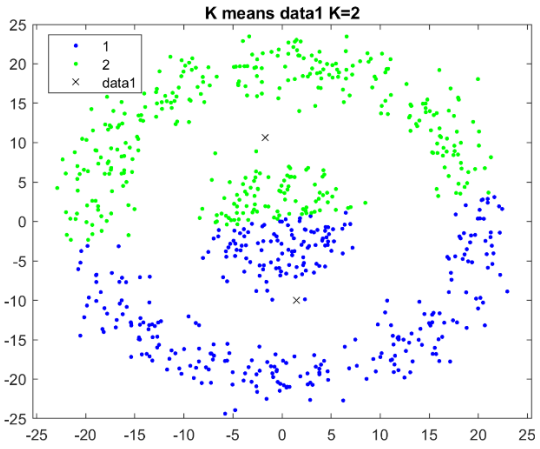
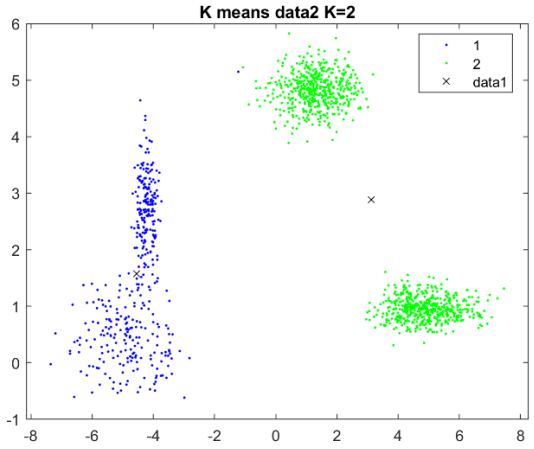
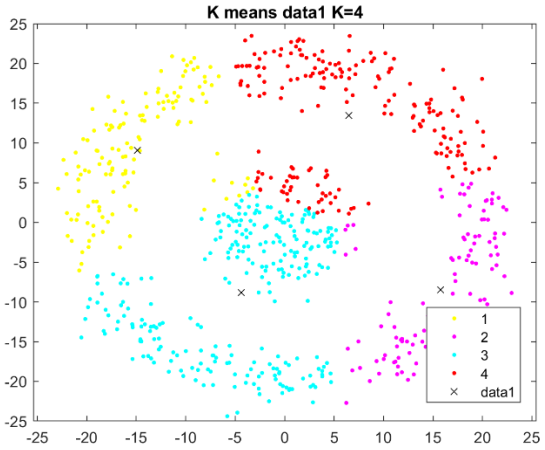
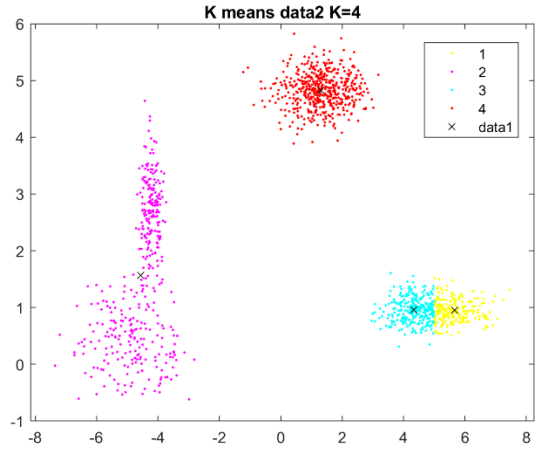
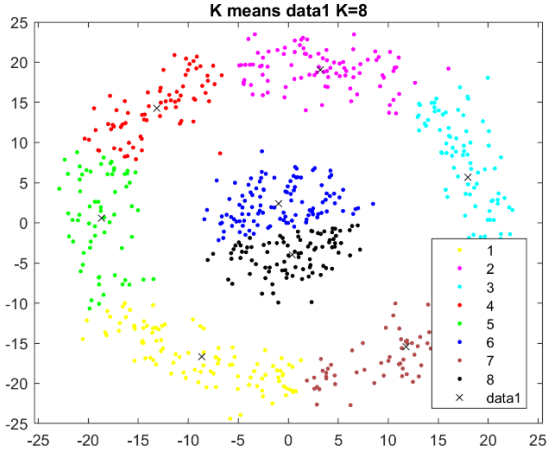
Problem 1

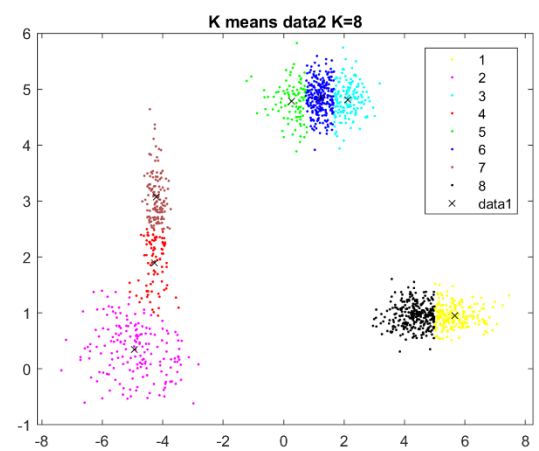

K means data1 K=2
1
2
data1

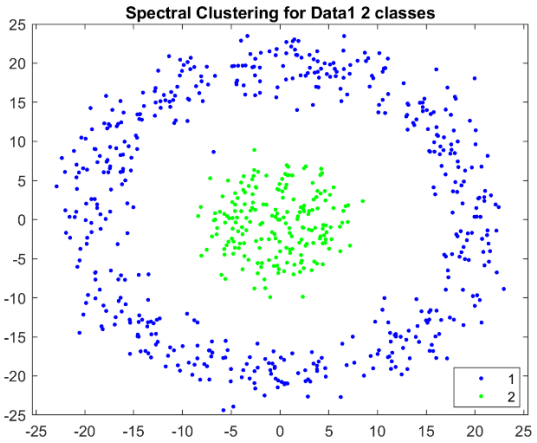

K means data2 K=2
1
2
data1

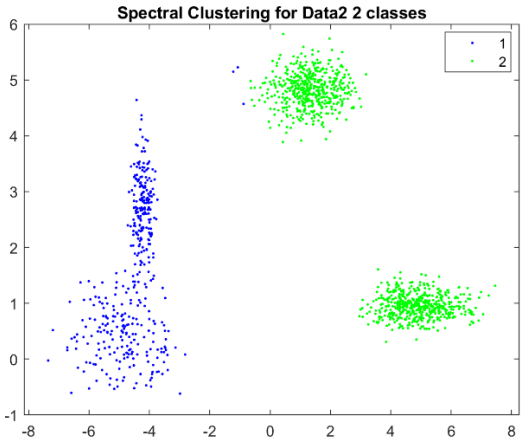

K means data1 K=4
1
2
3
4
data1

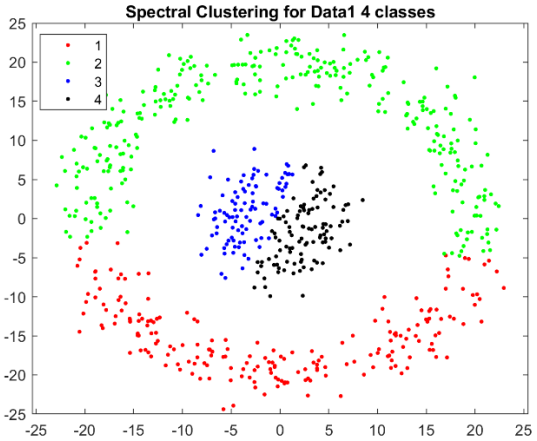

K means data2 K=4
1
2
3
4
data1

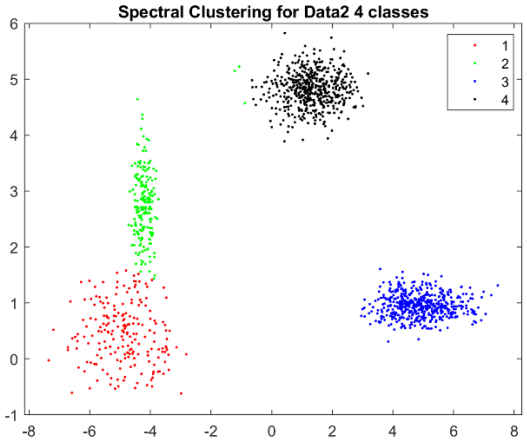

K means data1 K=8
1
2
3
4
5
6
7
8
data1

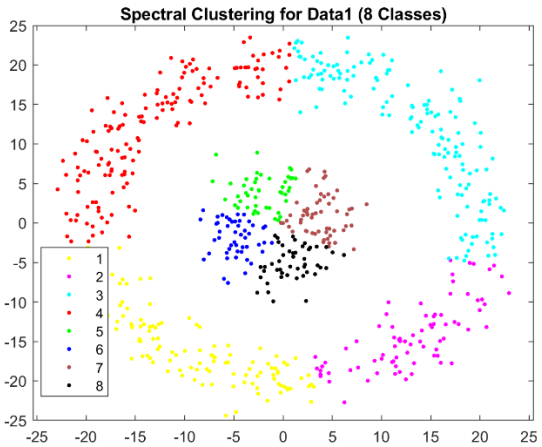

K means data2 K=8
1
2
3
4
5
6
7
8
data1

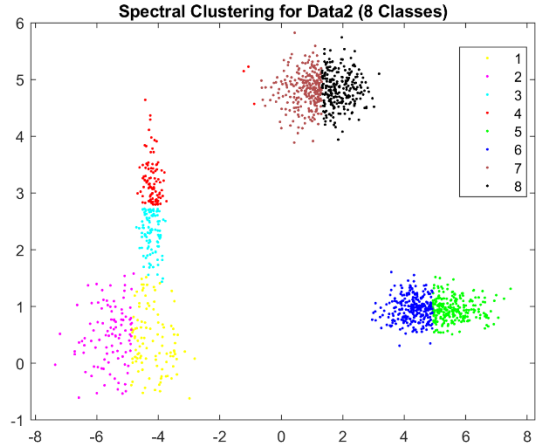

Spectral Clustering for Data1 2 classes
1
2


Spectral Clustering for Data2 2 classes
1
2


Spectral Clustering for Data1 4 classes
1
2
3
4


Spectral Clustering for Data2 4 classes
1
2
3
4


Spectral Clustering for Data1 (8 Classes)
1
2
3
4
5
6
7
8


Spectral Clustering for Data2 (8 Classes)
1
2
3
4
5
6
7
8

	Data 1	Data 2
K=2	1.3184e+05	1.1523e+04
K=4	6.3884e+04	955.5036
K=8	2.0112e+04	421.4844
Cluster=2	2.0771e+05	8.5295e+03
Cluster=4	1.1963e+05	982.7170
Cluster=8	4.3026e+04	457.4430

These two results seem to have similar cost values in different K and K means method will perform better. However, from the graph it is obvious that for data 1, spectral clustering is better that K means. For data2, K means is more likely to approach the ideal classification.