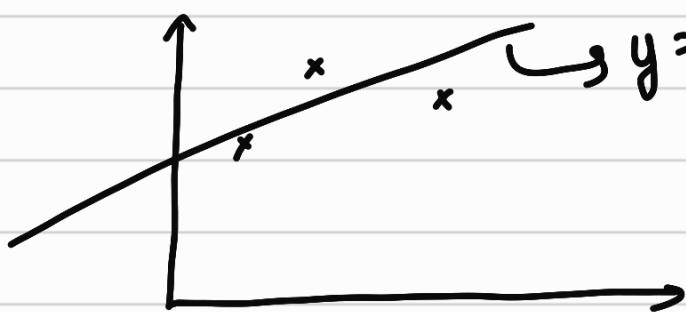


Polyomial Regression :-

MLR



$$y = \beta_1 x + \beta_2$$

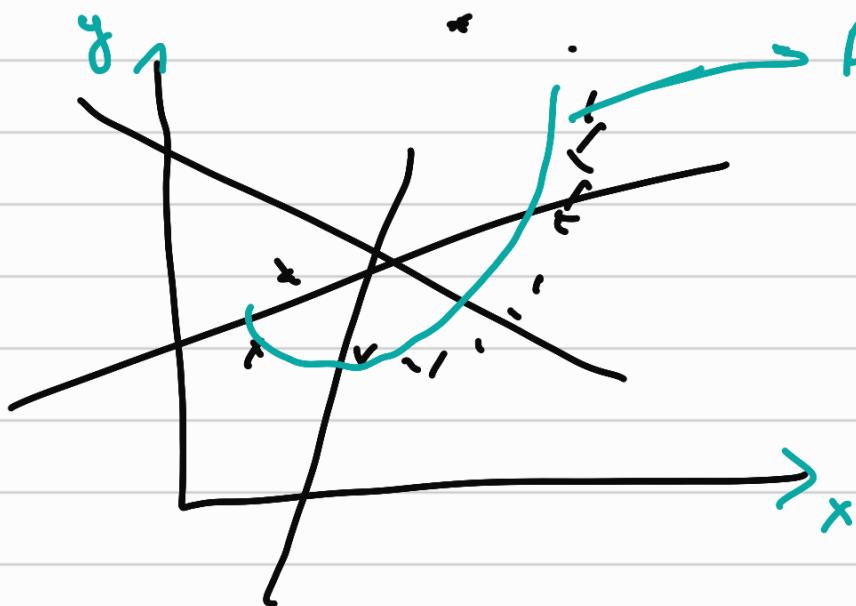
$$y = \beta_1 x_1 + \beta_2 x_2 + \beta_0$$

↓

$$y = \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + \beta_0$$

↓

$$\text{MLR} \Leftarrow y = \beta_0 + \sum_{i=1}^n \beta_i x_i$$



Better to use curve instead of Line
degree = 2

$$\begin{aligned} & \text{Age}(x) \\ & \text{So.} \end{aligned} \quad \left. \begin{aligned} & \text{Price}(y) \\ & \text{So.} \end{aligned} \right.$$

$$\begin{bmatrix} x^0, x^1, x^2 \end{bmatrix}$$

$$\begin{bmatrix} 1, 500, 250000 \end{bmatrix}$$

Best fit Curve

$$\text{PR} \rightarrow y = \beta_0 + \beta_1 x + \beta_2 x^2$$

$$\begin{matrix} d=2 \\ 1 \\ n^0 \\ n^1 \\ n^2 \end{matrix}$$

$$d=3 \quad y = \beta_0 + \beta_1 x + \beta_2 x^2 + \beta_3 x^3$$

3-d

$$MPR \Rightarrow y = \beta_0 + \beta_{11} n_1 + \beta_{12} n_1^2$$

$$+ \beta_{21} n_2 + \beta_{22} n_2^2$$



degree \Rightarrow Hypercones

Not
recovered
for $n=0$ &
 \uparrow

Feature Encoding:-

Concat

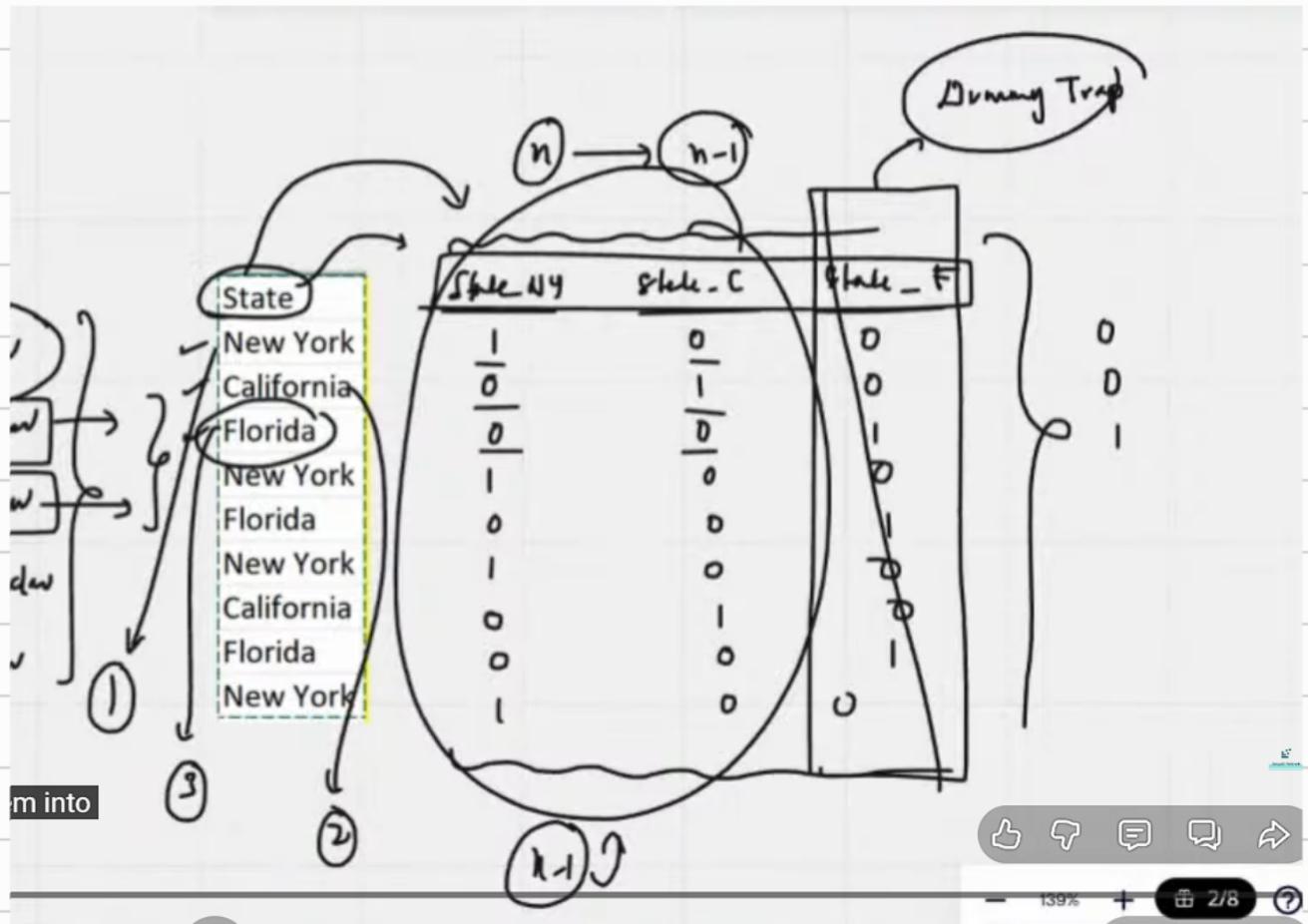
Categorical \rightarrow Num \rightarrow ML

Give no. to
Categories

- FE \Rightarrow
- ① Label Encoding
 - ② One hot "
 - ③ Dummy "
 - ④ Binary "
 - ⑤ Hash "

for Categorical
Create New Column

Updated version of One hot
 \hookrightarrow Create Col $n-1$



Evaluation Metrics:-

MAE, MSE, RMSE, R^2 , Adjusted R^2

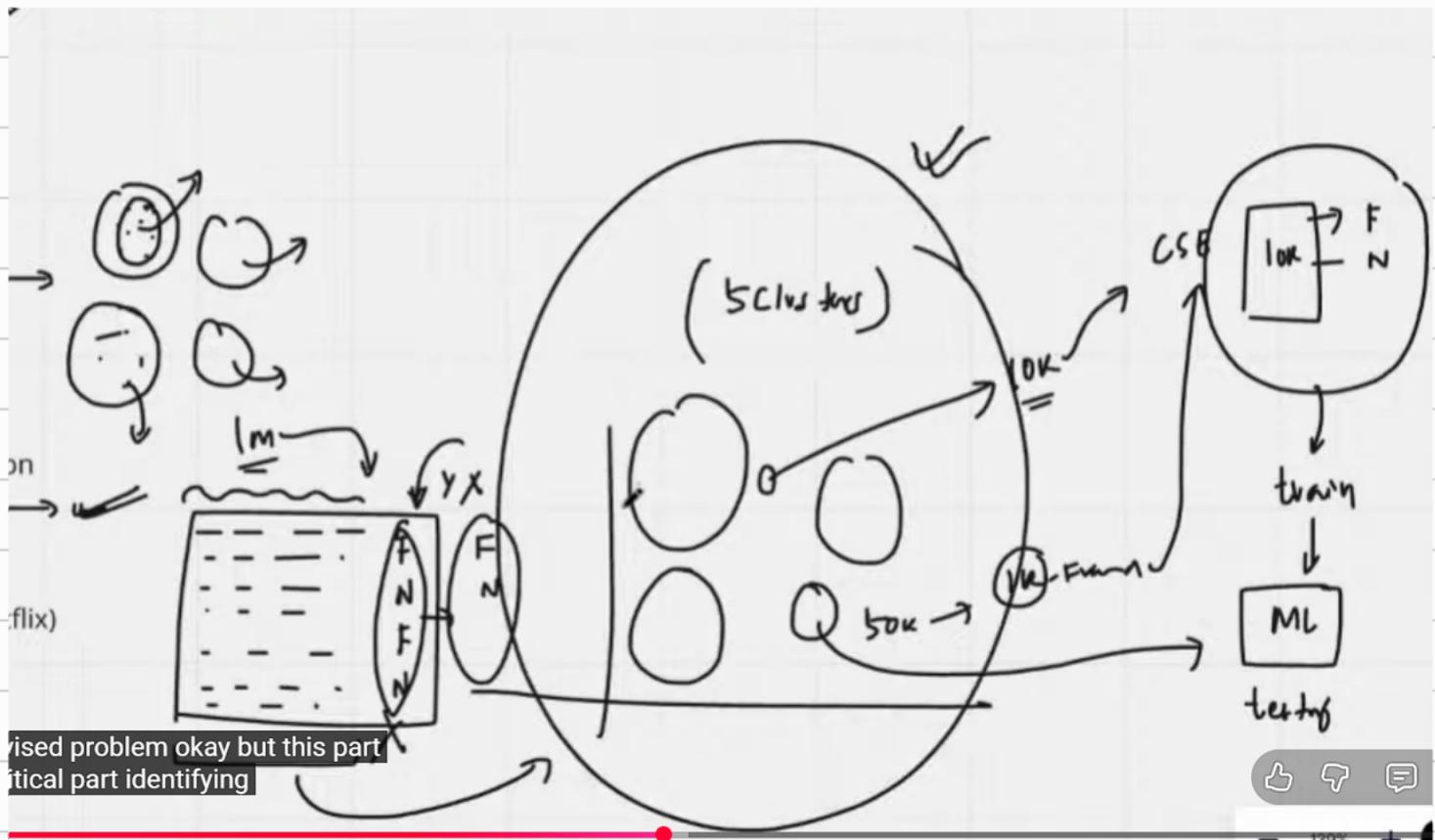
`describe()` \Rightarrow Gives statistical analysis of data

do Coding from scratch

Feature Selection

Clustering :- \rightarrow Unsupervised
 \hookrightarrow grouping of data points

Applications :- Customer Segmentation (1)
Food Detection (2)
Market Seg (3)
News Seg (4)
Movie Seg (5)



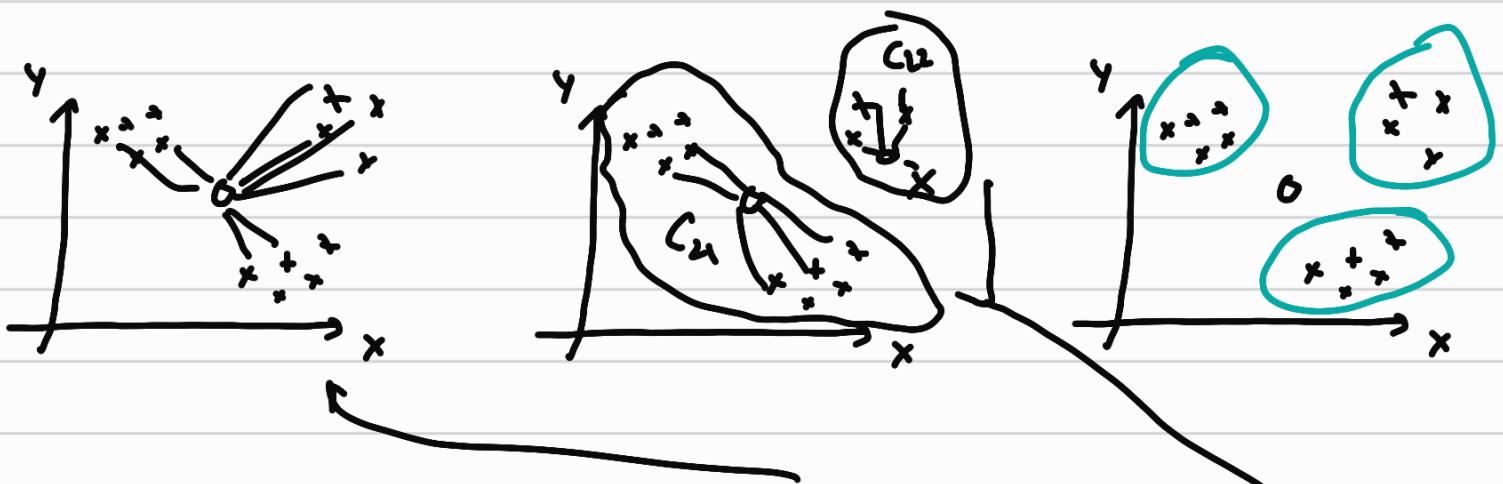
Clustering Algo :-

- ① K-Means Clustering \rightarrow Most Important
- ② HC Hierarchical Clustering
- ③ MSC Mean Shift Clustering
- ④ DB Scan Clustering

WCSS \rightarrow [Within Cluster Sum of Squared]

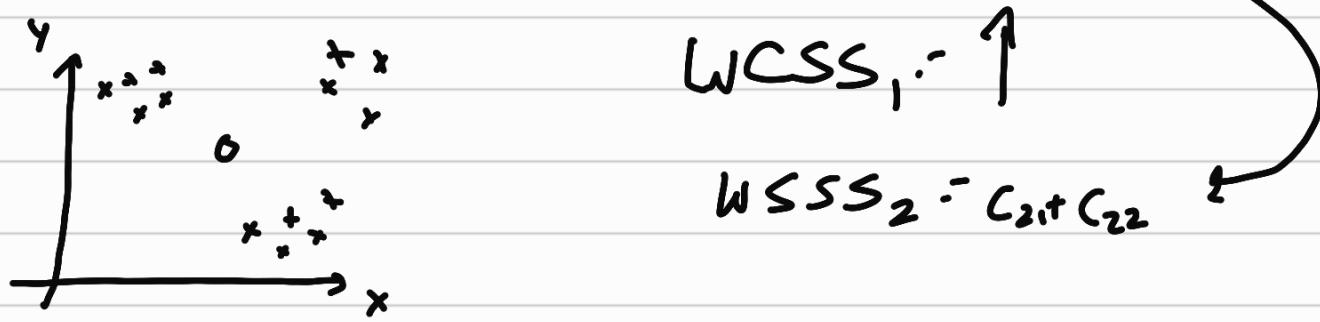
$$\hookrightarrow WCSS_{(k)} = \sum_{i=1}^k \left(\text{distance}(x_i, c_k)^2 \right)$$

↓
Centroid

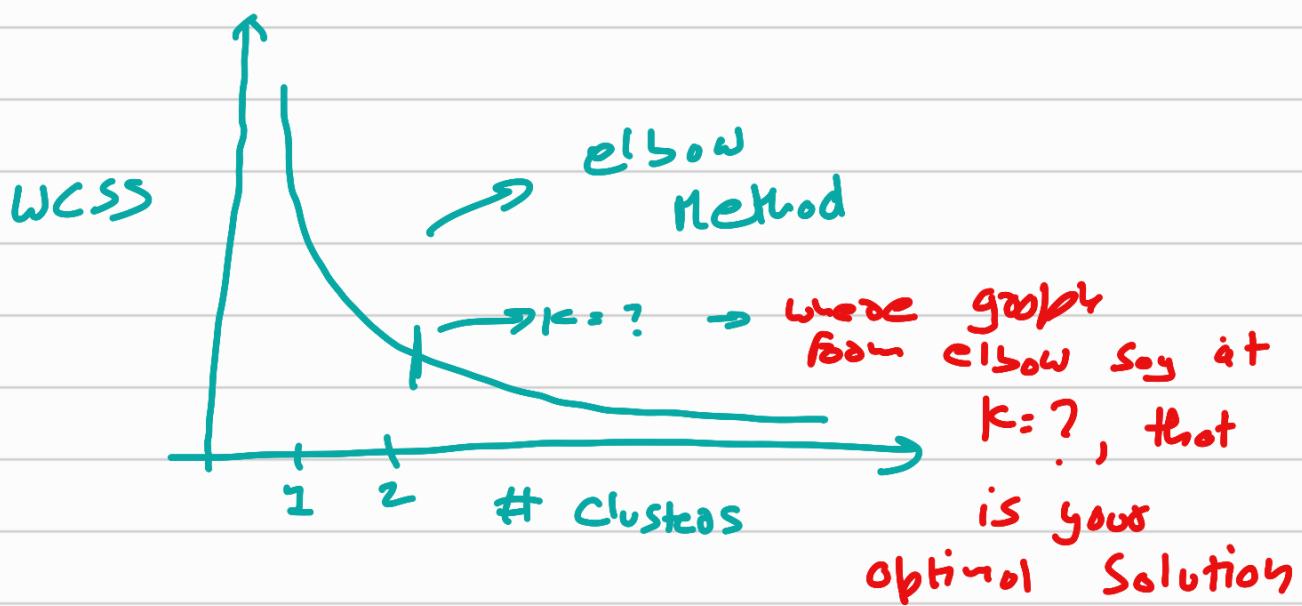


$WCSS_1 \cdot \uparrow$

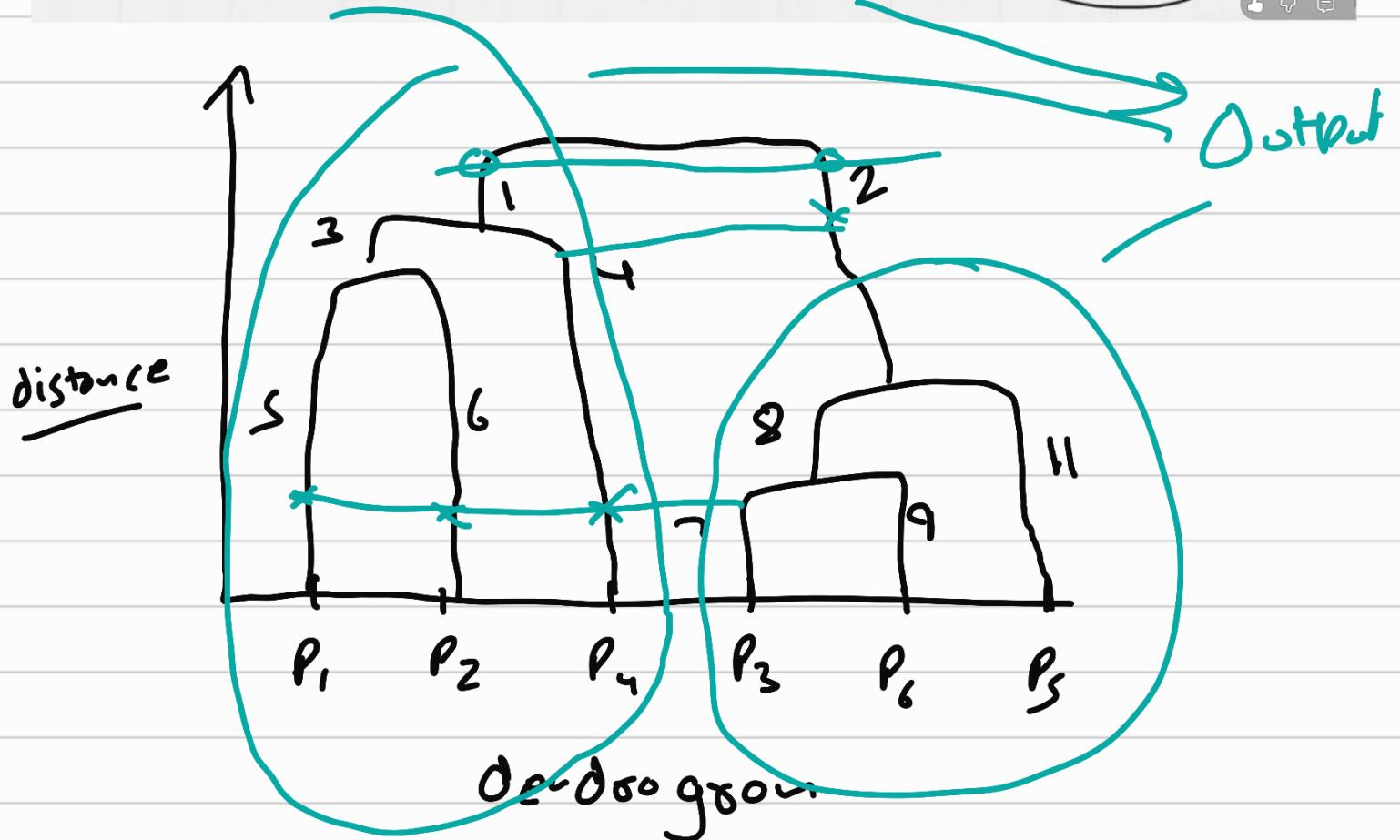
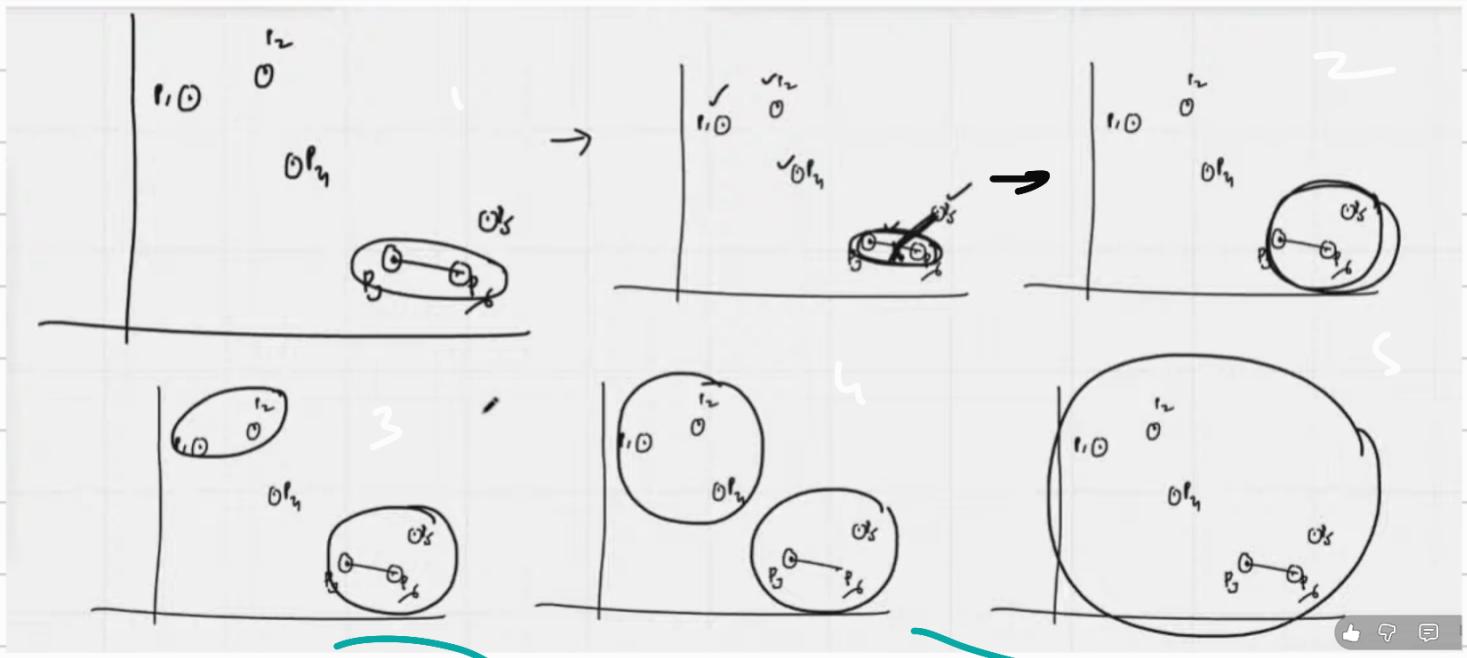
$WCSS_2 = C_{21} + C_{22} \cdot \downarrow$



When you have more No. of clusters
WCSS goes down.



Hierarchical Clustering



$1, 3, 8 \rightarrow \text{Lef} +$

