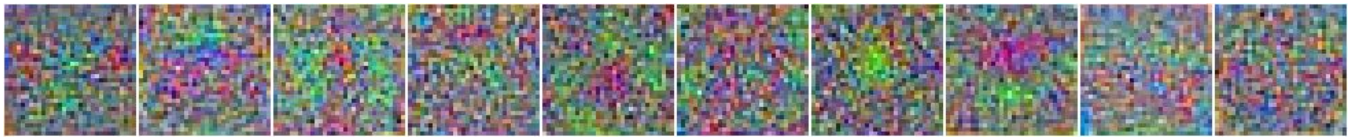
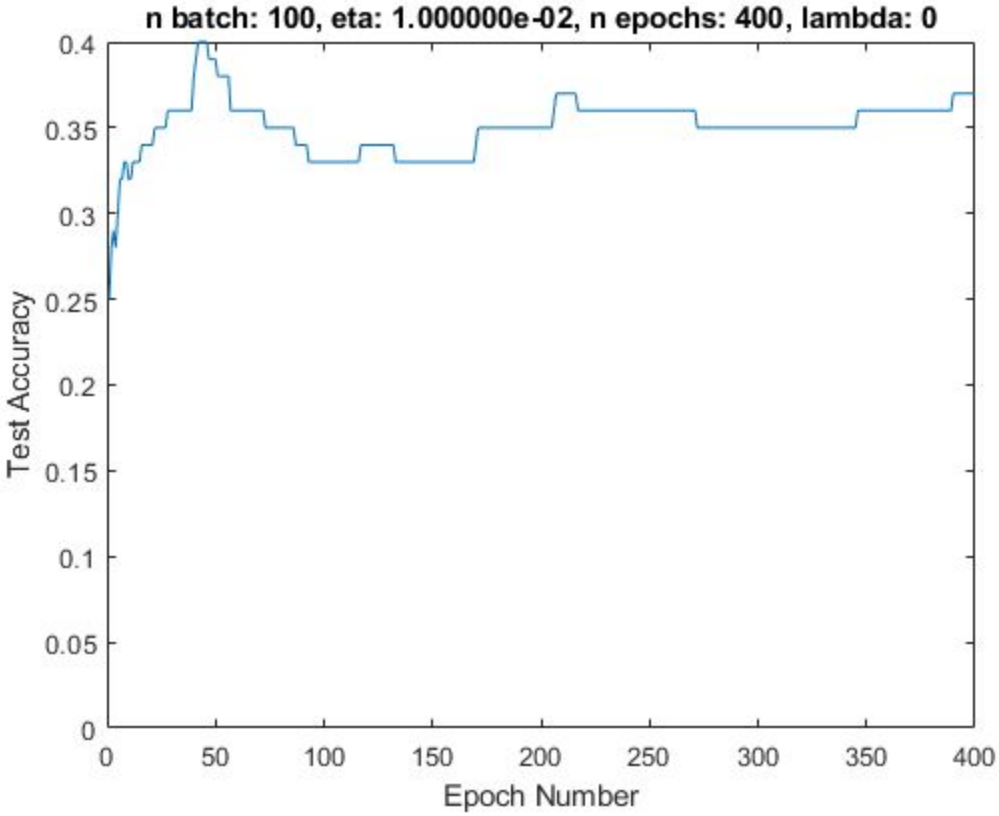
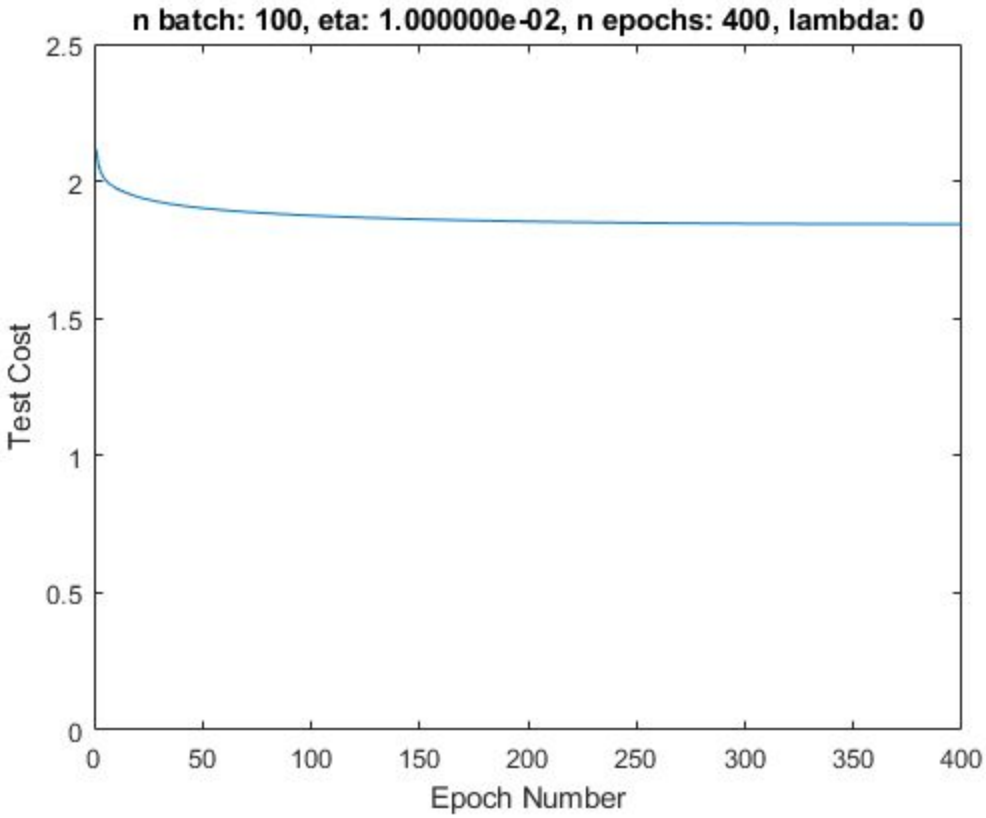
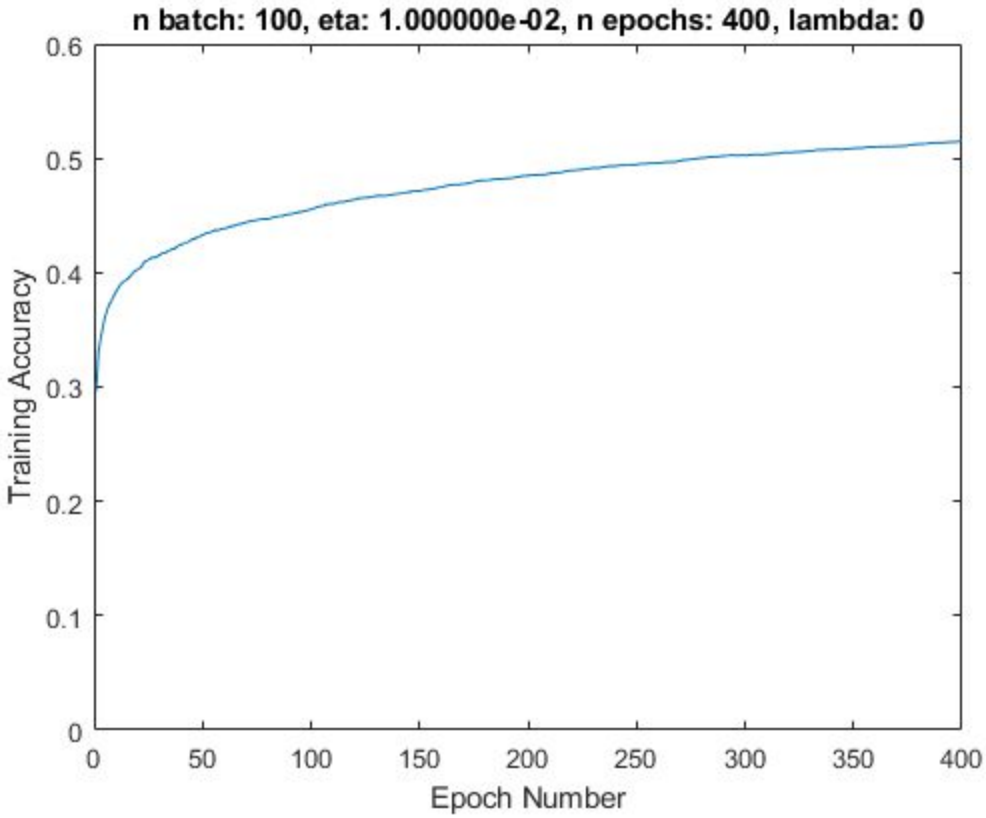
Exercise 2

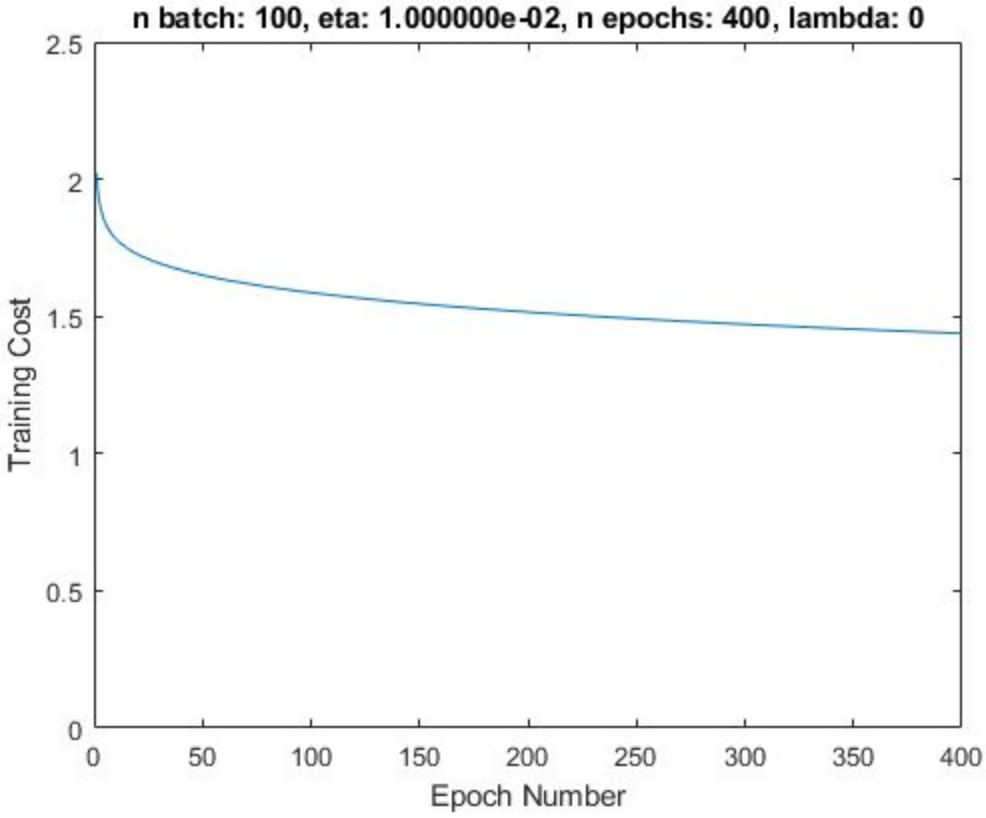
In exercise 1, without any optimizations the best accuracy 0.36. For exercise 2, I first ran the trainer with eta decaying by a factor of 0.9 for 40 epochs, which yielded a test accuracy of 0.3750. I then ran the trainer with each data set, which gave a 0.4070 accuracy. I then ran the data for 400 epochs, keeping track of the most accurate weights and using them to calculate the final accuracy. The final accuracy was 0.3950. The graphs for this 400 epoch run are below, followed by graphs for a 1000 epoch run. The 1000 epoch run has eta decay of 0.99, and the best run was chosen to calculate accuracy. Its accuracy was 0.4010. I then trained on all 5 data sets, used an eta decay rate of 0.99, and trained for 200 epochs, keeping track of the best weights. This yielded an accuracy of 0.4210. The best accuracy was obtained by the last model, which yielded an accuracy of **42.1%.**

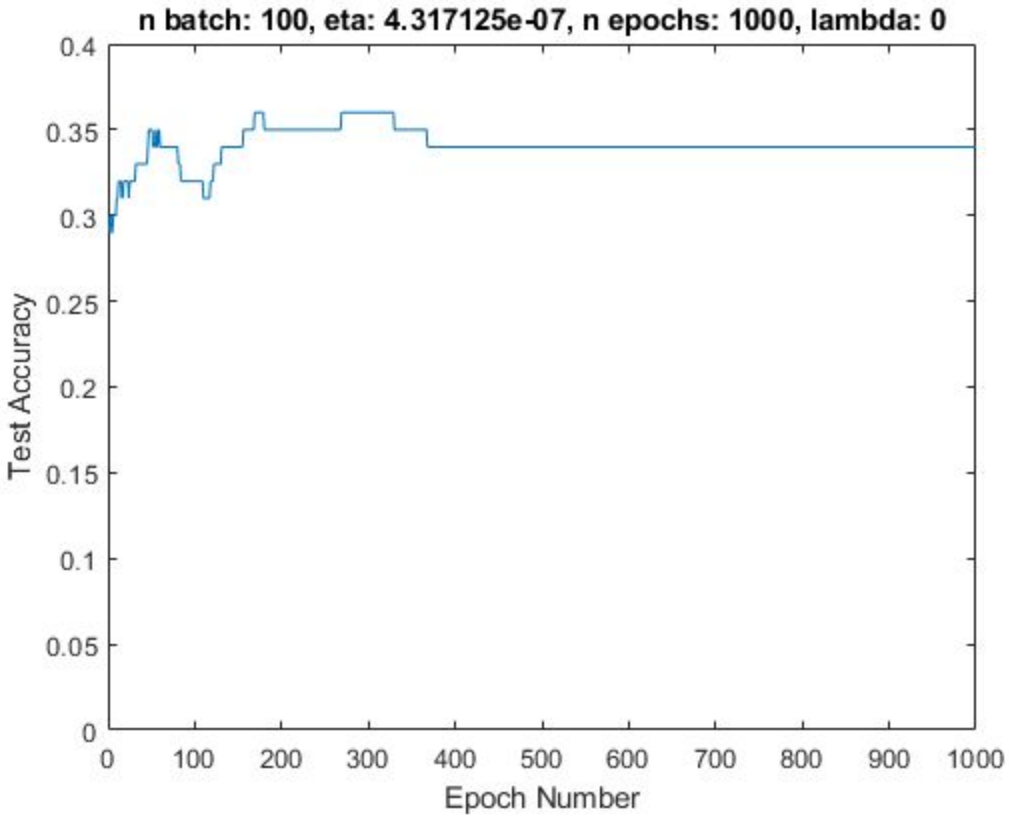


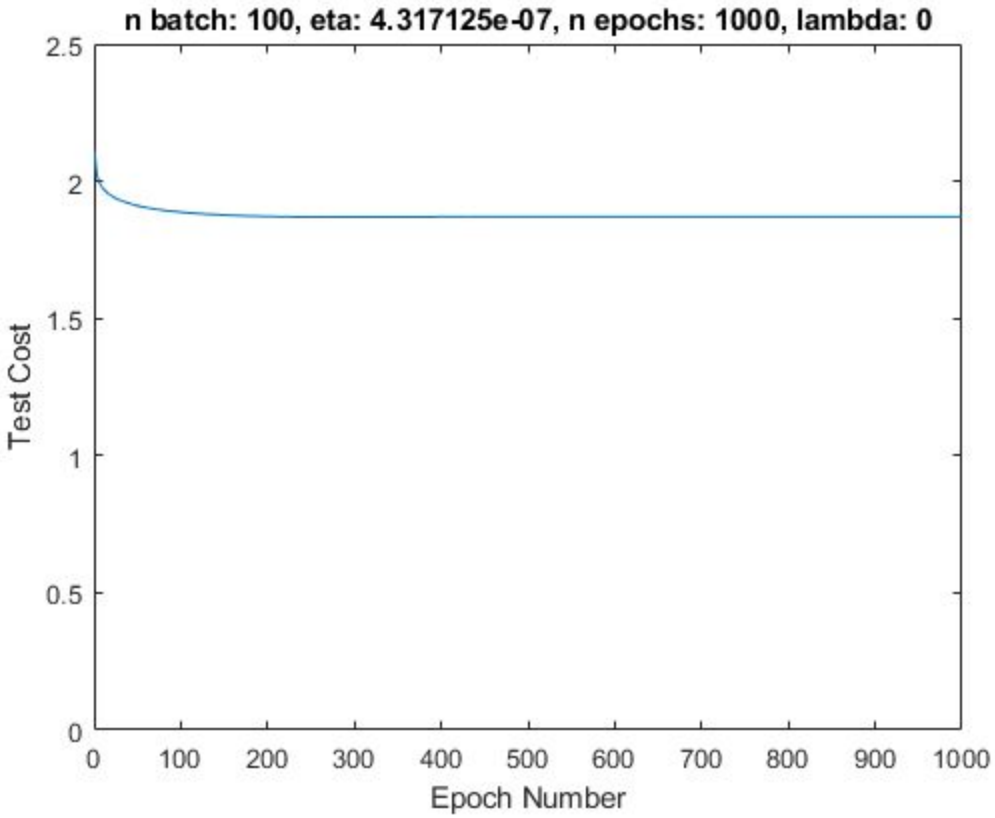


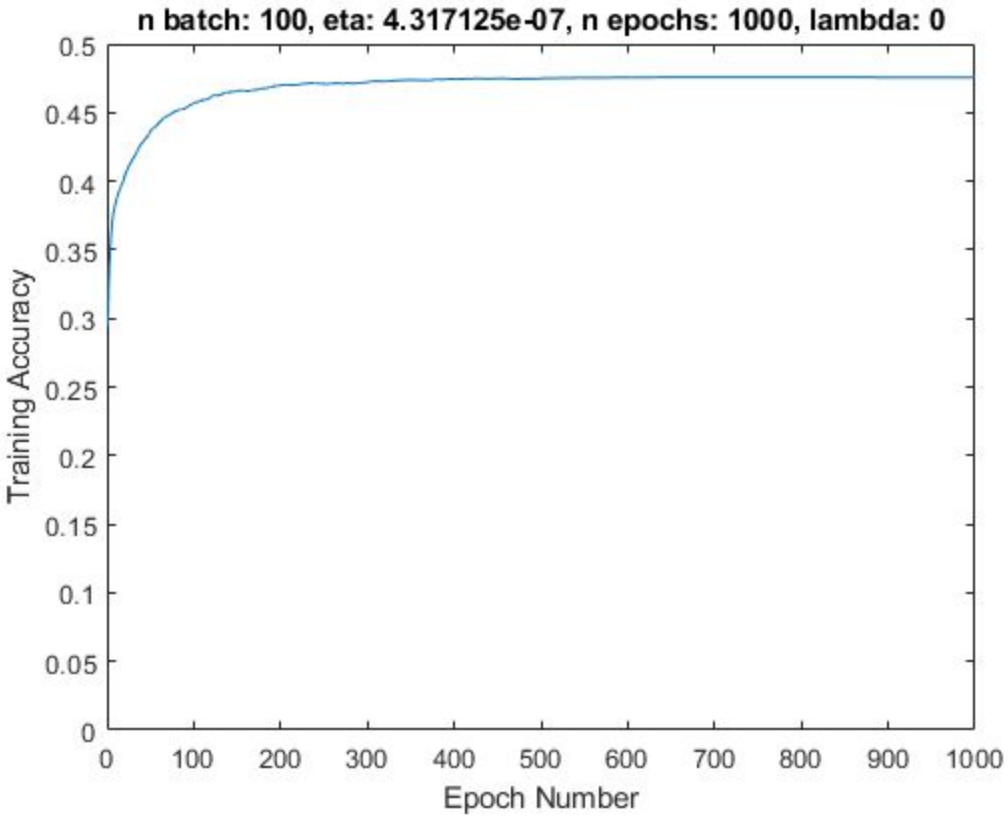

n batch: 100, eta: 1.000000e-02, n epochs: 400, lambda: 0
Test Cost
Epoch Number
2.5
2
1.5
1
0.5
0
0
50
100
150
200
250
300
350
400

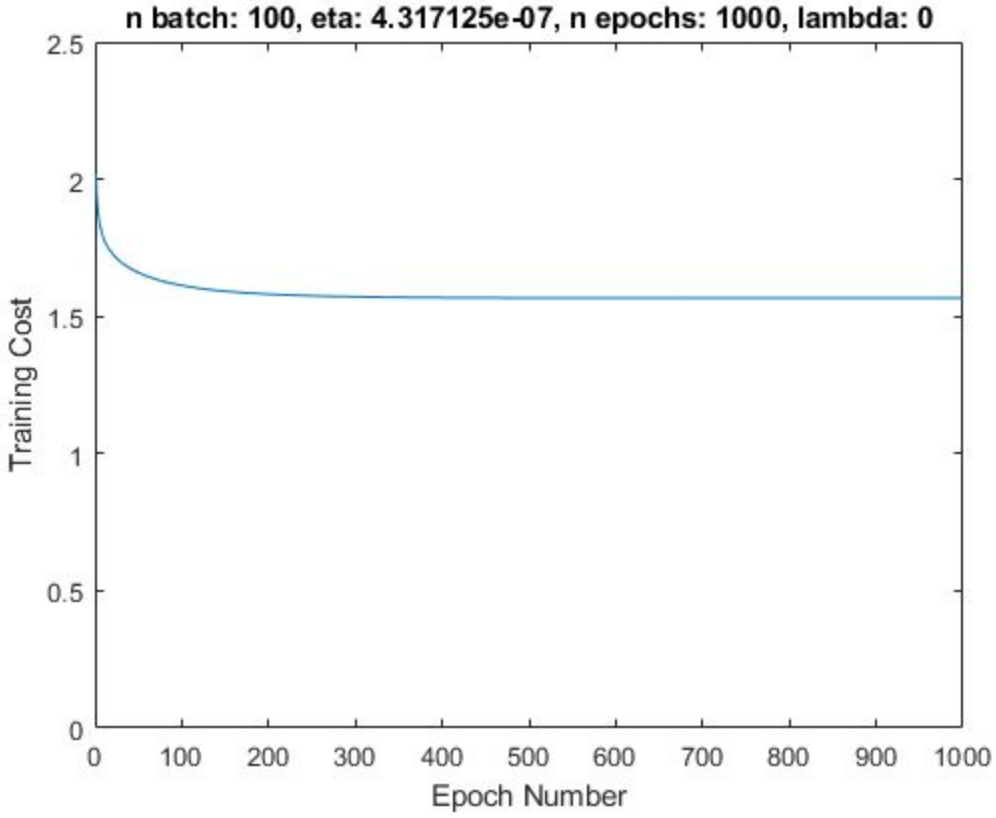

n batch: 100, eta: 1.000000e-02, n epochs: 400, lambda: 0
Training Accuracy
Epoch Number
0
0.1
0.2
0.3
0.4
0.5
0.6
0
50
100
150
200
250
300
350
400


n batch: 100, eta: 1.000000e-02, n epochs: 400, lambda: 0
Training Cost
Epoch Number
0
0.5
1
1.5
2
2.5
0
50
100
150
200
250
300
350
400


n batch: 100, eta: 4.317125e-07, n epochs: 1000, lambda: 0
Test Accuracy
Epoch Number
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0
100
200
300
400
500
600
700
800
900
1000


n batch: 100, eta: 4.317125e-07, n epochs: 1000, lambda: 0
Test Cost
Epoch Number
2.5
2
1.5
1
0.5
0
0
100
200
300
400
500
600
700
800
900
1000


n batch: 100, eta: 4.317125e-07, n epochs: 1000, lambda: 0
Training Accuracy
Epoch Number
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0
100
200
300
400
500
600
700
800
900
1000


n batch: 100, eta: 4.317125e-07, n epochs: 1000, lambda: 0
Training Cost
Epoch Number
0
0.5
1
1.5
2
2.5
0
100
200
300
400
500
600
700
800
900
1000