Exercise 0: Explain your system:

Hardware and Software	**Specification**
Processor	Intel®core™ i3-5005U CPU @2.00GHz
Number of cores	2
Logical processors	4
RAM	4.00 GB
OS	Windows 10
Python	3.6

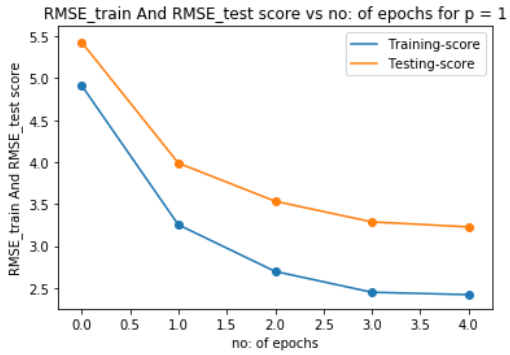
Exercise 2: Performance and convergence of PSGD (10 points)

a) No of epochs vs RMSE train and RMSE test score for different workers
b) Execution time for each epoch vs training score/ Testing score for different workers.

Dataset 1 Results:

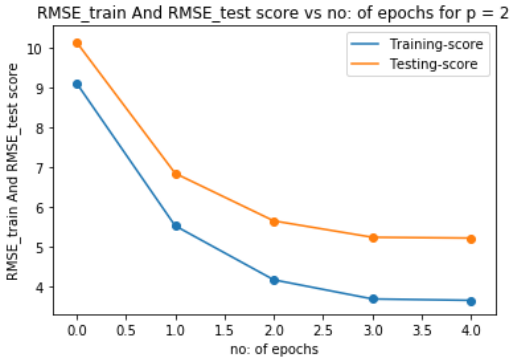
P=1 for Dataset1:

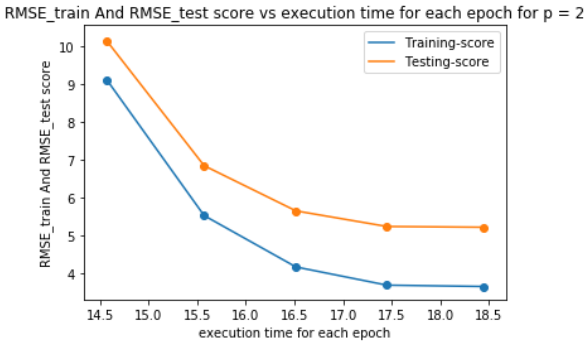
Serial Process Execution(Ts): In (sec)	Total parallel execution time(Tp)in (sec)	Total No: epochs	Training Converged at:	Testing converged at	Initial RMSE train value	Converged RMSE value	Initial RMSE test value	Converged RMSE value
20.066	20.066	100	5	5	4.915	2.421	5.430	3.229



P=2 for Dataset1:

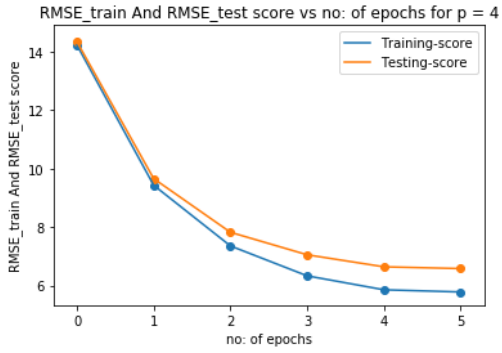
Serial Process Execution(Ts): In (sec)	Total parallel execution time(Tp) in (sec)	Total No: epochs	Training Converged at:	Testing converged at	Initial RMSE train value	Converged RMSE value	Initial RMSE test value	Converged RMSE value
20.066	17.643	20	5	5	9.103	3.639	10.13	5.204





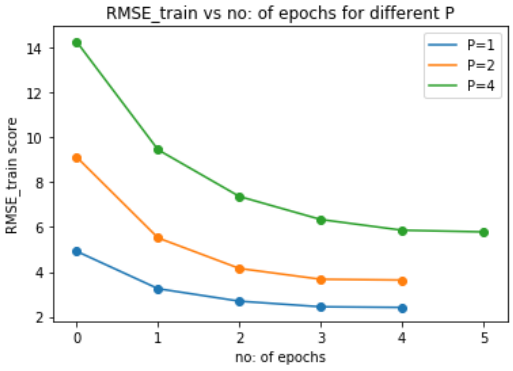
P=4 for Dataset1:

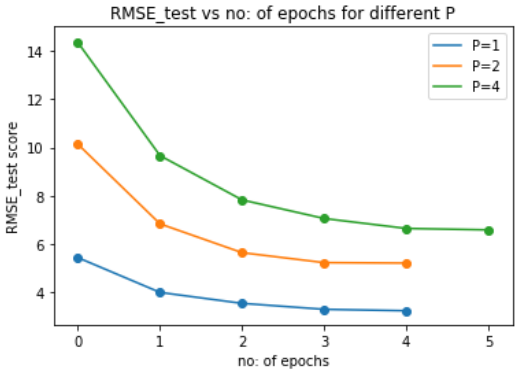
Serial Process Execution(Ts): In (sec)	Total parallel execution time(Tp) in (sec)	Total No: epochs	Training Converged at:	Testing converged	Initial RMSE train value	Converged RMSE value	Initial RMSE test value	Converged RMSE value
20.066	18.721	20	6	6	14.23	5.781	14.35	6.582



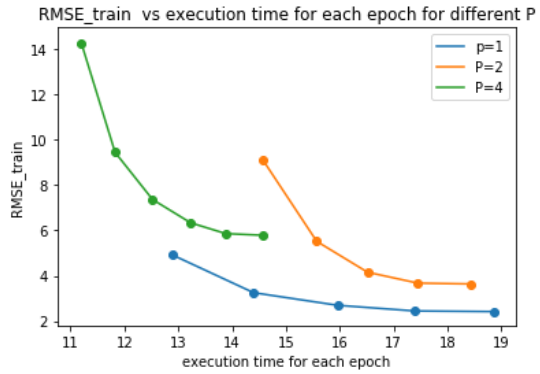
Performance comparison among workers:

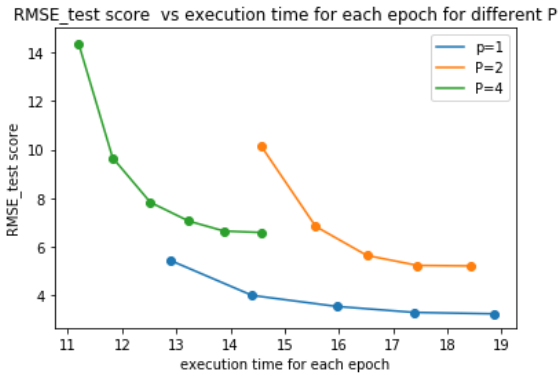
a)No:of epochs vs training and testing error among different workers for dataset1





b) Execution time in each epoch vs rmse train and rmse test among different workers for dataset 1





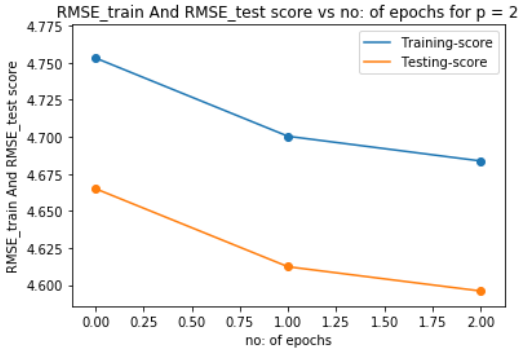
Second Dataset Results

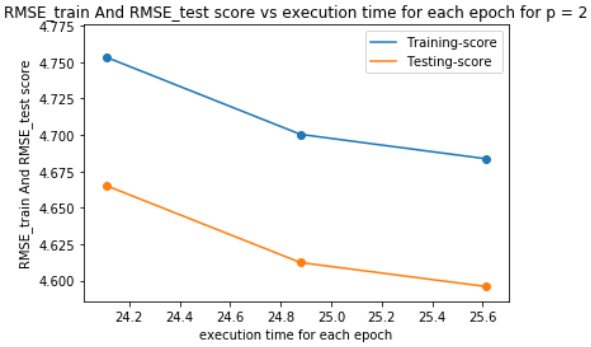
P=1 for Dataset2:

Serial Process Execution(Ts): In (sec)	Total parallel execution time(Tp)in (sec)	Total No: epochs	Training Converged at:	Testing converged	Initial RMSE train value	Converged RMSE value	Initial RMSE test value	Converged RMSE value
35.904	35.904	20	5	5	4.687	4.458	4.866	4.650

P=2 for Dataset2:

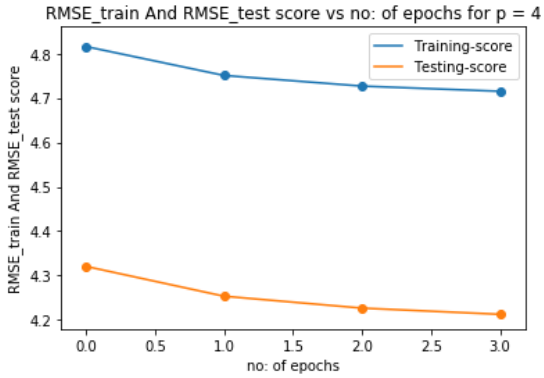
Serial Process Execution(Ts): In (sec)	Total parallel execution time(Tp)in (sec)	Total No: epochs	Training Converged at:	Testing converged	Initial RMSE train value	Converged RMSE value	Initial RMSE test value	Converged RMSE value
35.904	30.355	20	3	3	4.753	4.683	4.665	4.596

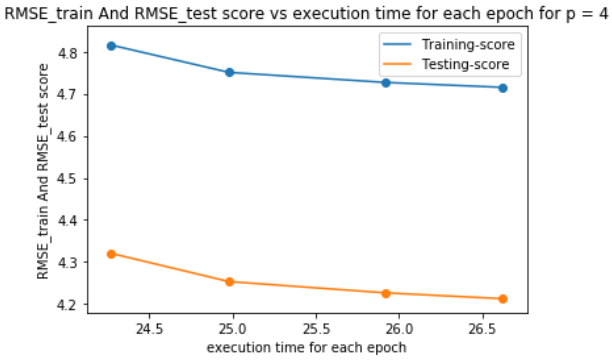




P=4 for Dataset2:

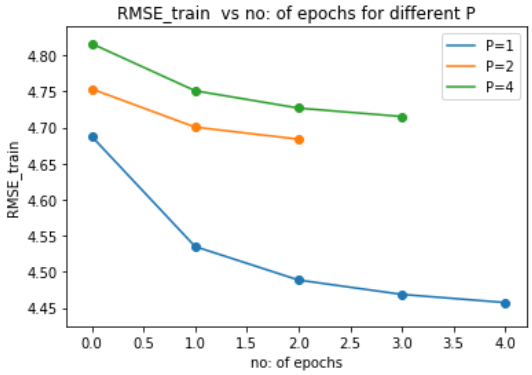
Serial Process Execution(Ts): In (sec)	Total parallel execution time(Tp)in (sec)	Total No: epochs	Training Converged at:	Testing converged	Initial RMSE train value	Converged RMSE value	Initial RMSE test value	Converged RMSE value
35.904	27.015	20	4	4	4.816	4.715	4.321	4.213

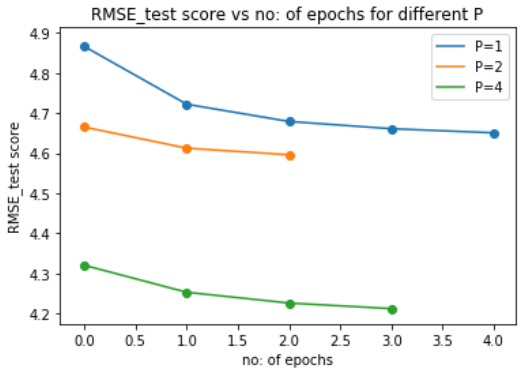




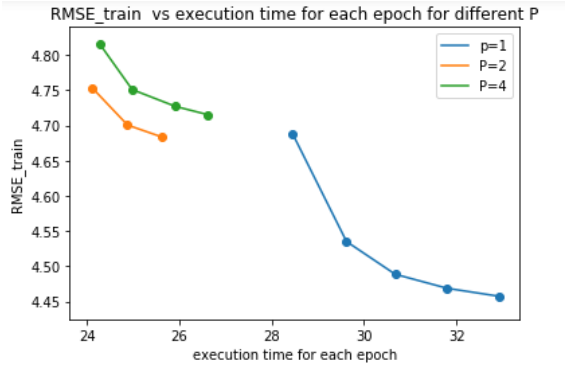
Performance comparison among workers:

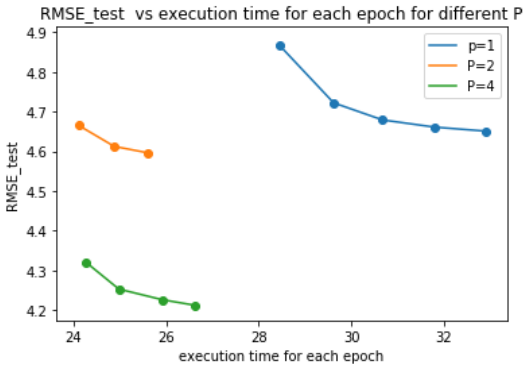
a)No:of epochs vs training and testing error among different workers for dataset2





b) Execution time in each epoch vs rmse train and rmse test among different workers for dataset 2





MY RMSE Train and Test scores will always depend on my learning rate. To show convergence in my graph I have shown my RMSE values to be big. If I change alpha values my RMSE scores for first data set will be 0.6 and would converge in the second iteration.