School of Computing and Information Systems
The University of Melbourne
COMP90049
Knowledge Technologies (Semester 1, 2018)
Workshop exercises: Week 12

1. Revise **Support Vector Machines**, paying particular attention to the terms "linear separability" and "maximum margin".

   (a) What is the significance of allowing "some margin of errors", indicated by ξ in the lectures?

   (b) Why are we interested in "kernel functions" here?

   (c) Why are SVMs "binary classifiers", and how can we extend them to "multi-class classifiers"?

2. What is **Clustering**?

   (a) What is the difference between "partitional" and "hierarchical" clustering? What are some other distinctions that we can draw between clusterings?

   (b) How does the ***k*-means** algorithm cluster data? Given the following dataset:

id	*apple*	*ibm*	*lemon*	*sun*
`A`	4	0	1	1
`B`	5	0	5	2
`C`	2	5	0	0
`D`	1	2	1	7
`E`	2	0	3	1
`F`	1	0	1	0

   Apply k-means, using the Manhattan distance, and seeds `A` and `D`. What would happen if we had used different instances as seeds?