Students

$x \rightarrow$ Study time $\rightarrow$ 0h - ∞h

Exam score $\rightarrow$ 0 - 100

Outliers

$$y = m \cdot x + b$$

Mean squared error $\}\rightarrow$ also called cost function

$$E = \frac{1}{n} \sum_{i=0}^{n} \left(y_i - \hat{y}_i \right)^2$$

$$= \frac{1}{n} \sum^{n} \left(y_i - (m x_i + b) \right)^2$$

$$= \frac{1}{n} \sum_{i=0} \left(y_i - (m \cdot x_i + b) \right)$$

$$\frac{\partial E}{\partial m} = \frac{1}{n} \sum_{i=0}^{n} 2 \left(y_i - (m \cdot x_i + b) \right) \cdot (-x_i)$$

$$= -\frac{2}{n} \sum_{i=0}^{n} x_i \cdot \left(y_i - (m \cdot x_i + b) \right)$$

Similarly

$$\frac{\partial E}{\partial b} = -\frac{2}{n} \sum_{i=0}^{n} \left[y_i - (m x_i + b) \right]$$

$$m = m - L \cdot \frac{\partial E}{\partial m}$$

$$b = b - L \cdot \frac{\partial E}{\partial b}$$

$L \longrightarrow$ learning rate

let $L = 0.001$