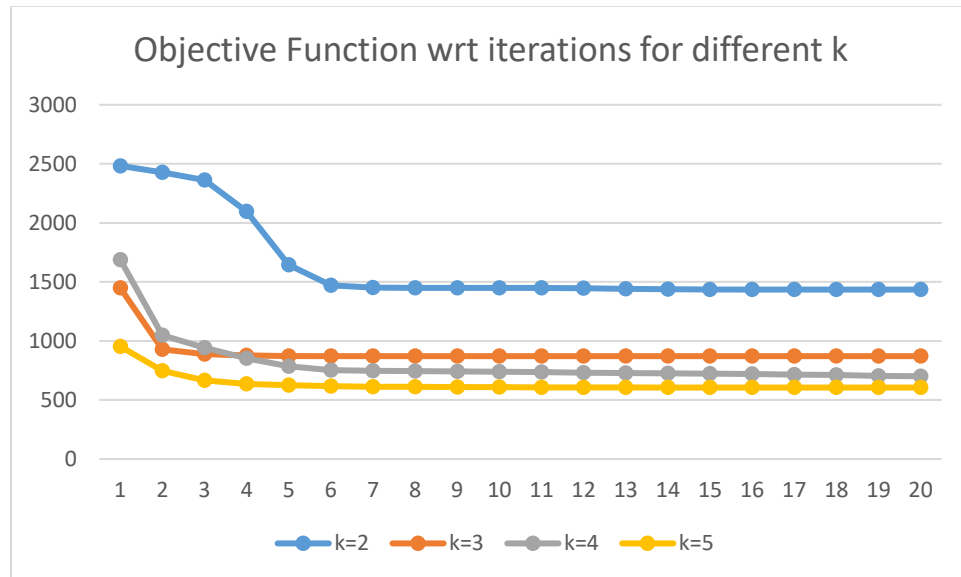


## Machine Learning for Data Science: HW4

Abhay Pawar UNI: asp2197

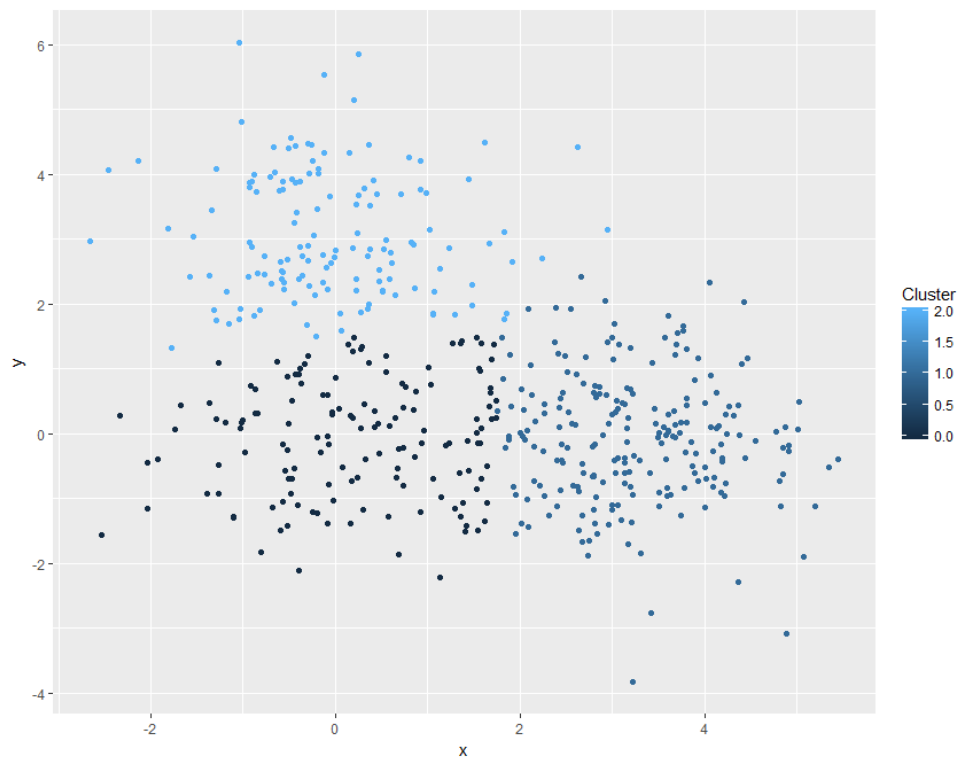
### Problem 1

a.

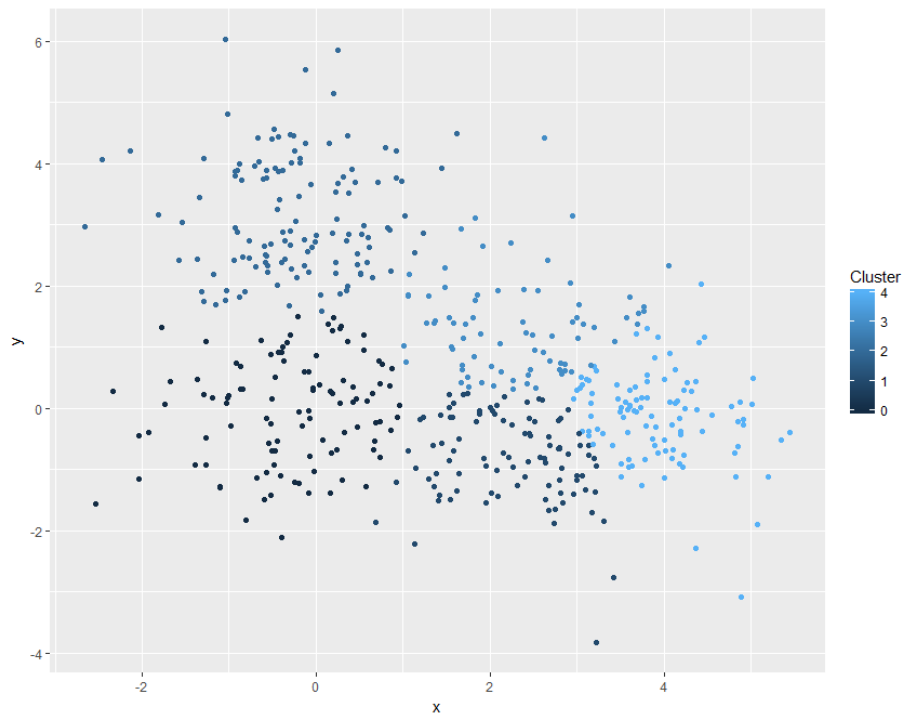


b.

k=3

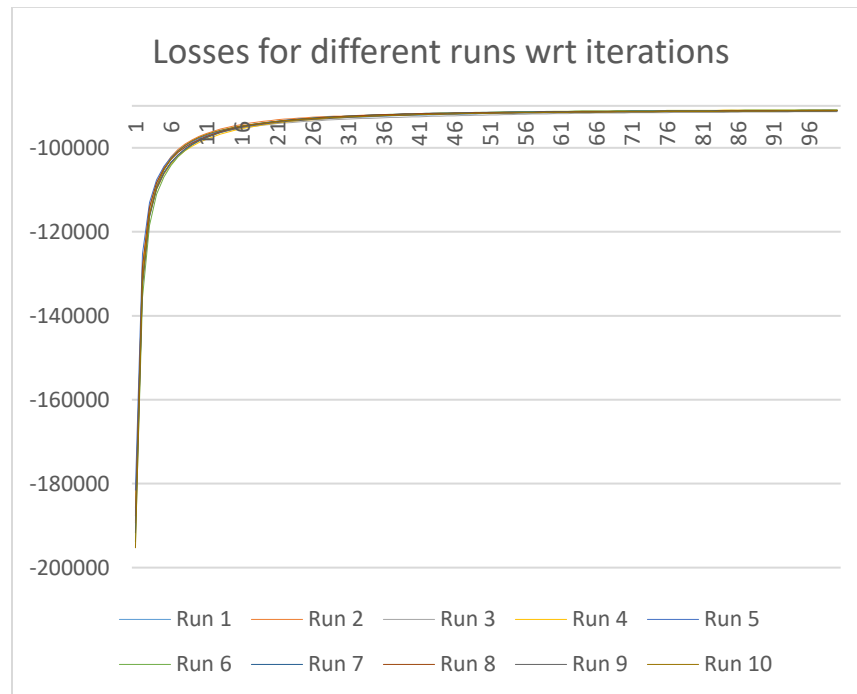


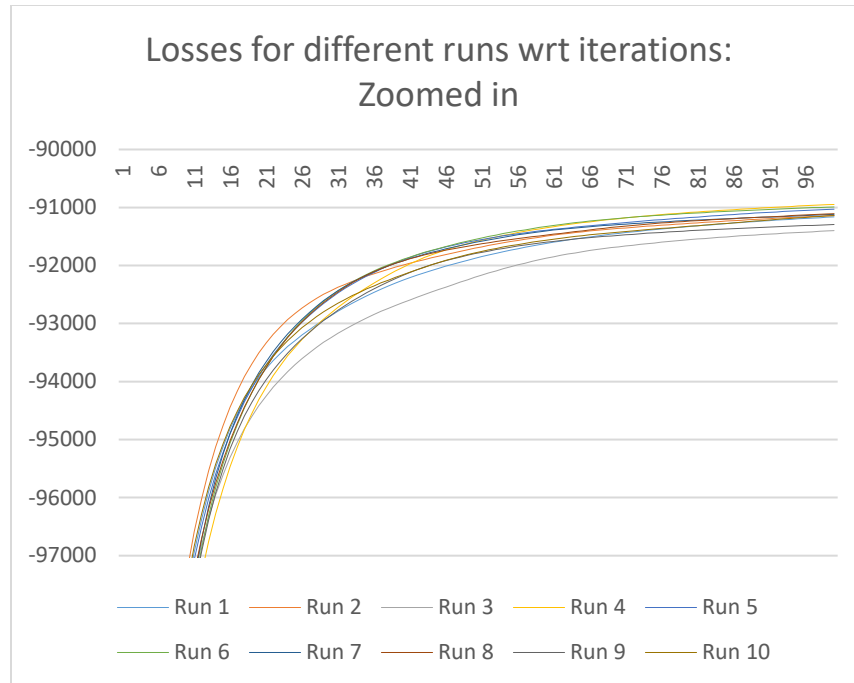
K=5



## Problem 2

a.





**RMSE and objective function table:**

Run Number	RMSE	Objective
4	1.1134293	-90948.2
6	1.1279473	-90991.3
5	1.1657309	-91029.5
8	1.0902391	-91107.2
7	1.1540008	-91118.5
2	1.1041874	-91137.5
10	1.1384329	-91139.9
1	1.1196615	-91161.7
9	1.1551715	-91292.5
3	1.1528288	-91398.5

b.

### Star Wars

Distance	Movie id	Movie name
0.306339	172	Empire Strikes Back
0.638073	181	Return of the Jedi (1983)
0.660484	174	Raiders of the Lost Ark (1981)
0.913159	195	Terminator
0.931221	166	Manon of the Spring (Manon des sources) (1986)
0.932036	96	Terminator 2: Judgment Day (1991)
0.935534	612	Lost Horizon (1937)
0.939225	1269	Love in the Afternoon (1957)
0.96232	12	Usual Suspects
1.002815	210	Indiana Jones and the Last Crusade (1989)

### My Fair Lady

Distance	Movie id	Movie name
0.679007	419	Mary Poppins (1964)
0.742099	486	Sabrina (1954)
0.908014	417	Parent Trap
0.918038	99	Snow White and the Seven Dwarfs (1937)
0.920242	8	Babe (1995)
0.96081	389	Black Beauty (1994)
0.969444	705	Singin' in the Rain (1952)
0.974147	143	Sound of Music
0.98549	136	Mr. Smith Goes to Washington (1939)
0.993045	1474	Nina Takes a Lover (1994)

### Goodfellas

Distance	Movie id	Movie name
0.632472	187	Godfather: Part II
0.66164	521	Deer Hunter
0.68899	180	Apocalypse Now (1979)
0.740406	693	Casino (1995)
0.774033	504	Bonnie and Clyde (1967)
0.817092	494	His Girl Friday (1940)
0.921291	127	Godfather
0.938727	321	Mother (1996)
0.950822	523	Cool Hand Luke (1967)
1.00701	76	Carlito's Way (1993)