Problem1

(a).

Iteration		MAP	RMSE
2	2.0	-192131.341388	1.128829
9	9.0	-192470.066264	1.097454
3	3.0	-192669.404945	1.101077
1	1.0	-192767.399540	1.113968
8	8.0	-192773.603150	1.110782
6	6.0	-192807.936431	1.108276
0	0.0	-192929.350140	1.078799
7	7.0	-192970.095986	1.108773
4	4.0	-193010.089869	1.078152
5	5.0	-193293.433494	1.096323
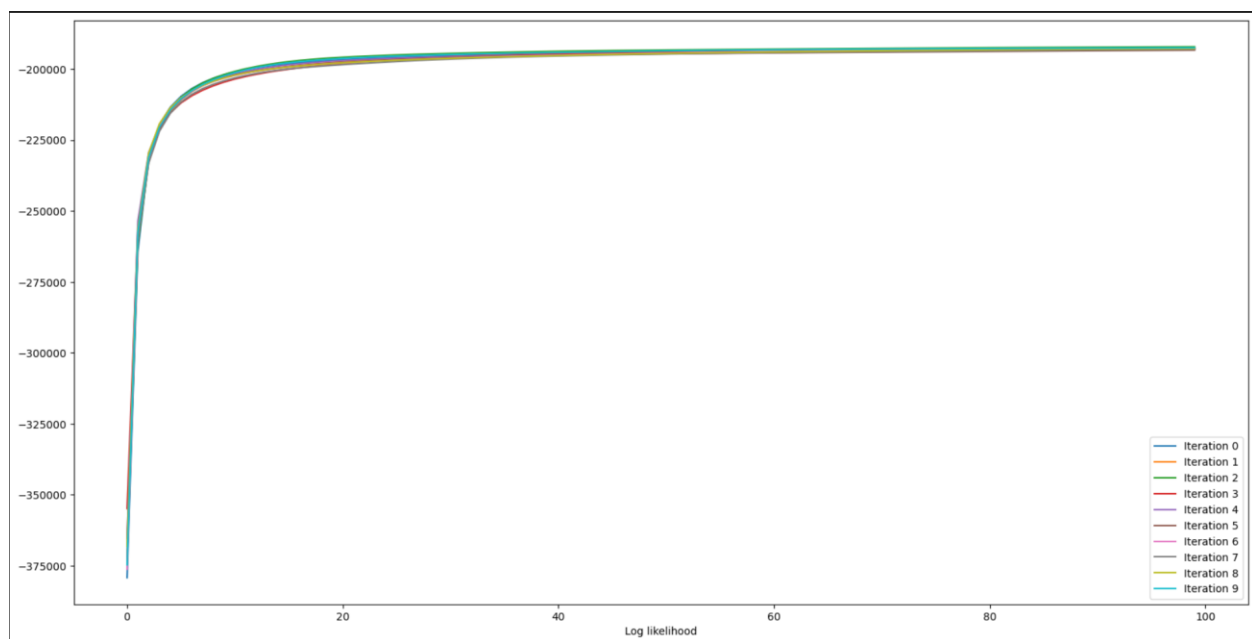
(b).

Star Wars:

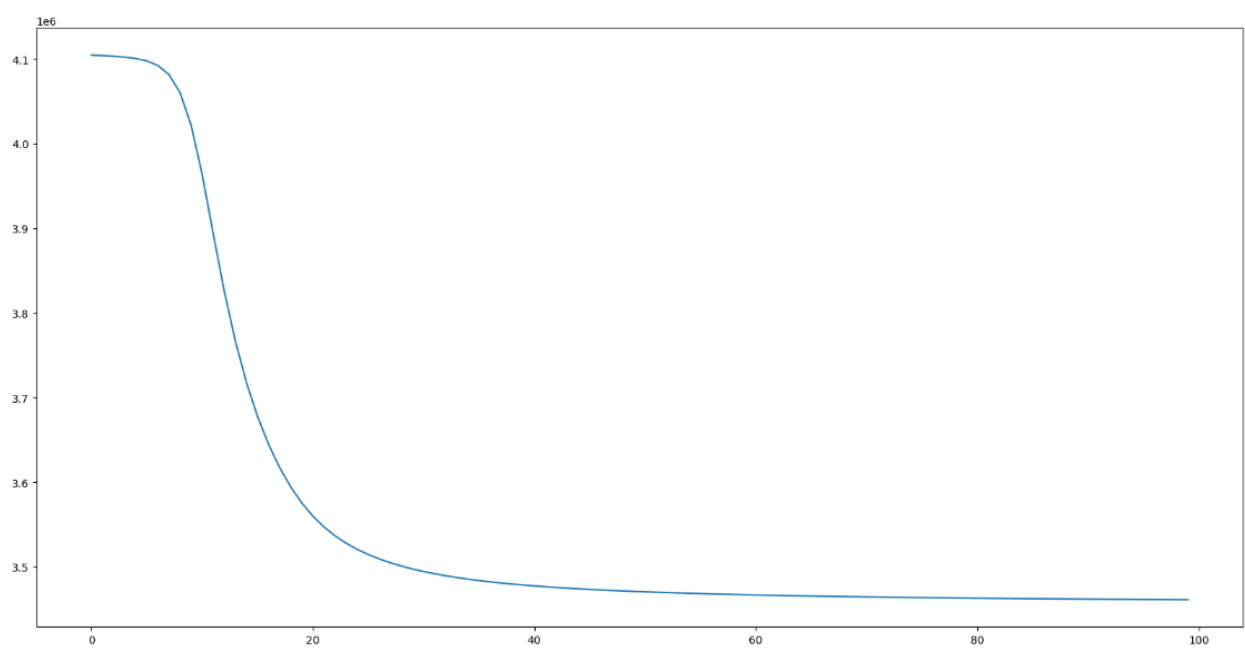|	moive_name	distance
171	Empire Strikes Back, The (1980)	0.380104
173	Raiders of the Lost Ark (1981)	0.614647
180	Return of the Jedi (1983)	0.835706
193	Sting, The (1973)	0.888138
198	Bridge on the River Kwai, The (1957)	0.977276
63	Shawshank Redemption, The (1994)	1.066094
209	Indiana Jones and the Last Crusade (1989)	1.086239
519	Great Escape, The (1963)	1.106433
1188	Prefontaine (1997)	1.110900
175	Aliens (1986)	1.113176

My Fair Lady:

	moive_name	distance
418	Mary Poppins (1964)	1.006996
739	Jane Eyre (1996)	1.039855
142	Sound of Music, The (1965)	1.048720
450	Grease (1978)	1.073920
274	Sense and Sensibility (1995)	1.121201
282	Emma (1996)	1.121766
704	Singin' in the Rain (1952)	1.210452
628	Victor/Victoria (1982)	1.218568
601	American in Paris, An (1951)	1.256800
1146	My Family (1995)	1.267139

GoodFellas:

	moive_name	distance
503	Bonnie and Clyde (1967)	0.751470
199	Shining, The (1980)	0.815122
176	Good, The Bad and The Ugly, The (1966)	0.830389
645	Once Upon a Time in the West (1969)	0.865401
187	Full Metal Jacket (1987)	0.910824
692	Casino (1995)	0.940235
186	Godfather: Part II, The (1974)	0.973353
149	Swingers (1996)	1.003256
237	Raising Arizona (1987)	1.019529
179	Apocalypse Now (1979)	1.026744

Probelm2:

Topic0

	topic	word	weight
781	topic0	jury	0.011082
904	topic0	sentence	0.012411
722	topic0	prosecutor	0.013231
629	topic0	prison	0.014523
404	topic0	trial	0.018840
313	topic0	judge	0.020072
126	topic0	court	0.022041
88	topic0	charge	0.022436
17	topic0	case	0.023403
162	topic0	lawyer	0.029732

Topic1

	topic	word	weight
394	topic1	style	0.006009
361	topic1	piece	0.006452
376	topic1	perform	0.006611
594	topic1	song	0.007177
473	topic1	dance	0.007259
3	topic1	play	0.007610
275	topic1	performance	0.007725
332	topic1	artist	0.010335
161	topic1	art	0.012397
138	topic1	music	0.017034

Topic2

	topic	word	weight
430	topic2	international	0.007087
198	topic2	meeting	0.007287
280	topic2	agreement	0.007448
75	topic2	political	0.008479
12	topic2	american	0.010852
11	topic2	states	0.011289
4	topic2	official	0.011999
24	topic2	country	0.012352
15	topic2	government	0.012794
84	topic2	leader	0.014132

Topic3

	topic	word	weight
110	topic3	low	0.010344
22	topic3	report	0.010531
98	topic3	fall	0.010862
388	topic3	economy	0.011458
93	topic3	increase	0.011753
47	topic3	price	0.014512
34	topic3	market	0.015098
152	topic3	rise	0.016994
97	topic3	rate	0.017386
1	topic3	percent	0.030222

Topic4

	topic	word	weight
90	topic4	lose	0.009829
195	topic4	hit	0.010229
14	topic4	point	0.011169
124	topic4	third	0.011771
228	topic4	score	0.012621
292	topic4	victory	0.013533
3	topic4	play	0.015387
40	topic4	win	0.017600
25	topic4	second	0.018463
5	topic4	game	0.019019

Topic5

	topic	word	weight
252	topic5	mother	0.013809
72	topic5	live	0.014344
380	topic5	wife	0.015121
177	topic5	friend	0.015873
6	topic5	man	0.017564
115	topic5	young	0.018791
21	topic5	life	0.022939
44	topic5	family	0.025591
20	topic5	child	0.028500
19	topic5	woman	0.028825

Topic6

	topic	word	weight
59	topic6	problem	0.007919
254	topic6	cause	0.008754
785	topic6	treatment	0.009368
360	topic6	research	0.009553
389	topic6	patient	0.010049
539	topic6	medical	0.010888
100	topic6	drug	0.011832
202	topic6	health	0.012308
352	topic6	doctor	0.012397
139	topic6	study	0.013621

Topic7

	topic	word	weight
61	topic7	keep	0.007845
68	topic7	little	0.007913
80	topic7	question	0.008289
50	topic7	put	0.009114
222	topic7	happen	0.009853
42	topic7	ask	0.011036
99	topic7	lot	0.011403
187	topic7	really	0.011811
87	topic7	feel	0.013213
31	topic7	thing	0.021761

Topic8

	topic	word	weight
695	topic8	author	0.006499
290	topic8	editor	0.007000
562	topic8	writer	0.008275
326	topic8	story	0.009351
3	topic8	play	0.009398
321	topic8	movie	0.010803
417	topic8	character	0.011602
184	topic8	film	0.012941
70	topic8	write	0.014246
101	topic8	book	0.016750

Topic9

	topic	word	weight
84	topic9	leader	0.009752
528	topic9	voter	0.009761
383	topic9	democratic	0.011950
253	topic9	republican	0.013213
120	topic9	party	0.014348
216	topic9	election	0.014582
319	topic9	candidate	0.014965
150	topic9	vote	0.016164
75	topic9	political	0.020597
132	topic9	campaign	0.022333

Topic10

	topic	word	weight
16	topic10	home	0.009262
200	topic10	project	0.009488
444	topic10	neighborhood	0.009666
237	topic10	street	0.010324
82	topic10	house	0.012757
102	topic10	area	0.012958
149	topic10	build	0.013152
330	topic10	resident	0.015706
121	topic10	building	0.023201
7	topic10	city	0.027036

Topic11

	topic	word	weight
738	topic11	soldier	0.008513
15	topic11	government	0.008521
11	topic11	states	0.008628
684	topic11	troop	0.009606
258	topic11	kill	0.011323
12	topic11	american	0.011752
63	topic11	force	0.013704
190	topic11	attack	0.014825
188	topic11	military	0.017688
153	topic11	war	0.023933

Topic12

	topic	word	weight
81	topic12	office	0.009014
558	topic12	arrest	0.010463
346	topic12	spokesman	0.010628
88	topic12	charge	0.011753
496	topic12	investigation	0.014252
35	topic12	yesterday	0.014661
22	topic12	report	0.014892
169	topic12	officer	0.017506
4	topic12	official	0.025503
67	topic12	police	0.030278

Topic13

	topic	word	weight
599	topic13	red	0.007045
1044	topic13	cook	0.007200
41	topic13	add	0.007329
741	topic13	eat	0.007589
762	topic13	dinner	0.007766
918	topic13	taste	0.008840
876	topic13	fresh	0.008938
144	topic13	serve	0.010219
466	topic13	restaurant	0.010471
270	topic13	food	0.016670

Topic14

	topic	word	weight
563	topic14	reporter	0.009530
259	topic14	interview	0.009725
22	topic14	report	0.009965
41	topic14	add	0.010116
10	topic14	group	0.010193
198	topic14	meeting	0.011000
532	topic14	newspaper	0.012627
32	topic14	member	0.014299
287	topic14	event	0.015916
145	topic14	news	0.016661

Topic15

	topic	word	weight
408	topic15	investment	0.010644
112	topic15	buy	0.010861
36	topic15	business	0.011608
69	topic15	executive	0.011611
79	topic15	sell	0.011845
235	topic15	bank	0.012953
140	topic15	stock	0.013575
320	topic15	financial	0.014358
113	topic15	share	0.016007
0	topic15	company	0.028196

Topic16

	topic	word	weight
890	topic16	clean	0.004795
436	topic16	land	0.004886
29	topic16	large	0.005182
102	topic16	area	0.005373
23	topic16	place	0.006089
71	topic16	small	0.006608
877	topic16	tree	0.007843
350	topic16	plant	0.010027
355	topic16	mile	0.010051
233	topic16	water	0.016183

Topic17

	topic	word	weight
507	topic17	teacher	0.009833
220	topic17	community	0.010705
282	topic17	class	0.011366
358	topic17	college	0.011406
290	topic17	editor	0.012114
409	topic17	education	0.013141
20	topic17	child	0.013568
13	topic17	program	0.014676
58	topic17	student	0.027111
9	topic17	school	0.035931

Topic18

	topic	word	weight
353	topic18	proposal	0.010636
13	topic18	program	0.010954
91	topic18	cut	0.011720
8	topic18	plan	0.012247
49	topic18	money	0.013397
134	topic18	tax	0.013551
2	topic18	state	0.014310
39	topic18	pay	0.014368
257	topic18	budget	0.014753
182	topic18	bill	0.015610

Topic19

	topic	word	weight
474	topic19	club	0.010108
641	topic19	baseball	0.011377
291	topic19	contract	0.011395
314	topic19	coach	0.014209
527	topic19	sport	0.014950
5	topic19	game	0.019906
53	topic19	season	0.021118
3	topic19	play	0.022463
103	topic19	player	0.026394
28	topic19	team	0.034364

Topic20

	topic	word	weight
328	topic20	product	0.008662
112	topic20	buy	0.009816
403	topic20	customer	0.010079
212	topic20	store	0.010813
86	topic20	cost	0.011912
79	topic20	sell	0.014748
131	topic20	sale	0.016022
36	topic20	business	0.016120
170	topic20	industry	0.018338
0	topic20	company	0.030475

Topic21

	topic	word	weight
35	topic21	yesterday	0.020340
585	topic21	retire	0.023670
69	topic21	executive	0.024244
55	topic21	director	0.024313
324	topic21	son	0.025499
391	topic21	vice	0.026978
433	topic21	graduate	0.028774
218	topic21	father	0.031218
33	topic21	president	0.041771
171	topic21	mrs	0.044109

Topic22

	topic	word	weight
165	topic22	hand	0.007082
371	topic22	sit	0.007312
315	topic22	walk	0.007416
452	topic22	morning	0.007581
6	topic22	man	0.007668
155	topic22	car	0.007927
230	topic22	stop	0.008285
94	topic22	hour	0.009101
65	topic22	night	0.009224
476	topic22	wear	0.010943

Topic23

	topic	word	weight
286	topic23	action	0.007933
126	topic23	court	0.008969
209	topic23	require	0.009080
477	topic23	legal	0.009291
2	topic23	state	0.009967
17	topic23	case	0.010966
27	topic23	issue	0.011005
137	topic23	decision	0.012532
207	topic23	rule	0.016204
48	topic23	law	0.017996

Topic24

	topic	word	weight
535	topic24	network	0.007696
0	topic24	company	0.007819
700	topic24	machine	0.007921
219	topic24	site	0.008215
865	topic24	internet	0.008639
13	topic24	program	0.008775
163	topic24	information	0.009924
74	topic24	system	0.013876
427	topic24	technology	0.014109
265	topic24	computer	0.019136