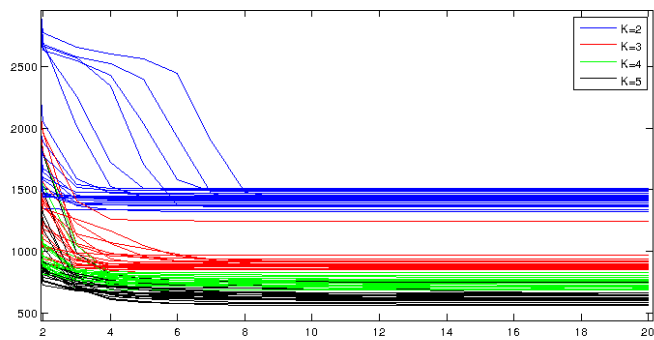


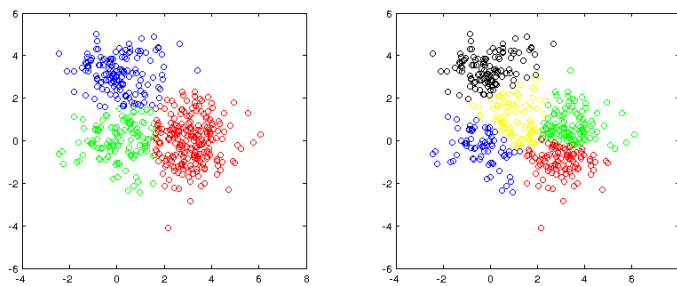
## Homework 3 SOLUTIONS

### Problem 1

a) I have plotted for many runs below.

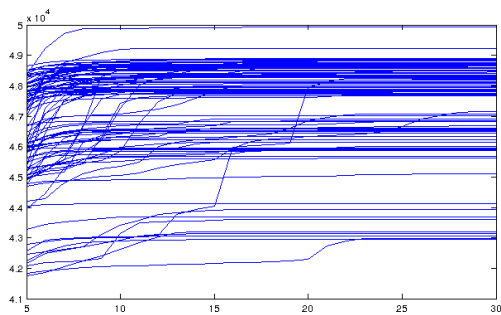


b) The answer should look something like this.

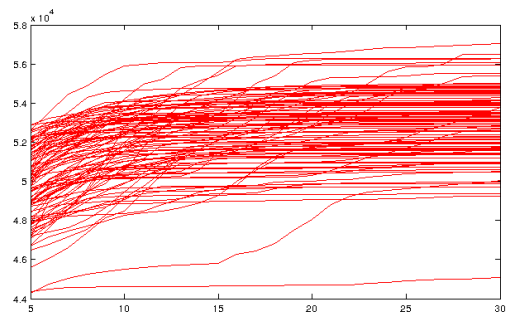


### Problem 2

a) Here are 100 runs each. It should look something like this.



(a) Class 1



(b) Class 0

b) Below are the results from 1 (top) to 4 (bottom) clusters. I ran these experiments 1000 times and show the (min, max) values from those runs. There is no randomness for the first result.

	pred = 0	pred = 1
truth = 0	182	96
truth = 1	7	175

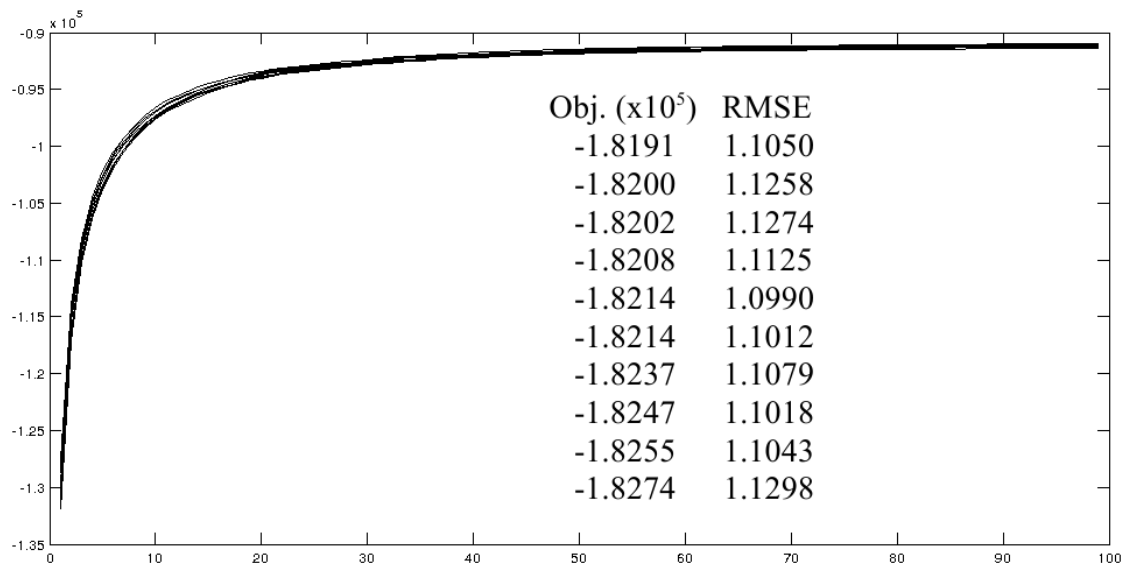
	pred = 0	pred = 1
truth = 0	(172, 248)	(30, 106)
truth = 1	(4, 37)	(145, 178)

	pred = 0	pred = 1
truth = 0	(177, 249)	(29, 101)
truth = 1	(4, 35)	(147, 178)

	pred = 0	pred = 1
truth = 0	(181, 247)	(31, 97)
truth = 1	(3, 27)	(155, 179)

### Problem 3

a) Here is an example.



b) Below I give results from one run. The lists and numbers may vary slightly, but there should be a large overlap in movies.

```

Star Wars (1977) : Distance = 0
Empire Strikes Back, The (1980) : Distance = 0.098296
Raiders of the Lost Ark (1981) : Distance = 0.31797
Return of the Jedi (1983) : Distance = 0.37699
Indiana Jones and the Last Crusade (1989) : Distance = 0.87774
Toy Story (1995) : Distance = 0.91801
Terminator, The (1984) : Distance = 0.92122
Usual Suspects, The (1995) : Distance = 0.98945
Meet John Doe (1941) : Distance = 1.0043
L.A. Confidential (1997) : Distance = 1.0823
Princess Bride, The (1987) : Distance = 1.0967

```

```

My Fair Lady (1964) : Distance = 0
Mary Poppins (1964) : Distance = 0.70708

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Backbeat (1993) : Distance = 1.0489  
Sound of Music, The (1965) : Distance = 1.0796  
Family Thing, A (1996) : Distance = 1.088  
Jungle Book, The (1994) : Distance = 1.1441  
Parent Trap, The (1961) : Distance = 1.1828  
Swept from the Sea (1997) : Distance = 1.2914  
Tango Lesson, The (1997) : Distance = 1.3037  
American in Paris, An (1951) : Distance = 1.3104  
Wizard of Oz, The (1939) : Distance = 1.335

GoodFellas (1990) : Distance = 0  
Once Upon a Time in the West (1969) : Distance = 0.31252  
Apocalypse Now (1979) : Distance = 0.38818  
Full Metal Jacket (1987) : Distance = 0.43551  
Bonnie and Clyde (1967) : Distance = 0.50927  
Good, The Bad and The Ugly, The (1966) : Distance = 0.60945  
Casino (1995) : Distance = 0.61202  
Godfather: Part II, The (1974) : Distance = 0.73075  
People vs. Larry Flynt, The (1996) : Distance = 0.75397  
Cool Hand Luke (1967) : Distance = 0.77145  
Short Cuts (1993) : Distance = 0.77417