Clustering

Congratulations! You passed!

Grade received	Latest Submission Grade	To pass
100%	100%	80% or higher

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1. Which of these best describes unsupervised learning? **1 / 1 point**

- ○ A form of machine learning that finds patterns in data using only labels (y) but without any inputs (x) .
- ○ A form of machine learning that finds patterns without using a cost function.
- ◉ A form of machine learning that finds patterns using unlabeled data (x).
- ○ A form of machine learning that finds patterns using labeled data (x, y)

Correct
Unsupervised learning uses unlabeled data. The training examples do not have targets or labels "y". Recall the T-shirt example. The data was height and weight but no target size.

2. **1 / 1 point**

Which of these statements are true about K-means? Check all that apply.

- ☑ If you are running K-means with $K = 3$ clusters, then each $c^{(i)}$ should be 1, 2, or 3.

Correct
$c^{(i)}$ describes which centroid example(i) is assigned to. If $K = 3$, then $c^{(i)}$ would be one of 1,2 or 3 assuming counting starts at 1.

- ☑ The number of cluster assignment variables $c^{(i)}$ is equal to the number of training examples.

Correct
$c^{(i)}$ describes which centroid example(i) is assigned to.

- [x] If each example x is a vector of 5 numbers, then each cluster centroid μ_k is also going to be a vector of 5 numbers.

Correct
The dimension of μ_k matches the dimension of the examples.

- [ ] The number of cluster centroids μ_k is equal to the number of examples.

3. **1 / 1 point**

You run K-means 100 times with different initializations. How should you pick from the 100 resulting solutions?

- ( ) Pick the last one (i.e., the 100th random initialization) because K-means always improves over time
- ( ) Average all 100 solutions together.
- ( ) Pick randomly -- that was the point of random initialization.
- (•) Pick the one with the lowest cost J

Correct
K-means can arrive at different solutions depending on initialization. After running repeated trials, choose the solution with the lowest cost.

4. You run K-means and compute the value of the cost function $J(c^{(1)}, \ldots, c^{(m)}, \mu_1, \ldots, \mu_K)$ after each iteration. Which of these statements should be true? **1 / 1 point**

- (•) The cost will either decrease or stay the same after each iteration. .
- ( ) The cost can be greater or smaller than the cost in the previous iteration, but it decreases in the long run.
- ( ) There is no cost function for the K-means algorithm.
- ( ) Because K-means tries to maximize cost, the cost is always greater than or equal to the cost in the previous iteration.

Correct
The cost never increases. K-means always converges.

5. In K-means, the elbow method is a method to **1 / 1 point**

- ( ) Choose the best random initialization
- (•) Choose the number of clusters K
- ( ) Choose the best number of samples in the dataset
- ( ) Choose the maximum number of examples for each cluster

Correct
The elbow method plots a graph between the number of clusters K and the cost function. The 'bend' in the cost curve can suggest a natural value for K. Note that this feature may not exist or be significant in some data sets.