CS5100 Assignment 1 Report

For task 4 I used 3 different values of eta {0.01, 0.1, 1}. And I found both the test and training MSE at 10 different stopping points. I then extracted these two data frames that I had created as a csv. The results can be seen in *figure 1* and *figure 2*, below.

Figure 1 — Training MSE's

Epochs(Steps)

Eta	1	2	4	10	20	50	100	200	500	1000
0.01	0.210462352634223	0.209359976773842	0.207194851485687	0.20100471771476	0.191629806121878	0.169291688054224	0.145157648547106	0.120833793169624	0.098013436757699	0.085850638103364
0.1	0.200724235879569	0.191147643795346	0.17517820472429	0.144333312997813	0.120244598026248	0.097791869749957	0.085740496362931	0.075478865109768	0.065853244666973	0.061702960562214
1	0.133025190092336	0.11314982018179	0.098974235081474	0.084458777002234	0.074833644519214	0.065669686753128	0.061646103502626	0.059579052426929	0.058785920950408	0.058833709729653

Figure 2 — Test MSE's

Epochs(Steps)

Eta	1	2	4	10	20	50	100	200	500	1000
0.01	0.204893131873895	0.203736404119375	0.201465942494881	0.194985837503376	0.18520791744962	0.162134324613964	0.137685994638 65	0.113790033326875	0.092861516445395	0.083152899918192
0.1	0.19470067055199	0.184720218851743	0.168199785216535	0.136881097846852	0.113225565654912	0.092659106994473	0.083064660076702	0.075691039928235	0.069218092262746	0.066910488029208
1	0.125990566551676	0.106478281647006	0.093476341640575	0.08202474649687	0.075188465854988	0.069050637809078	0.066860621880471	0.06622520143546	0.066576133485985	0.067000572329656

In task 6 I ran my gradient descent logistic regression with 100 different initial beta's. I stopped the gradient descent at 50 steps, as this had proven to be a reasonable stopping point in previous implementations of the algorithm. I then made a boxplot out of these 100 MSE's that can be seen in *figure 3*.

Figure 3