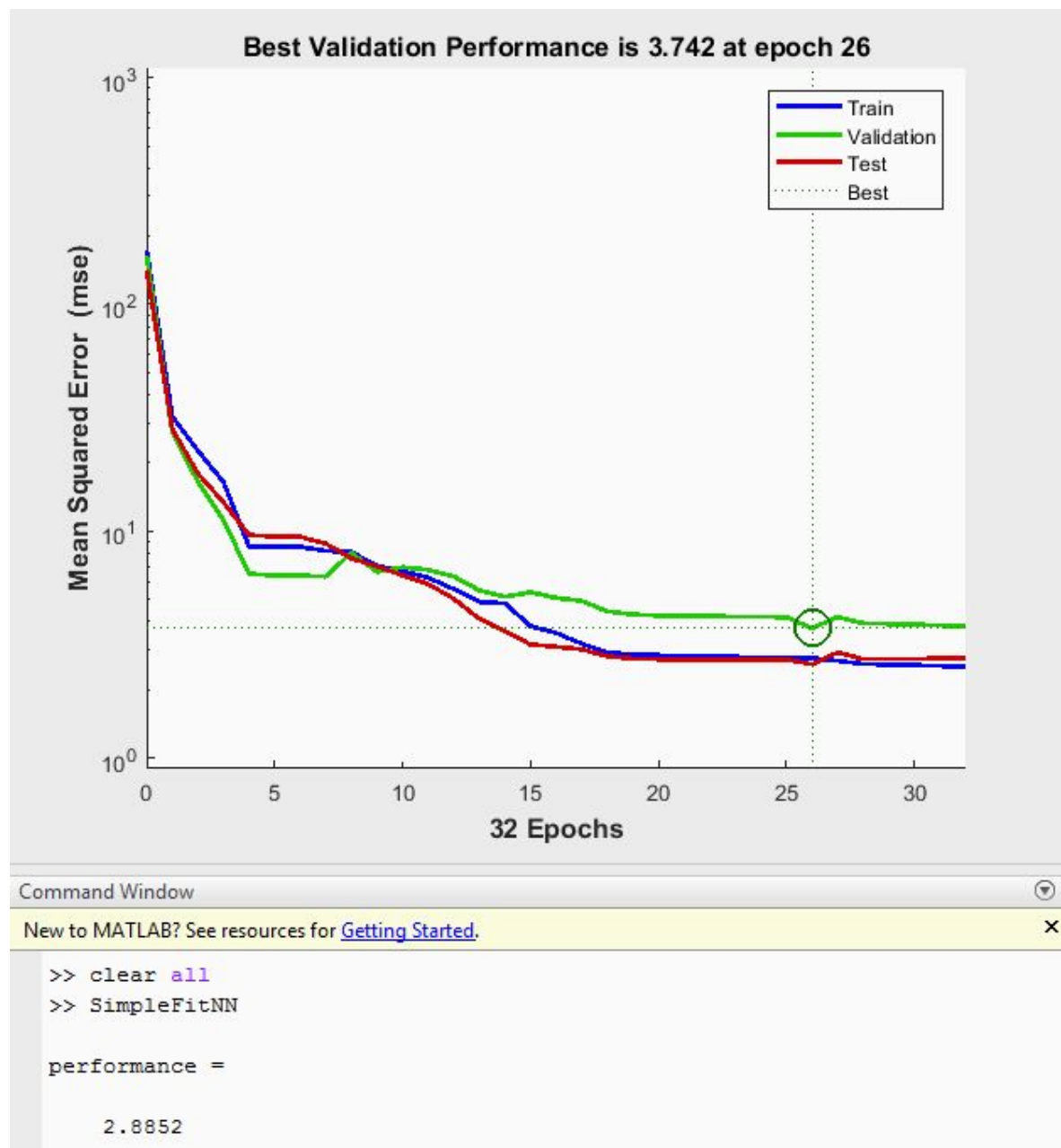


James Chhun
T/TH 530-645pm

Homework 5

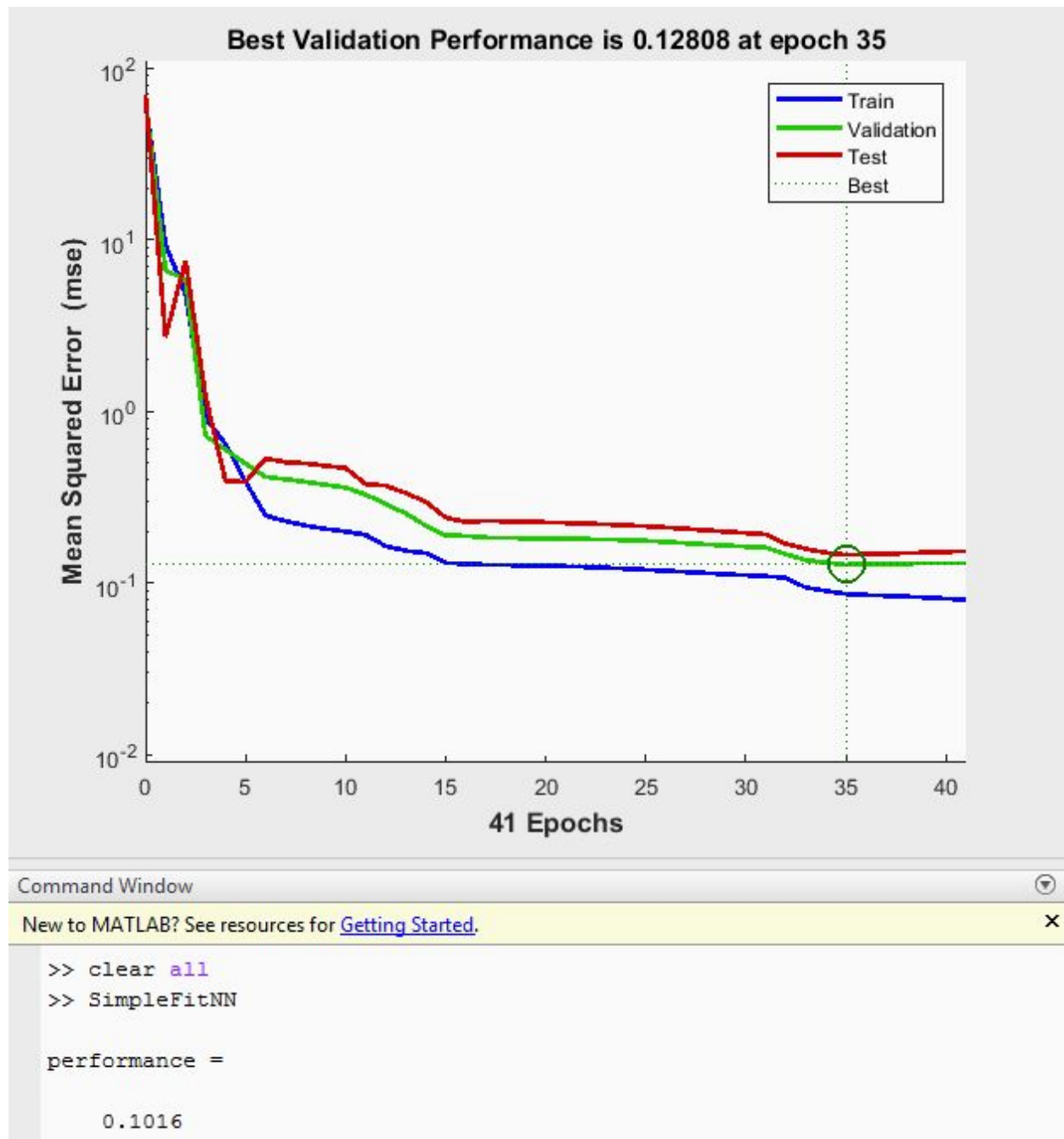
Problem 1

B.



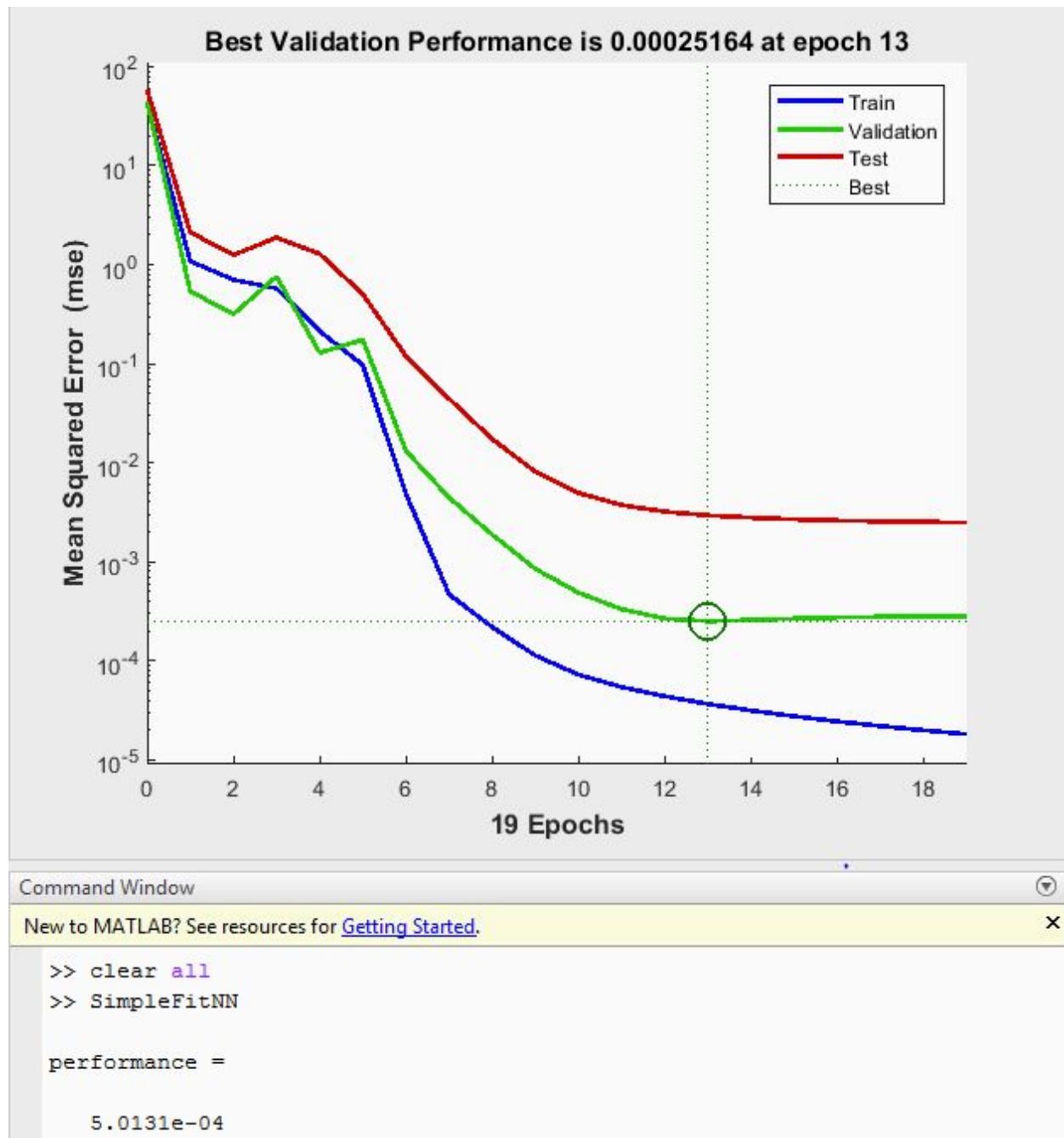
- The resulting performance is performance = **2.8852**

C.



The resulting performance is **0.1016**

D.



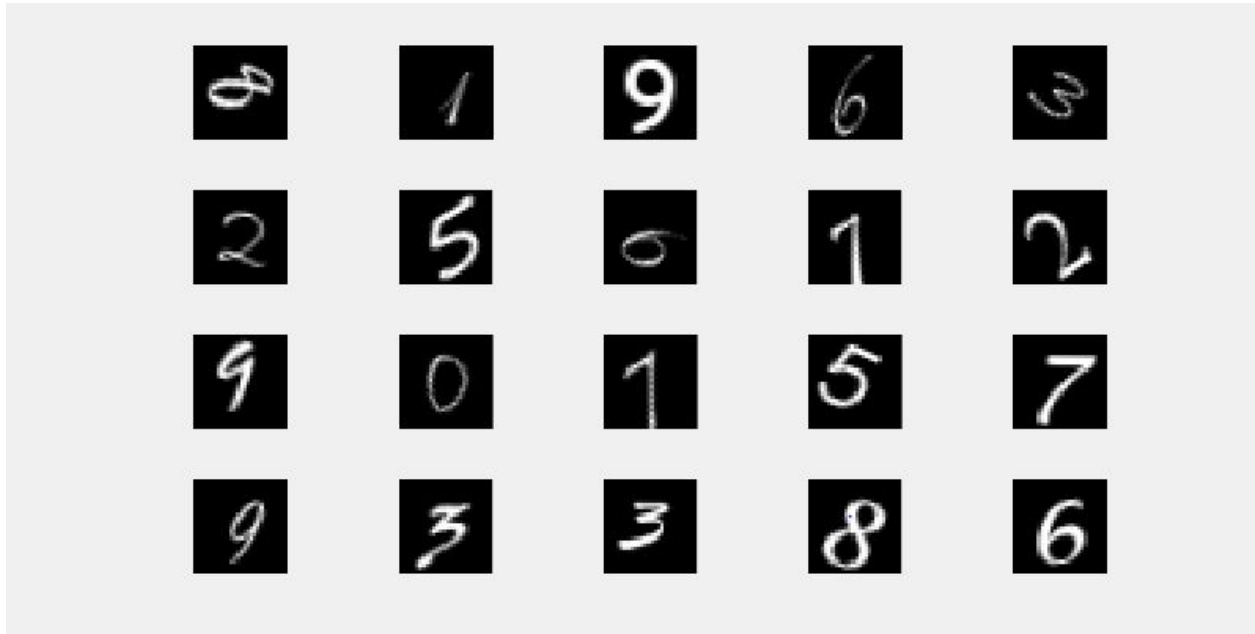
The resulting performance is **5.0131e⁻⁰⁴**

E.

- The percentage of examples for the training set, validation set and testing set are as follows, **70%, 15%, and 10% respectively.**

Problem 2

A.



- The features look different in terms of thickness, some are blurred, and some are rotated/thin.
- Initial Data with base learning rate of **.0001**

C.

- After changing learning rate to **.01**

Training on single CPU.
 Initializing image normalization.

Epoch	Iteration	Time Elapsed (seconds)	Mini-batch Loss	Mini-batch Accuracy	Base Learning Rate
1	1	0.40	2.6103	8.59%	0.0100
1	50	14.24	NaN	14.84%	0.0100
2	100	32.52	NaN	9.38%	0.0100
3	150	48.34	NaN	10.94%	0.0100
4	200	66.04	NaN	10.94%	0.0100
5	250	80.58	NaN	6.25%	0.0100
6	300	101.83	NaN	9.38%	0.0100
7	350	120.91	NaN	5.47%	0.0100
7	400	137.50	NaN	12.50%	0.0100
8	450	153.58	NaN	6.25%	0.0100
9	500	169.89	NaN	3.91%	0.0100
10	550	183.50	NaN	10.94%	0.0100
11	600	203.61	NaN	8.59%	0.0100
12	650	218.29	NaN	7.81%	0.0100
13	700	235.24	NaN	11.72%	0.0100
13	750	251.45	NaN	9.38%	0.0100
14	800	265.14	NaN	14.06%	0.0100
15	850	278.40	NaN	12.50%	0.0100
15	870	284.44	NaN	10.94%	0.0100

accuracy =

0

D.

- Learning rate **.0010**

Epoch	Iteration	Time Elapsed (seconds)	Mini-batch Loss	Mini-batch Accuracy	Base Learning Rate
1	1	0.40	2.6103	8.59%	0.0010
1	50	20.13	0.5255	83.59%	0.0010
2	100	36.15	0.2924	90.63%	0.0010
3	150	58.25	0.4873	81.25%	0.0010
4	200	76.78	0.3694	83.59%	0.0010
5	250	90.17	0.0842	97.66%	0.0010
6	300	105.16	0.2003	95.31%	0.0010
7	350	125.82	0.0606	96.88%	0.0010
7	400	142.33	0.0941	97.66%	0.0010
8	450	161.62	0.0448	99.22%	0.0010
9	500	182.59	0.0329	98.44%	0.0010
10	550	201.05	0.0012	100.00%	0.0010
11	600	218.18	0.0074	100.00%	0.0010
12	650	239.35	0.0058	100.00%	0.0010
13	700	253.91	0.0140	99.22%	0.0010
13	750	270.45	0.0601	99.22%	0.0010
14	800	285.72	0.0006	100.00%	0.0010
15	850	306.55	0.0006	100.00%	0.0010
15	870	313.99	0.0259	99.22%	0.0010

accuracy =

0.9908