COSC 522 (MACHINE LEARNING) HOMEWORK 3
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PROBLEM ONE

a. Difference Between K-Means and Winner-Take-All

	Aspect	**K-Means**	**Winner-Takes-All**
1	**Learning Type**	Batch Learning	Online Learning
2	**Update**	All centroid updated per iteration	Only winning unit updated per input
3	**Convergence**	Full dataset in each iteration	Immediate local, after each input
4	**Distance Metric**	Euclidean Distance	Any Distance Metric (Often Euclidean)
5	**Cluster Shape**	Mostly Spherical Cluster	Flexible Cluster Shape
6	**Application**	Customer segmentation, etc	Competitive learning eg neural nets, SOMs etc
7	**Speed**	Efficient for Large Dataset	Faster for some tasks but sensitive to initialization

a. What is common with the clustering algorithms is that they are all trying to minimize within cluster variance and maximize between cluster variance.