

**Courses » Introduction to Machine Learning**
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# Unit 9 - Week 8:

## Course outline

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#### Week 8:

- ☒ Lecture 41: Introduction to Clustering
- ☐ Lecture 42: Kmeans Clustering
- ☐ Lecture 43: Agglomerative Hierarchical Clustering
- ☐ Lecture 44: Python Exercise on Kmeans Clustering
- ☐ Week 8 - Lecture Notes

## Week 8 : Assignment 1

**Due date for this assignment:** 2017-09-20, 23:59 IST.

### Week 8 Assignment 1

1) With respect to k-means clustering, which of the following are the correct descriptions **2 points** of the expectation (E) and maximization (M) steps respectively?

- ☒ A. E-step: assign points to nearest cluster center, M-step: estimate model parameters that maximize the likelihood for the given assignment of points.
- ☐ B. E-step: estimate model parameters that maximize the likelihood for the given assignment of points, M-step: assign points to nearest cluster center.
- ☐ C. None of A or B.
- ☐ D. Both A and B

2) You are given a set of 6 points, {A, B, C, D, E, F} and the distance matrix of size 6 **5 points**


	A	B	C	D	E	F
A	0.0	0.71	5.66	3.61	4.24	3.20
B	0.71	0.0	4.95	2.92	3.54	2.50
C	5.66	4.95	0.0	2.24	1.41	2.50
D	3.61	2.92	2.24	0.0	1.0	0.50
E	4.24	3.54	1.41	1.0	0.0	1.12
F	3.20	2.50	2.50	0.5	1.12	0.0

by 6.

This distance matrix was calculated based on the features of the points. Using single linkage clustering construct the dendrogram for the set of points. The final dendrogram is given by which of the following? (The bracing in the options directly corresponds to the dendrogram hierarchical structure.)

- ☐ A. (((D, F), E), B), (A, C))
- ☐ B. (((A, F), E), C), (D, B))
- ☒ C. (((D, F), E), C), (A, B))
- ☐ D. (((D, E), F), C), (A, B))

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3) Which of the following options is a measure of internal evaluation of a clustering algorithm?

**2 points**

- ☐ A. Rand index
- ☒ B. Davies-Bouldin index
- ☐ C. Jaccard index
- ☐ D. F-measure

4) K-means clustering is not an example of which of the following clustering method:

**2 points**

- ☐ A. Non-hierarchical clustering
- ☐ B. optimizing partitioning
- ☐ C. Divisive clustering
- ☒ D. Agglomerative clustering

5) Which of the following statements are true about the different types of linkages.

**2 points**

- ☒ A. single linkage suffers from chaining.
- ☐ B. Average linkage suffers from crowding.
- ☐ C. In single linkage clustering the similarity between two clusters depends on all the elements in the two clusters.
- ☒ D. Complete linkage avoids chaining but suffers from crowding.

6) Suppose you run K-means clustering algorithm on a given dataset. What are the factors on which the final clusters depend on ?

**3 points**

- I. The value of K
- II. The initial cluster seeds chosen
- III. The distance function used.

- ☐ A. I only
- ☐ B. II only
- ☐ C. I and II only
- ☒ D. I, II and III

You may submit any number of times before the due date. The final submission will be considered for grading.

**Submit Answers**

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