```
C:\Users\Alex Anderson\Documents\EECS_658\AlexAnderson_Assignment3>python dbn.py
[START] Pre-training step:
>> Epoch 1 finished        RBM Reconstruction error 2.740666
>> Epoch 2 finished        RBM Reconstruction error 1.805594
>> Epoch 3 finished        RBM Reconstruction error 1.432523
>> Epoch 4 finished        RBM Reconstruction error 1.274614
>> Epoch 5 finished        RBM Reconstruction error 1.127715
>> Epoch 6 finished        RBM Reconstruction error 1.016233
>> Epoch 7 finished        RBM Reconstruction error 0.931797
>> Epoch 8 finished        RBM Reconstruction error 0.904623
>> Epoch 9 finished        RBM Reconstruction error 0.891258
>> Epoch 10 finished       RBM Reconstruction error 0.790757
>> Epoch 1 finished        RBM Reconstruction error 2.880171
>> Epoch 2 finished        RBM Reconstruction error 1.491411
>> Epoch 3 finished        RBM Reconstruction error 1.120919
>> Epoch 4 finished        RBM Reconstruction error 0.921536
>> Epoch 5 finished        RBM Reconstruction error 0.763747
>> Epoch 6 finished        RBM Reconstruction error 0.667087
>> Epoch 7 finished        RBM Reconstruction error 0.573752
>> Epoch 8 finished        RBM Reconstruction error 0.529821
>> Epoch 9 finished        RBM Reconstruction error 0.480695
>> Epoch 10 finished       RBM Reconstruction error 0.456472
[END] Pre-training step
[START] Fine tuning step:
>> Epoch 1 finished        ANN training loss 19.815676
>> Epoch 2 finished        ANN training loss 13.012750
>> Epoch 3 finished        ANN training loss 9.025525
>> Epoch 4 finished        ANN training loss 7.295055
>> Epoch 5 finished        ANN training loss 6.229197
>> Epoch 6 finished        ANN training loss 5.808220
>> Epoch 7 finished        ANN training loss 5.241246
>> Epoch 8 finished        ANN training loss 4.761866
>> Epoch 9 finished        ANN training loss 4.898449
>> Epoch 10 finished       ANN training loss 4.430443
>> Epoch 11 finished       ANN training loss 4.188848
>> Epoch 12 finished       ANN training loss 4.099041
>> Epoch 13 finished       ANN training loss 4.149002
>> Epoch 14 finished       ANN training loss 4.126827
>> Epoch 15 finished       ANN training loss 4.024709
```

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>> Epoch 15 finished    ANN training loss 4.024709
>> Epoch 16 finished    ANN training loss 3.837017
>> Epoch 17 finished    ANN training loss 3.789805
>> Epoch 18 finished    ANN training loss 3.749225
>> Epoch 19 finished    ANN training loss 3.768161
>> Epoch 20 finished    ANN training loss 3.448430
>> Epoch 21 finished    ANN training loss 3.973341
>> Epoch 22 finished    ANN training loss 3.486660
>> Epoch 23 finished    ANN training loss 3.562496
>> Epoch 24 finished    ANN training loss 3.220933
>> Epoch 25 finished    ANN training loss 3.473933
>> Epoch 26 finished    ANN training loss 3.096372
>> Epoch 27 finished    ANN training loss 3.127187
>> Epoch 28 finished    ANN training loss 3.654857
>> Epoch 29 finished    ANN training loss 3.176199
>> Epoch 30 finished    ANN training loss 3.204959
>> Epoch 31 finished    ANN training loss 3.372546
>> Epoch 32 finished    ANN training loss 3.147058
>> Epoch 33 finished    ANN training loss 3.235672
>> Epoch 34 finished    ANN training loss 2.879812
>> Epoch 35 finished    ANN training loss 2.878245
>> Epoch 36 finished    ANN training loss 3.084891
>> Epoch 37 finished    ANN training loss 3.132054
>> Epoch 38 finished    ANN training loss 2.776393
>> Epoch 39 finished    ANN training loss 3.132948
>> Epoch 40 finished    ANN training loss 2.989652
>> Epoch 41 finished    ANN training loss 2.867335
>> Epoch 42 finished    ANN training loss 2.809363
>> Epoch 43 finished    ANN training loss 2.884767
>> Epoch 44 finished    ANN training loss 3.035932
>> Epoch 45 finished    ANN training loss 2.848164
>> Epoch 46 finished    ANN training loss 2.913252
>> Epoch 47 finished    ANN training loss 2.813828
>> Epoch 48 finished    ANN training loss 2.736477
>> Epoch 49 finished    ANN training loss 2.766231
>> Epoch 50 finished    ANN training loss 2.839658
>> Epoch 51 finished    ANN training loss 2.699174
>> Epoch 52 finished    ANN training loss 2.548628
>> Epoch 53 finished    ANN training loss 2.651098
>> Epoch 54 finished    ANN training loss 2.472910
```

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>> Epoch 55 finished     ANN training loss 2.586327
>> Epoch 56 finished     ANN training loss 2.511920
>> Epoch 57 finished     ANN training loss 2.684920
>> Epoch 58 finished     ANN training loss 2.370807
>> Epoch 59 finished     ANN training loss 2.716494
>> Epoch 60 finished     ANN training loss 2.562766
>> Epoch 61 finished     ANN training loss 2.397317
>> Epoch 62 finished     ANN training loss 2.461418
>> Epoch 63 finished     ANN training loss 2.493879
>> Epoch 64 finished     ANN training loss 2.541392
>> Epoch 65 finished     ANN training loss 2.619213
>> Epoch 66 finished     ANN training loss 2.511461
>> Epoch 67 finished     ANN training loss 2.588723
>> Epoch 68 finished     ANN training loss 2.558595
>> Epoch 69 finished     ANN training loss 2.794101
>> Epoch 70 finished     ANN training loss 2.243804
>> Epoch 71 finished     ANN training loss 2.400391
>> Epoch 72 finished     ANN training loss 2.415319
>> Epoch 73 finished     ANN training loss 2.235596
>> Epoch 74 finished     ANN training loss 2.320560
>> Epoch 75 finished     ANN training loss 2.365965
>> Epoch 76 finished     ANN training loss 2.373090
>> Epoch 77 finished     ANN training loss 2.344638
>> Epoch 78 finished     ANN training loss 2.370614
>> Epoch 79 finished     ANN training loss 2.378325
>> Epoch 80 finished     ANN training loss 2.296690
>> Epoch 81 finished     ANN training loss 2.207147
>> Epoch 82 finished     ANN training loss 2.213116
>> Epoch 83 finished     ANN training loss 2.479594
>> Epoch 84 finished     ANN training loss 2.184803
>> Epoch 85 finished     ANN training loss 2.145601
>> Epoch 86 finished     ANN training loss 2.331894
>> Epoch 87 finished     ANN training loss 2.236025
>> Epoch 88 finished     ANN training loss 2.343825
>> Epoch 89 finished     ANN training loss 1.923268
>> Epoch 90 finished     ANN training loss 2.162285
>> Epoch 91 finished     ANN training loss 2.198585
>> Epoch 92 finished     ANN training loss 2.443944
>> Epoch 93 finished     ANN training loss 2.322807
>> Epoch 94 finished     ANN training loss 2.092216
```

```
>> Epoch 95 finished    ANN training loss 2.326477
>> Epoch 96 finished    ANN training loss 2.240110
>> Epoch 97 finished    ANN training loss 2.341988
>> Epoch 98 finished    ANN training loss 1.917154
>> Epoch 99 finished    ANN training loss 2.006803
>> Epoch 100 finished   ANN training loss 1.919281
[END] Fine tuning step
Done.
Accuracy: 0.997222

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```