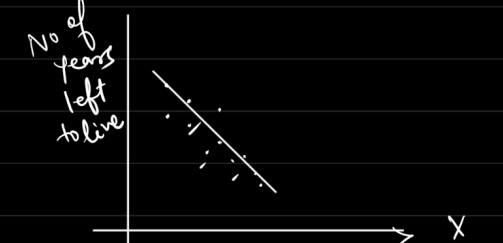
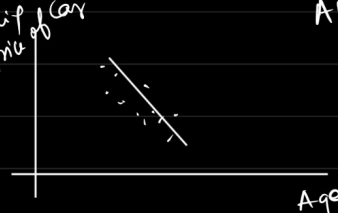
Multiple linear Regression

Ex-1 Predict price of house based on no of Rooms./Area of house

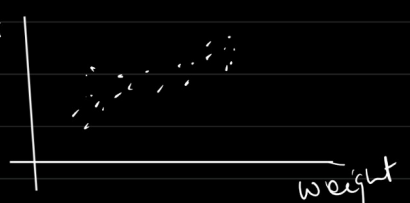
Ex-2 

Eg 

X (#no of rooms)	Y (price of house)
1	50
2	60
—	—
—	—
—	—
New 6	?

$y = f(x)$

$\rightarrow y_{pred} = \beta_0 + \beta_1 x$ or $\theta_0 + \theta_1 x$ or $mx + c$

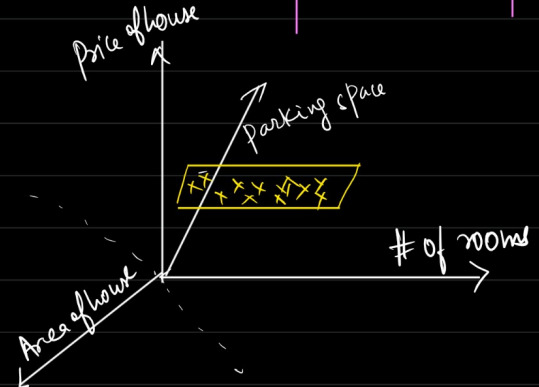
Eg 

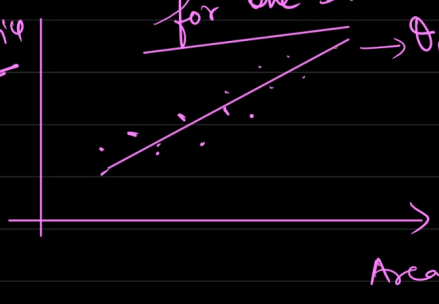
* We have only 1 feature (IV-x)

* Simple linear Regression
  ↓
  Only one feature.

* Only feature cannot be enough to predict the target variable.

# of rooms x_1	Parking space x_2	# Area of house x_3	y (price of house)
2	100	1100	80
—	—	—	—
—	—	—	—



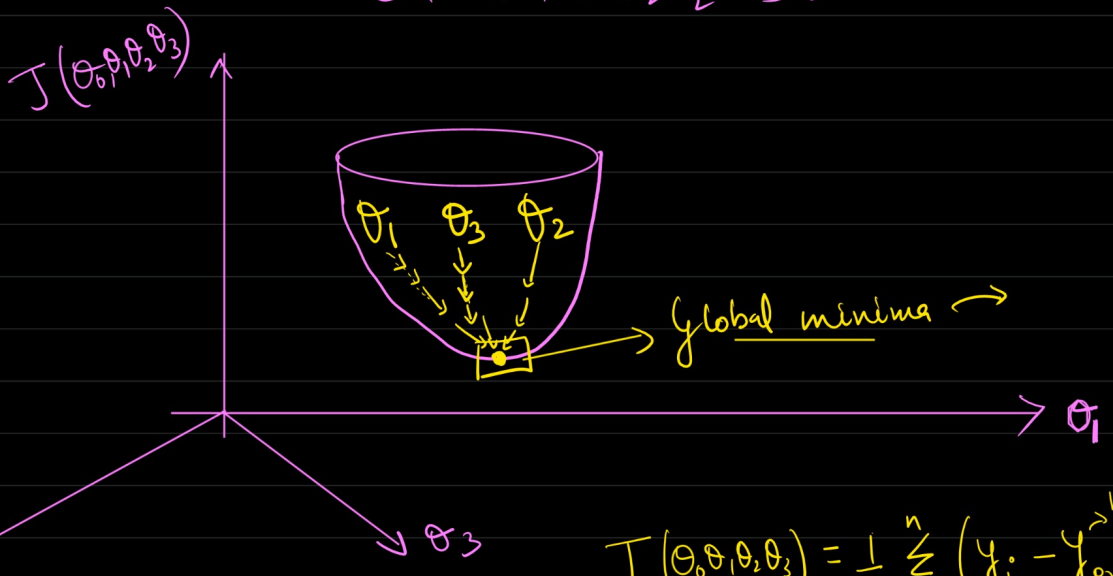


$$h_\theta(x) = \theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_3$$

$$y_{pred} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3$$

$$= C + m_1 x_1 + m_2 x_2 + m_3 x_3$$

($\theta_0, \theta_1, \theta_2, \theta_3$ → optimal coeff)

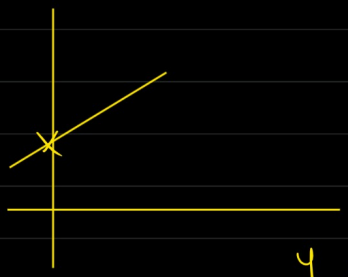


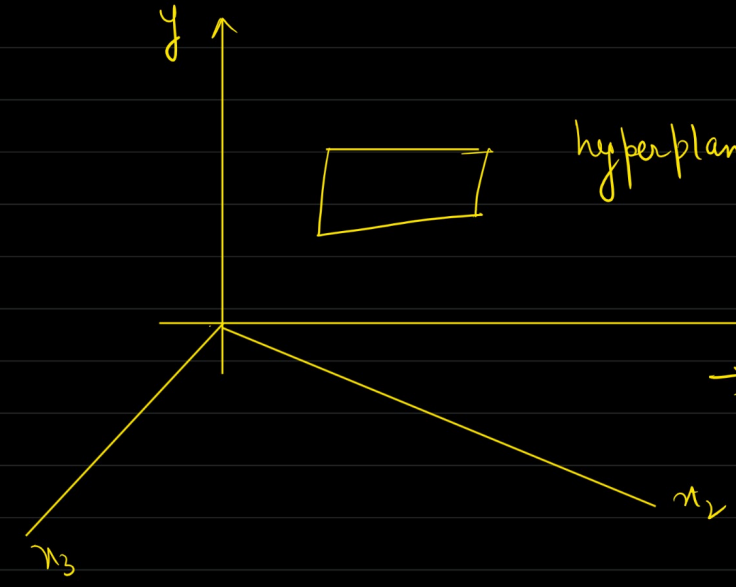
$$J(\theta_0\theta_1\theta_2\theta_3)_{min} = \frac{1}{n}\sum_{i=1}^{n}\left(y_i - y_{pred}^{h_\theta(x)}\right)$$

$$= \frac{1}{n}\sum_{i=1}^{n}\left(y_i - (\theta_0 + \theta_1 x_1 + \theta_2 x_2 + \theta_3 x_3)\right)$$

⇓

Minimise the eqn using gradient descent to get optimal $\theta_0\theta_1\theta_2\theta_3$ (coeff)





hyperplane (a multidimensional plane)

→ In MLR, the intercept is the point where this hyperplane intersects the vertical axis (dependent variable - y)

$$h_\theta(x) = \theta_0 + \theta_1 x_1 + \theta_2 x_2 - - - - \theta_n x_n$$