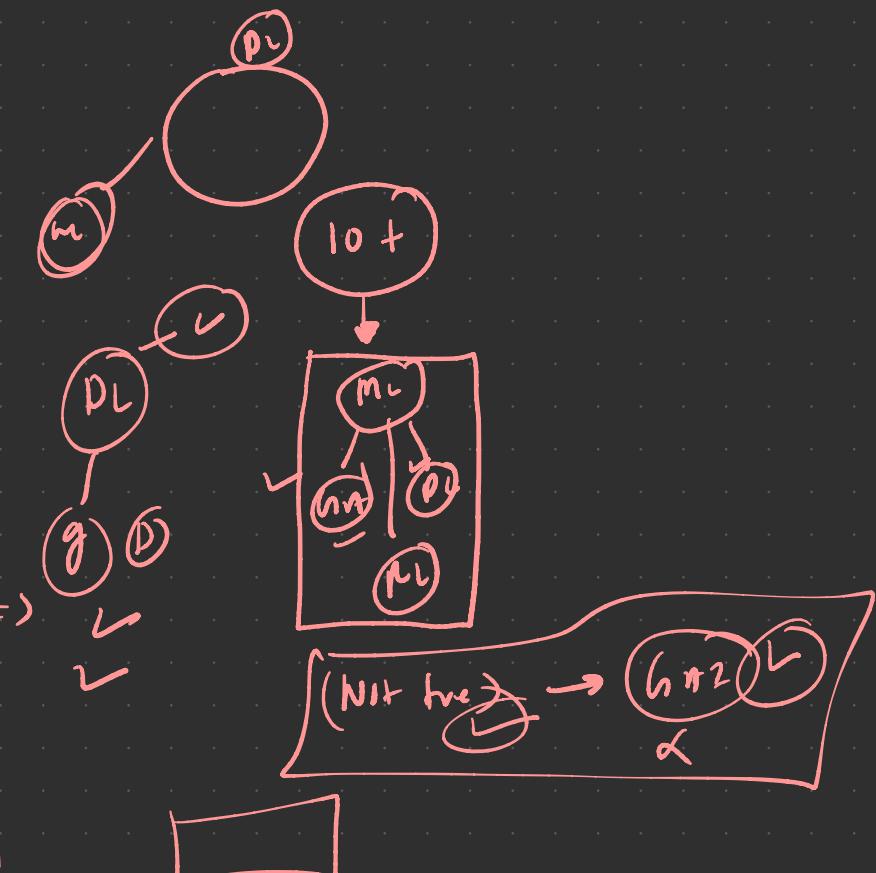
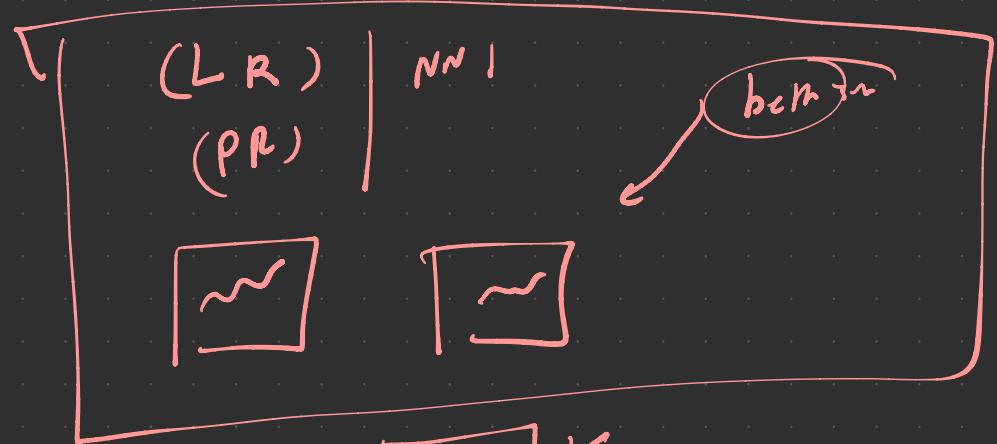
Yes) = VS
(\$000)
100.
25,000

25,000

(p.h p.m)

(Generative Bi) — (Learn) (out) ✓





like - mean = 0.98
 car = 0.26
 Indya = 0.12

very = 0.96
 men = 0.91
 D = 0.2

✓ Can you give me top 10 places to visit in bahalore in decemver



DL + T^o

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981.

Zd. -m

I have ent
L

Rish

"I am taking a simple example of a document here to show how exactly does stopword removal works"

['taking', 'simple', 'example', 'document', 'show',
'exactly', 'stopword', 'removal', 'works']

(Gen AI) \Rightarrow (LLM)

(B) -

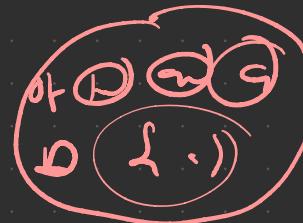
large

72 Bx

language model

72 Billion
params

1 - (TFL)



M

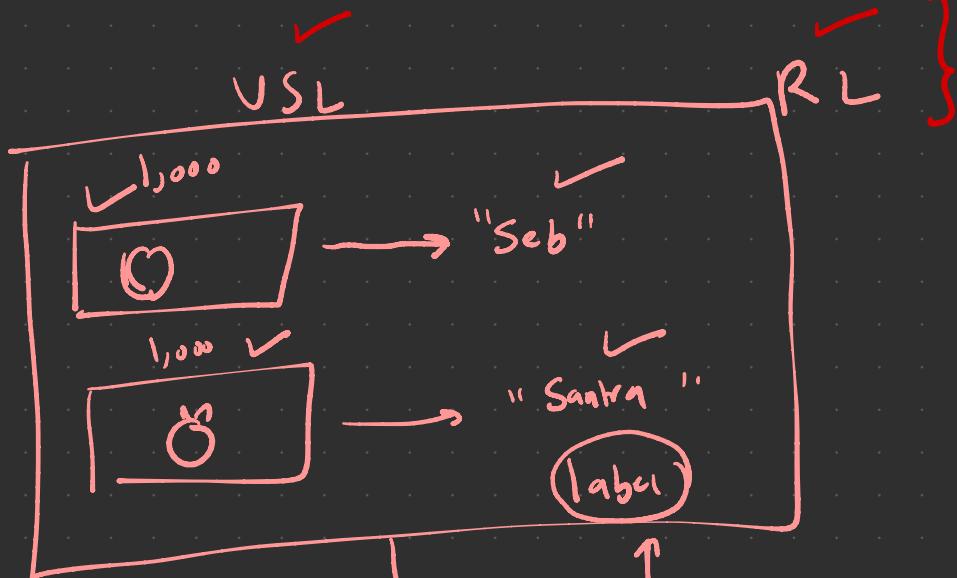
B

#

(\neg add)

{ \checkmark SL }

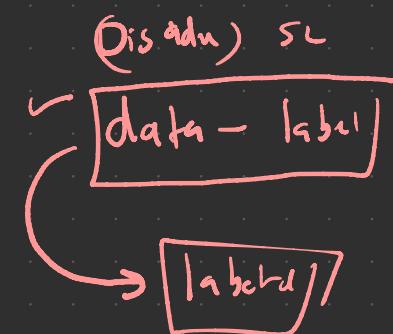
(m_A) - (d_{mb})



(p.)

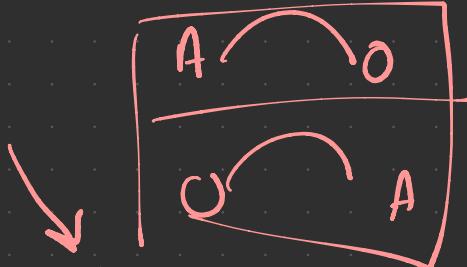
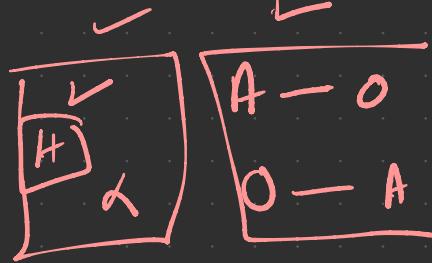
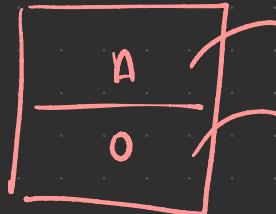
✓	✓	✓	SL	⇒	label	(label)
Ase	Cibit	Sala	29, 850, 1.2L		loan	Yes
23, 600, 20,000					Yes	No

Yes ✓ Man 17 ✓

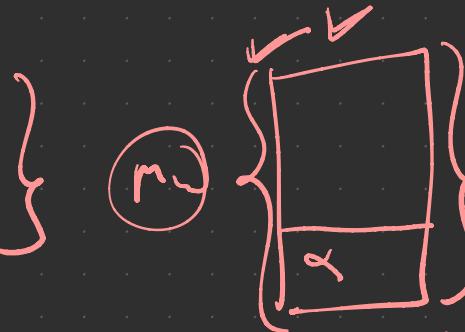


(Unsupervised learning)

(MC) - (mis)



(MC) - (in)



(HIL) = Horn in up

(HIL) - dark has no tail

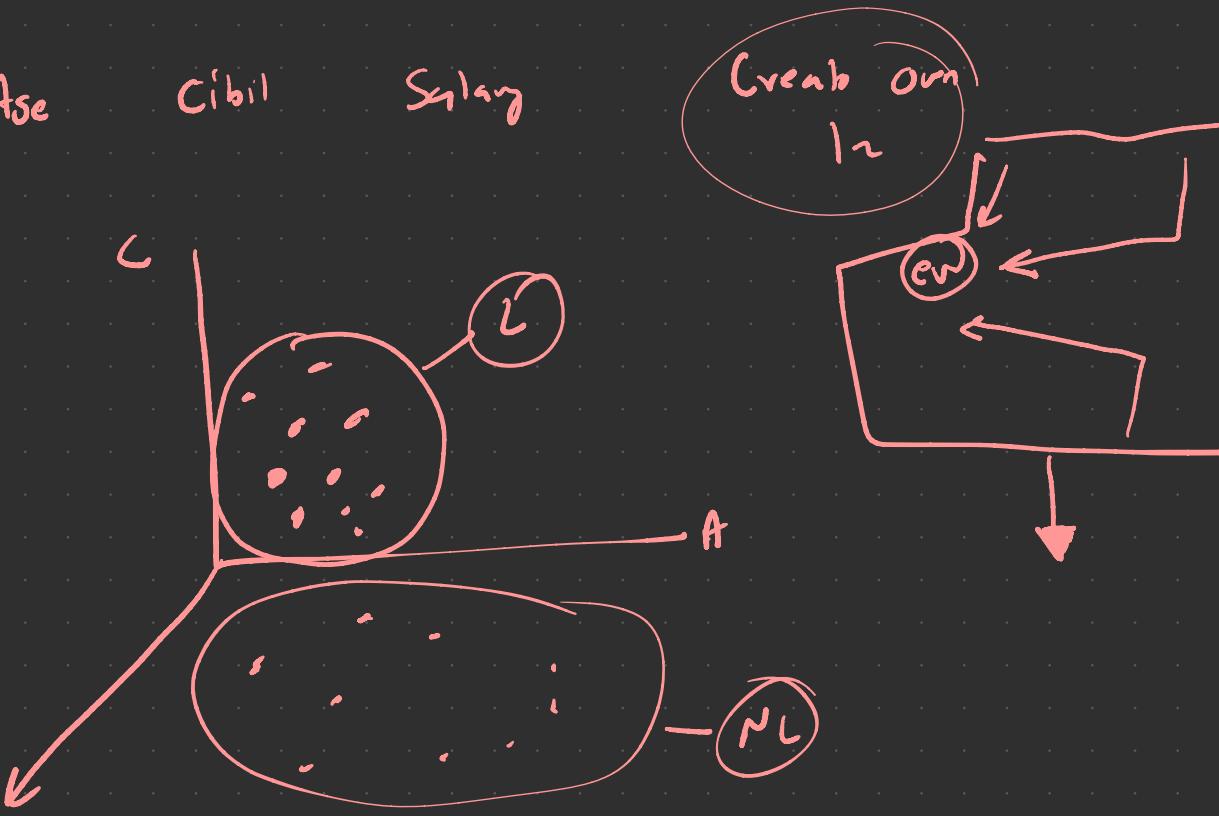


Group

Cluster

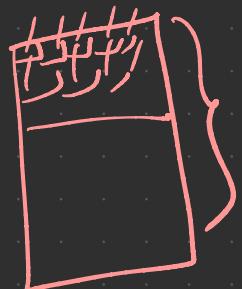
Clust

Ase Cibil Salay

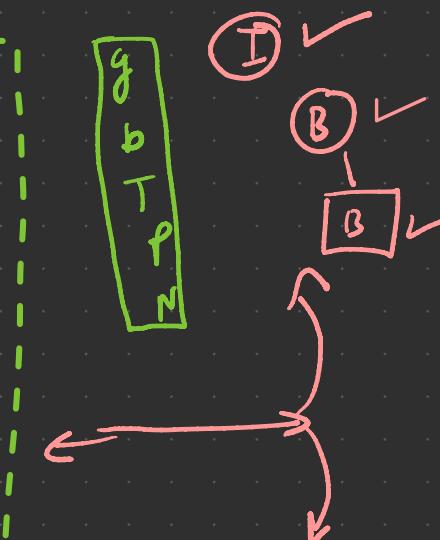
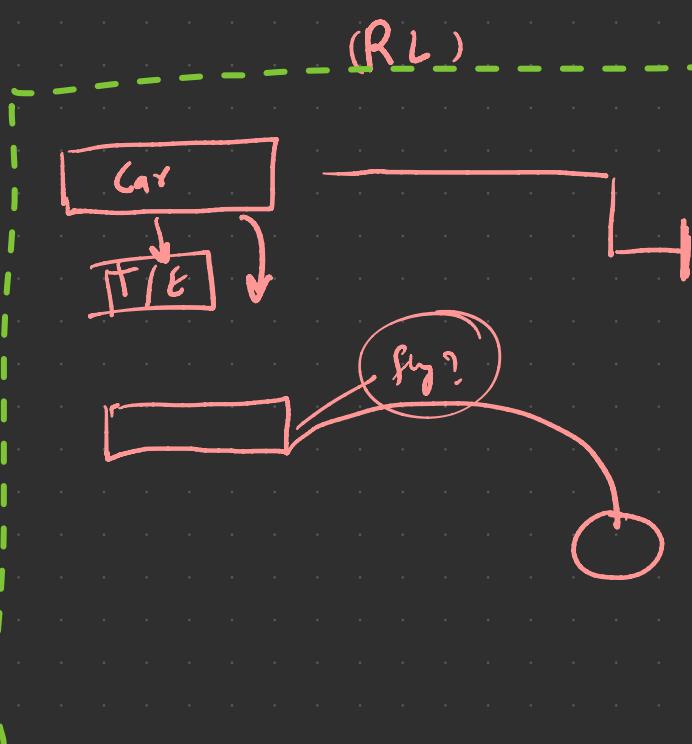


① Agent ✓
(learning)

② Env (opens) ✓
100 → -20 → 100
-20 → 100
100 → 100

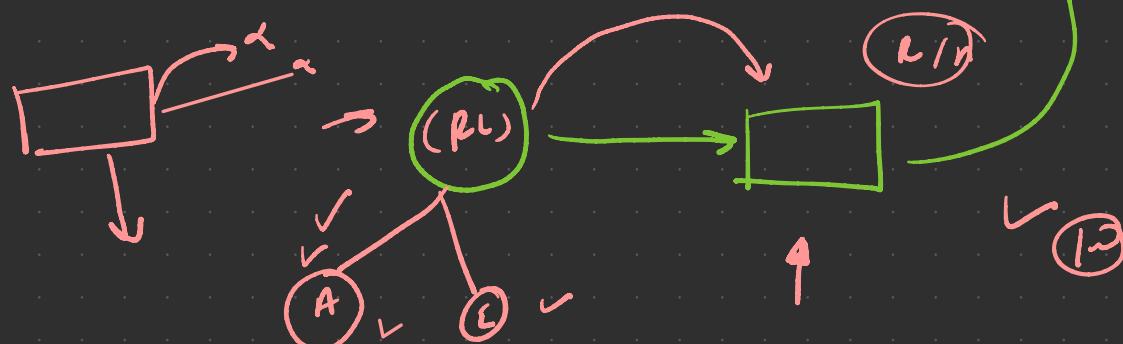
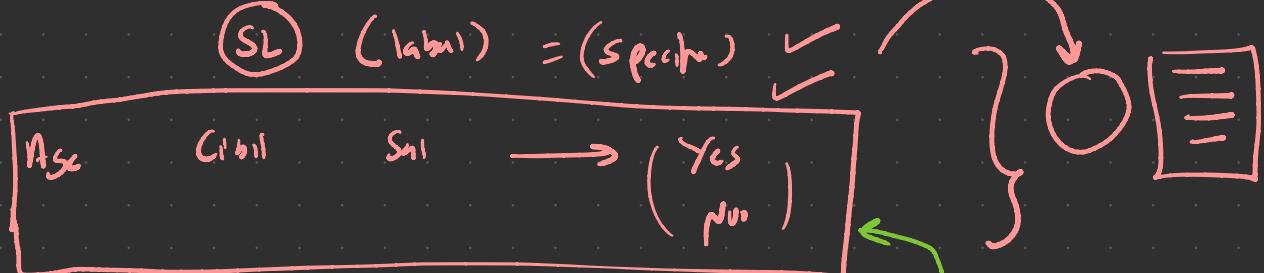
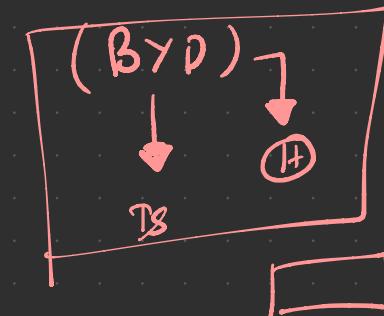
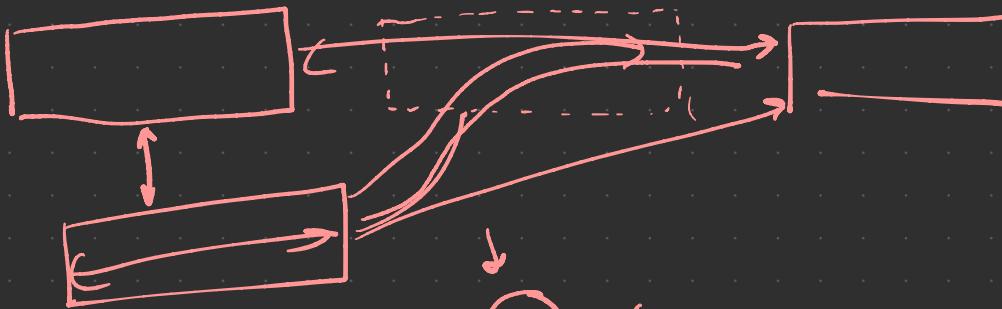


✓	✓
✓	✓

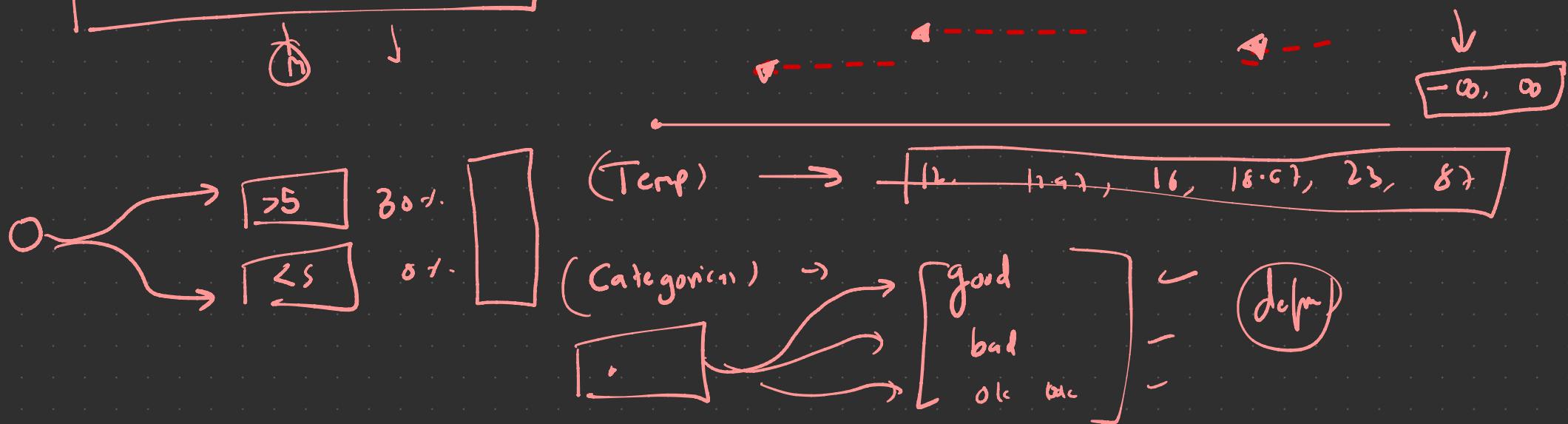
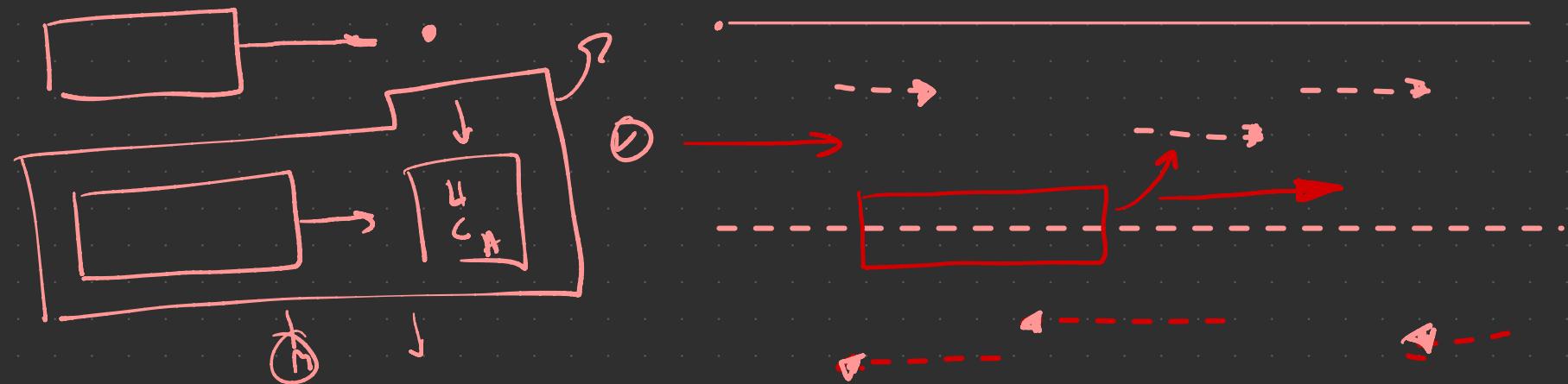
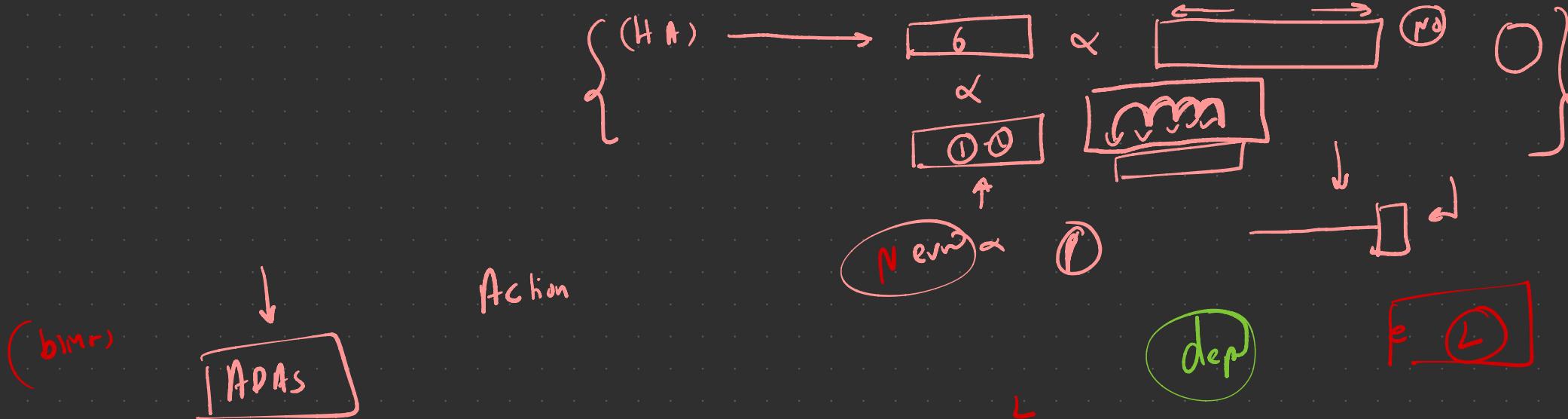


- ③ Action ✓: all possible moves a agent can make (v) (distr)
④ State ✓: Situation of the Env ()
⑤ Policy ✓: (act) @ (s)

(Parallel Parity)

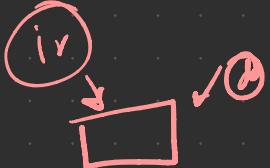


$$\text{opr} \rightarrow \text{Path} - (\text{Path}) =$$



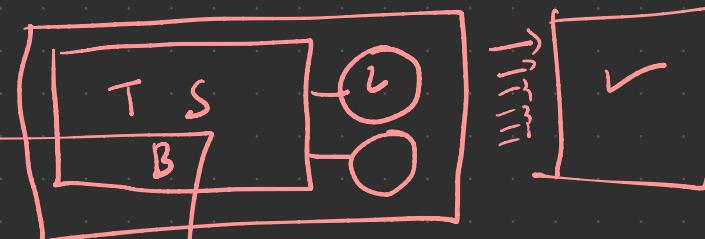


\uparrow Data - \uparrow good



6

1

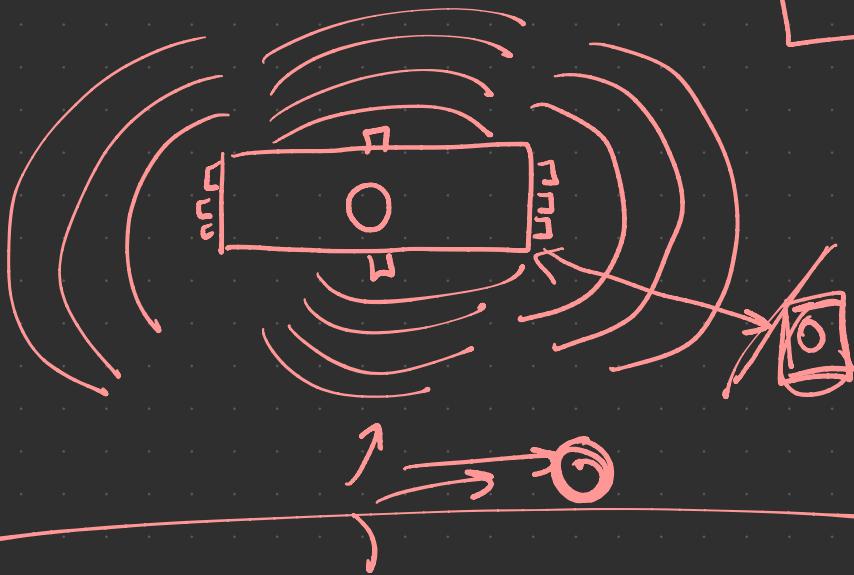


T

(1)

Saturn

30



11

(lidar

31

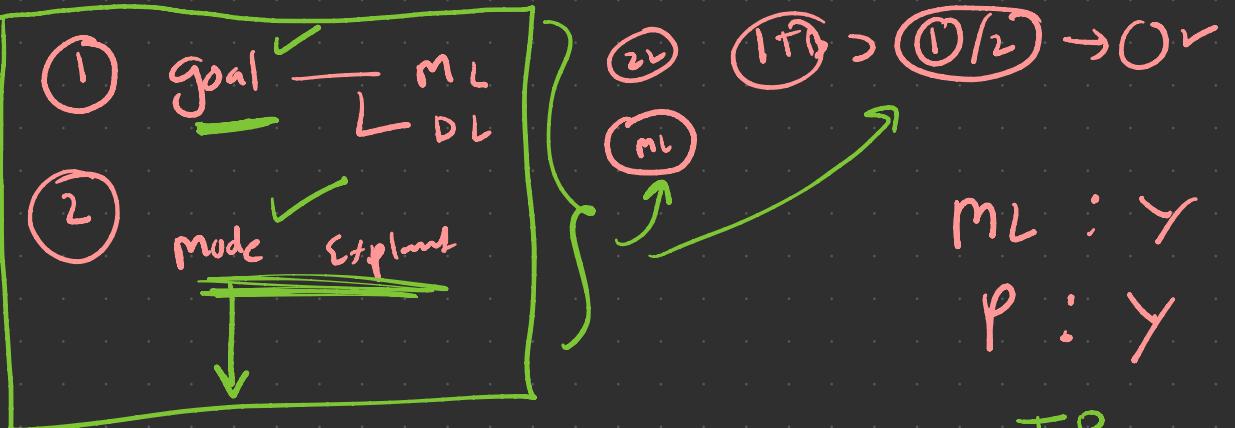
Lidar
Spoofing

6

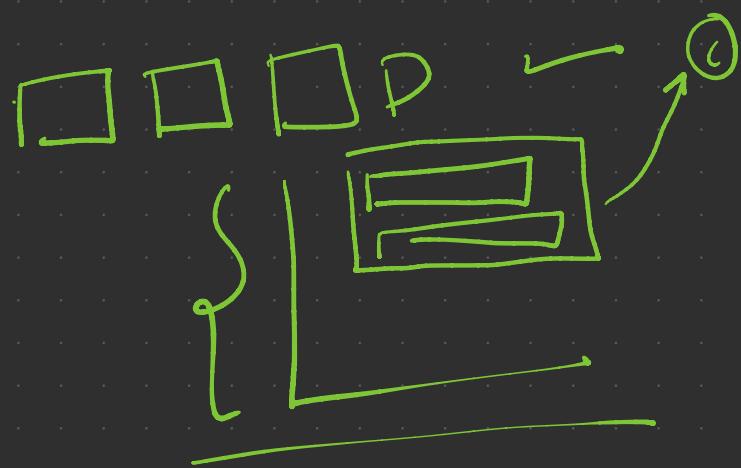
1

4

1

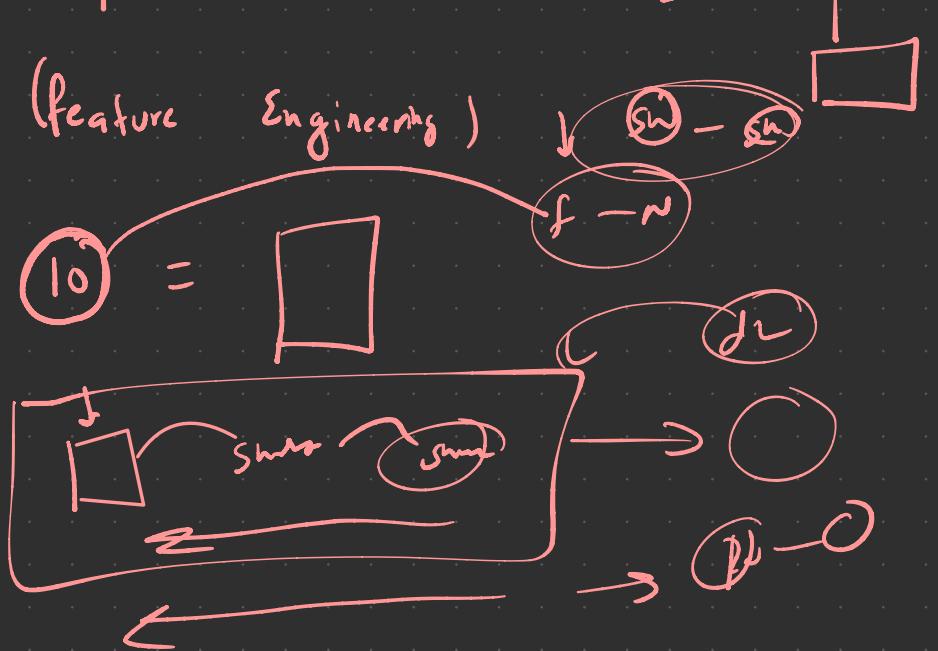


P - Why?

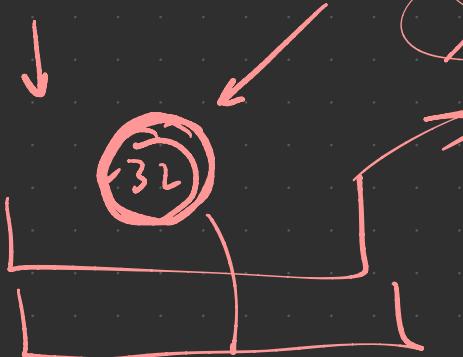
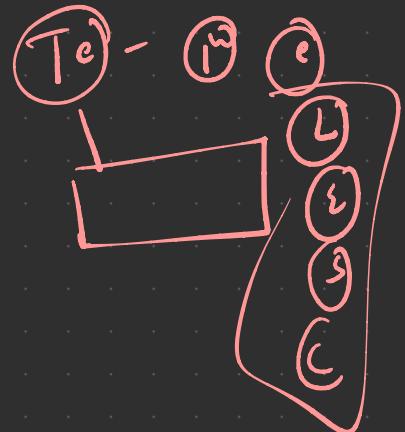


$M_L : Y$	$M_L : Y$
$P : Y$	$P : N$
TP	FP
$M_L : N$	$M_L : N$
$P : Y$	$P : N$
FN	TN

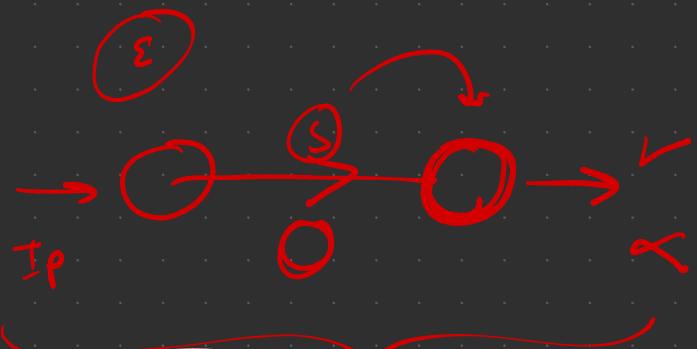
(ML) - (feature Engineering)



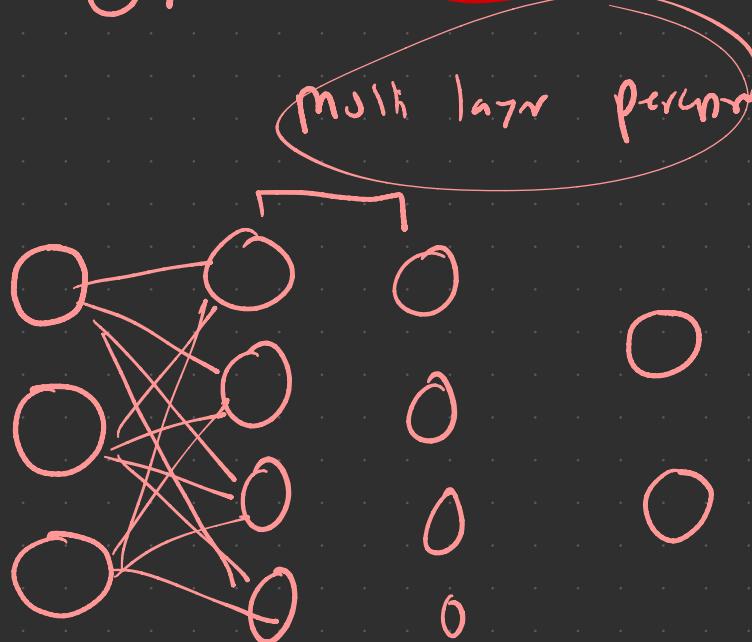
$(Gx) = (GST)$ ✓



MLP



Age Salary Cibil

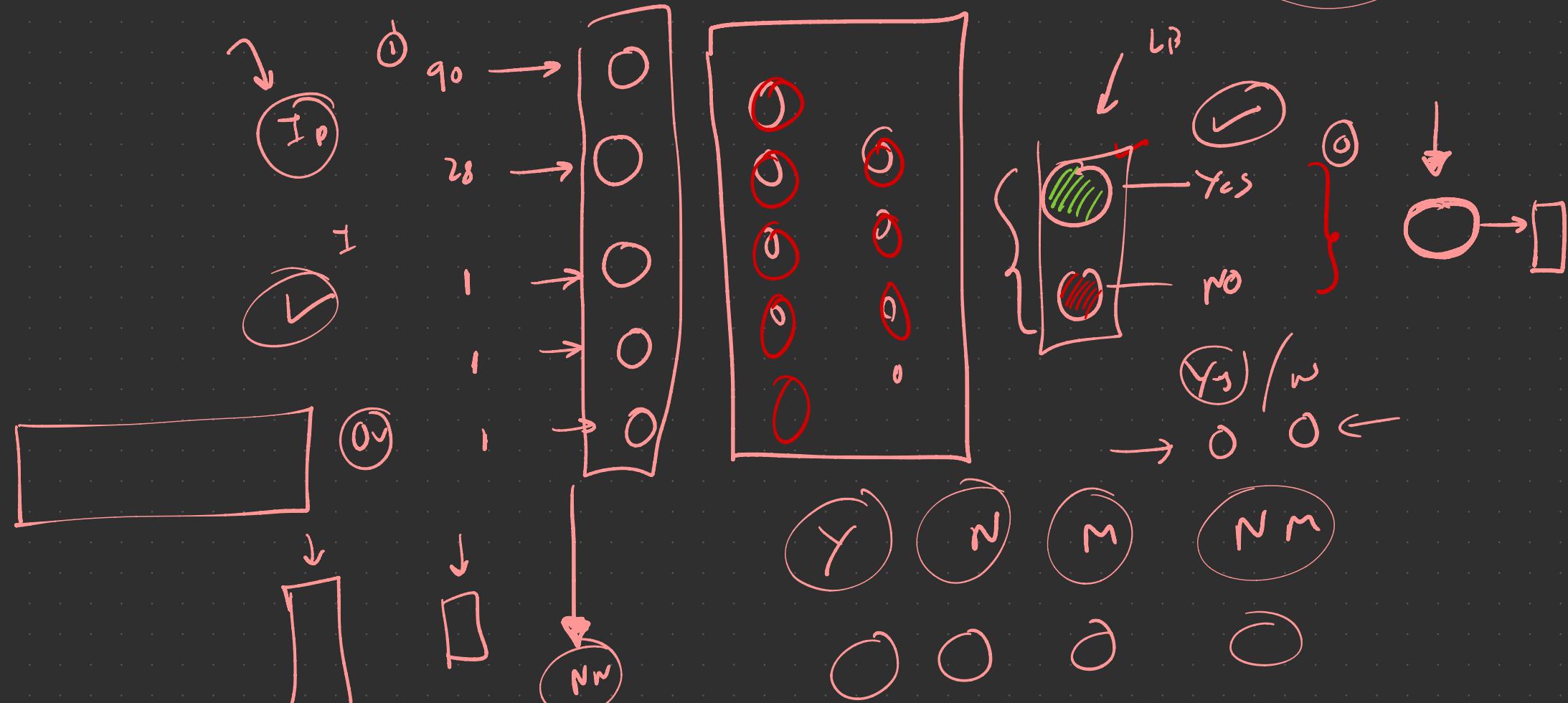


multi layer perceptron

bp	Age	Sex	Smoked	Diabetes	$\frac{Y}{N}$
90	28	m	y	y	$\frac{Y}{N}$

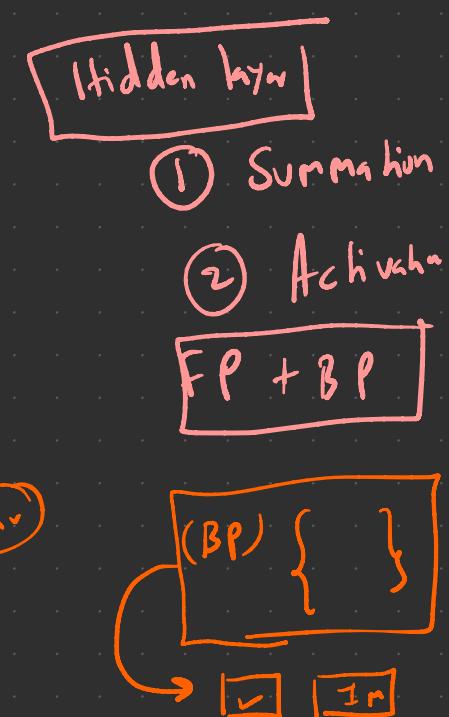
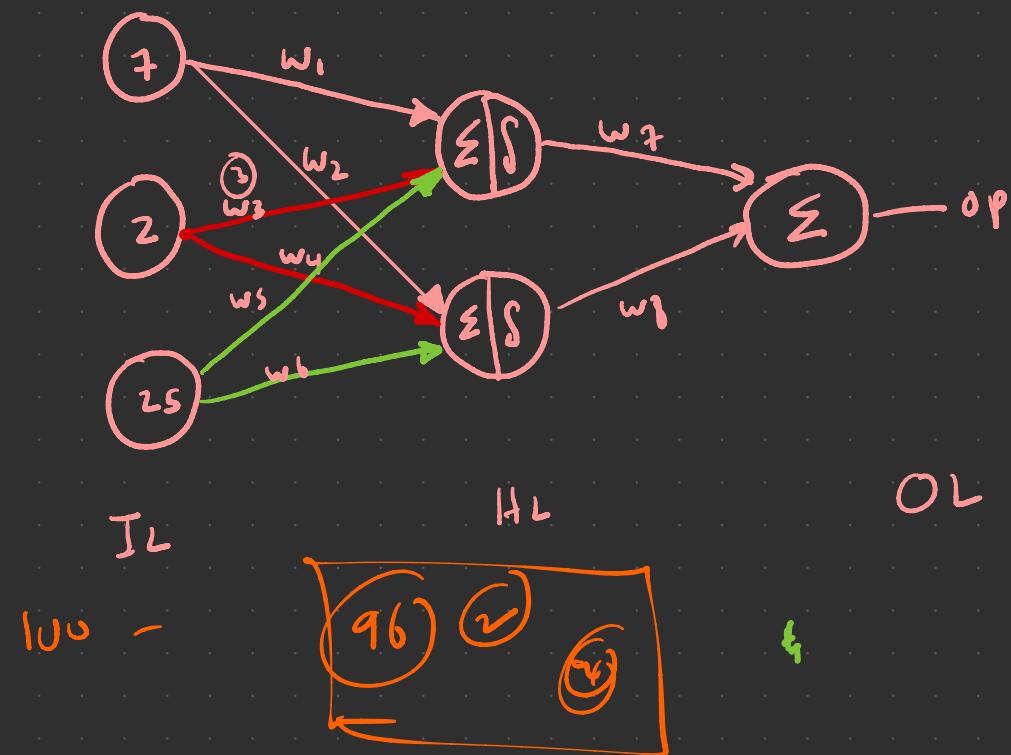
(Categorical)

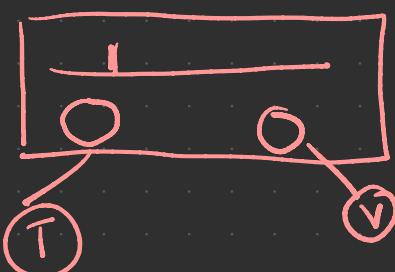
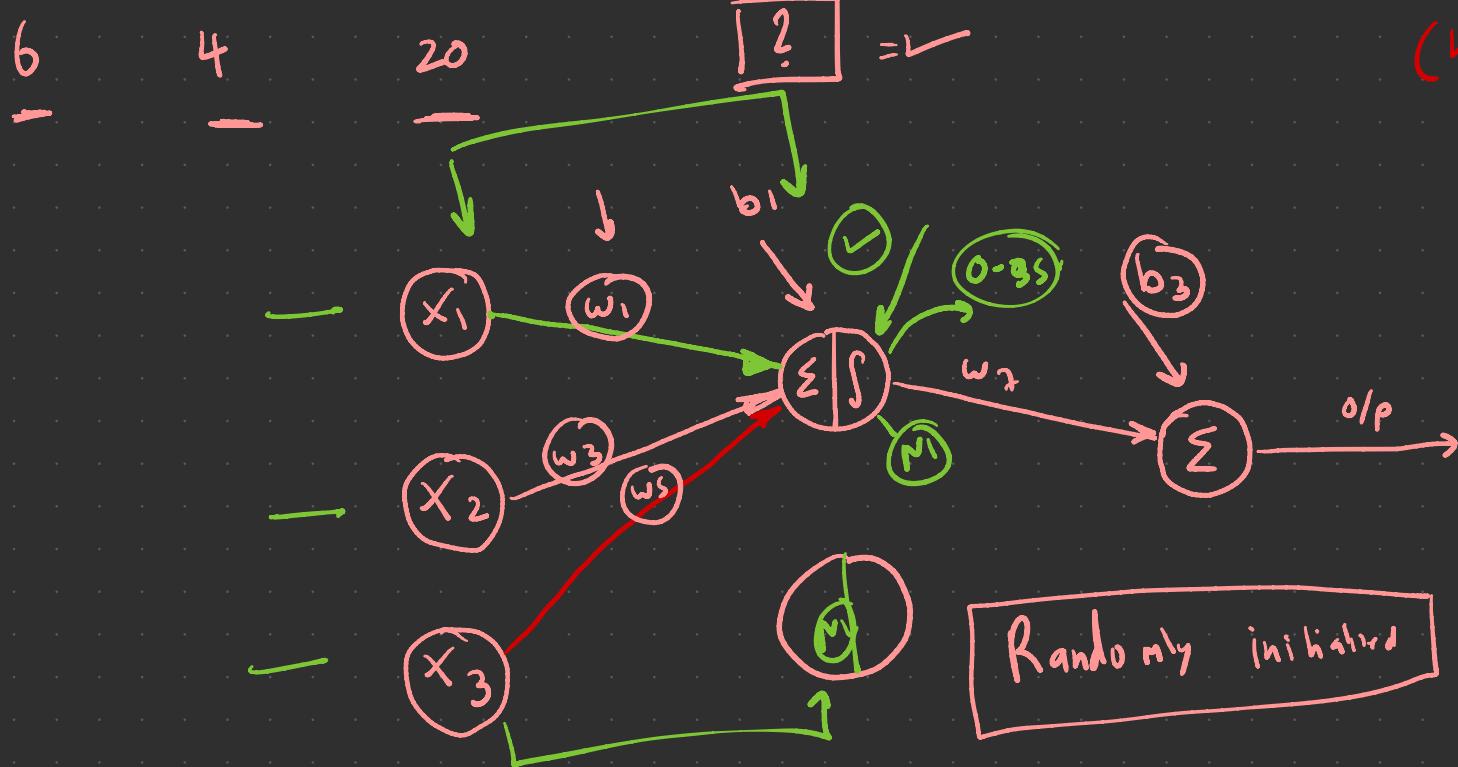
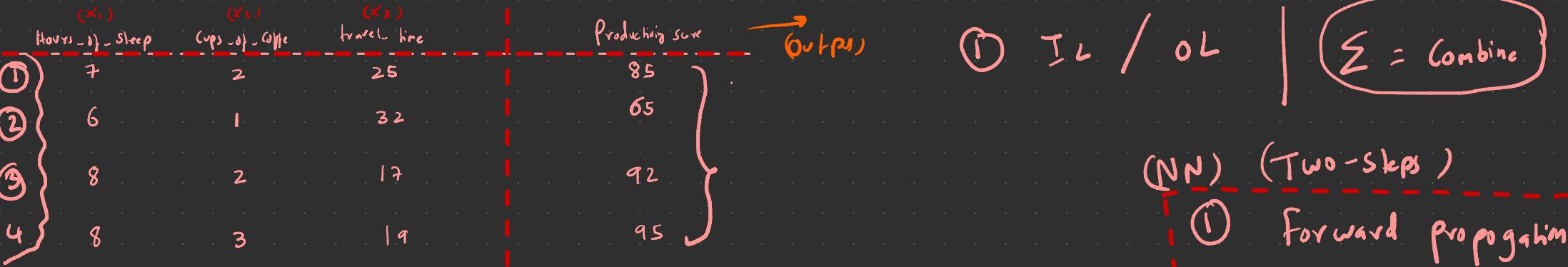
Nodes



Graphs

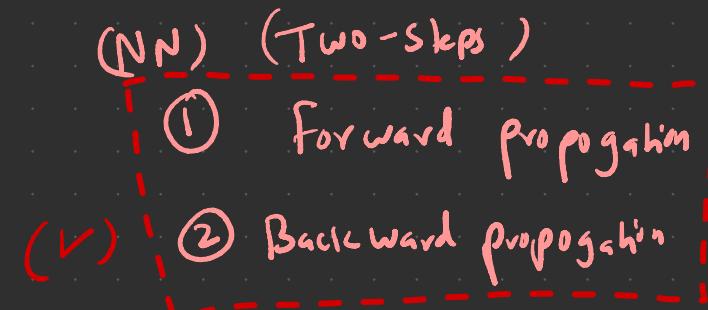
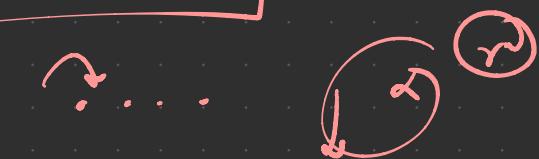
(x_1) Hours - sleep	(x_2) Cups - of - coffee	(x_3) travel - time	Productivity score
7	2	25	85
6	1	32	65
8	2	17	92
8	3	19	95





$(\text{Machine}) = \text{bias}$

...

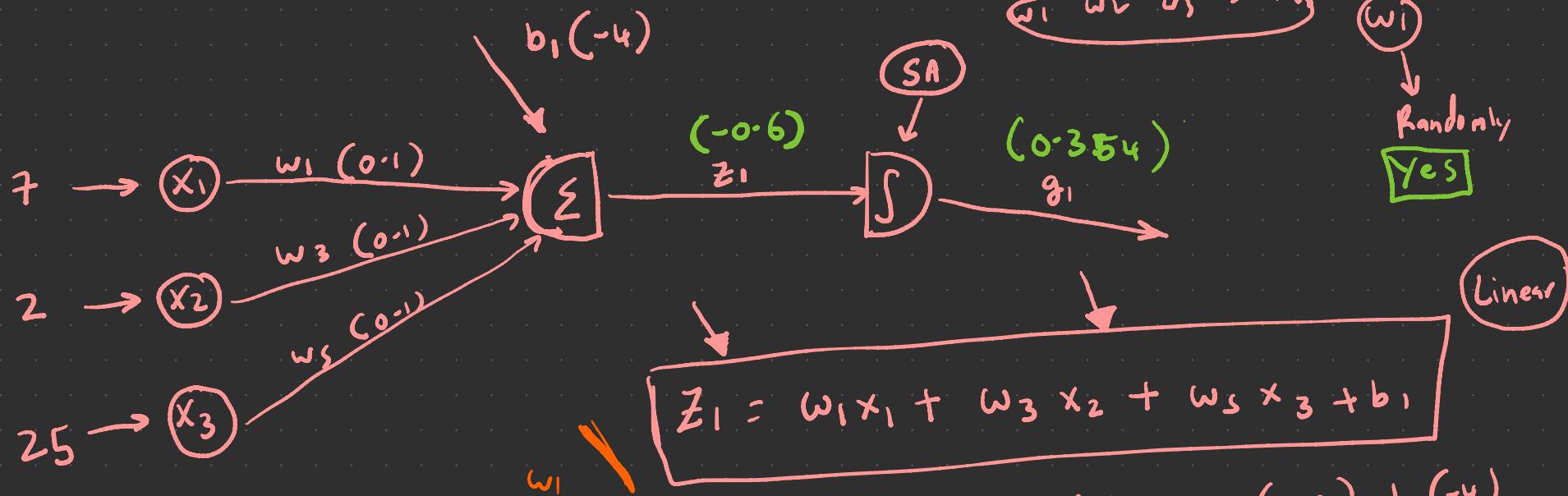


$$\begin{cases} w = 8 \\ b = 3 \end{cases} = 11$$

anything



FP



Activation function

$$L(LR) = y = m \cdot x + c$$

$$y = m_1 x_1 + m_2 x_2 + m_3 x_3 + c$$

↑ ↑ ↑

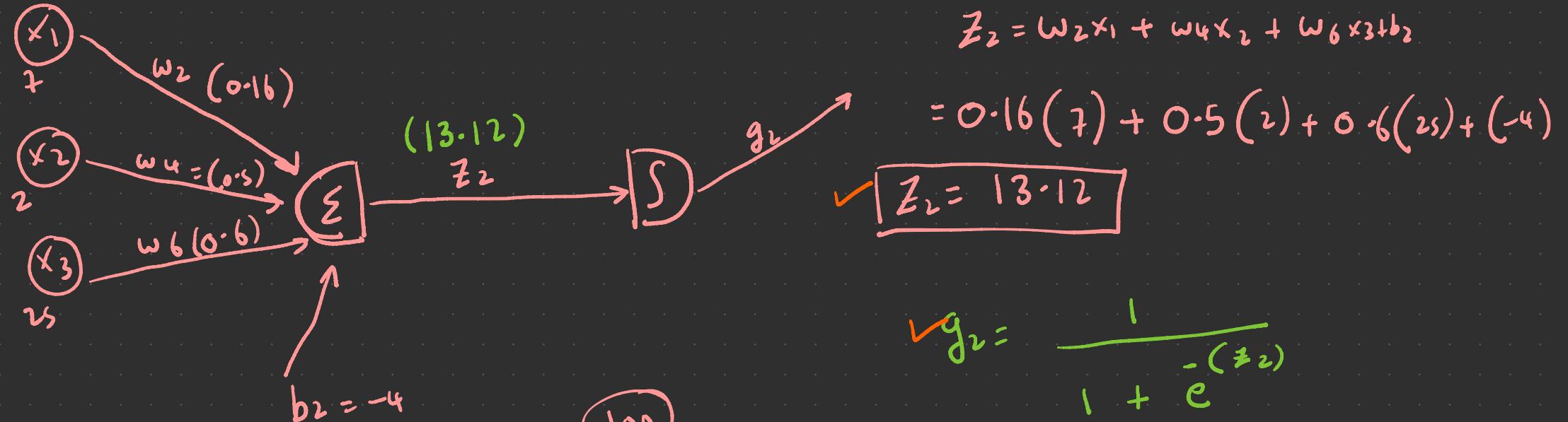
(Non-linear)

① Sigmoid = $\frac{1}{1 + e^{-x}}$

$$g_1 = \frac{1}{1 + e^{-(z_1)}}$$

$$= \frac{1}{1 + e^{-(-0.6)}}$$

$$g_1 = 0.354$$

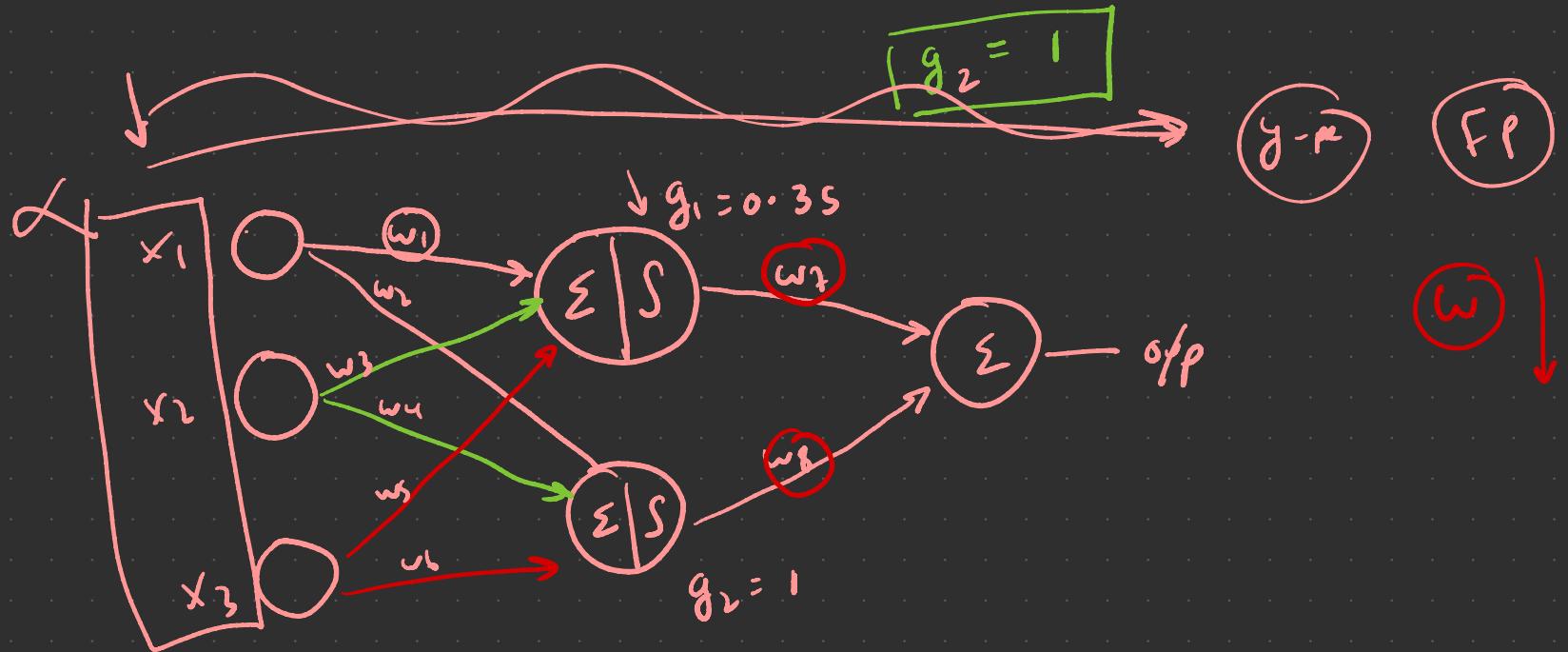
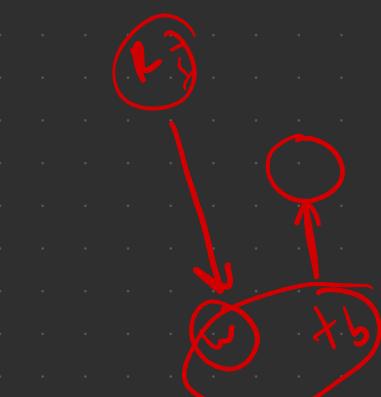


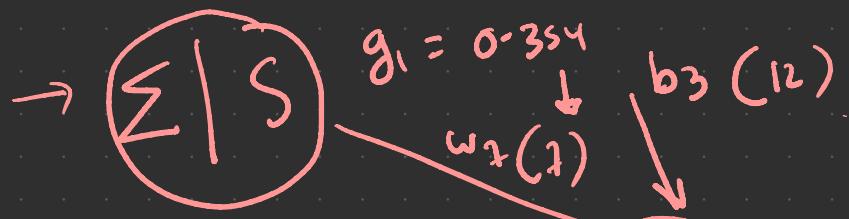
$$g_2 = \frac{1}{1 + e^{-(Z_2)}}$$

$$= \frac{1}{1 + e^{-(13.12)}}$$



100





$$g_2 = 1$$

w_{ch}



③

$$\Sigma \rightarrow y_{pred}$$

$y_{pred} = 17.478$

$$y_{pred} = w_7(g_1) + w_8(g_2) + b_3$$

$$= 7(0.354) + 3(1) + 12$$



(Error) = $(A_{pred} - A_{target})^2 \alpha$

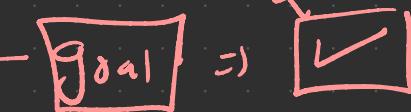
$$= (85 - 17.478)^2$$

$\Sigma = 67.522$

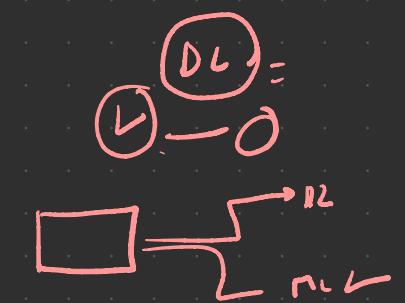


- ① 100% Yes
- ② 3
- ① Yes
- ② Yes - deeply

(more hidden layer) → No 1!



Teach ✓



Teach BP ✓

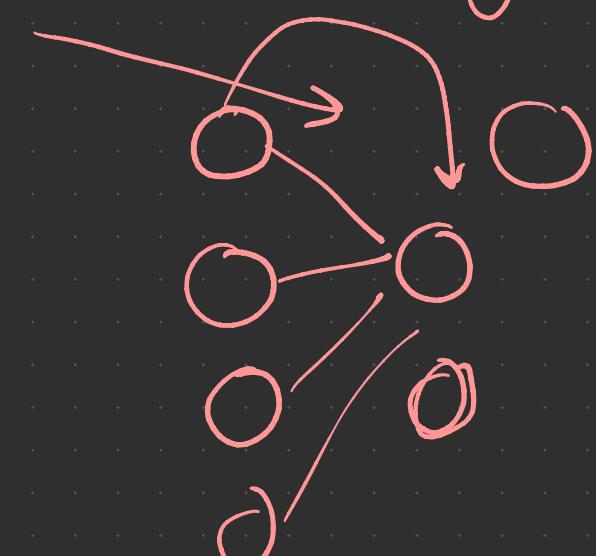
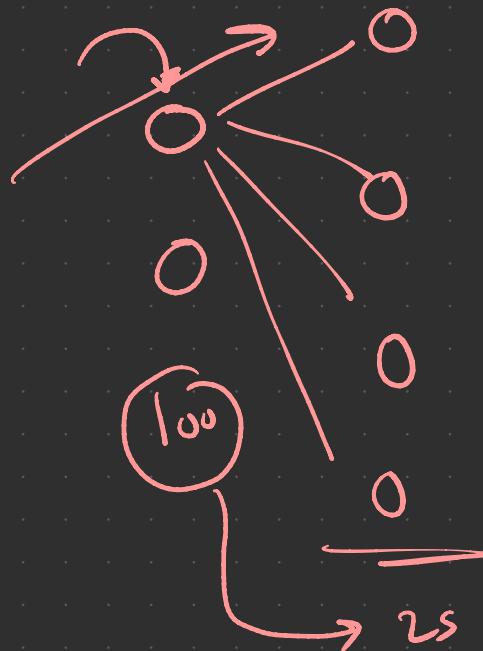
I H O

S - C

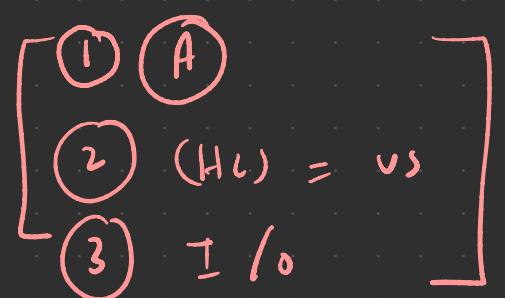
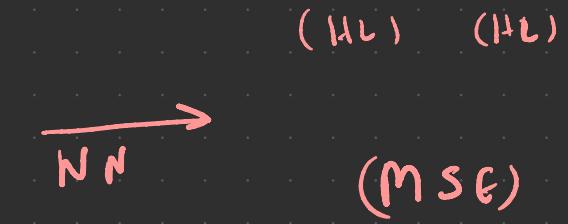
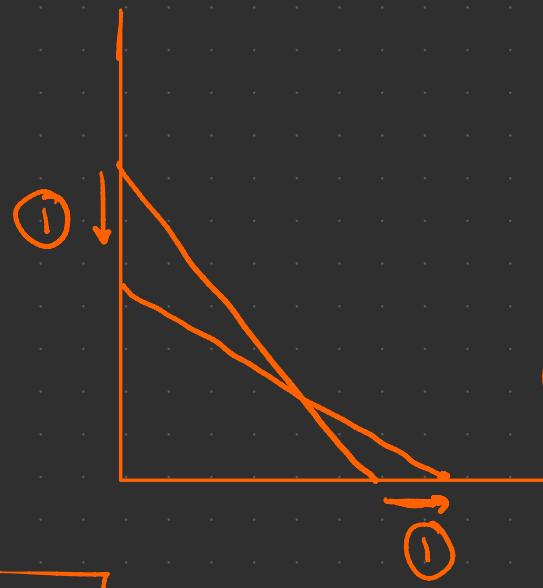
2

4

E + P



(Traded w)

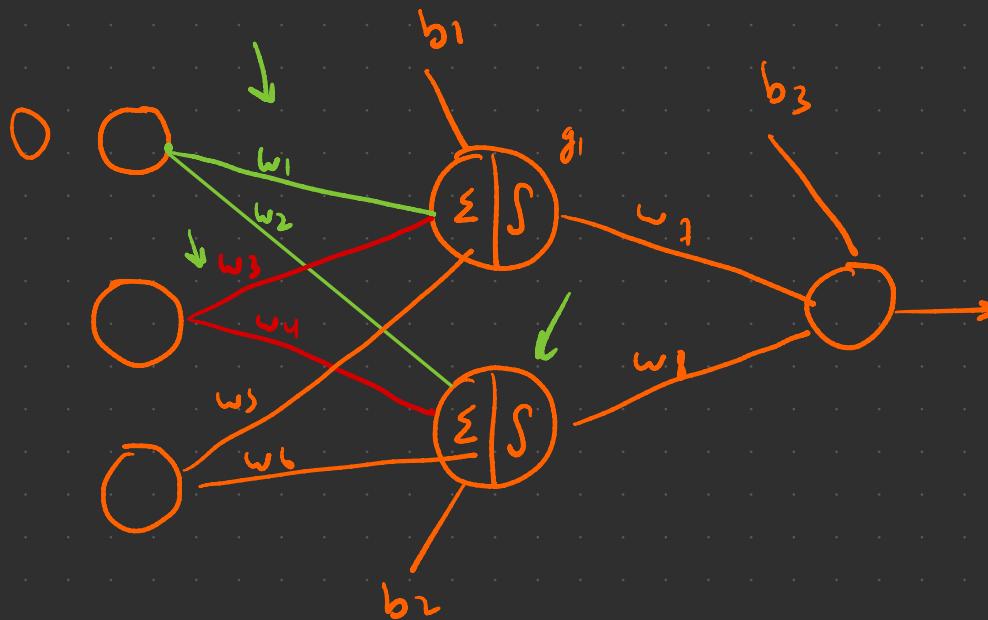


Backpropagation is an algorithm that updates your weights and bias value such that your (actual - predicted) error is as less as possible

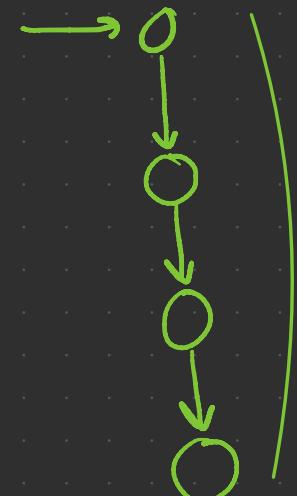
In Backpropagation, the aim of the algorithm is to change all possible weights and bias values such that the neural network has the least amount of errors on the entire data set

$$(DT) \checkmark = \alpha$$

(Chain like)



$$(y_{act} - y_{pred})^2$$



$$x^2 = 2x$$

$$4x^2 = 8x^1$$

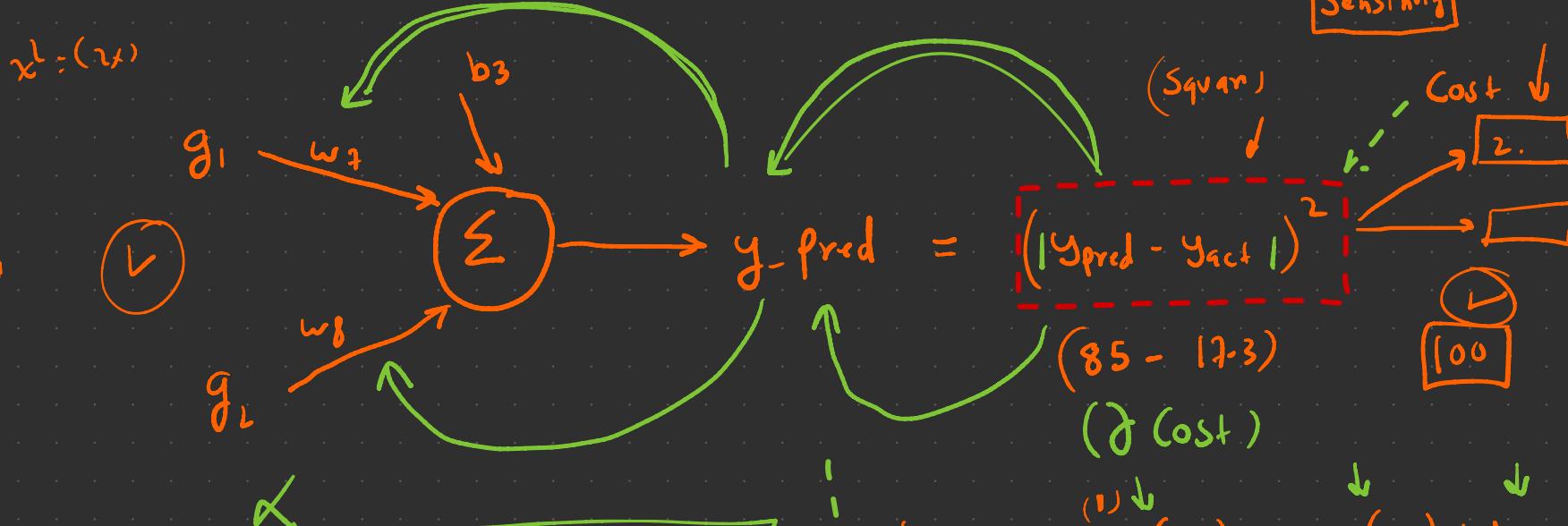
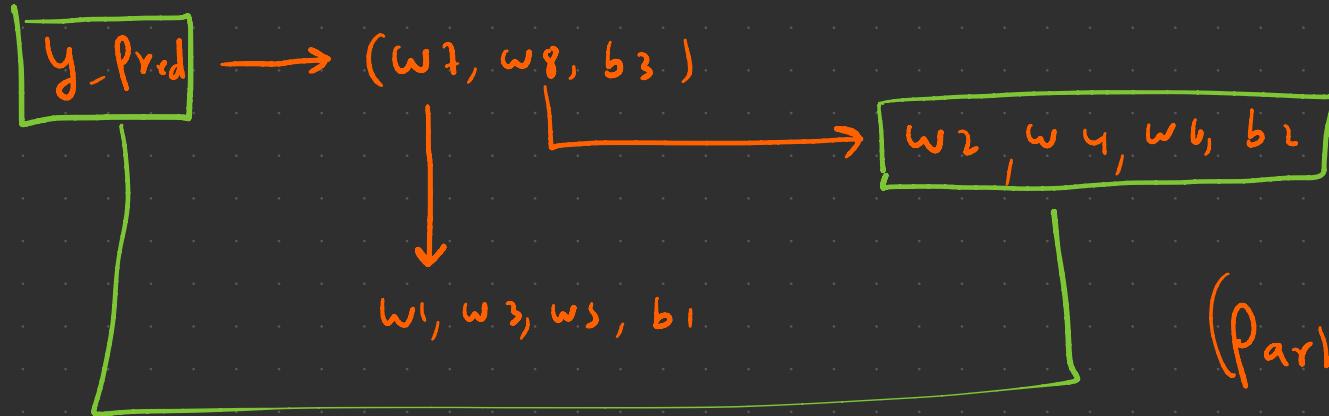
$$x^2 = 2(x)$$

$$(y_{\text{pred}} - y_{\text{act}})^2$$

$$(f \cdot x^{2-1}) = 2x^1$$

$$= 2x$$

$$x^2 = 2(x)$$



$$\frac{\partial \text{Cost}}{\partial w_7} = \frac{\partial \text{Cost}}{\partial y_{\text{pred}}} \times \frac{\partial y_{\text{pred}}}{\partial w_7}$$

$$= 2(y_{\text{pred}} - y_{\text{act}}) \times g_1$$

$$= 2(17.478 - 85) \times 0.354$$

$$y_{\text{pred}} = w_7(g_1) + w_8(g_2) + b_3$$

$$\frac{\partial y_{\text{pred}}}{\partial w_7} = 1 \cdot g_1 + 0 + 0$$

$$\frac{\partial y_{\text{pred}}}{\partial w_7} = g_1$$

$$\boxed{\frac{\partial \text{Cost}}{\partial w_7} = -47.805}$$

$$\frac{\partial \text{Cost}}{\partial w_8} = \frac{\partial \text{Cost}}{\partial y_{\text{pred}}} \times \frac{\partial y_{\text{pred}}}{\partial w_8}$$

(etc)

$$= 2(y_{\text{pred}} - y_{\text{act}}) \times g_2$$

$$= 2(17.478 - 85) \times 1$$

$$\boxed{\frac{\partial \text{Cost}}{\partial w_8} = -135.044}$$

$$y_{\text{pred}} = w_7(g_1) + w_8(g_2) + b_3$$

$$\frac{\partial y_{\text{pred}}}{\partial w_8} = 0 + 1 \cdot g_2 + 0$$

$$\begin{cases} w_7 = 7 \\ w_8 = 3 \end{cases}$$

α

(New weights / bias Value) \longrightarrow (Gradient descent)

✓ $w_7^+ = w_7 - \eta \frac{\partial \text{Cost}}{\partial w_7} = 7 - [0.01 \times (-47.805)]$

\downarrow
 (0.01)

$$= \boxed{7.47}$$

✓ $w_8^+ = w_8 - \eta \frac{\partial \text{Cost}}{\partial w_8} = 3 - [0.01 \times -135.044]$

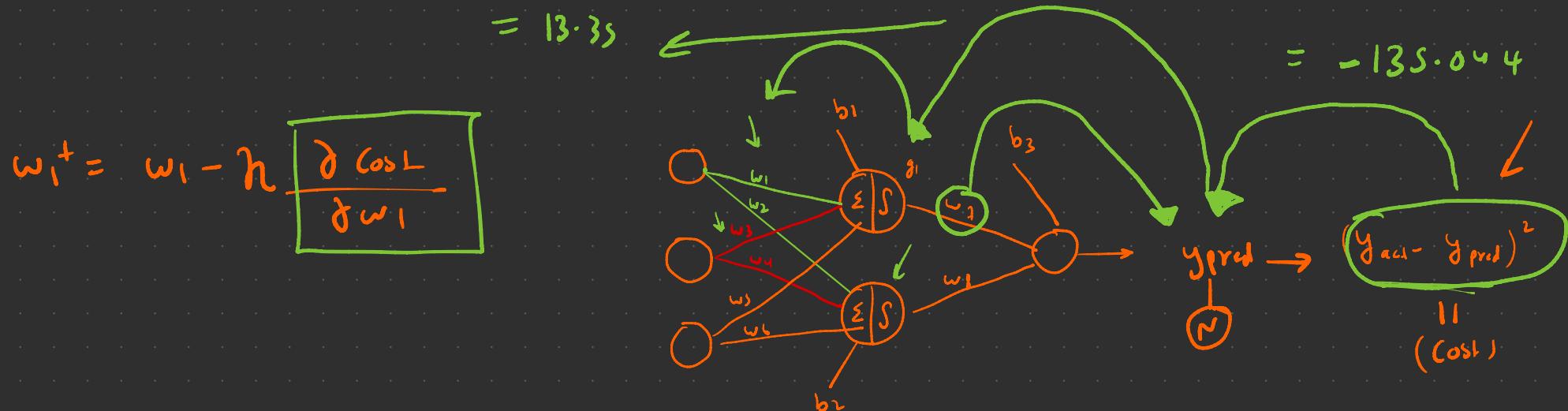
$$= \boxed{4.35}$$

(we define it)

$$b_3^+ = b_3 - h \frac{\partial \text{cost}}{\partial b_3}$$

$\frac{\partial \text{cost}}{\partial b_3} = \frac{\partial \text{cost}}{\partial y_{\text{pred}}} \times \frac{\partial y_{\text{pred}}}{\partial b_3}$

$\rightarrow = 12 - 0.01 (-135.044)$



$$\boxed{\frac{\partial \text{cost}}{\partial \omega_1} = \frac{\partial \text{cost}}{\partial y_{\text{pred}}} \times \frac{\partial y_{\text{pred}}}{\partial g_1} \times \frac{\partial g_1}{\partial \omega_1}}$$

$$\left(\frac{1}{1 + e^{-x}} \right) = \boxed{\gamma_1 (1 - \gamma_1)}$$

$$\frac{\partial g_1}{\partial \omega_1} = \frac{\partial g_1}{\partial z_1} \times \frac{\partial z_1}{\partial \omega_1}$$

$$\frac{\partial \text{Cost}}{\partial w_1} = \frac{\partial \text{Cost}}{\partial y_{\text{pred}}} \times \frac{\partial y_{\text{pred}}}{\partial g_1} \times \frac{\partial g_1}{\partial z_1} \times \frac{\partial z_1}{\partial w_1}$$

$$= 2(y_p - y_t) \times w_7 \times [g_1 \times (1-g_1)] \times x_1$$

$$= 2(17.48 - 85) \times 7 \times \left[\frac{1}{1 + e^{-(0.6)}} \times 1 - \frac{1}{1 + e^{-(0.6)}} \right] \times 7$$

(w/b)

$$(0.354) \times (-0.354)$$

$$= -1513.183$$

$$w_1^+ = w_1 - \eta \frac{\partial \text{Cost}}{\partial w_1}$$

(1)

$$w_1^+ =$$

$$-0.1 - 0.01(-1513.183)$$

