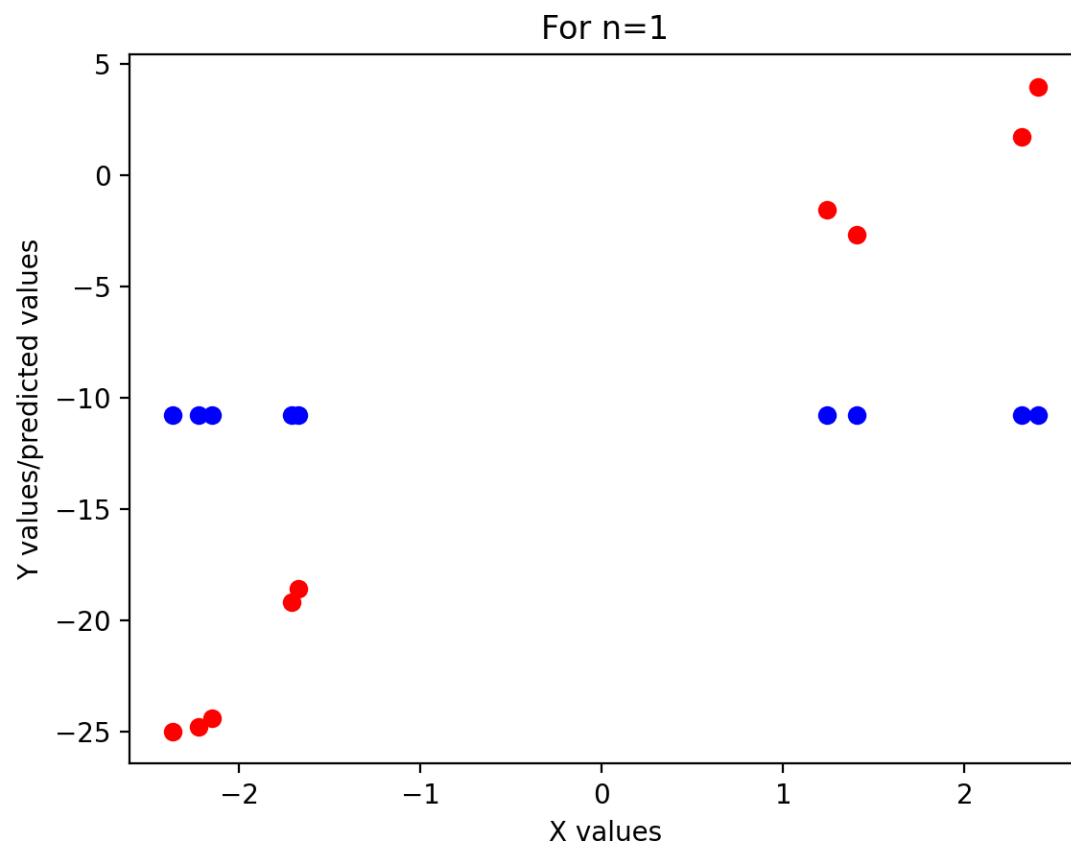
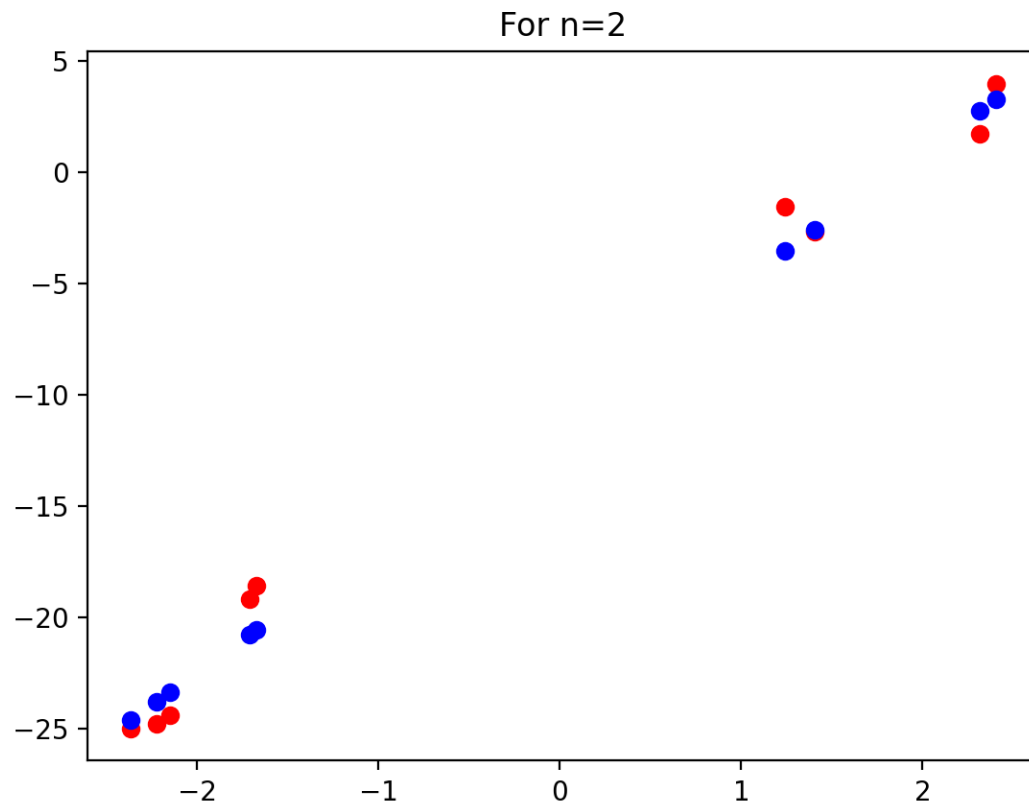
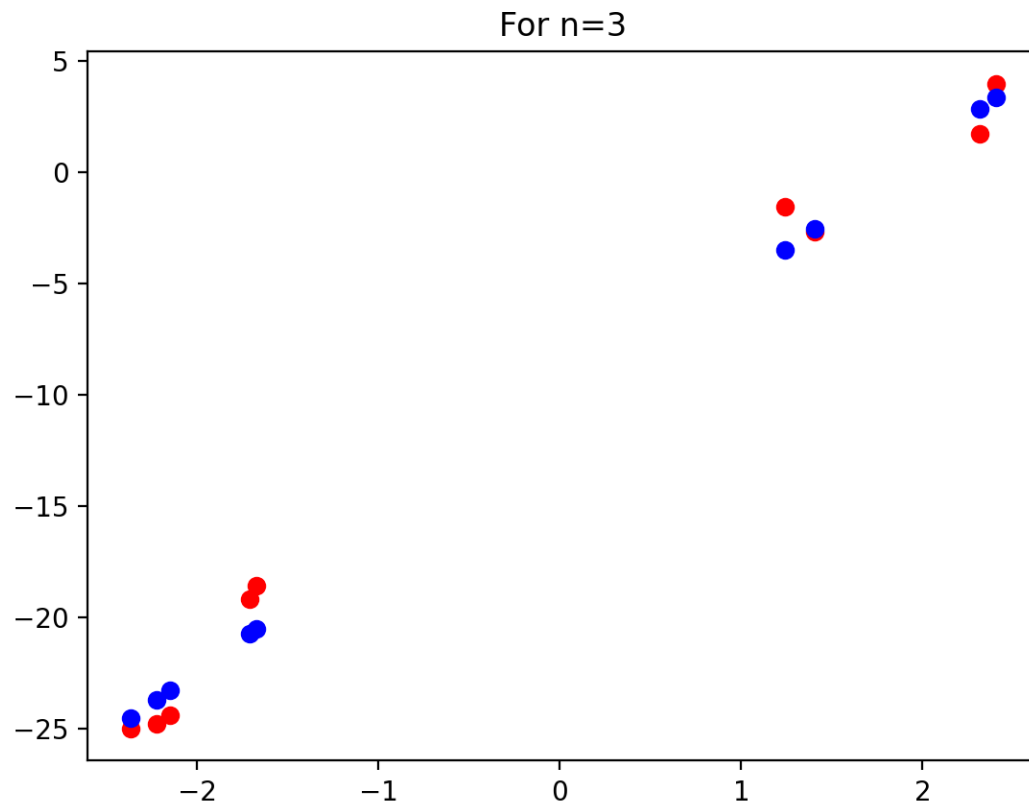


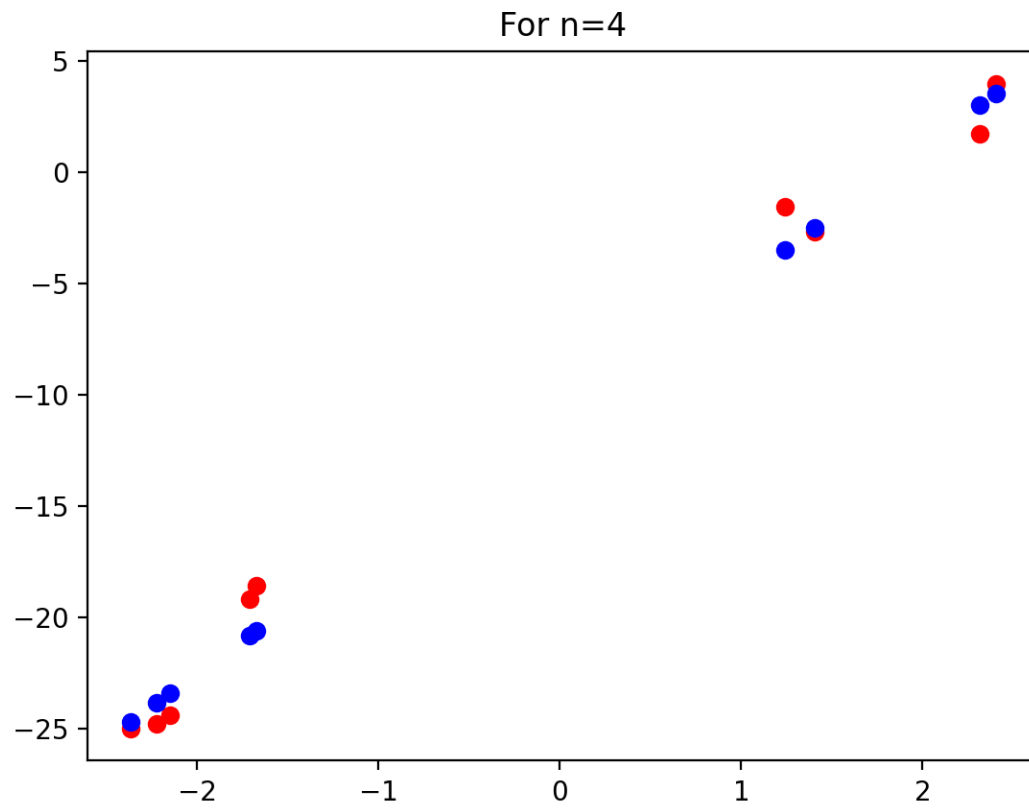
PART A**Output –**

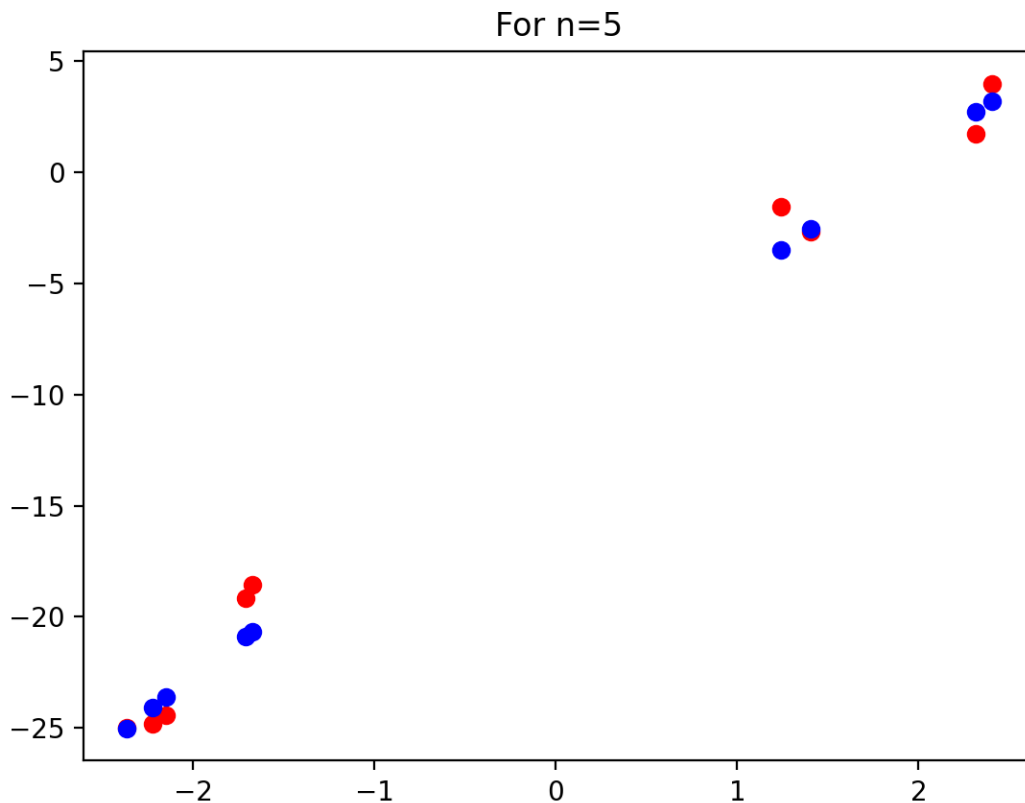
```
→ LogisticRegression git:(main) /usr/local/bin/python3
/Users/praveenakondepudi/Documents/Repos/LogisticRegression/Assignment2-PartA.py
epoch 1: w1 = -0.025, w2 = 0.053, w3 = -0.102, w4 = 0.243, w5 = -0.455
epoch 101: w1 = -4.446, w2 = 4.900, w3 = -1.578, w4 = 0.229, w5 = 0.046
epoch 201: w1 = -6.810, w2 = 5.725, w3 = -0.956, w4 = 0.050, w5 = 0.022
epoch 301: w1 = -8.306, w2 = 5.863, w3 = -0.585, w4 = 0.017, w5 = 0.009
epoch 401: w1 = -9.256, w2 = 5.875, w3 = -0.354, w4 = 0.011, w5 = 0.002
epoch 501: w1 = -9.858, w2 = 5.868, w3 = -0.208, w4 = 0.011, w5 = -0.003
epoch 601: w1 = -10.241, w2 = 5.861, w3 = -0.116, w4 = 0.012, w5 = -0.006
epoch 701: w1 = -10.483, w2 = 5.856, w3 = -0.058, w4 = 0.012, w5 = -0.008
epoch 801: w1 = -10.637, w2 = 5.852, w3 = -0.020, w4 = 0.012, w5 = -0.009
epoch 901: w1 = -10.735, w2 = 5.850, w3 = 0.003, w4 = 0.012, w5 = -0.010
result1 = tensor([-10.7962, -10.7962, -10.7962, -10.7962, -10.7962, -10.7962, -10.7962,
-10.7962, -10.7962], grad_fn=<AddBackward0>)
result2 = tensor([-20.5784, -24.6315, -23.3554, -2.5761, -3.5261, -20.8006, 2.7488,
3.2694, -23.7876], grad_fn=<AddBackward0>)
result3 = tensor([-20.5285, -24.5316, -23.2732, -2.5409, -3.4985, -20.7484, 2.8445,
3.3726, -23.6996], grad_fn=<AddBackward0>)
result4 = tensor([-20.5869, -24.6967, -23.3967, -2.5063, -3.4746, -20.8108, 2.9994,
3.5461, -23.8363], grad_fn=<AddBackward0>)
result5 = tensor([-20.6682, -25.0222, -23.6177, -2.5468, -3.4994, -20.8998, 2.7004,
3.1983, -24.0893], grad_fn=<AddBackward0>)
```











PART B

Steps

- 1) Loading and Normalizing MNIST dataset
- 2) Define a Convolutional Neural Network - Logistic Regression
- 3) Define a Loss function and optimizer
- 4) Train the CNN
- 5) Save the trained model
- 6) Now test the trained model with test data

Output –

Total testset images: 1902 correctly identified images: 1819 Error: 4.363827549947423%

Accuracy: 92%

→ LogisticRegression git:(main) X /usr/local/bin/python3
/Users/praveenakondepudi/Documents/Repos/LogisticRegression/MNIST_LogisticRegression_p
torch_PARTB.py

epoch:1, iteration: 1 training average running loss: 0.295
epoch:1, iteration: 11 training average running loss: 1.173
epoch:1, iteration: 21 training average running loss: 0.446
epoch:1, iteration: 31 training average running loss: 0.346
epoch:1, iteration: 41 training average running loss: 0.271
epoch:1, iteration: 51 training average running loss: 0.262
epoch:1, iteration: 61 training average running loss: 0.253
epoch:1, iteration: 71 training average running loss: 0.213
epoch:1, iteration: 81 training average running loss: 0.224
epoch:1, iteration: 91 training average running loss: 0.198
epoch:1, iteration: 101 training average running loss: 0.207
epoch:1, iteration: 111 training average running loss: 0.206
epoch:2, iteration: 1 training average running loss: 0.028
epoch:2, iteration: 11 training average running loss: 0.195
epoch:2, iteration: 21 training average running loss: 0.193
epoch:2, iteration: 31 training average running loss: 0.171
epoch:2, iteration: 41 training average running loss: 0.180
epoch:2, iteration: 51 training average running loss: 0.173
epoch:2, iteration: 61 training average running loss: 0.161
epoch:2, iteration: 71 training average running loss: 0.175
epoch:2, iteration: 81 training average running loss: 0.180
epoch:2, iteration: 91 training average running loss: 0.166
epoch:2, iteration: 101 training average running loss: 0.164
epoch:2, iteration: 111 training average running loss: 0.169
epoch:3, iteration: 1 training average running loss: 0.019
epoch:3, iteration: 11 training average running loss: 0.188
epoch:3, iteration: 21 training average running loss: 0.144
epoch:3, iteration: 31 training average running loss: 0.147
epoch:3, iteration: 41 training average running loss: 0.143
epoch:3, iteration: 51 training average running loss: 0.158
epoch:3, iteration: 61 training average running loss: 0.155
epoch:3, iteration: 71 training average running loss: 0.150
epoch:3, iteration: 81 training average running loss: 0.155
epoch:3, iteration: 91 training average running loss: 0.168
epoch:3, iteration: 101 training average running loss: 0.148
epoch:3, iteration: 111 training average running loss: 0.147
epoch:4, iteration: 1 training average running loss: 0.016
epoch:4, iteration: 11 training average running loss: 0.151
epoch:4, iteration: 21 training average running loss: 0.159
epoch:4, iteration: 31 training average running loss: 0.150

epoch:4, iteration: 41 training average running loss: 0.156
epoch:4, iteration: 51 training average running loss: 0.135
epoch:4, iteration: 61 training average running loss: 0.135
epoch:4, iteration: 71 training average running loss: 0.146
epoch:4, iteration: 81 training average running loss: 0.128
epoch:4, iteration: 91 training average running loss: 0.161
epoch:4, iteration: 101 training average running loss: 0.136
epoch:4, iteration: 111 training average running loss: 0.153
epoch:5, iteration: 1 training average running loss: 0.016
epoch:5, iteration: 11 training average running loss: 0.162
epoch:5, iteration: 21 training average running loss: 0.154
epoch:5, iteration: 31 training average running loss: 0.134
epoch:5, iteration: 41 training average running loss: 0.144
epoch:5, iteration: 51 training average running loss: 0.125
epoch:5, iteration: 61 training average running loss: 0.122
epoch:5, iteration: 71 training average running loss: 0.145
epoch:5, iteration: 81 training average running loss: 0.135
epoch:5, iteration: 91 training average running loss: 0.128
epoch:5, iteration: 101 training average running loss: 0.137
epoch:5, iteration: 111 training average running loss: 0.137
epoch:6, iteration: 1 training average running loss: 0.015
epoch:6, iteration: 11 training average running loss: 0.124
epoch:6, iteration: 21 training average running loss: 0.129
epoch:6, iteration: 31 training average running loss: 0.136
epoch:6, iteration: 41 training average running loss: 0.131
epoch:6, iteration: 51 training average running loss: 0.123
epoch:6, iteration: 61 training average running loss: 0.127
epoch:6, iteration: 71 training average running loss: 0.134
epoch:6, iteration: 81 training average running loss: 0.166
epoch:6, iteration: 91 training average running loss: 0.138
epoch:6, iteration: 101 training average running loss: 0.145
epoch:6, iteration: 111 training average running loss: 0.118
epoch:7, iteration: 1 training average running loss: 0.008
epoch:7, iteration: 11 training average running loss: 0.132
epoch:7, iteration: 21 training average running loss: 0.119
epoch:7, iteration: 31 training average running loss: 0.119
epoch:7, iteration: 41 training average running loss: 0.125
epoch:7, iteration: 51 training average running loss: 0.129
epoch:7, iteration: 61 training average running loss: 0.130
epoch:7, iteration: 71 training average running loss: 0.127
epoch:7, iteration: 81 training average running loss: 0.139
epoch:7, iteration: 91 training average running loss: 0.127
epoch:7, iteration: 101 training average running loss: 0.133
epoch:7, iteration: 111 training average running loss: 0.138

epoch:8, iteration: 1 training average running loss: 0.017
epoch:8, iteration: 11 training average running loss: 0.125
epoch:8, iteration: 21 training average running loss: 0.133
epoch:8, iteration: 31 training average running loss: 0.131
epoch:8, iteration: 41 training average running loss: 0.126
epoch:8, iteration: 51 training average running loss: 0.140
epoch:8, iteration: 61 training average running loss: 0.140
epoch:8, iteration: 71 training average running loss: 0.132
epoch:8, iteration: 81 training average running loss: 0.097
epoch:8, iteration: 91 training average running loss: 0.119
epoch:8, iteration: 101 training average running loss: 0.139
epoch:8, iteration: 111 training average running loss: 0.118
epoch:9, iteration: 1 training average running loss: 0.009
epoch:9, iteration: 11 training average running loss: 0.135
epoch:9, iteration: 21 training average running loss: 0.116
epoch:9, iteration: 31 training average running loss: 0.129
epoch:9, iteration: 41 training average running loss: 0.123
epoch:9, iteration: 51 training average running loss: 0.128
epoch:9, iteration: 61 training average running loss: 0.132
epoch:9, iteration: 71 training average running loss: 0.107
epoch:9, iteration: 81 training average running loss: 0.123
epoch:9, iteration: 91 training average running loss: 0.130
epoch:9, iteration: 101 training average running loss: 0.133
epoch:9, iteration: 111 training average running loss: 0.112
epoch:10, iteration: 1 training average running loss: 0.008
epoch:10, iteration: 11 training average running loss: 0.128
epoch:10, iteration: 21 training average running loss: 0.117
epoch:10, iteration: 31 training average running loss: 0.121
epoch:10, iteration: 41 training average running loss: 0.126
epoch:10, iteration: 51 training average running loss: 0.117
epoch:10, iteration: 61 training average running loss: 0.128
epoch:10, iteration: 71 training average running loss: 0.140
epoch:10, iteration: 81 training average running loss: 0.126
epoch:10, iteration: 91 training average running loss: 0.106
epoch:10, iteration: 101 training average running loss: 0.102
epoch:10, iteration: 111 training average running loss: 0.138

Finished Training

Training Plotting Done!

iteration: 1 testdata average running loss: 0.017

iteration: 11 testdata average running loss: 0.174

Total testset images: 1902 correctly identified images: 1819 Error: 4.363827549947423%

Accuracy: 92%

Plotting Done!

