

Unit 6: Quiz

Due Mar 20 at 11:59pm **Points** 10 **Questions** 10
Available until Mar 21 at 2:59am **Time Limit** 60 Minutes

This quiz was locked Mar 21 at 2:59am.

Attempt History

| | Attempt | Time | Score |
|--------|----------------------------------|-----------|--------------|
| LATEST | <u>Attempt 1</u> | 7 minutes | 10 out of 10 |

Score for this quiz: **10** out of 10

Submitted Mar 20 at 10:07pm

This attempt took 7 minutes.

Question 1

1 / 1 pts

K-Means algorithm is not for solving _____ problems. (Select all that apply.)

☐ Clustering

☒ Logistic Regression

☒ Linear Regression

☒ Classification

Correct!

Correct!

Correct!

Question 2

1 / 1 pts

Which of the following defines hard clustering?

Correct!

- ☒ Every data point falls into one cluster and one only.
- ☐ Every cluster contains one data point only.
- ☐ The entire dataset is clustered in one cluster only.
- ☐ The cluster's centers never change.

Question 3**1 / 1 pts**

Which of the following can NOT be used as a stopping criterion for the K-means algorithm? (select all that apply)

Correct!

- ☒ The sum of squared error reaches a local maximum.

Correct!

- ☒ There are points that belong to more than one cluster.

- ☐ The centroids have stopped changing.

Correct!

- ☒ Some centroids contain no point at all after an iteration.

"Some centroids contain no point at all after an iteration." is not a stopping criterion. You should randomly assign a point (which is not a centroid) back to that cluster. Another possible solution is that, you keep that cluster empty and return less centroids. In both cases you don't stop the iteration.

Question 4**1 / 1 pts**

Which of the following reasons is **not** the reason why the K-means algorithm will likely end up with sub-optimal clustering? (Select all that apply.)

☐ Bad choices for the initial cluster centers.

Correct!



Choosing a k that corresponds to the number of natural clusters in the dataset.

Correct!



Fast convergence of the K-means algorithm.

Correct!



Existence of closely-located data samples in the dataset.

Question 5

1 / 1 pts

Which of the following is a step in K-means algorithm implementation? (Select all that apply.)

Correct!



Set initial cluster centers.

Correct!



Compute the distance between every data point and each cluster center.

Correct!



Assign each data point to its nearest cluster center.



Initialize the cluster centers to random points at each iteration.

Question 6

1 / 1 pts

Which of the following is true for the K-means algorithm? (Select all that apply.)

Correct!

☒ The value of K needs to be set before running the algorithm.

Correct!



On every iteration of the algorithm, the cost function should either stay the same or decrease (in particular, it should not increase).



Once a data point has been assigned to a particular center, it will no longer be re-assigned to a different center in later iterations.



The algorithm will produce the same set of centers regardless of the initialization.

Question 7

1 / 1 pts

Given a data point, $x_1 = (1,1)$, and two cluster centers, $C_1 = (1,0)$ and $C_2 = (0,0)$, which cluster does x_1 belong to?

☐ Cluster 2

☒ Cluster 1

☐ Both clusters 1 and 2

☐ Neither

Correct!

Question 8

1 / 1 pts

You are given 5 data points in a 1-D space:

$x_1 = -5, x_2 = -4, x_3 = 0, x_4 = 2$ and $x_5 = 3$. Suppose $K = 2$ and the initial cluster centers are $\mu_1 = 0$ and $\mu_2 = 1$. When running K-means, what are the final cluster centers after convergence?

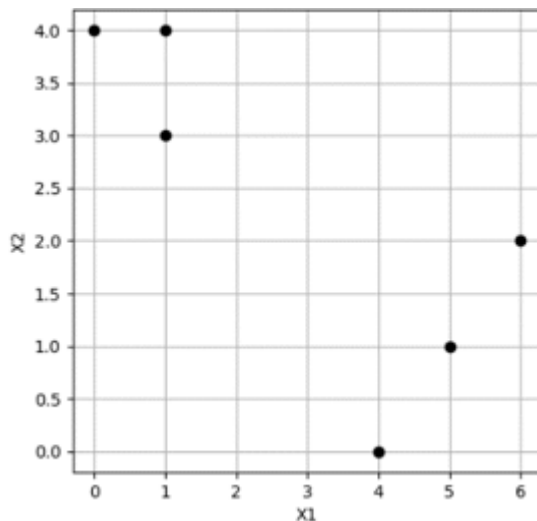
- ☐ $\mu_1 = 0, \mu_2 = 1$
- ☐ $\mu_1 = -3, \mu_2 = 2.5$
- ☐ $\mu_1 = -4.5, \mu_2 = 2.5$
- ☒ $\mu_1 = -4.5, \mu_2 = 5/3$

Correct!

Question 9

1 / 1 pts

K-means clustering is applied with $K = 2$, on a small dataset of six points as illustrated below. What are the centroids for each cluster?



- ☒ $(2/3, 11/3)$ and $(5, 1)$
- ☐ $(1, 4)$ and $(5, 3)$
- ☐ $(11/3, 2/3)$ and $(5, 1)$

Correct!

☐ (4,0) and (2,3)

Question 10**1 / 1 pts**

The following points (1,1), (2,6), (3,3),(3,4),(4,2),(6,4),(5,3) are clustered using the K-means algorithm.

The assignment step of the K-Means algorithm creates the following clusters: cluster_1: {(1,1),(2,6),(3,4)} and cluster_2: {(3,3),(4,2),(6,4),(5,3)}.

What are the new centroids of each cluster?

Correct!

☒ (2,11/3),(4.5,3)

☐ (2,6),(5,3)

☐ (11/3,2),(3,4.5)

☐ (11/3,4.5),(2,3)

Quiz Score: 10 out of 10