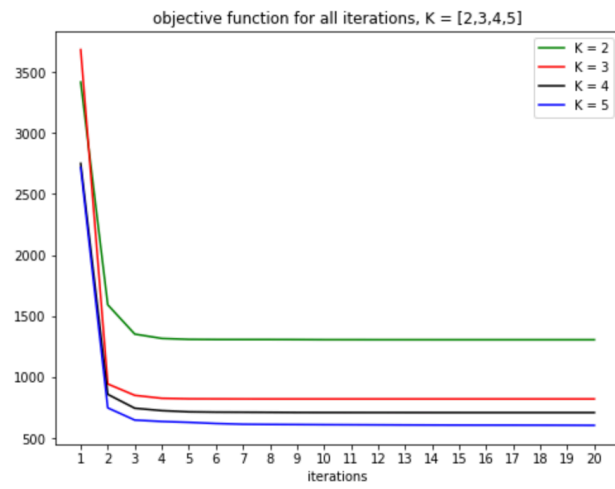
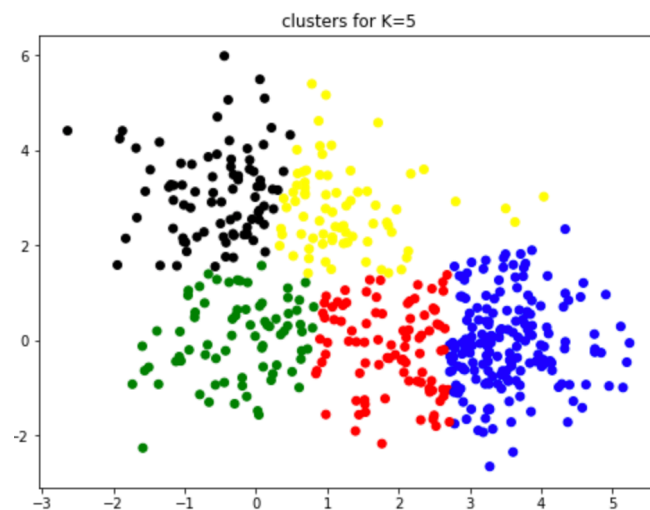
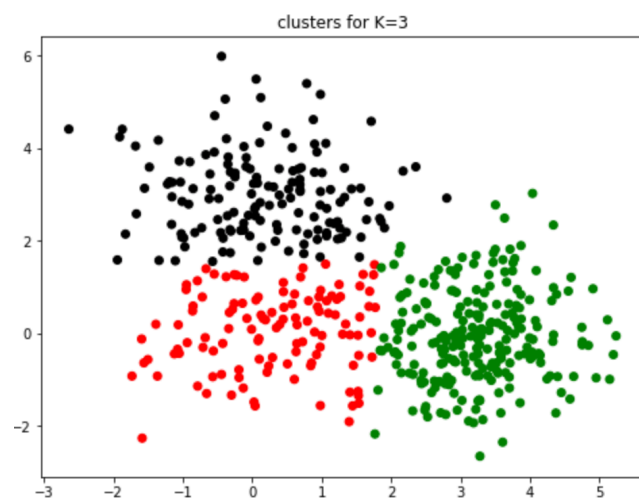


## Answer 1

a)



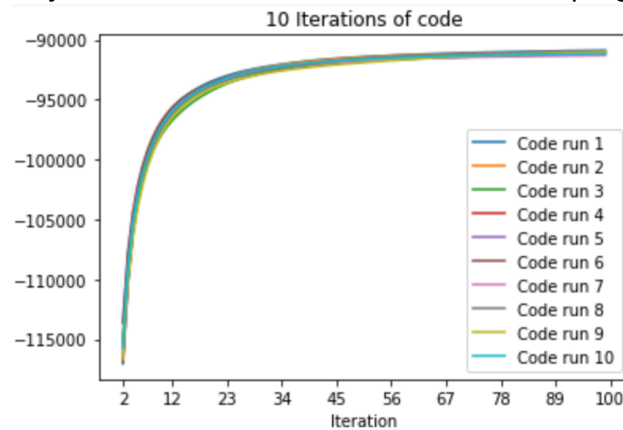
b)



## Answer 2

a)

Objective function for ten iterations of the program.



Objective function and test rmse sorted according to decreasing value of objective function.

s.no.	objective	test_rmse
1	-90889.144	1.11369223
8	-90959.523	1.11308376
4	-91005.665	1.14378427
2	-91012.312	1.1099805
9	-91023.06	1.11567952
10	-91170.409	1.10658887
6	-91177.335	1.09959316
5	-91179.741	1.16124919
3	-91200.432	1.10708552
7	-91307.909	1.09041408

b)

List of 10 closest movies for Star Wars, My Fair Lady, GoodFellas.

Star Wars	My Fair Lady	GoodFellas
Empire Strikes Back, The (1980)	Mary Poppins (1964)	Good, The Bad and The Ugly, The (1966)
Raiders of the Lost Ark (1981)	American in Paris, An (1951)	Once Upon a Time in the West (1969)
Return of the Jedi (1983)	Snow White and the Seven Dwarfs (1937)	Full Metal Jacket (1987)
Usual Suspects, The (1995)	Sound of Music, The (1965)	Bonnie and Clyde (1967)
Wrong Trousers, The (1993)	Wizard of Oz, The (1939)	Apocalypse Now (1979)
Indiana Jones and the Last Crusade (1989)	Cinderella (1950)	Godfather: Part II, The (1974)
Great Escape, The (1963)	Babe (1995)	Raging Bull (1980)
Terminator, The (1984)	Mr. Smith Goes to Washington (1939)	Godfather, The (1972)
Sting, The (1973)	Arsenic and Old Lace (1944)	Alien (1979)
Meet John Doe (1941)	Singin' in the Rain (1952)	Cool Hand Luke (1967)

Distance of closest movies.

<b>Star Wars</b>	<b>My Fair Lady</b>	<b>GoodFellas</b>
0.32432772	0.522594444	0.61424654
0.56814327	0.684559269	0.76896394
0.63116438	0.705770748	0.85167279
0.76122287	0.756264102	0.88183867
0.80617996	0.791628204	0.89416705
0.84232011	0.815269903	0.92485794
0.86448072	0.821698758	0.96823458
0.87620233	0.87771626	0.97242373
0.93823196	0.935370244	1.00386865
0.94418751	0.960117924	1.01719801