

LECTURE 5 TERM 2:

MSIN0097

UCL
SCHOOL OF
MANAGEMENT

PREDICTIVE ANALYTICS Assignment Project Exam Help

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A P MOORE

A. Classification

Model requirements

Classification

$$x \in [-\infty, \infty]$$
$$y \in \{0, N\}$$

B. Regression

Model requirements

Regression

$$x \in [-\infty, \infty]$$
$$y \in [-\infty, \infty]$$

C. Clustering

Model requirements

Clustering

$$x \in [-\infty, \infty]$$
$$y \in \{0, N\}$$

D. Decomposition

Model requirements

Decomposition

$$x \in [-\infty, \infty]$$
$$y \in [-\infty, \infty]$$

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Supervised

Unsupervised

A. Classification

Model requirements

Classification

$$x \in [-\infty, \infty]$$
$$y \in \{0, N\}$$

B. Regression

Model requirements

Regression

$$x \in [-\infty, \infty]$$
$$y \in [-\infty, \infty]$$

C. Clustering

Model requirements

Clustering

$$x \in [-\infty, \infty]$$
$$y \in \{0, N\}$$

Hidden variables

Density estimation

D. Decomposition

Model requirements

Decomposition

$$x \in [-\infty, \infty]$$
$$y \in [-\infty, \infty]$$

Subspaces
Manifolds

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Supervised

Unsupervised

CLASSIFICATION

CATEGORICAL VARIABLE

Model requirements

Classification

$$x \in [-\infty, \infty]$$

$$y \in \{0, N\}$$



CLASSIFICATION VS CLUSTERING

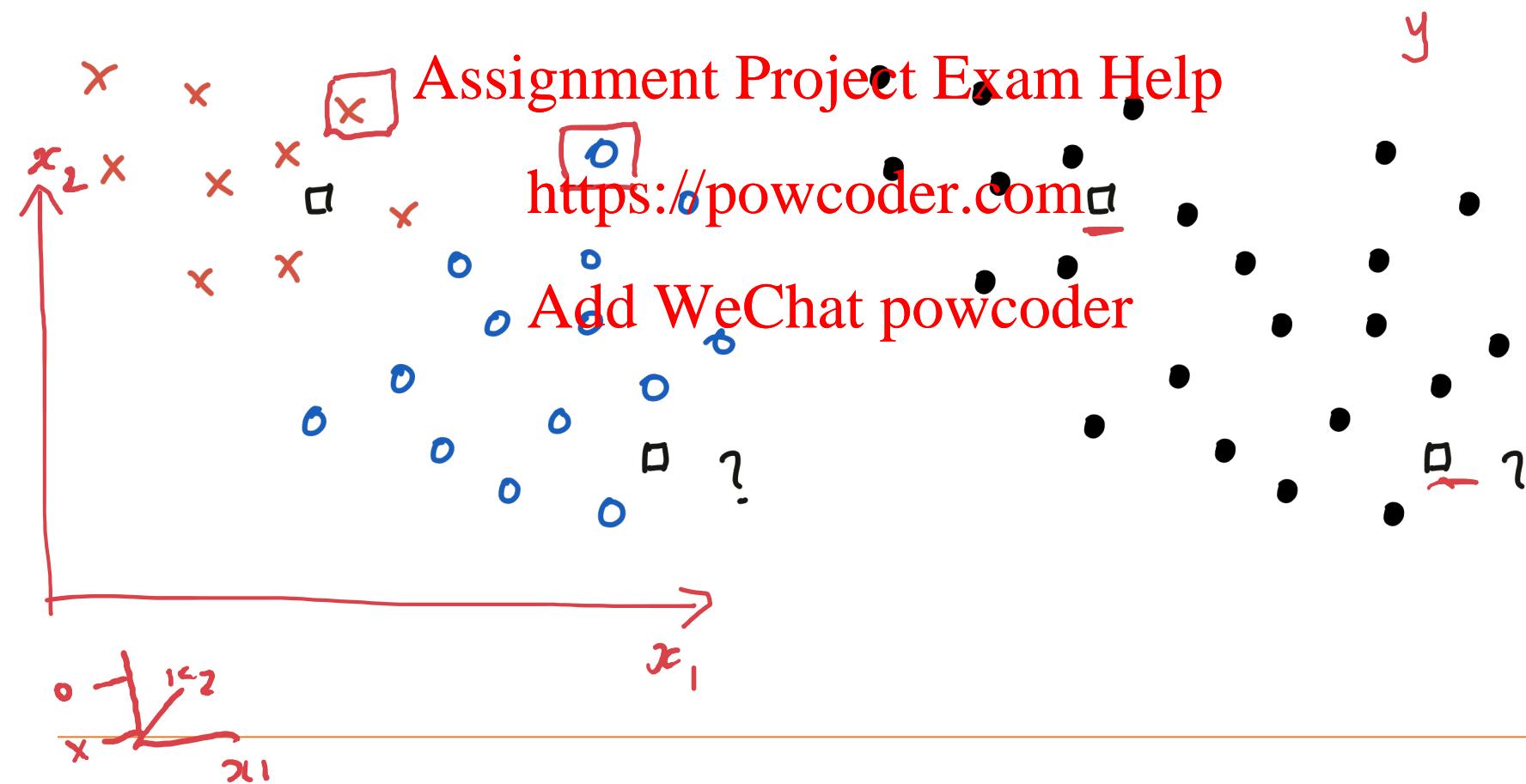
CATEGORICAL VARIABLE

Model requirements

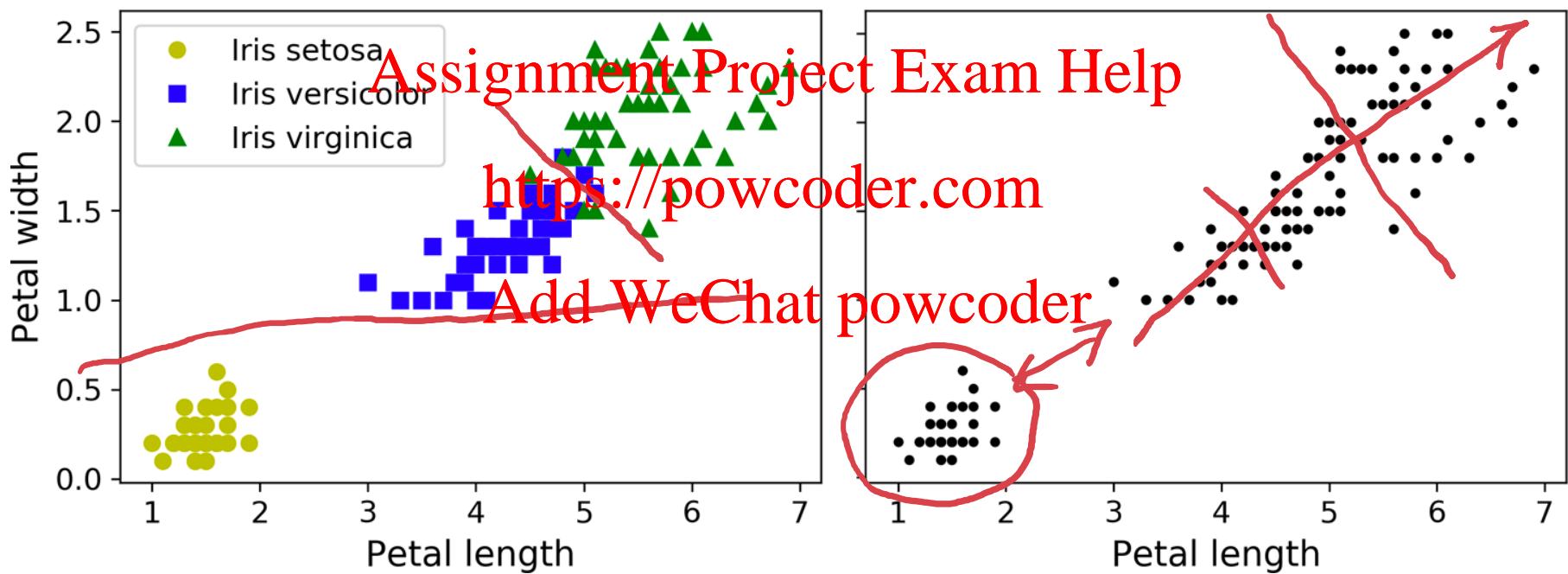
Classification

$$x \in [-\infty, \infty]$$

$$y \in \{0, N\}$$



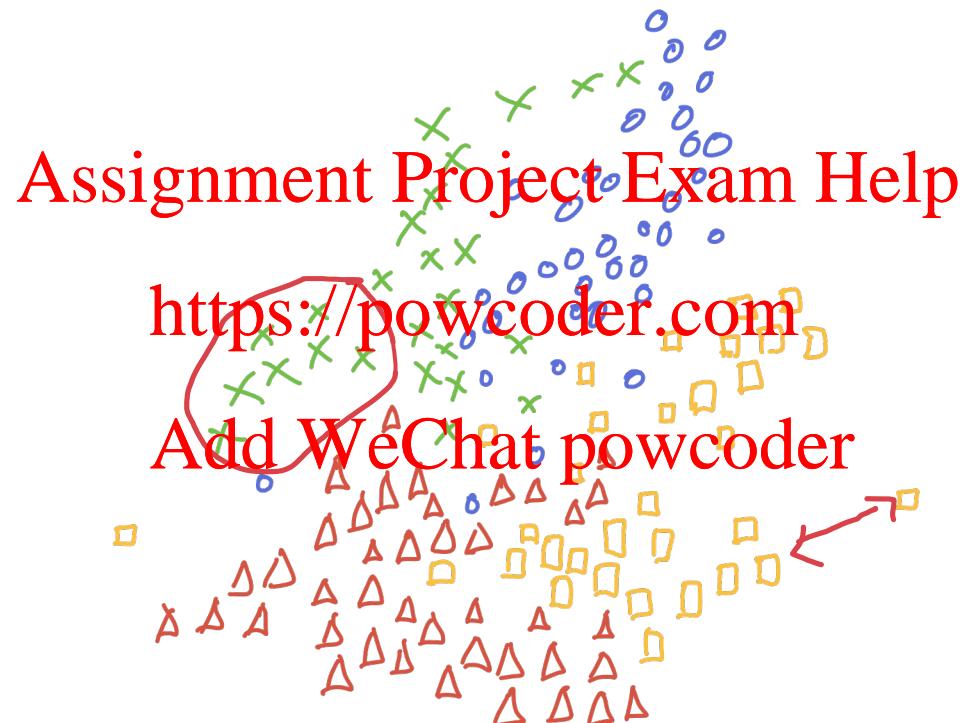
CLASSIFICATION VS CLUSTERING



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Types of clustering
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CLUSTERING TAXONOMY



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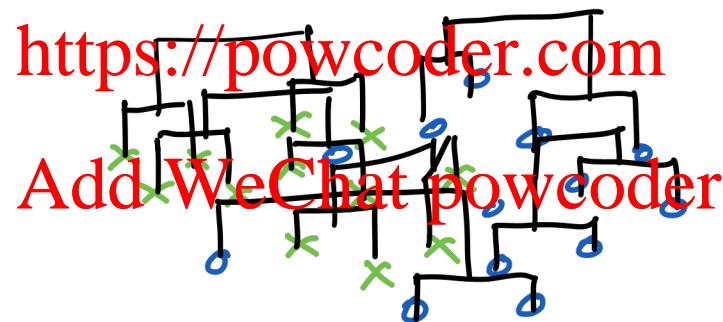
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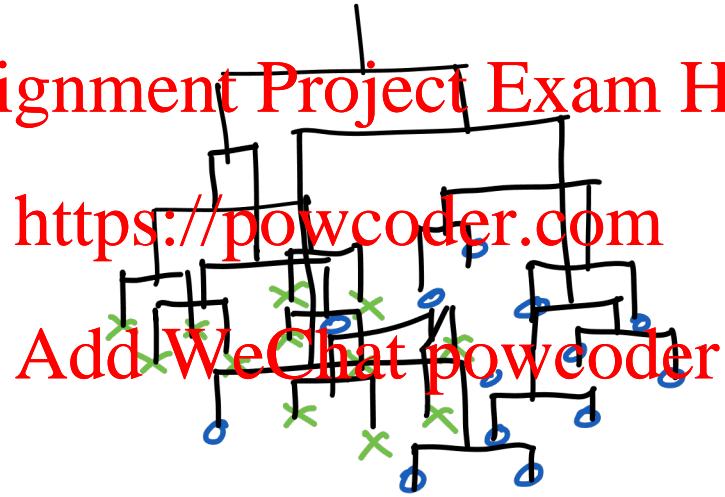


AGGLOMERATIVE

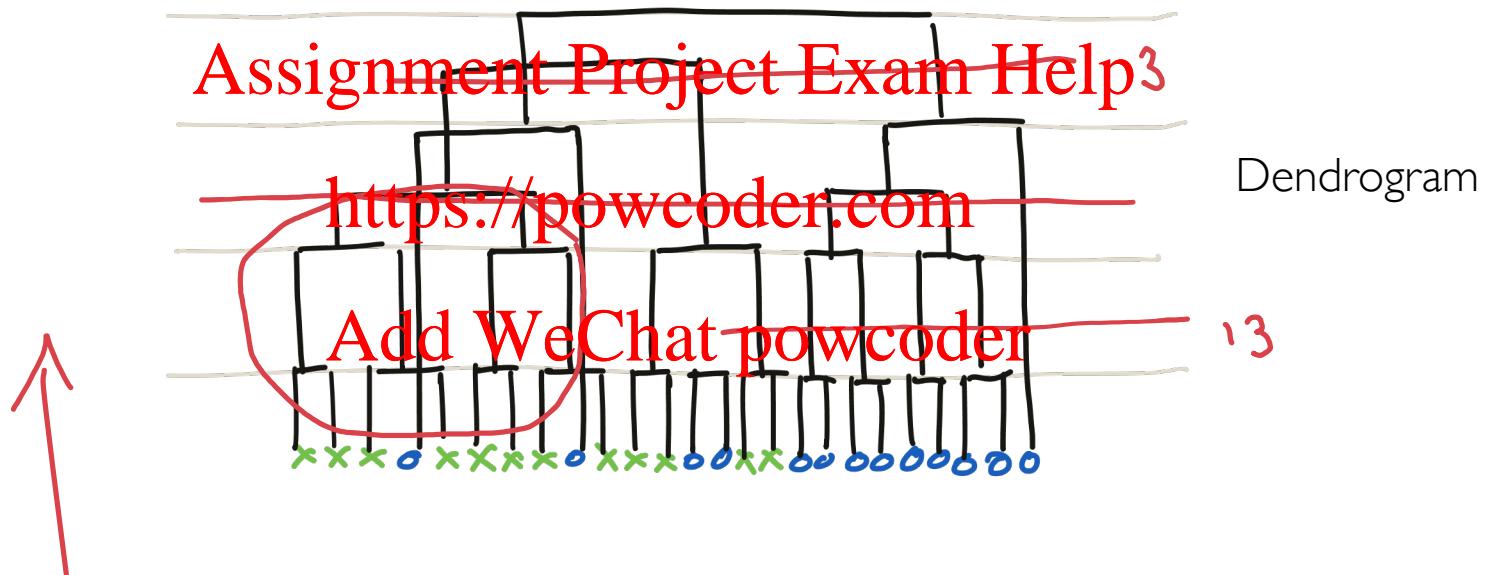
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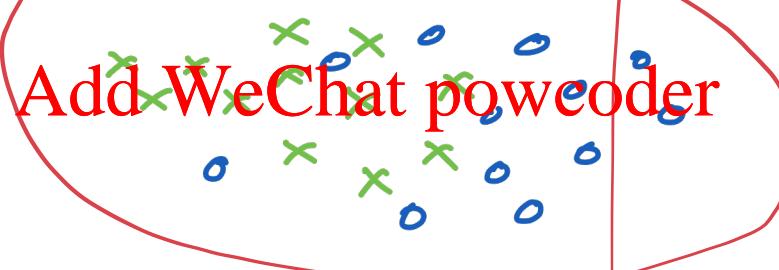
AGGLOMERATIVE DENDROGRAM



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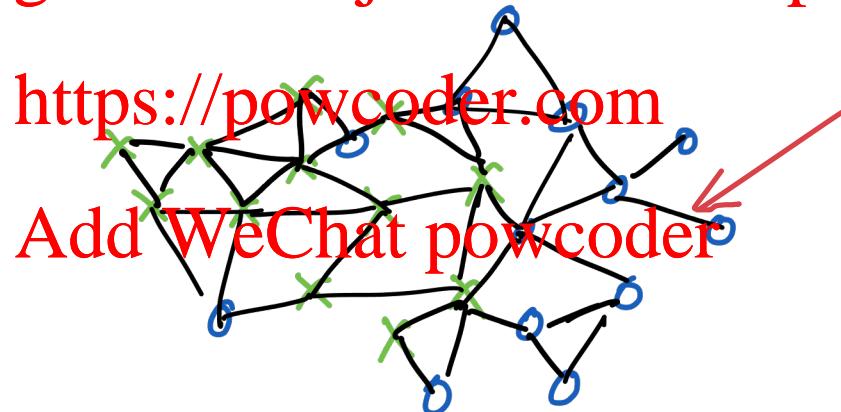
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A cluster of green 'X' marks and blue circles is centered around the text "Add WeChat powcoder". The symbols are scattered in various directions, creating a sense of motion or dispersion.

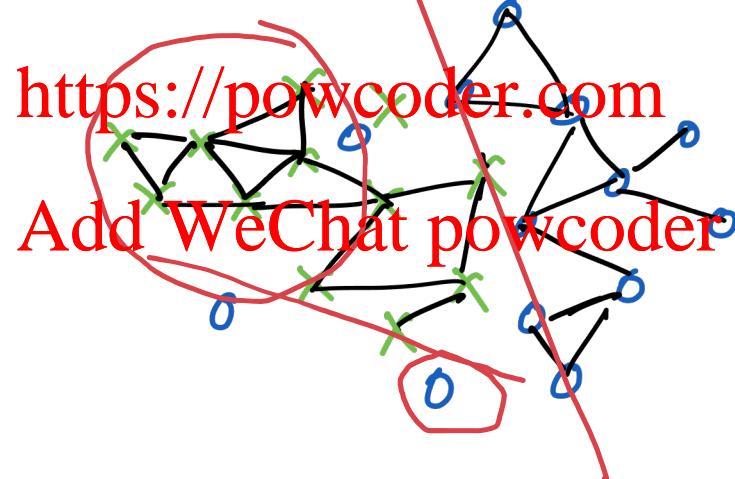
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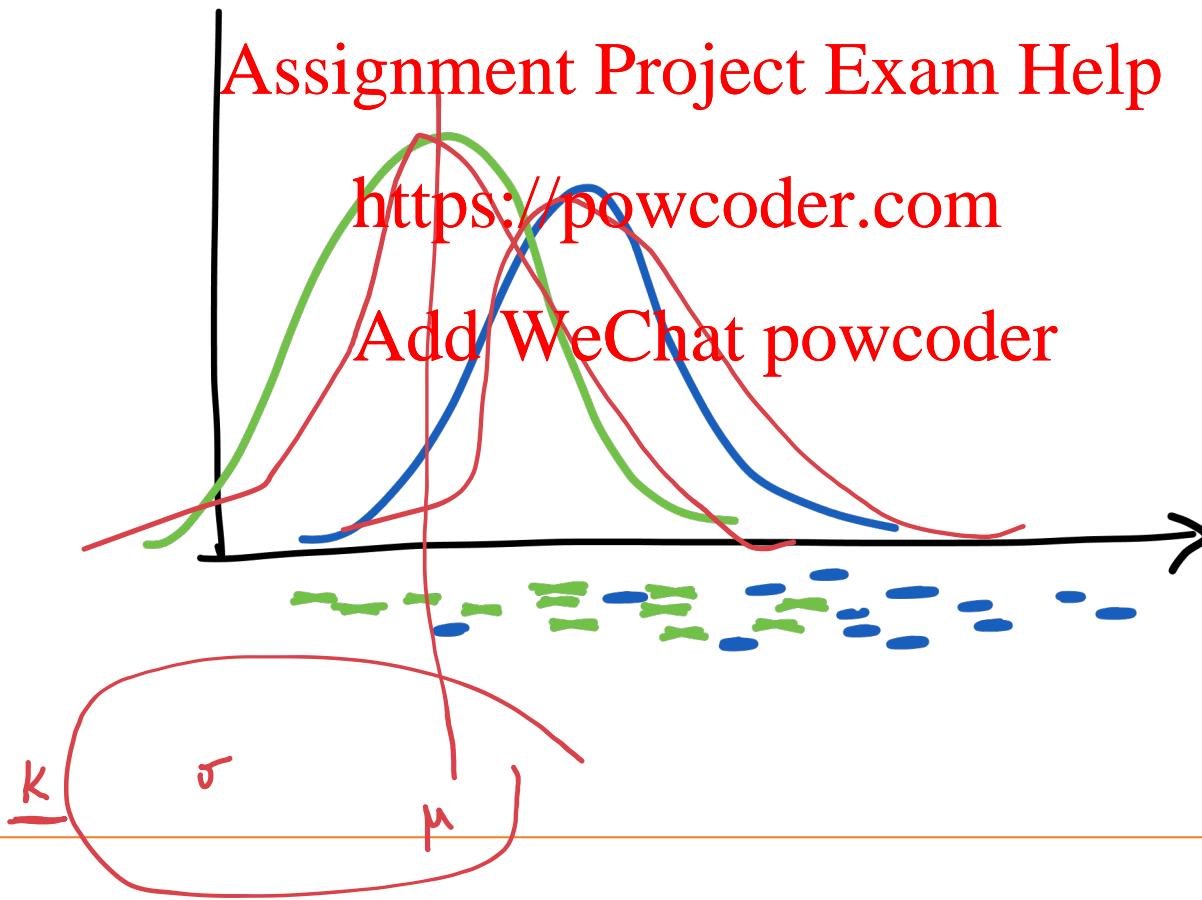
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2

k-

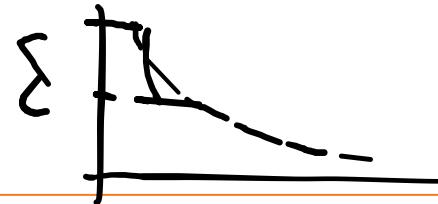


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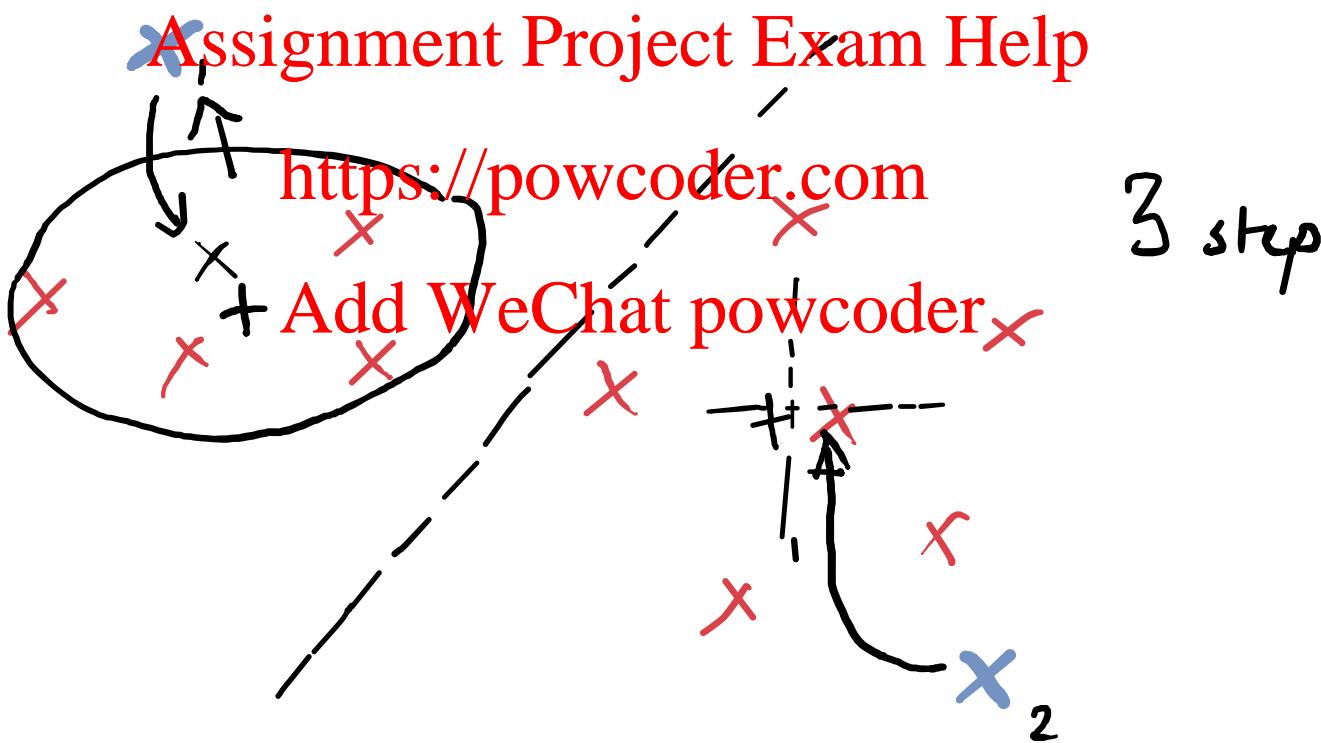
A <https://powcoder.com>
simple algorithm
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K-MEANS

LLOYD-FORGY ALGORITHM

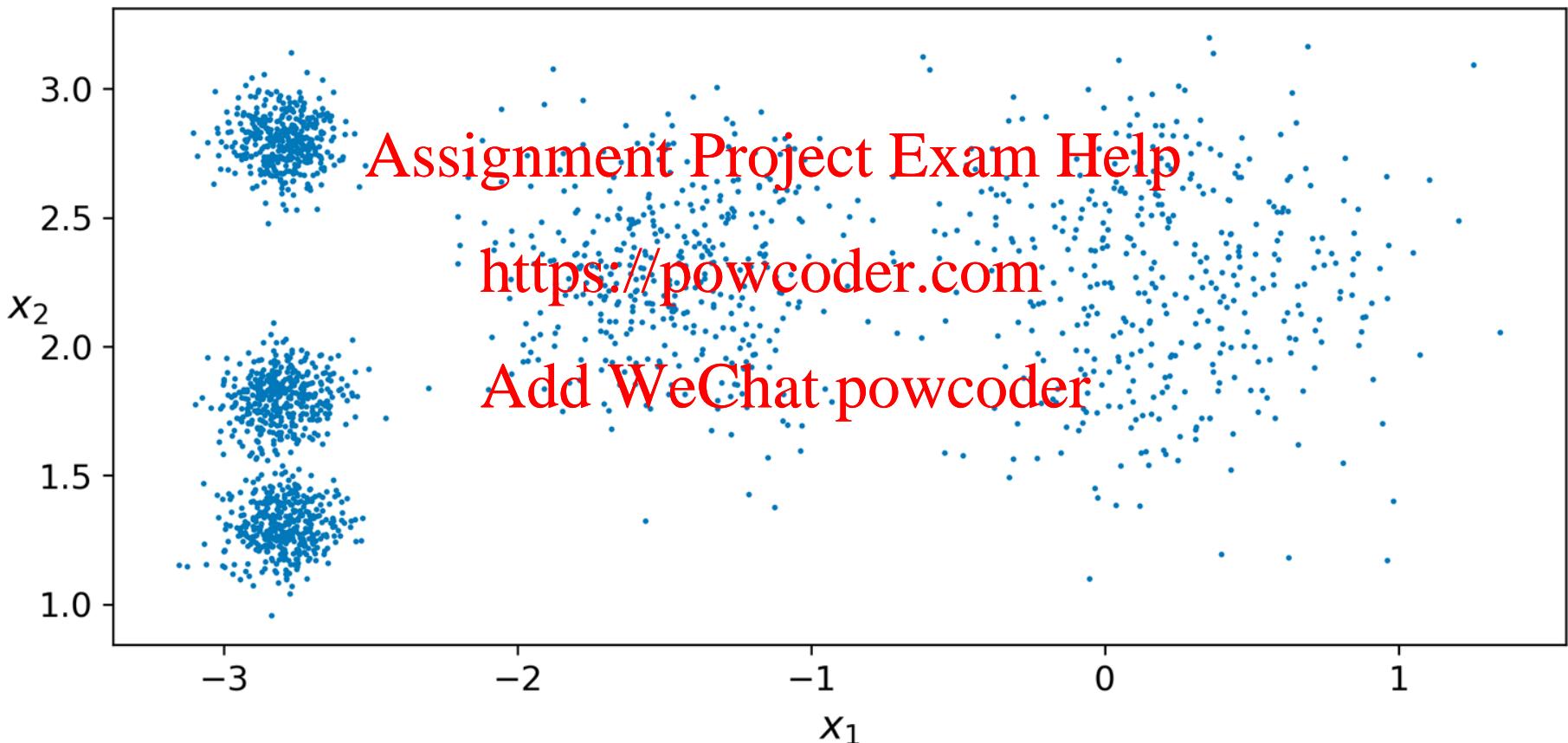


$K=2$



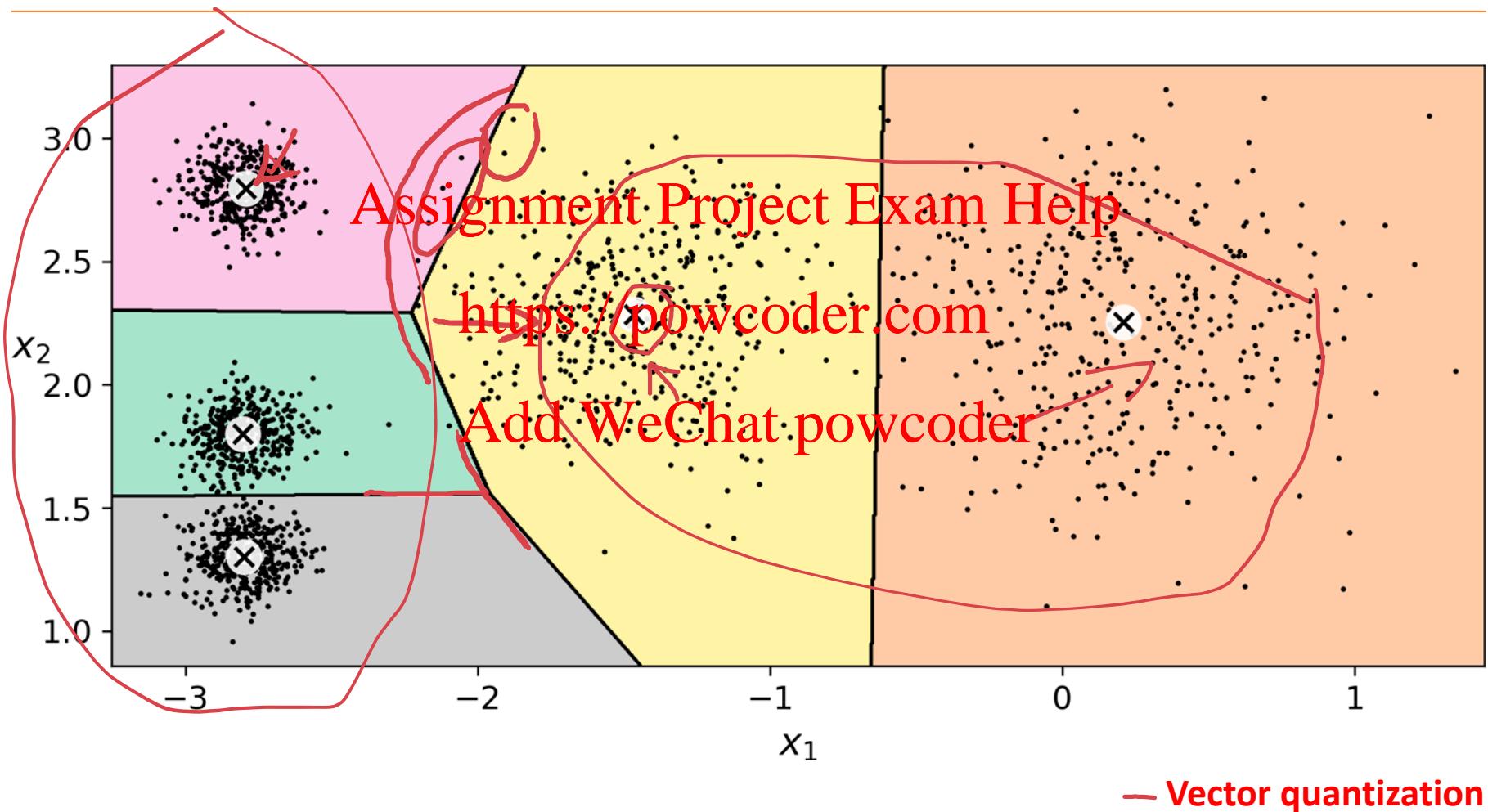
K-MEANS

LLOYD-FORGY ALGORITHM

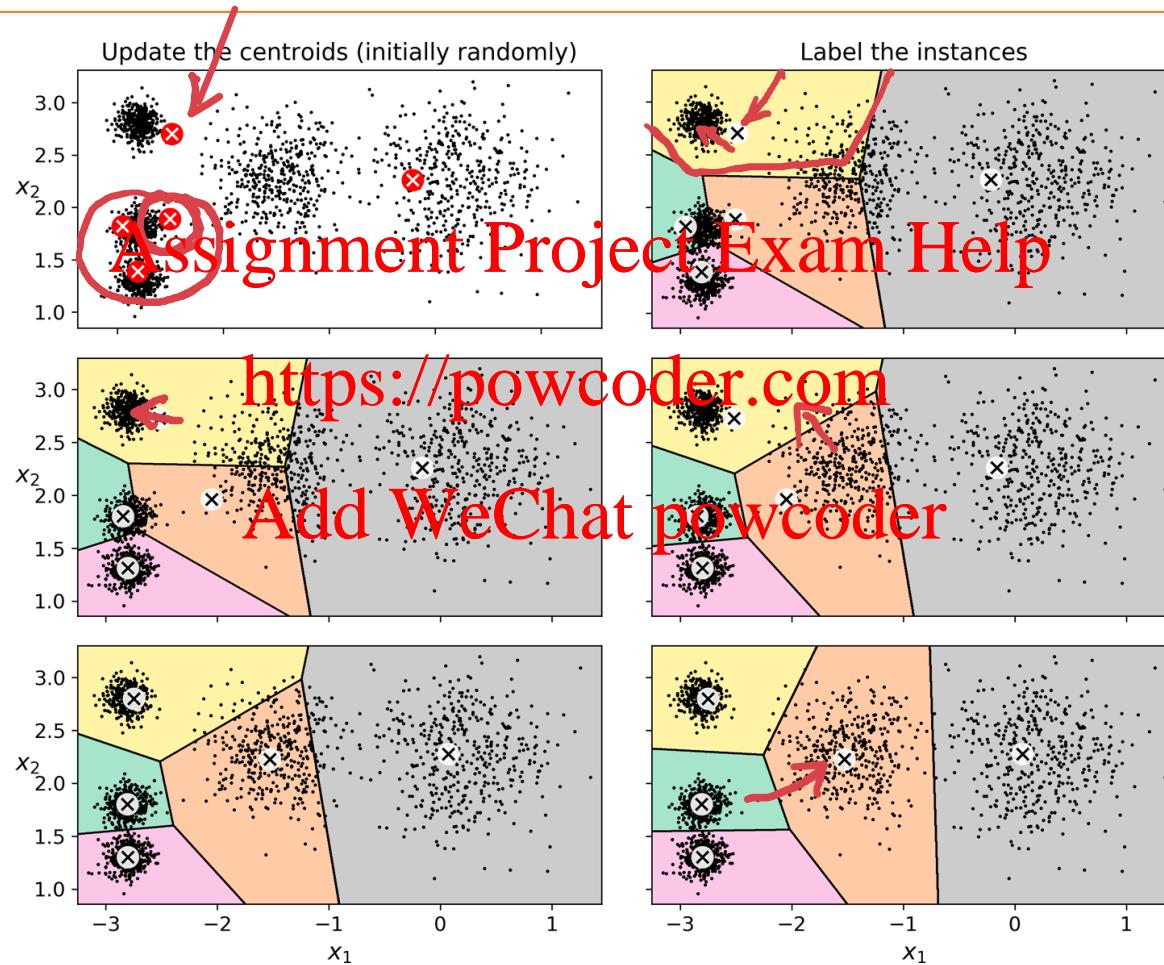


DECISION BOUNDARIES

VORONOI TESSELLATION

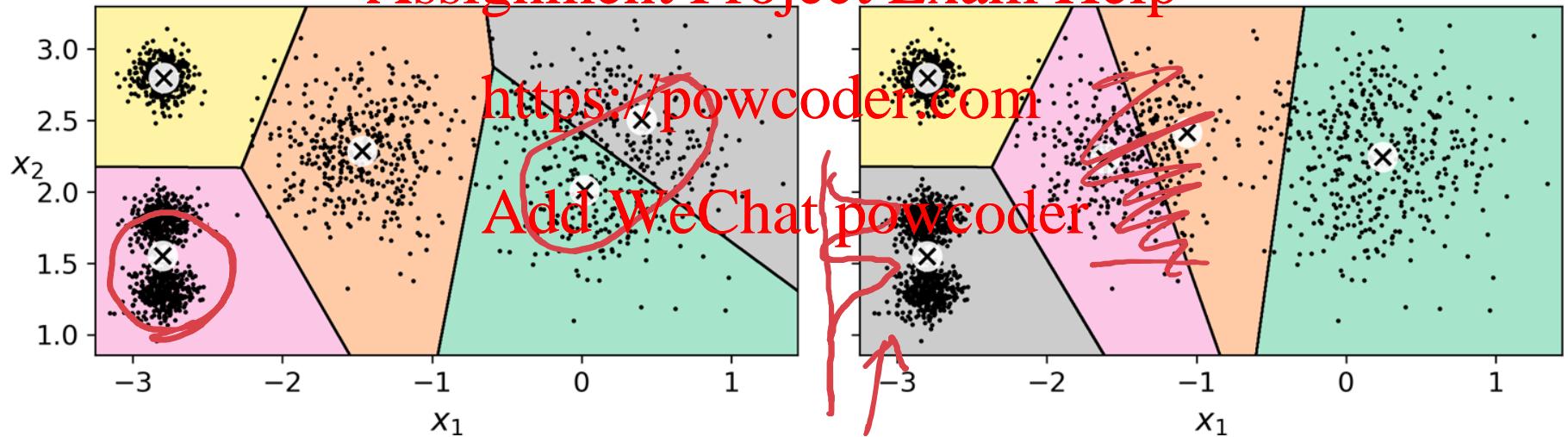


K-MEANS ALGORITHM



INITIALIZATION

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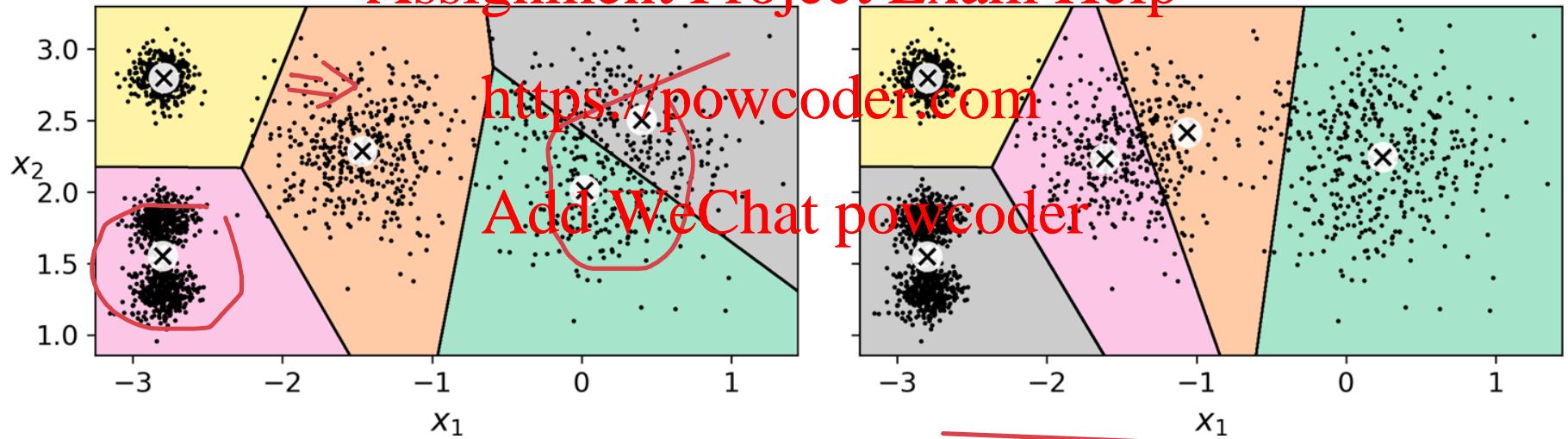


223.3

INITIALIZATION

5

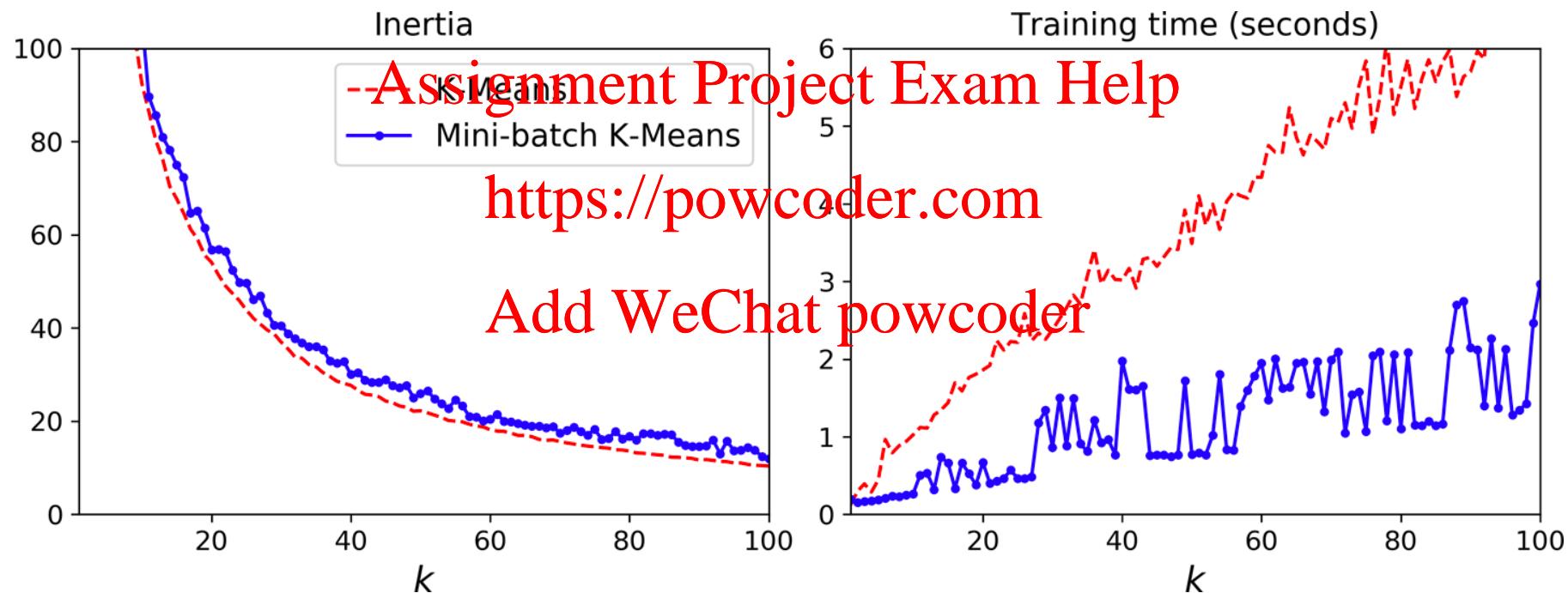
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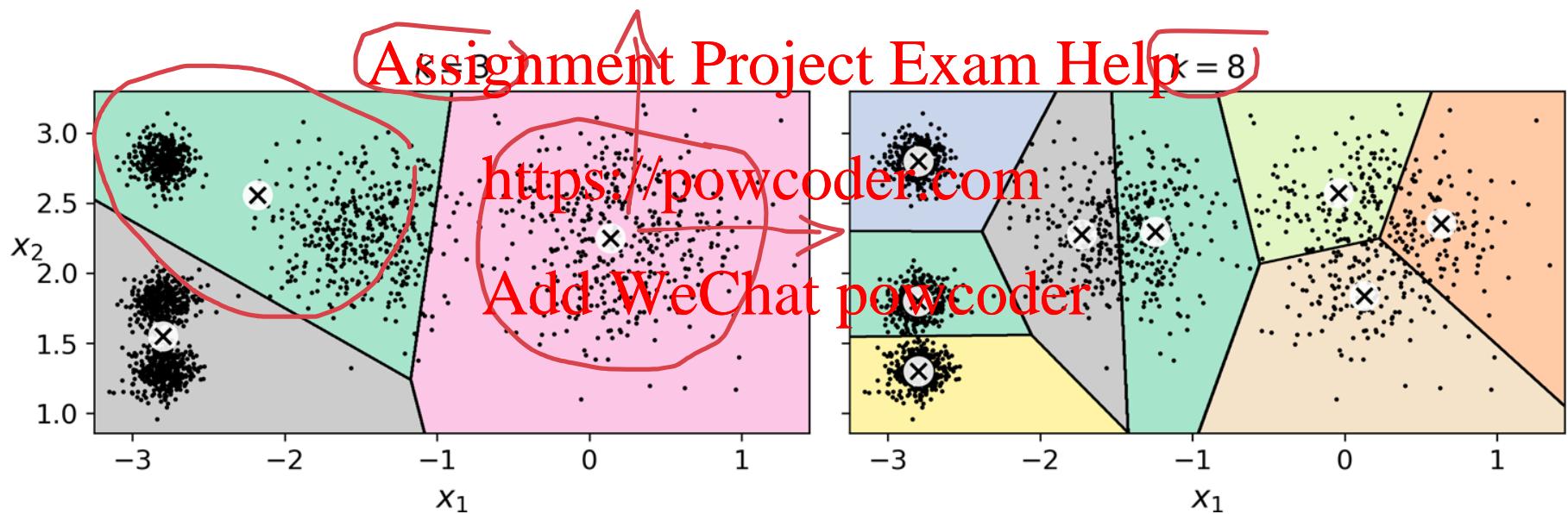
223.3

237.5

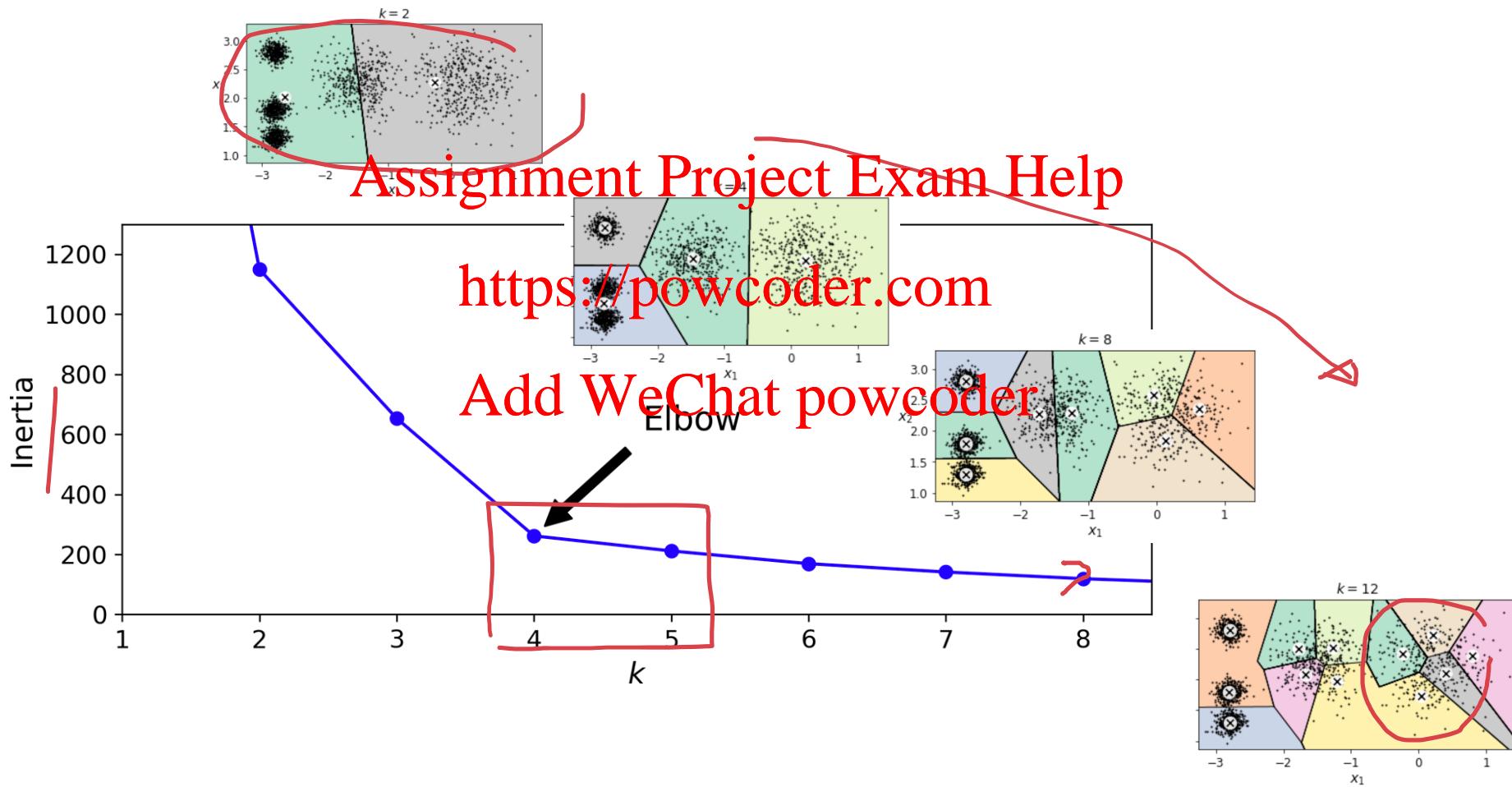
ACCELERATING K-MEANS



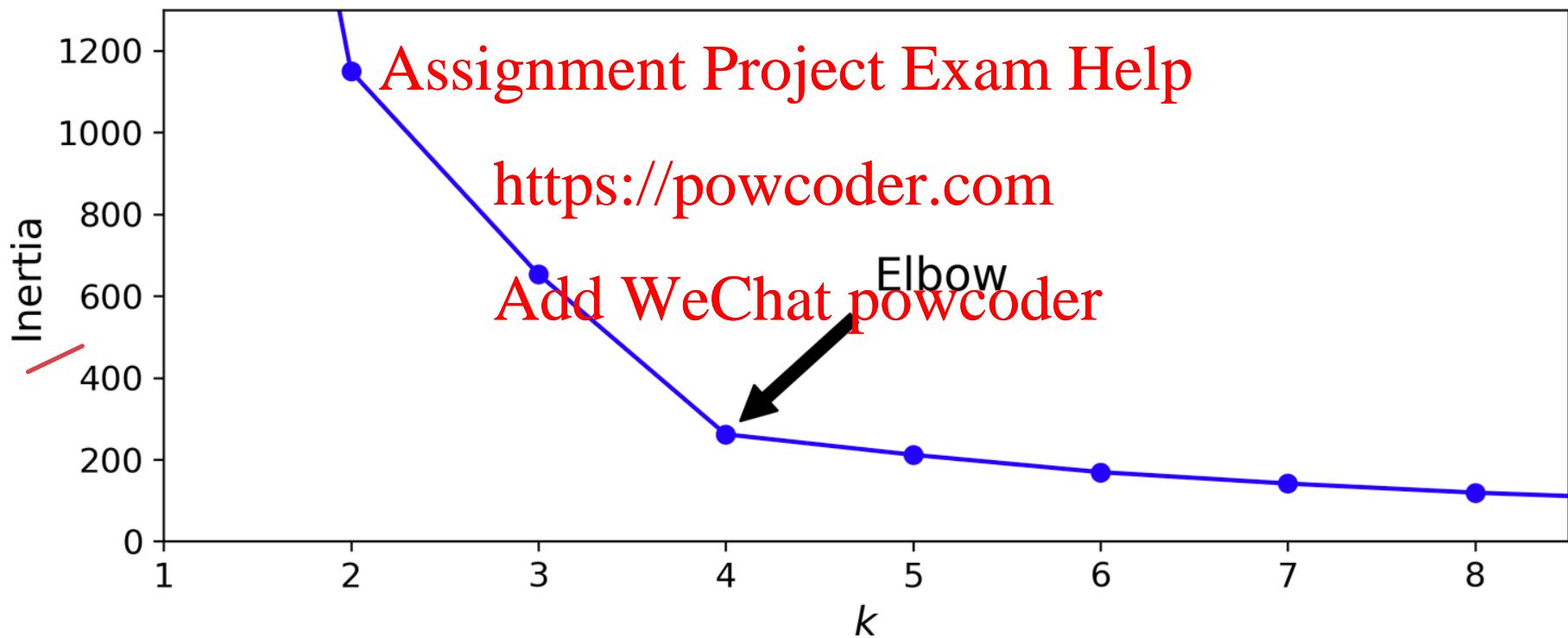
BAD CLUSTERS



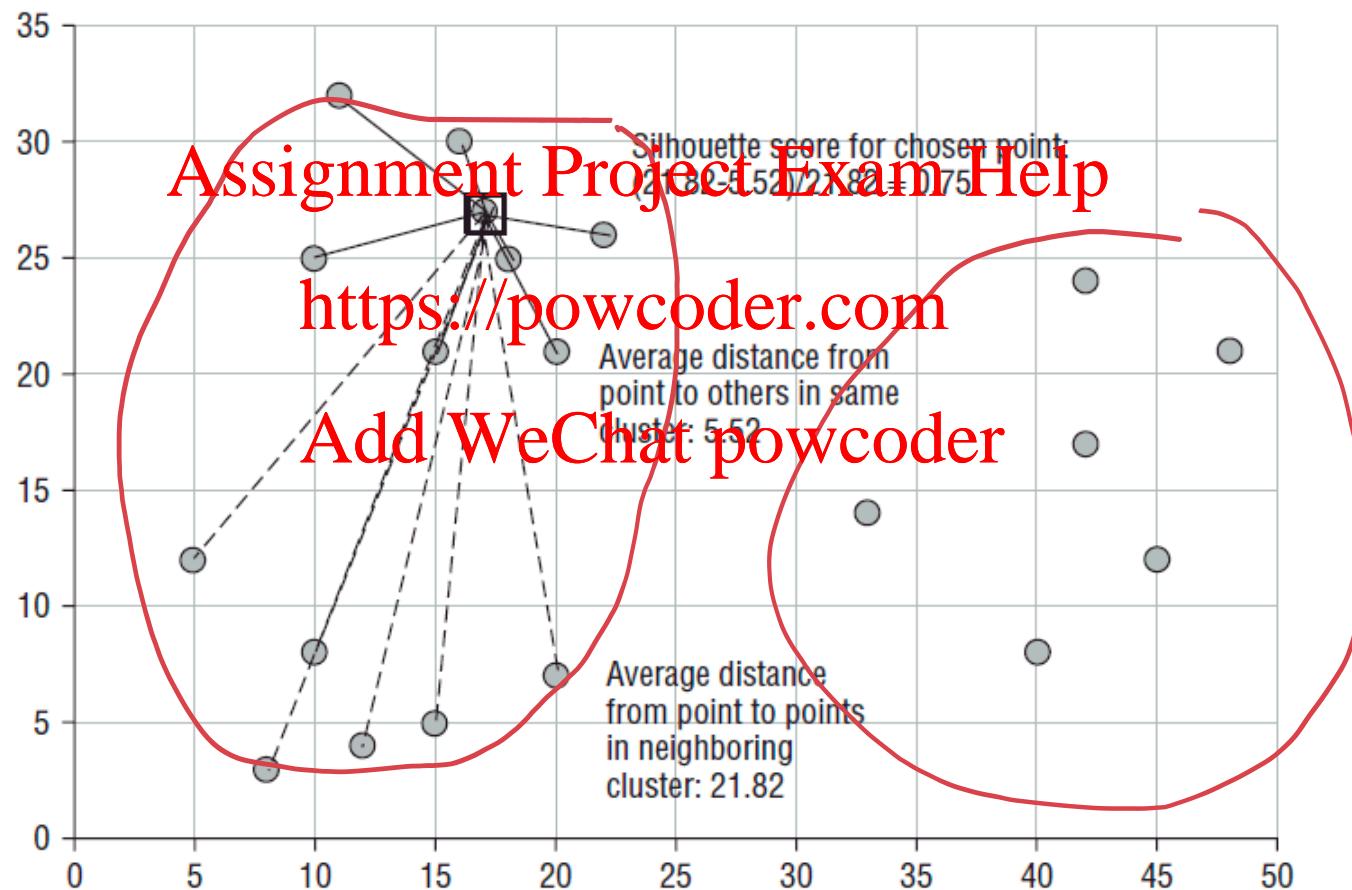
SELECTING K - INERTIA



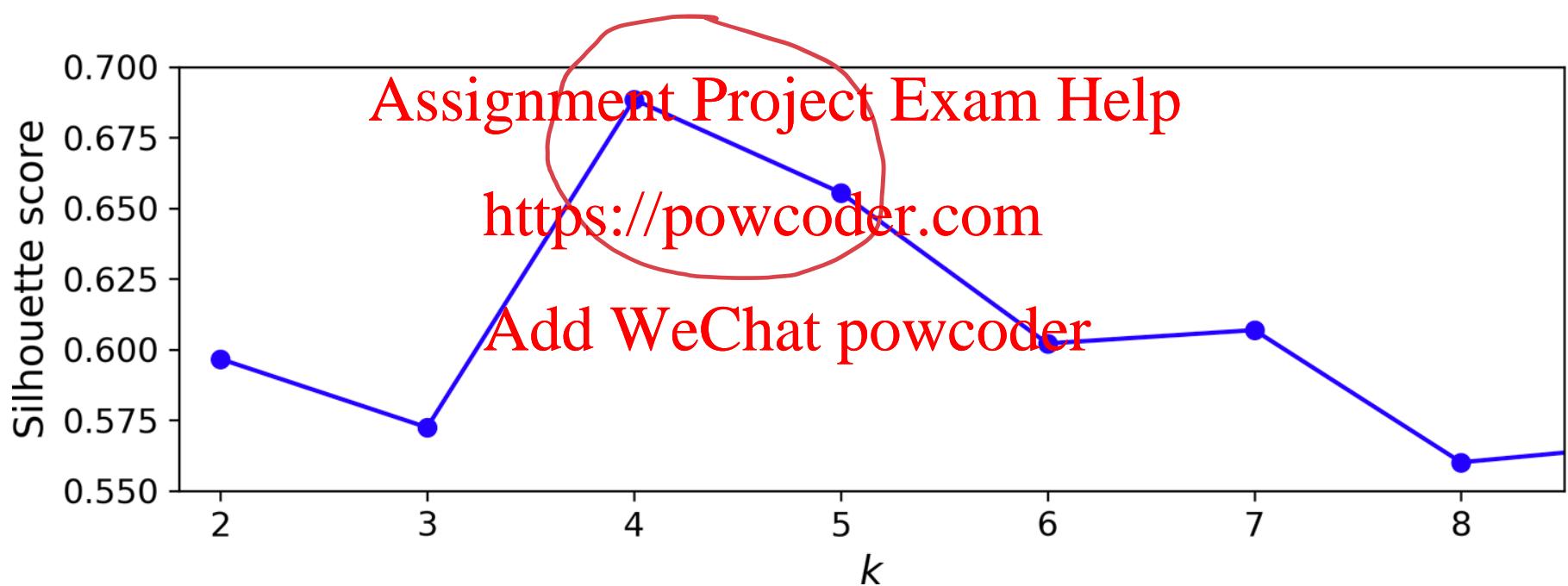
SELECTING K - INERTIA



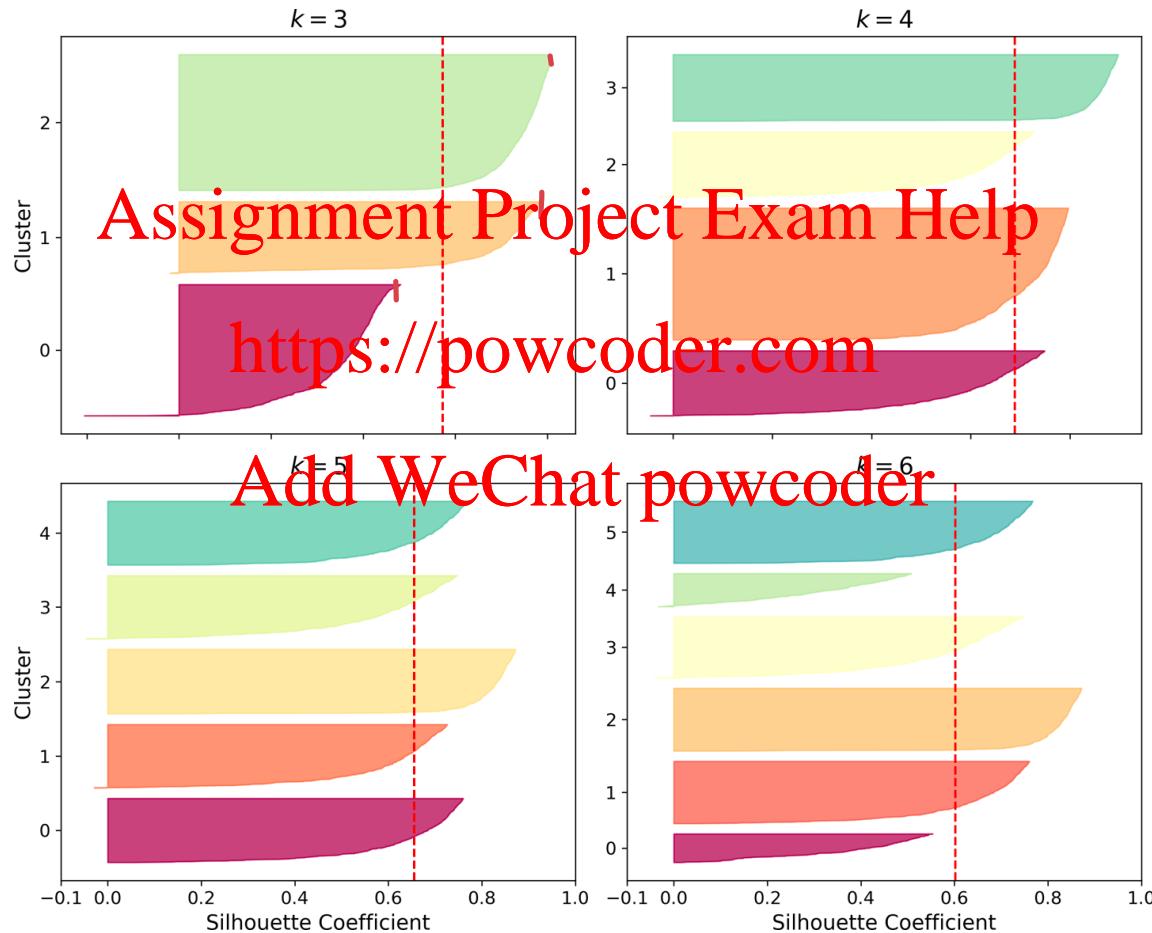
SILHOUETTE SCORE



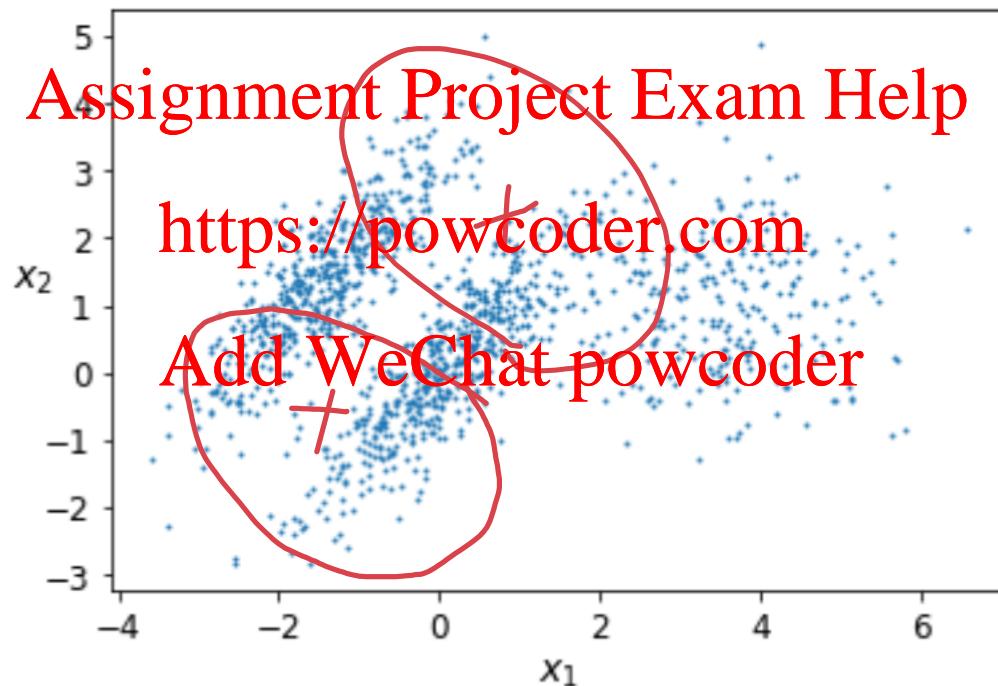
SELECTING K – SILHOUETTE SCORE



SILHOUETTE DIAGRAMS



ELLIPSOIDAL DISTRIBUTED DATA

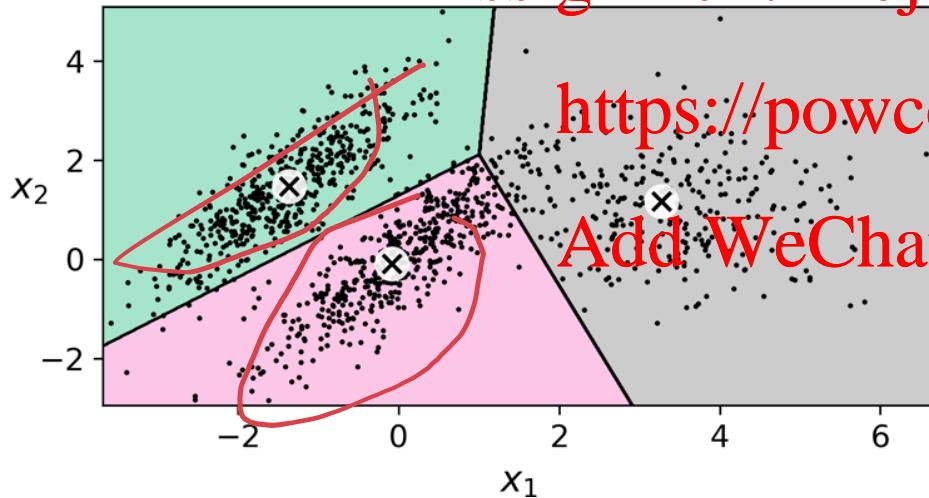


ELLIPSOIDAL DISTRIBUTED DATA

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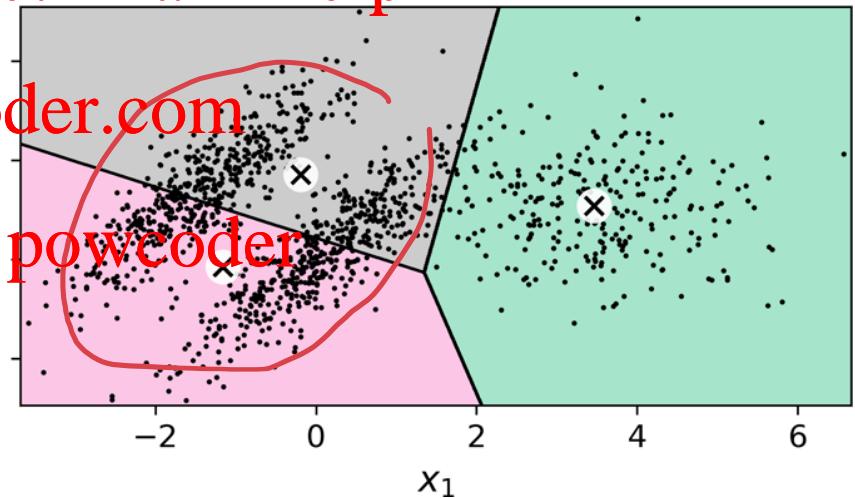
Inertia = 2421

Inertia = 2179.5



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CLUSTERING FOR SEGMENTATION



CLUSTERING FOR SEGMENTATION

Original image



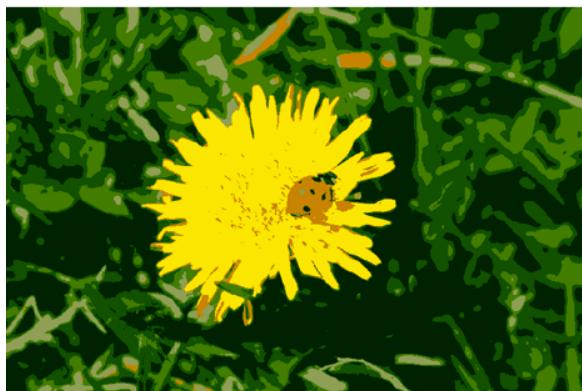
10 colors



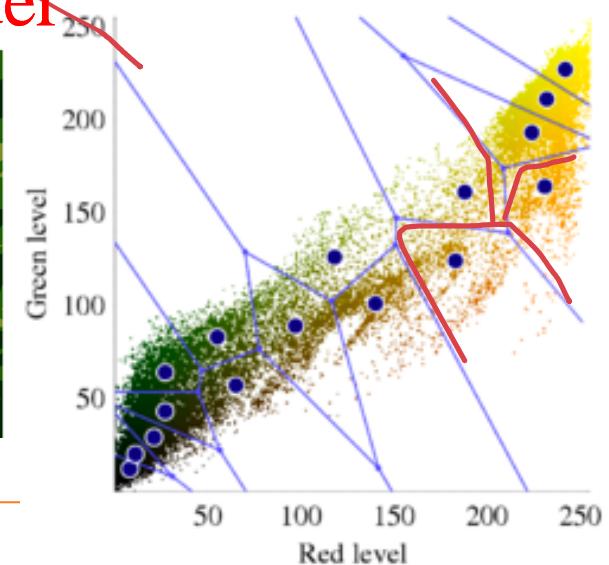
8 colors



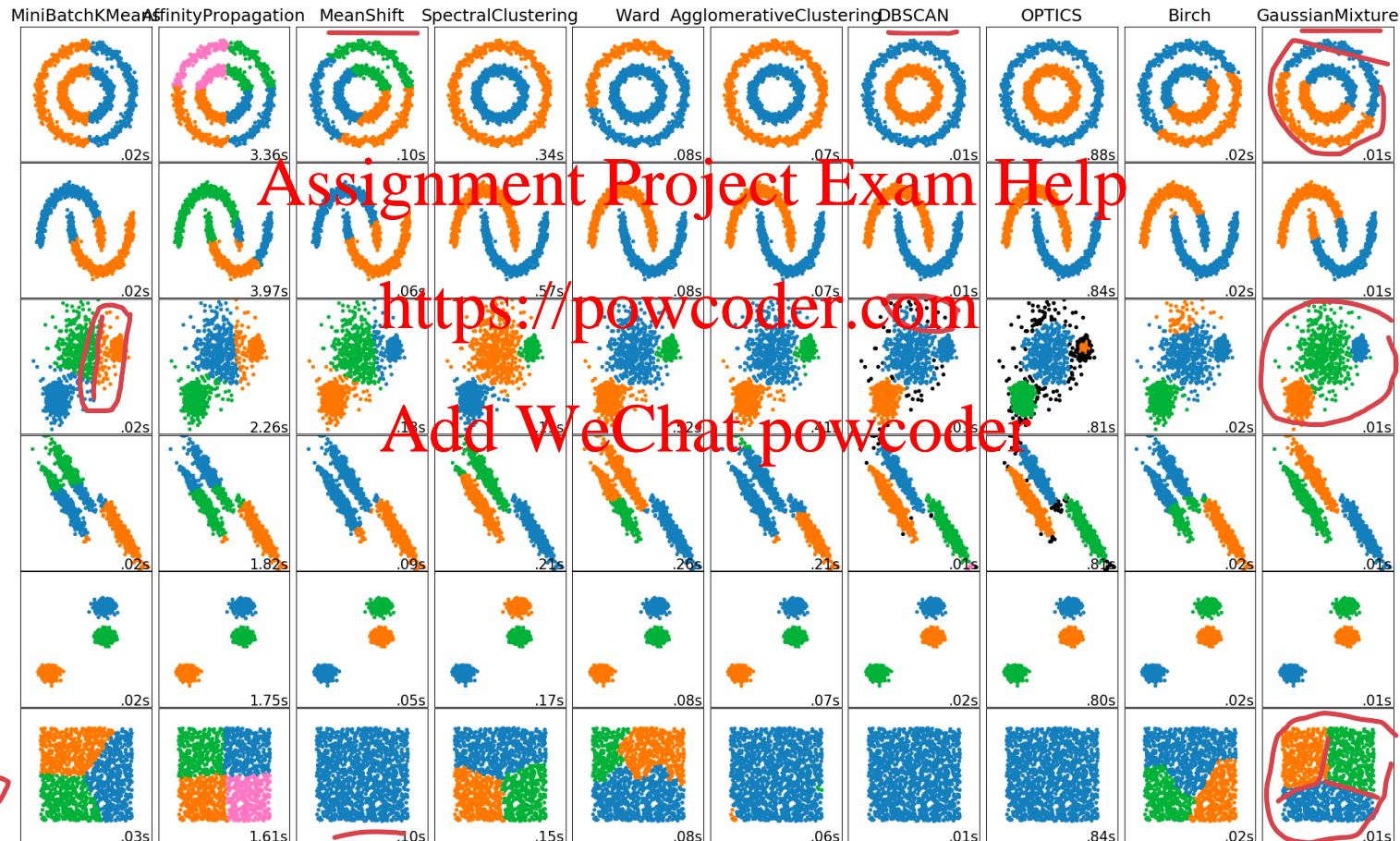
6 colors



4 colors



CLUSTERING METHODS



Agglomerative

- BIRCH
- Mean-shift
- Affinity propagation

Divisive

- Spectral clustering

Partitional

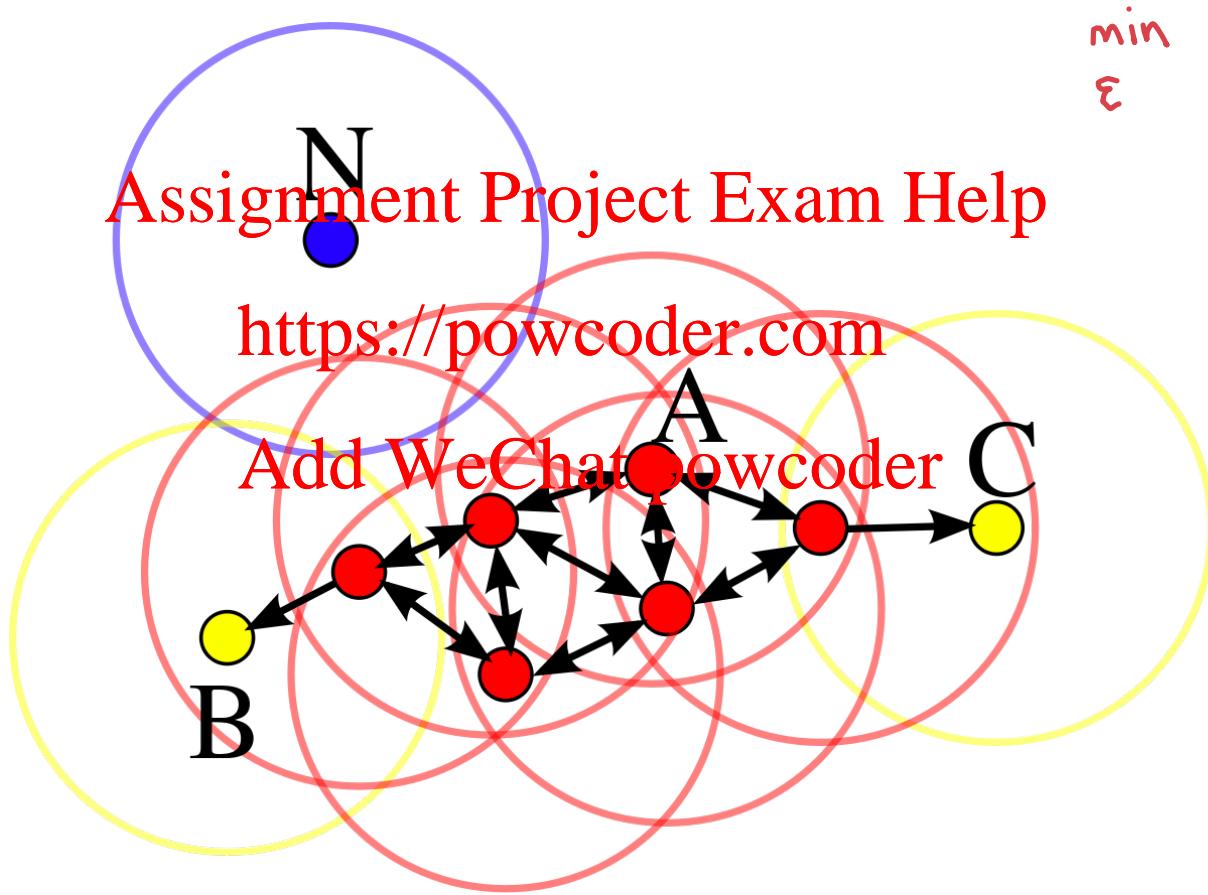
- k-means
- Mixture models
 - Gaussian mixture models (GMMs)

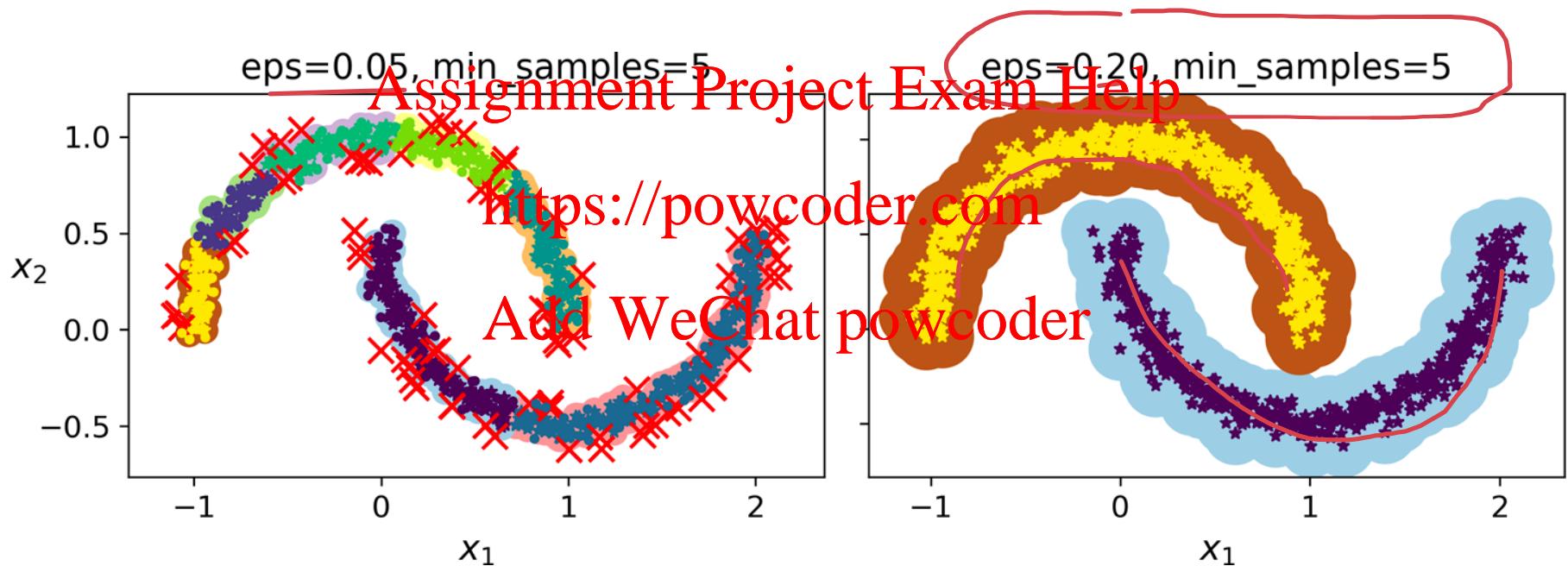
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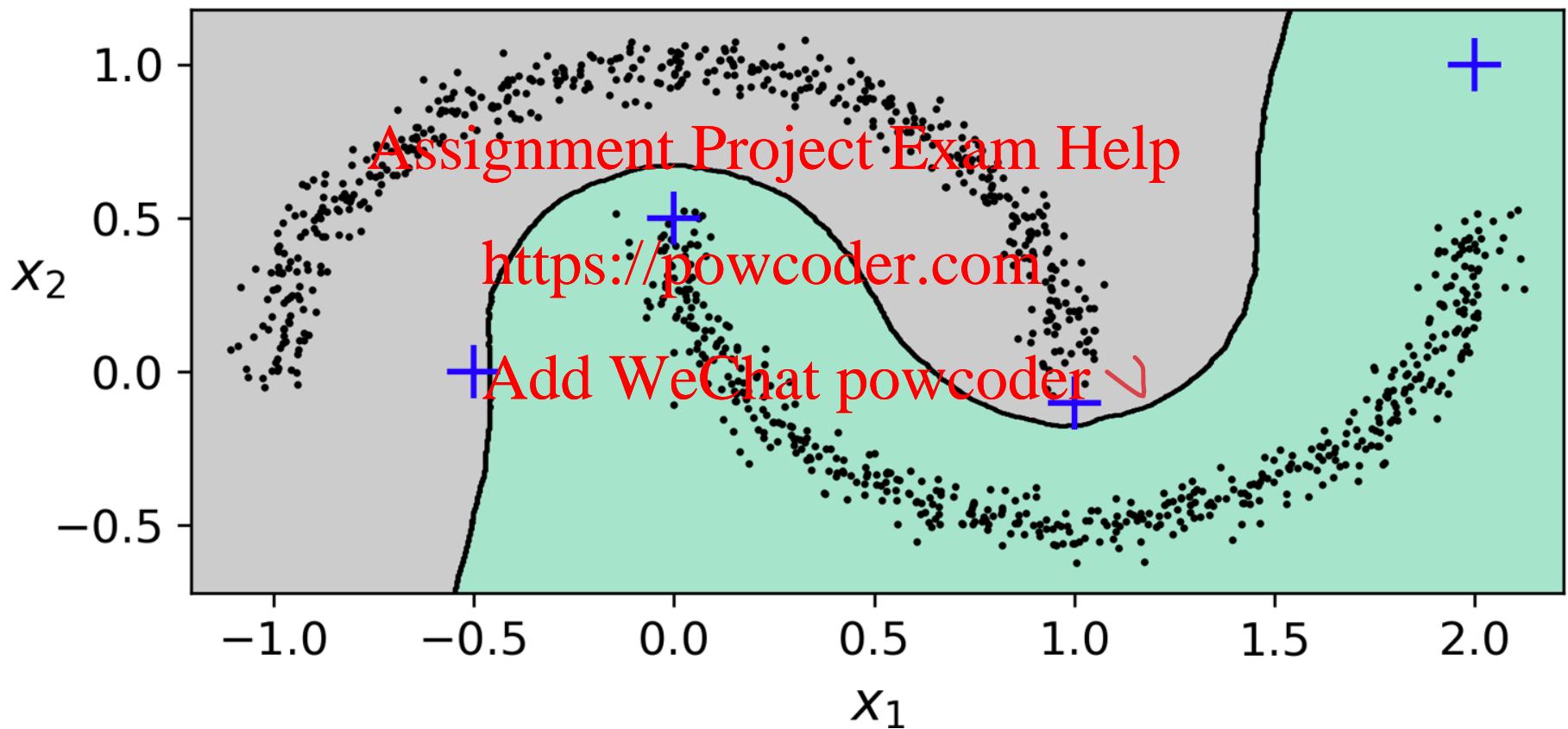
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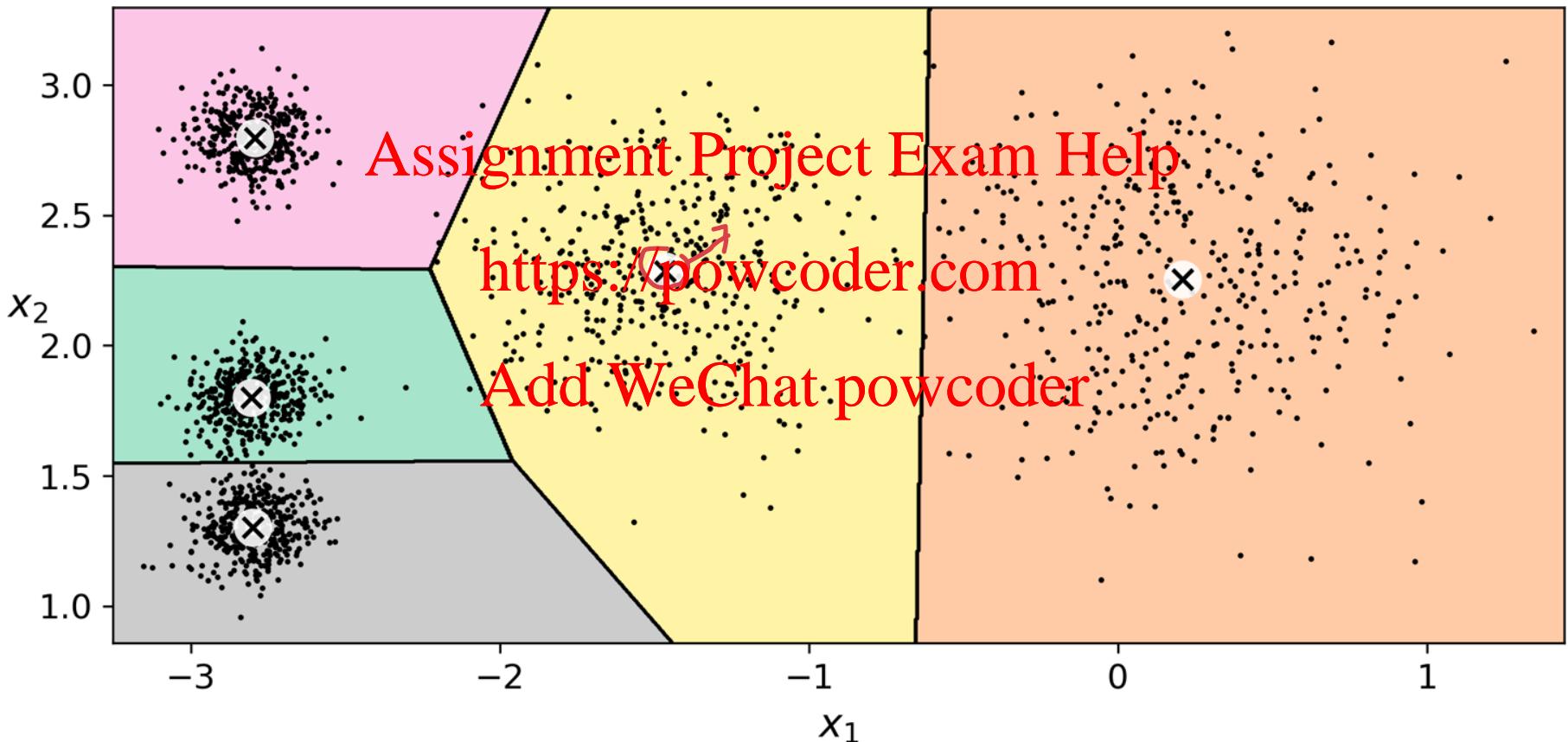




DECISION BOUNDARY

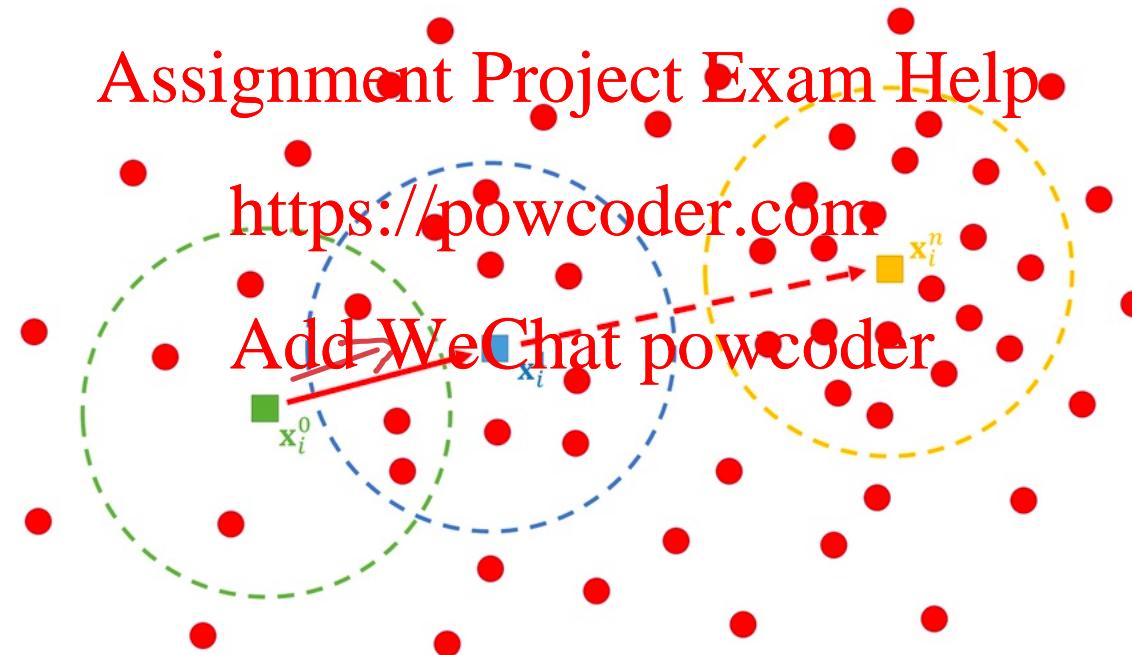


K-MEANS?

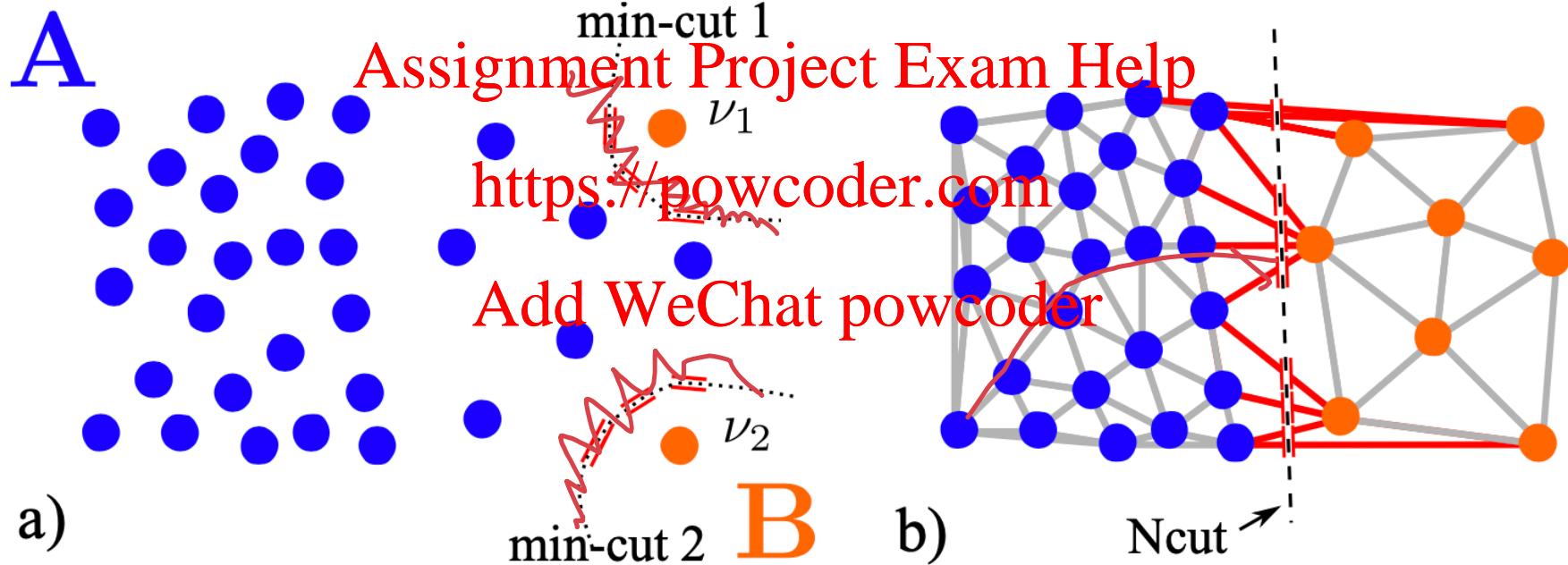


MEAN SHIFT

k



GRAPH PARTITIONING



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