

~~ARTIFICIAL~~

~~NEURAL~~

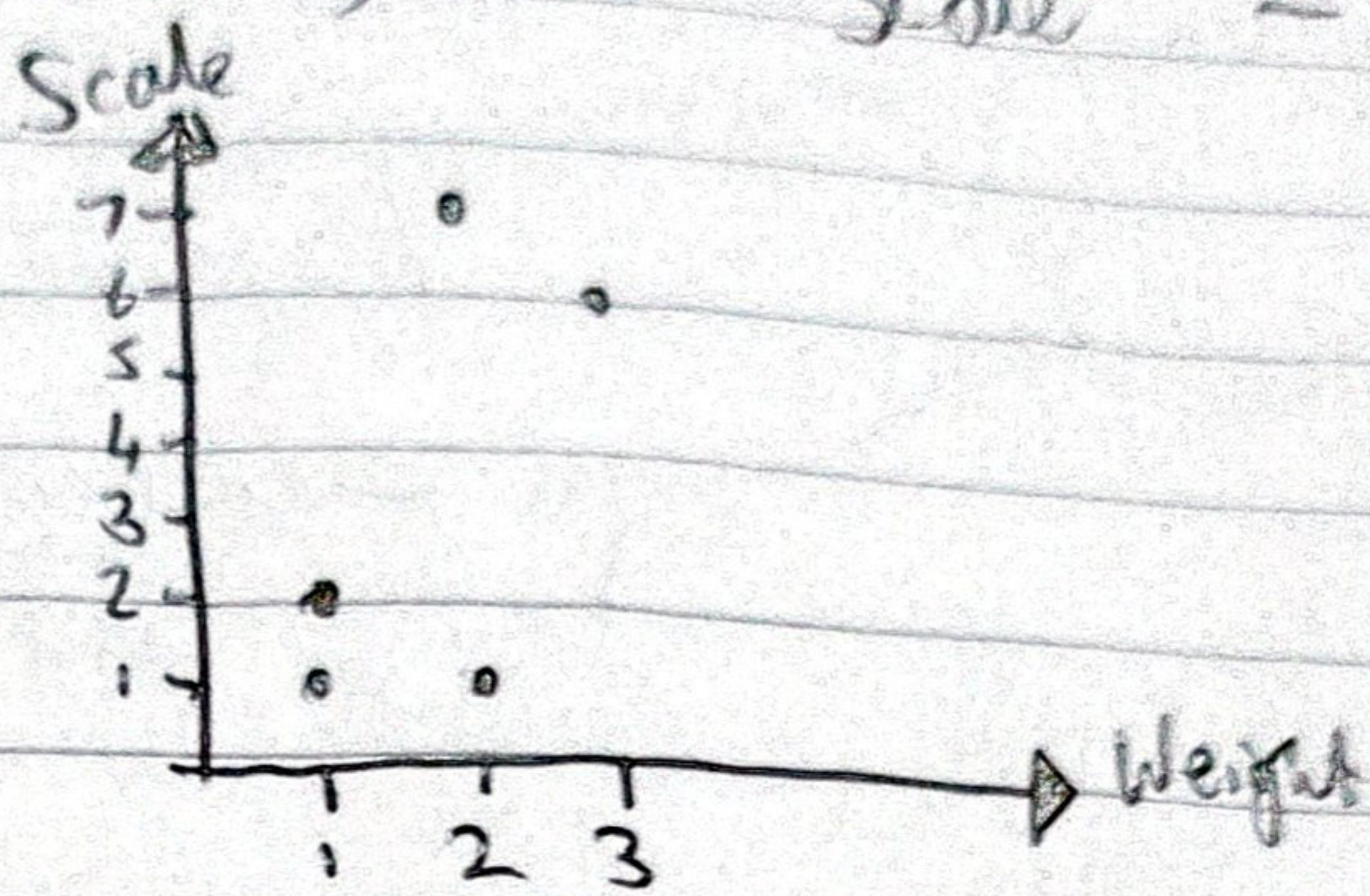
# Project 1

Pencil or Eraser?

(i) INPUTS (Weight, Scale)  
( $x_1$ ,  $x_2$ )

Weight - grams  
Scale - 1-13

- (2, 7) - 1
- (3, 6) - 1
- (1, 1) - 0
- (1, 2) - 0
- (2, 1) - 0



(2) OUTPUT =  $y$  - be either 0 or 1  
Eraser or Pencil classification

(3) - Includes  
Weights -  $w$  0.1, 0.3  
Bias -  $b$  0.5  
Learning Rate -  $\eta$  0.1

## Training the model

(2, 7) - 1  
INPUT  $x$  OUTPUT  $y$

Using weights 0.1, 0.3 bias = 0.5

$$Z = w_1 \times x_1 + w_2 \times x_2 + b$$
$$0.1 \times 2 + 0.3 \times 7 + 0.5$$
$$0.2 + 2.1 + 0.5$$

Weighted Sum = 2.8

$$Z = w_1 \times x_1 + w_2 \times x_2 + b$$

Activation function }  $F(x) = \begin{cases} 1 & \text{if } x \geq 0 \\ 0 & \text{if } x < 0 \end{cases}$



INPUT

(1, 2)

$x$

OUTPUT

0

$y$

Predicted  
Eraser

0 - Eraser  
1 - Pencil

$W = 0.1, 0.3$   
 $b = 0.5$

$$Z = W_1 \cdot x_1 + W_2 \cdot x_2 + b$$

$$\cancel{1 \times 0.1} + 2$$

$$0.1 \times 1 + 0.3 \times 2 + 0.5$$

$$0.1 + 0.6 + 0.5$$

$$= 1.2 \text{ Weighted Sum}$$

$$F(x) = \begin{cases} 1 \Rightarrow 0 \checkmark & \text{Pencil} \\ 0 \Leftarrow 0 \end{cases}$$

Model is  
Wrong

Weights and/or bias  
is wrong