

HW 3

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See `fc.py` in the `.zip` file.

I used a learning rate of 0.3, a batch size of 128, a test batch size of 10,000, and 10 epochs. I used an SGD optimizer, all Linear hidden layers, and Cross Entropy Loss training function. My final test accuracy was 96%.

```
-batch-size=128 --test-batch-size=10000 --lr=0.3 --epochs=10
Train Epoch: 1 [0/60000 (0%)]    Loss: 2.303245
Train Epoch: 1 [1280/60000 (2%)]    Loss: 2.293573
Train Epoch: 1 [2560/60000 (4%)]    Loss: 2.277858
Train Epoch: 1 [3840/60000 (6%)]    Loss: 2.229024
Train Epoch: 1 [5120/60000 (9%)]    Loss: 2.124072
Train Epoch: 1 [6400/60000 (11%)]   Loss: 1.955669
Train Epoch: 1 [7680/60000 (13%)]   Loss: 1.841936
Train Epoch: 1 [8960/60000 (15%)]   Loss: 1.810192
Train Epoch: 1 [10240/60000 (17%)]  Loss: 1.841741
Train Epoch: 1 [11520/60000 (19%)]  Loss: 1.732630
Train Epoch: 1 [12800/60000 (21%)]  Loss: 1.704969
Train Epoch: 1 [14080/60000 (23%)]  Loss: 1.740352
Train Epoch: 1 [15360/60000 (26%)]  Loss: 1.721207
Train Epoch: 1 [16640/60000 (28%)]  Loss: 1.811379
Train Epoch: 1 [17920/60000 (30%)]  Loss: 1.661973
Train Epoch: 1 [19200/60000 (32%)]  Loss: 1.711020
Train Epoch: 1 [20480/60000 (34%)]  Loss: 1.744011
Train Epoch: 1 [21760/60000 (36%)]  Loss: 1.749768
Train Epoch: 1 [23040/60000 (38%)]  Loss: 1.727127
Train Epoch: 1 [24320/60000 (41%)]  Loss: 1.672485
Train Epoch: 1 [25600/60000 (43%)]  Loss: 1.676784
Train Epoch: 1 [26880/60000 (45%)]  Loss: 1.652241
Train Epoch: 1 [28160/60000 (47%)]  Loss: 1.646751
Train Epoch: 1 [29440/60000 (49%)]  Loss: 1.631483
Train Epoch: 1 [30720/60000 (51%)]  Loss: 1.670763
Train Epoch: 1 [32000/60000 (53%)]  Loss: 1.558245
Train Epoch: 1 [33280/60000 (55%)]  Loss: 1.606913
Train Epoch: 1 [34560/60000 (58%)]  Loss: 1.605866
Train Epoch: 1 [35840/60000 (60%)]  Loss: 1.604022
Train Epoch: 1 [37120/60000 (62%)]  Loss: 1.602832
Train Epoch: 1 [38400/60000 (64%)]  Loss: 1.616641
Train Epoch: 1 [39680/60000 (66%)]  Loss: 1.586105
Train Epoch: 1 [40960/60000 (68%)]  Loss: 1.562276
Train Epoch: 1 [42240/60000 (70%)]  Loss: 1.569453
Train Epoch: 1 [43520/60000 (72%)]  Loss: 1.568654
Train Epoch: 1 [44800/60000 (75%)]  Loss: 1.547043
Train Epoch: 1 [46080/60000 (77%)]  Loss: 1.594423
Train Epoch: 1 [47360/60000 (79%)]  Loss: 1.564706
Train Epoch: 1 [48640/60000 (81%)]  Loss: 1.537741
```

Train Epoch: 1 [49920/60000 (83%)]	Loss: 1.572096
Train Epoch: 1 [51200/60000 (85%)]	Loss: 1.548974
Train Epoch: 1 [52480/60000 (87%)]	Loss: 1.532709
Train Epoch: 1 [53760/60000 (90%)]	Loss: 1.535466
Train Epoch: 1 [55040/60000 (92%)]	Loss: 1.558817
Train Epoch: 1 [56320/60000 (94%)]	Loss: 1.531034
Train Epoch: 1 [57600/60000 (96%)]	Loss: 1.543975
Train Epoch: 1 [58880/60000 (98%)]	Loss: 1.542723

Test set: Average loss: -0.9132, Accuracy: 9236/10000 (92%)

Train Epoch: 2 [0/60000 (0%)]	Loss: 1.545478
Train Epoch: 2 [1280/60000 (2%)]	Loss: 1.545119
Train Epoch: 2 [2560/60000 (4%)]	Loss: 1.570091
Train Epoch: 2 [3840/60000 (6%)]	Loss: 1.499642
Train Epoch: 2 [5120/60000 (9%)]	Loss: 1.599372
Train Epoch: 2 [6400/60000 (11%)]	Loss: 1.542257
Train Epoch: 2 [7680/60000 (13%)]	Loss: 1.561269
Train Epoch: 2 [8960/60000 (15%)]	Loss: 1.554803
Train Epoch: 2 [10240/60000 (17%)]	Loss: 1.526906
Train Epoch: 2 [11520/60000 (19%)]	Loss: 1.546932
Train Epoch: 2 [12800/60000 (21%)]	Loss: 1.526076
Train Epoch: 2 [14080/60000 (23%)]	Loss: 1.529747
Train Epoch: 2 [15360/60000 (26%)]	Loss: 1.523742
Train Epoch: 2 [16640/60000 (28%)]	Loss: 1.560738
Train Epoch: 2 [17920/60000 (30%)]	Loss: 1.516297
Train Epoch: 2 [19200/60000 (32%)]	Loss: 1.553550
Train Epoch: 2 [20480/60000 (34%)]	Loss: 1.560612
Train Epoch: 2 [21760/60000 (36%)]	Loss: 1.576960
Train Epoch: 2 [23040/60000 (38%)]	Loss: 1.568067
Train Epoch: 2 [24320/60000 (41%)]	Loss: 1.514521
Train Epoch: 2 [25600/60000 (43%)]	Loss: 1.580228
Train Epoch: 2 [26880/60000 (45%)]	Loss: 1.537751
Train Epoch: 2 [28160/60000 (47%)]	Loss: 1.524733
Train Epoch: 2 [29440/60000 (49%)]	Loss: 1.552228
Train Epoch: 2 [30720/60000 (51%)]	Loss: 1.565603
Train Epoch: 2 [32000/60000 (53%)]	Loss: 1.479625
Train Epoch: 2 [33280/60000 (55%)]	Loss: 1.531151
Train Epoch: 2 [34560/60000 (58%)]	Loss: 1.528710
Train Epoch: 2 [35840/60000 (60%)]	Loss: 1.534107
Train Epoch: 2 [37120/60000 (62%)]	Loss: 1.540559
Train Epoch: 2 [38400/60000 (64%)]	Loss: 1.512868

Train Epoch: 2 [39680/60000 (66%)]	Loss: 1.512926
Train Epoch: 2 [40960/60000 (68%)]	Loss: 1.535590
Train Epoch: 2 [42240/60000 (70%)]	Loss: 1.529381
Train Epoch: 2 [43520/60000 (72%)]	Loss: 1.553504
Train Epoch: 2 [44800/60000 (75%)]	Loss: 1.508058
Train Epoch: 2 [46080/60000 (77%)]	Loss: 1.536752
Train Epoch: 2 [47360/60000 (79%)]	Loss: 1.514430
Train Epoch: 2 [48640/60000 (81%)]	Loss: 1.550715
Train Epoch: 2 [49920/60000 (83%)]	Loss: 1.514829
Train Epoch: 2 [51200/60000 (85%)]	Loss: 1.524073
Train Epoch: 2 [52480/60000 (87%)]	Loss: 1.528783
Train Epoch: 2 [53760/60000 (90%)]	Loss: 1.513702
Train Epoch: 2 [55040/60000 (92%)]	Loss: 1.502274
Train Epoch: 2 [56320/60000 (94%)]	Loss: 1.512871
Train Epoch: 2 [57600/60000 (96%)]	Loss: 1.534402
Train Epoch: 2 [58880/60000 (98%)]	Loss: 1.515594

Test set: Average loss: -0.9265, Accuracy: 9337/10000 (93%)

Train Epoch: 3 [0/60000 (0%)]	Loss: 1.546321
Train Epoch: 3 [1280/60000 (2%)]	Loss: 1.530017
Train Epoch: 3 [2560/60000 (4%)]	Loss: 1.561976
Train Epoch: 3 [3840/60000 (6%)]	Loss: 1.513588
Train Epoch: 3 [5120/60000 (9%)]	Loss: 1.516991
Train Epoch: 3 [6400/60000 (11%)]	Loss: 1.519186
Train Epoch: 3 [7680/60000 (13%)]	Loss: 1.521918
Train Epoch: 3 [8960/60000 (15%)]	Loss: 1.527455
Train Epoch: 3 [10240/60000 (17%)]	Loss: 1.516286
Train Epoch: 3 [11520/60000 (19%)]	Loss: 1.529102
Train Epoch: 3 [12800/60000 (21%)]	Loss: 1.557894
Train Epoch: 3 [14080/60000 (23%)]	Loss: 1.524075
Train Epoch: 3 [15360/60000 (26%)]	Loss: 1.555921
Train Epoch: 3 [16640/60000 (28%)]	Loss: 1.516865
Train Epoch: 3 [17920/60000 (30%)]	Loss: 1.538398
Train Epoch: 3 [19200/60000 (32%)]	Loss: 1.499833
Train Epoch: 3 [20480/60000 (34%)]	Loss: 1.508287
Train Epoch: 3 [21760/60000 (36%)]	Loss: 1.531318
Train Epoch: 3 [23040/60000 (38%)]	Loss: 1.557399
Train Epoch: 3 [24320/60000 (41%)]	Loss: 1.523355
Train Epoch: 3 [25600/60000 (43%)]	Loss: 1.501550
Train Epoch: 3 [26880/60000 (45%)]	Loss: 1.541974
Train Epoch: 3 [28160/60000 (47%)]	Loss: 1.523364

Train Epoch: 3 [29440/60000 (49%)]	Loss: 1.527759
Train Epoch: 3 [30720/60000 (51%)]	Loss: 1.526221
Train Epoch: 3 [32000/60000 (53%)]	Loss: 1.524908
Train Epoch: 3 [33280/60000 (55%)]	Loss: 1.559803
Train Epoch: 3 [34560/60000 (58%)]	Loss: 1.554365
Train Epoch: 3 [35840/60000 (60%)]	Loss: 1.507211
Train Epoch: 3 [37120/60000 (62%)]	Loss: 1.506959
Train Epoch: 3 [38400/60000 (64%)]	Loss: 1.525993
Train Epoch: 3 [39680/60000 (66%)]	Loss: 1.522139
Train Epoch: 3 [40960/60000 (68%)]	Loss: 1.533976
Train Epoch: 3 [42240/60000 (70%)]	Loss: 1.547135
Train Epoch: 3 [43520/60000 (72%)]	Loss: 1.503385
Train Epoch: 3 [44800/60000 (75%)]	Loss: 1.524958
Train Epoch: 3 [46080/60000 (77%)]	Loss: 1.499773
Train Epoch: 3 [47360/60000 (79%)]	Loss: 1.536696
Train Epoch: 3 [48640/60000 (81%)]	Loss: 1.531313
Train Epoch: 3 [49920/60000 (83%)]	Loss: 1.546280
Train Epoch: 3 [51200/60000 (85%)]	Loss: 1.491191
Train Epoch: 3 [52480/60000 (87%)]	Loss: 1.550843
Train Epoch: 3 [53760/60000 (90%)]	Loss: 1.521615
Train Epoch: 3 [55040/60000 (92%)]	Loss: 1.506078
Train Epoch: 3 [56320/60000 (94%)]	Loss: 1.545586
Train Epoch: 3 [57600/60000 (96%)]	Loss: 1.507071
Train Epoch: 3 [58880/60000 (98%)]	Loss: 1.532946

Test set: Average loss: -0.9419, Accuracy: 9475/10000 (95%)

Train Epoch: 4 [0/60000 (0%)]	Loss: 1.518003
Train Epoch: 4 [1280/60000 (2%)]	Loss: 1.474075
Train Epoch: 4 [2560/60000 (4%)]	Loss: 1.498904
Train Epoch: 4 [3840/60000 (6%)]	Loss: 1.492175
Train Epoch: 4 [5120/60000 (9%)]	Loss: 1.520190
Train Epoch: 4 [6400/60000 (11%)]	Loss: 1.488667
Train Epoch: 4 [7680/60000 (13%)]	Loss: 1.486132
Train Epoch: 4 [8960/60000 (15%)]	Loss: 1.499640
Train Epoch: 4 [10240/60000 (17%)]	Loss: 1.513090
Train Epoch: 4 [11520/60000 (19%)]	Loss: 1.507188
Train Epoch: 4 [12800/60000 (21%)]	Loss: 1.532613
Train Epoch: 4 [14080/60000 (23%)]	Loss: 1.561800
Train Epoch: 4 [15360/60000 (26%)]	Loss: 1.485266
Train Epoch: 4 [16640/60000 (28%)]	Loss: 1.512882
Train Epoch: 4 [17920/60000 (30%)]	Loss: 1.517985

Train Epoch: 4 [17920/60000 (30%)]	Loss: 1.517985
Train Epoch: 4 [19200/60000 (32%)]	Loss: 1.528552
Train Epoch: 4 [20480/60000 (34%)]	Loss: 1.486219
Train Epoch: 4 [21760/60000 (36%)]	Loss: 1.513561
Train Epoch: 4 [23040/60000 (38%)]	Loss: 1.506792
Train Epoch: 4 [24320/60000 (41%)]	Loss: 1.519465
Train Epoch: 4 [25600/60000 (43%)]	Loss: 1.520237
Train Epoch: 4 [26880/60000 (45%)]	Loss: 1.507091
Train Epoch: 4 [28160/60000 (47%)]	Loss: 1.527244
Train Epoch: 4 [29440/60000 (49%)]	Loss: 1.533224
Train Epoch: 4 [30720/60000 (51%)]	Loss: 1.532174
Train Epoch: 4 [32000/60000 (53%)]	Loss: 1.518988
Train Epoch: 4 [33280/60000 (55%)]	Loss: 1.515349
Train Epoch: 4 [34560/60000 (58%)]	Loss: 1.497749
Train Epoch: 4 [35840/60000 (60%)]	Loss: 1.507164
Train Epoch: 4 [37120/60000 (62%)]	Loss: 1.493946
Train Epoch: 4 [38400/60000 (64%)]	Loss: 1.503561
Train Epoch: 4 [39680/60000 (66%)]	Loss: 1.534411
Train Epoch: 4 [40960/60000 (68%)]	Loss: 1.504507
Train Epoch: 4 [42240/60000 (70%)]	Loss: 1.475110
Train Epoch: 4 [43520/60000 (72%)]	Loss: 1.505892
Train Epoch: 4 [44800/60000 (75%)]	Loss: 1.492822
Train Epoch: 4 [46080/60000 (77%)]	Loss: 1.537080
Train Epoch: 4 [47360/60000 (79%)]	Loss: 1.487357
Train Epoch: 4 [48640/60000 (81%)]	Loss: 1.520625
Train Epoch: 4 [49920/60000 (83%)]	Loss: 1.507264
Train Epoch: 4 [51200/60000 (85%)]	Loss: 1.496460
Train Epoch: 4 [52480/60000 (87%)]	Loss: 1.504712
Train Epoch: 4 [53760/60000 (90%)]	Loss: 1.497363
Train Epoch: 4 [55040/60000 (92%)]	Loss: 1.501862
Train Epoch: 4 [56320/60000 (94%)]	Loss: 1.537203
Train Epoch: 4 [57600/60000 (96%)]	Loss: 1.536151
Train Epoch: 4 [58880/60000 (98%)]	Loss: 1.492151

Test set: Average loss: -0.9468, Accuracy: 9529/10000 (95%)

Train Epoch: 5 [0/60000 (0%)]	Loss: 1.504876
Train Epoch: 5 [1280/60000 (2%)]	Loss: 1.508821
Train Epoch: 5 [2560/60000 (4%)]	Loss: 1.524901
Train Epoch: 5 [3840/60000 (6%)]	Loss: 1.484803
Train Epoch: 5 [5120/60000 (9%)]	Loss: 1.499161
Train Epoch: 5 [6400/60000 (11%)]	Loss: 1.503483

Train Epoch: 5 [7680/60000 (13%)]	Loss: 1.490543
Train Epoch: 5 [8960/60000 (15%)]	Loss: 1.507276
Train Epoch: 5 [10240/60000 (17%)]	Loss: 1.505860
Train Epoch: 5 [11520/60000 (19%)]	Loss: 1.510968
Train Epoch: 5 [12800/60000 (21%)]	Loss: 1.497550
Train Epoch: 5 [14080/60000 (23%)]	Loss: 1.511122
Train Epoch: 5 [15360/60000 (26%)]	Loss: 1.536796
Train Epoch: 5 [16640/60000 (28%)]	Loss: 1.498702
Train Epoch: 5 [17920/60000 (30%)]	Loss: 1.525409
Train Epoch: 5 [19200/60000 (32%)]	Loss: 1.509503
Train Epoch: 5 [20480/60000 (34%)]	Loss: 1.507973
Train Epoch: 5 [21760/60000 (36%)]	Loss: 1.499922
Train Epoch: 5 [23040/60000 (38%)]	Loss: 1.475631
Train Epoch: 5 [24320/60000 (41%)]	Loss: 1.492256
Train Epoch: 5 [25600/60000 (43%)]	Loss: 1.474182
Train Epoch: 5 [26880/60000 (45%)]	Loss: 1.491409
Train Epoch: 5 [28160/60000 (47%)]	Loss: 1.491120
Train Epoch: 5 [29440/60000 (49%)]	Loss: 1.508589
Train Epoch: 5 [30720/60000 (51%)]	Loss: 1.501532
Train Epoch: 5 [32000/60000 (53%)]	Loss: 1.507129
Train Epoch: 5 [33280/60000 (55%)]	Loss: 1.513162
Train Epoch: 5 [34560/60000 (58%)]	Loss: 1.496721
Train Epoch: 5 [35840/60000 (60%)]	Loss: 1.508759
Train Epoch: 5 [37120/60000 (62%)]	Loss: 1.536075
Train Epoch: 5 [38400/60000 (64%)]	Loss: 1.542213
Train Epoch: 5 [39680/60000 (66%)]	Loss: 1.506774
Train Epoch: 5 [40960/60000 (68%)]	Loss: 1.519385
Train Epoch: 5 [42240/60000 (70%)]	Loss: 1.522834
Train Epoch: 5 [43520/60000 (72%)]	Loss: 1.509038
Train Epoch: 5 [44800/60000 (75%)]	Loss: 1.513979
Train Epoch: 5 [46080/60000 (77%)]	Loss: 1.496344
Train Epoch: 5 [47360/60000 (79%)]	Loss: 1.509174
Train Epoch: 5 [48640/60000 (81%)]	Loss: 1.519917
Train Epoch: 5 [49920/60000 (83%)]	Loss: 1.522974
Train Epoch: 5 [51200/60000 (85%)]	Loss: 1.478231
Train Epoch: 5 [52480/60000 (87%)]	Loss: 1.510772
Train Epoch: 5 [53760/60000 (90%)]	Loss: 1.530705
Train Epoch: 5 [55040/60000 (92%)]	Loss: 1.480399
Train Epoch: 5 [56320/60000 (94%)]	Loss: 1.519931
Train Epoch: 5 [57600/60000 (96%)]	Loss: 1.495836
Train Epoch: 5 [58880/60000 (98%)]	Loss: 1.517746

Test set: Average loss: -0.9506, Accuracy: 9552/10000 (96%)

Train Epoch: 6 [0/60000 (0%)]	Loss: 1.490188
Train Epoch: 6 [1280/60000 (2%)]	Loss: 1.476495
Train Epoch: 6 [2560/60000 (4%)]	Loss: 1.493944
Train Epoch: 6 [3840/60000 (6%)]	Loss: 1.503994
Train Epoch: 6 [5120/60000 (9%)]	Loss: 1.513873
Train Epoch: 6 [6400/60000 (11%)]	Loss: 1.508758
Train Epoch: 6 [7680/60000 (13%)]	Loss: 1.516677
Train Epoch: 6 [8960/60000 (15%)]	Loss: 1.491956
Train Epoch: 6 [10240/60000 (17%)]	Loss: 1.505913
Train Epoch: 6 [11520/60000 (19%)]	Loss: 1.514748
Train Epoch: 6 [12800/60000 (21%)]	Loss: 1.482150
Train Epoch: 6 [14080/60000 (23%)]	Loss: 1.508079
Train Epoch: 6 [15360/60000 (26%)]	Loss: 1.517360
Train Epoch: 6 [16640/60000 (28%)]	Loss: 1.510278
Train Epoch: 6 [17920/60000 (30%)]	Loss: 1.497253
Train Epoch: 6 [19200/60000 (32%)]	Loss: 1.524593
Train Epoch: 6 [20480/60000 (34%)]	Loss: 1.523783
Train Epoch: 6 [21760/60000 (36%)]	Loss: 1.526734
Train Epoch: 6 [23040/60000 (38%)]	Loss: 1.525357
Train Epoch: 6 [24320/60000 (41%)]	Loss: 1.501499
Train Epoch: 6 [25600/60000 (43%)]	Loss: 1.513233
Train Epoch: 6 [26880/60000 (45%)]	Loss: 1.497782
Train Epoch: 6 [28160/60000 (47%)]	Loss: 1.517658
Train Epoch: 6 [29440/60000 (49%)]	Loss: 1.506840
Train Epoch: 6 [30720/60000 (51%)]	Loss: 1.500924
Train Epoch: 6 [32000/60000 (53%)]	Loss: 1.501654
Train Epoch: 6 [33280/60000 (55%)]	Loss: 1.521874
Train Epoch: 6 [34560/60000 (58%)]	Loss: 1.491121
Train Epoch: 6 [35840/60000 (60%)]	Loss: 1.497693
Train Epoch: 6 [37120/60000 (62%)]	Loss: 1.502287
Train Epoch: 6 [38400/60000 (64%)]	Loss: 1.480968
Train Epoch: 6 [39680/60000 (66%)]	Loss: 1.503760
Train Epoch: 6 [40960/60000 (68%)]	Loss: 1.498832
Train Epoch: 6 [42240/60000 (70%)]	Loss: 1.500246
Train Epoch: 6 [43520/60000 (72%)]	Loss: 1.499925
Train Epoch: 6 [44800/60000 (75%)]	Loss: 1.494449
Train Epoch: 6 [46080/60000 (77%)]	Loss: 1.491415
Train Epoch: 6 [47360/60000 (79%)]	Loss: 1.489507
Train Epoch: 6 [48640/60000 (81%)]	Loss: 1.485223

Train Epoch: 6 [48640/60000 (81%)]	Loss: 1.485223
Train Epoch: 6 [49920/60000 (83%)]	Loss: 1.494018
Train Epoch: 6 [51200/60000 (85%)]	Loss: 1.495472
Train Epoch: 6 [52480/60000 (87%)]	Loss: 1.513703
Train Epoch: 6 [53760/60000 (90%)]	Loss: 1.518078
Train Epoch: 6 [55040/60000 (92%)]	Loss: 1.500973
Train Epoch: 6 [56320/60000 (94%)]	Loss: 1.480341
Train Epoch: 6 [57600/60000 (96%)]	Loss: 1.482476
Train Epoch: 6 [58880/60000 (98%)]	Loss: 1.491267

Test set: Average loss: -0.9525, Accuracy: 9573/10000 (96%)

Train Epoch: 7 [0/60000 (0%)]	Loss: 1.494223
Train Epoch: 7 [1280/60000 (2%)]	Loss: 1.480999
Train Epoch: 7 [2560/60000 (4%)]	Loss: 1.527156
Train Epoch: 7 [3840/60000 (6%)]	Loss: 1.500762
Train Epoch: 7 [5120/60000 (9%)]	Loss: 1.495612
Train Epoch: 7 [6400/60000 (11%)]	Loss: 1.488178
Train Epoch: 7 [7680/60000 (13%)]	Loss: 1.524328
Train Epoch: 7 [8960/60000 (15%)]	Loss: 1.503933
Train Epoch: 7 [10240/60000 (17%)]	Loss: 1.497930
Train Epoch: 7 [11520/60000 (19%)]	Loss: 1.503350
Train Epoch: 7 [12800/60000 (21%)]	Loss: 1.502734
Train Epoch: 7 [14080/60000 (23%)]	Loss: 1.502371
Train Epoch: 7 [15360/60000 (26%)]	Loss: 1.513721
Train Epoch: 7 [16640/60000 (28%)]	Loss: 1.507204
Train Epoch: 7 [17920/60000 (30%)]	Loss: 1.507678
Train Epoch: 7 [19200/60000 (32%)]	Loss: 1.488850
Train Epoch: 7 [20480/60000 (34%)]	Loss: 1.500257
Train Epoch: 7 [21760/60000 (36%)]	Loss: 1.505408
Train Epoch: 7 [23040/60000 (38%)]	Loss: 1.521254
Train Epoch: 7 [24320/60000 (41%)]	Loss: 1.500619
Train Epoch: 7 [25600/60000 (43%)]	Loss: 1.488268
Train Epoch: 7 [26880/60000 (45%)]	Loss: 1.506173
Train Epoch: 7 [28160/60000 (47%)]	Loss: 1.506396
Train Epoch: 7 [29440/60000 (49%)]	Loss: 1.502828
Train Epoch: 7 [30720/60000 (51%)]	Loss: 1.501461
Train Epoch: 7 [32000/60000 (53%)]	Loss: 1.507318
Train Epoch: 7 [33280/60000 (55%)]	Loss: 1.523172
Train Epoch: 7 [34560/60000 (58%)]	Loss: 1.484221
Train Epoch: 7 [35840/60000 (60%)]	Loss: 1.491075
Train Epoch: 7 [37120/60000 (62%)]	Loss: 1.497927

Train Epoch: 7 [37120/60000 (62%)]	Loss: 1.497927
Train Epoch: 7 [38400/60000 (64%)]	Loss: 1.496492
Train Epoch: 7 [39680/60000 (66%)]	Loss: 1.489491
Train Epoch: 7 [40960/60000 (68%)]	Loss: 1.506154
Train Epoch: 7 [42240/60000 (70%)]	Loss: 1.483116
Train Epoch: 7 [43520/60000 (72%)]	Loss: 1.515781
Train Epoch: 7 [44800/60000 (75%)]	Loss: 1.514124
Train Epoch: 7 [46080/60000 (77%)]	Loss: 1.506178
Train Epoch: 7 [47360/60000 (79%)]	Loss: 1.508640
Train Epoch: 7 [48640/60000 (81%)]	Loss: 1.490126
Train Epoch: 7 [49920/60000 (83%)]	Loss: 1.526608
Train Epoch: 7 [51200/60000 (85%)]	Loss: 1.480335
Train Epoch: 7 [52480/60000 (87%)]	Loss: 1.501590
Train Epoch: 7 [53760/60000 (90%)]	Loss: 1.523438
Train Epoch: 7 [55040/60000 (92%)]	Loss: 1.486836
Train Epoch: 7 [56320/60000 (94%)]	Loss: 1.500515
Train Epoch: 7 [57600/60000 (96%)]	Loss: 1.502560
Train Epoch: 7 [58880/60000 (98%)]	Loss: 1.474975

Test set: Average loss: -0.9541, Accuracy: 9590/10000 (96%)

Train Epoch: 8 [0/60000 (0%)]	Loss: 1.502359
Train Epoch: 8 [1280/60000 (2%)]	Loss: 1.514529
Train Epoch: 8 [2560/60000 (4%)]	Loss: 1.495662
Train Epoch: 8 [3840/60000 (6%)]	Loss: 1.513351
Train Epoch: 8 [5120/60000 (9%)]	Loss: 1.506002
Train Epoch: 8 [6400/60000 (11%)]	Loss: 1.499061
Train Epoch: 8 [7680/60000 (13%)]	Loss: 1.500720
Train Epoch: 8 [8960/60000 (15%)]	Loss: 1.488847
Train Epoch: 8 [10240/60000 (17%)]	Loss: 1.483077
Train Epoch: 8 [11520/60000 (19%)]	Loss: 1.486606
Train Epoch: 8 [12800/60000 (21%)]	Loss: 1.479716
Train Epoch: 8 [14080/60000 (23%)]	Loss: 1.550347
Train Epoch: 8 [15360/60000 (26%)]	Loss: 1.474683
Train Epoch: 8 [16640/60000 (28%)]	Loss: 1.490747
Train Epoch: 8 [17920/60000 (30%)]	Loss: 1.479209
Train Epoch: 8 [19200/60000 (32%)]	Loss: 1.507862
Train Epoch: 8 [20480/60000 (34%)]	Loss: 1.498229
Train Epoch: 8 [21760/60000 (36%)]	Loss: 1.499550
Train Epoch: 8 [23040/60000 (38%)]	Loss: 1.497121
Train Epoch: 8 [24320/60000 (41%)]	Loss: 1.484957
Train Epoch: 8 [25600/60000 (43%)]	Loss: 1.502066

Train Epoch: 8 [26880/60000 (45%)]	Loss: 1.506234
Train Epoch: 8 [28160/60000 (47%)]	Loss: 1.504540
Train Epoch: 8 [29440/60000 (49%)]	Loss: 1.519197
Train Epoch: 8 [30720/60000 (51%)]	Loss: 1.490985
Train Epoch: 8 [32000/60000 (53%)]	Loss: 1.507098
Train Epoch: 8 [33280/60000 (55%)]	Loss: 1.489280
Train Epoch: 8 [34560/60000 (58%)]	Loss: 1.499781
Train Epoch: 8 [35840/60000 (60%)]	Loss: 1.514123
Train Epoch: 8 [37120/60000 (62%)]	Loss: 1.474763
Train Epoch: 8 [38400/60000 (64%)]	Loss: 1.499759
Train Epoch: 8 [39680/60000 (66%)]	Loss: 1.472365
Train Epoch: 8 [40960/60000 (68%)]	Loss: 1.512742
Train Epoch: 8 [42240/60000 (70%)]	Loss: 1.486822
Train Epoch: 8 [43520/60000 (72%)]	Loss: 1.510108
Train Epoch: 8 [44800/60000 (75%)]	Loss: 1.491430
Train Epoch: 8 [46080/60000 (77%)]	Loss: 1.517654
Train Epoch: 8 [47360/60000 (79%)]	Loss: 1.496153
Train Epoch: 8 [48640/60000 (81%)]	Loss: 1.526066
Train Epoch: 8 [49920/60000 (83%)]	Loss: 1.538282
Train Epoch: 8 [51200/60000 (85%)]	Loss: 1.492575
Train Epoch: 8 [52480/60000 (87%)]	Loss: 1.490435
Train Epoch: 8 [53760/60000 (90%)]	Loss: 1.475904
Train Epoch: 8 [55040/60000 (92%)]	Loss: 1.475349
Train Epoch: 8 [56320/60000 (94%)]	Loss: 1.545204
Train Epoch: 8 [57600/60000 (96%)]	Loss: 1.518467
Train Epoch: 8 [58880/60000 (98%)]	Loss: 1.513487

Test set: Average loss: -0.9550, Accuracy: 9593/10000 (96%)

Train Epoch: 9 [0/60000 (0%)]	Loss: 1.498388
Train Epoch: 9 [1280/60000 (2%)]	Loss: 1.515407
Train Epoch: 9 [2560/60000 (4%)]	Loss: 1.492998
Train Epoch: 9 [3840/60000 (6%)]	Loss: 1.521542
Train Epoch: 9 [5120/60000 (9%)]	Loss: 1.488694
Train Epoch: 9 [6400/60000 (11%)]	Loss: 1.517006
Train Epoch: 9 [7680/60000 (13%)]	Loss: 1.491766
Train Epoch: 9 [8960/60000 (15%)]	Loss: 1.481424
Train Epoch: 9 [10240/60000 (17%)]	Loss: 1.515184
Train Epoch: 9 [11520/60000 (19%)]	Loss: 1.514887
Train Epoch: 9 [12800/60000 (21%)]	Loss: 1.520313
Train Epoch: 9 [14080/60000 (23%)]	Loss: 1.488407
Train Epoch: 9 [15360/60000 (26%)]	Loss: 1.505454

Train Epoch: 9 [16640/60000 (28%)]	Loss: 1.511961
Train Epoch: 9 [17920/60000 (30%)]	Loss: 1.504544
Train Epoch: 9 [19200/60000 (32%)]	Loss: 1.470306
Train Epoch: 9 [20480/60000 (34%)]	Loss: 1.489533
Train Epoch: 9 [21760/60000 (36%)]	Loss: 1.497751
Train Epoch: 9 [23040/60000 (38%)]	Loss: 1.498157
Train Epoch: 9 [24320/60000 (41%)]	Loss: 1.515923
Train Epoch: 9 [25600/60000 (43%)]	Loss: 1.491179
Train Epoch: 9 [26880/60000 (45%)]	Loss: 1.490628
Train Epoch: 9 [28160/60000 (47%)]	Loss: 1.493733
Train Epoch: 9 [29440/60000 (49%)]	Loss: 1.477500
Train Epoch: 9 [30720/60000 (51%)]	Loss: 1.489863
Train Epoch: 9 [32000/60000 (53%)]	Loss: 1.491011
Train Epoch: 9 [33280/60000 (55%)]	Loss: 1.464164
Train Epoch: 9 [34560/60000 (58%)]	Loss: 1.474494
Train Epoch: 9 [35840/60000 (60%)]	Loss: 1.473783
Train Epoch: 9 [37120/60000 (62%)]	Loss: 1.501677
Train Epoch: 9 [38400/60000 (64%)]	Loss: 1.500614
Train Epoch: 9 [39680/60000 (66%)]	Loss: 1.505207
Train Epoch: 9 [40960/60000 (68%)]	Loss: 1.483702
Train Epoch: 9 [42240/60000 (70%)]	Loss: 1.503569
Train Epoch: 9 [43520/60000 (72%)]	Loss: 1.493070
Train Epoch: 9 [44800/60000 (75%)]	Loss: 1.505751
Train Epoch: 9 [46080/60000 (77%)]	Loss: 1.498505
Train Epoch: 9 [47360/60000 (79%)]	Loss: 1.514981
Train Epoch: 9 [48640/60000 (81%)]	Loss: 1.509483
Train Epoch: 9 [49920/60000 (83%)]	Loss: 1.516687
Train Epoch: 9 [51200/60000 (85%)]	Loss: 1.501186
Train Epoch: 9 [52480/60000 (87%)]	Loss: 1.508571
Train Epoch: 9 [53760/60000 (90%)]	Loss: 1.483489
Train Epoch: 9 [55040/60000 (92%)]	Loss: 1.499584
Train Epoch: 9 [56320/60000 (94%)]	Loss: 1.513512
Train Epoch: 9 [57600/60000 (96%)]	Loss: 1.493494
Train Epoch: 9 [58880/60000 (98%)]	Loss: 1.508505

Test set: Average loss: -0.9556, Accuracy: 9605/10000 (96%)

Train Epoch: 10 [0/60000 (0%)]	Loss: 1.514652
Train Epoch: 10 [1280/60000 (2%)]	Loss: 1.485242
Train Epoch: 10 [2560/60000 (4%)]	Loss: 1.502027
Train Epoch: 10 [3840/60000 (6%)]	Loss: 1.524040
Train Epoch: 10 [5120/60000 (9%)]	Loss: 1.473933

Train Epoch: 10 [6400/60000 (11%)]	Loss: 1.500293
Train Epoch: 10 [7680/60000 (13%)]	Loss: 1.498744
Train Epoch: 10 [8960/60000 (15%)]	Loss: 1.499916
Train Epoch: 10 [10240/60000 (17%)]	Loss: 1.479985
Train Epoch: 10 [11520/60000 (19%)]	Loss: 1.534696
Train Epoch: 10 [12800/60000 (21%)]	Loss: 1.490716
Train Epoch: 10 [14080/60000 (23%)]	Loss: 1.487113
Train Epoch: 10 [15360/60000 (26%)]	Loss: 1.519016
Train Epoch: 10 [16640/60000 (28%)]	Loss: 1.501354
Train Epoch: 10 [17920/60000 (30%)]	Loss: 1.498915
Train Epoch: 10 [19200/60000 (32%)]	Loss: 1.483846
Train Epoch: 10 [20480/60000 (34%)]	Loss: 1.506793
Train Epoch: 10 [21760/60000 (36%)]	Loss: 1.511096
Train Epoch: 10 [23040/60000 (38%)]	Loss: 1.476360
Train Epoch: 10 [24320/60000 (41%)]	Loss: 1.506874
Train Epoch: 10 [25600/60000 (43%)]	Loss: 1.500055
Train Epoch: 10 [26880/60000 (45%)]	Loss: 1.509442
Train Epoch: 10 [28160/60000 (47%)]	Loss: 1.513592
Train Epoch: 10 [29440/60000 (49%)]	Loss: 1.514413
Train Epoch: 10 [30720/60000 (51%)]	Loss: 1.476218
Train Epoch: 10 [32000/60000 (53%)]	Loss: 1.502541
Train Epoch: 10 [33280/60000 (55%)]	Loss: 1.511048
Train Epoch: 10 [34560/60000 (58%)]	Loss: 1.508385
Train Epoch: 10 [35840/60000 (60%)]	Loss: 1.503188
Train Epoch: 10 [37120/60000 (62%)]	Loss: 1.500286
Train Epoch: 10 [38400/60000 (64%)]	Loss: 1.496858
Train Epoch: 10 [39680/60000 (66%)]	Loss: 1.473609
Train Epoch: 10 [40960/60000 (68%)]	Loss: 1.497229
Train Epoch: 10 [42240/60000 (70%)]	Loss: 1.495292
Train Epoch: 10 [43520/60000 (72%)]	Loss: 1.542542
Train Epoch: 10 [44800/60000 (75%)]	Loss: 1.499464
Train Epoch: 10 [46080/60000 (77%)]	Loss: 1.498906
Train Epoch: 10 [47360/60000 (79%)]	Loss: 1.487348
Train Epoch: 10 [48640/60000 (81%)]	Loss: 1.496099
Train Epoch: 10 [49920/60000 (83%)]	Loss: 1.480285
Train Epoch: 10 [51200/60000 (85%)]	Loss: 1.505082
Train Epoch: 10 [52480/60000 (87%)]	Loss: 1.477094
Train Epoch: 10 [53760/60000 (90%)]	Loss: 1.490914
Train Epoch: 10 [55040/60000 (92%)]	Loss: 1.488309
Train Epoch: 10 [56320/60000 (94%)]	Loss: 1.485156
Train Epoch: 10 [57600/60000 (96%)]	Loss: 1.496843
Train Epoch: 10 [58880/60000 (98%)]	Loss: 1.476969

Test set: Average loss: -0.9561, Accuracy: 9606/10000 (96%)

Total Training and Testing Execution Time: 14.90053391456604