# Homework 1: Autoregressive Models

Deliverable: PDF write-up by **Tuesday February 11th, 23:59pm**. Your PDF should be generated by simply replacing the placeholder images of this LaTeX document with the appropriate solution images that will be generated automatically when solving each question. The solution images are automatically generated and saved using the accompanying IPython notebook. Your PDF is to be submitted into Gradescope. This PDF already contains a few solution images. These images will allow you to check your own solution to ensure correctness.

Question 1: 1D Data

(a) **[15pt] Fitting a Histogram**
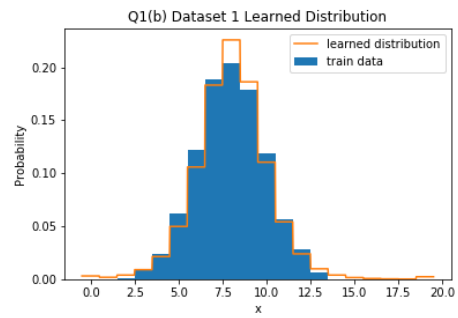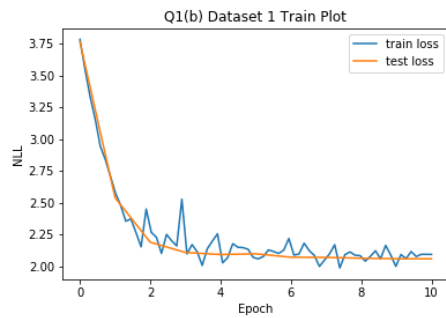
Final test loss for dataset 1: 2.0553 nats / dim
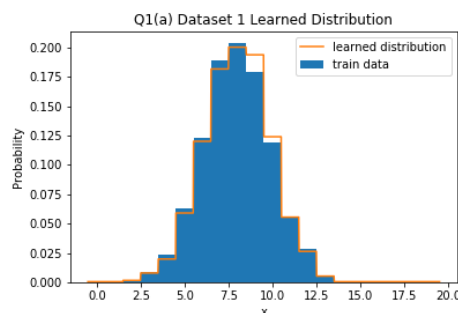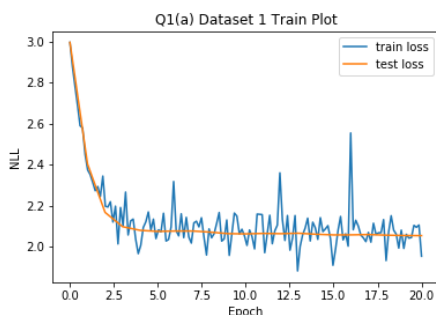
Final test loss for dataset 2: 0.0000 nats / dim

(b) **[15pth] Fitting Discretized Mixture of Logistics**

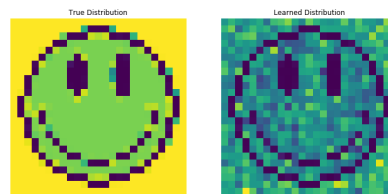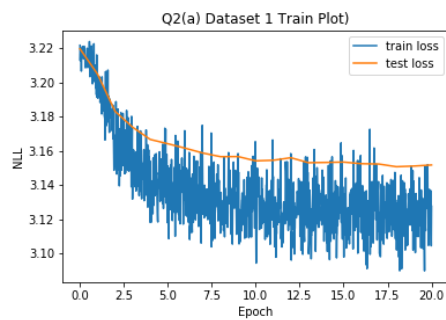Final test loss for dataset 1: 2.0586 nats / dim

Final test loss for dataset 2: 0.0000 nats / dim

Placeholder   Placeholder

Question 2: MADE

(a) **[10pt] Fitting 2D Data**

Final test loss for dataset 1: 3.1518 nats / dim
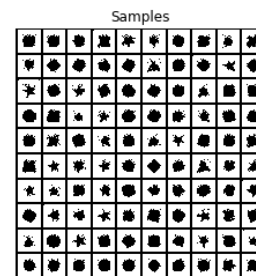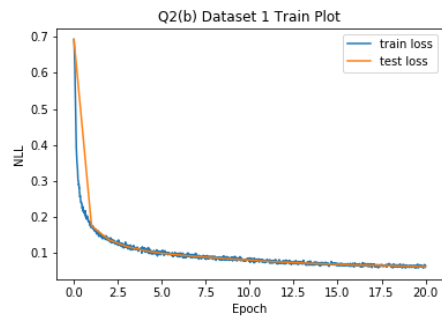

Final test loss for dataset 2: 0.0000 nats / dim

Placeholder   Placeholder

(b) **[10pt] Shapes and MNIST**
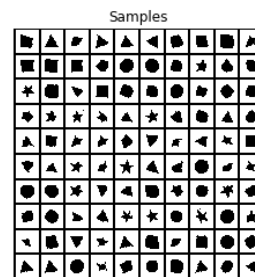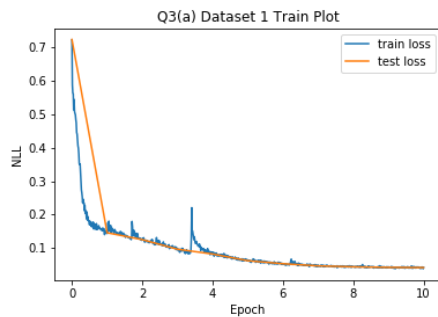
Final test loss for dataset 1: 0.0623 nats / dim

Final test loss for dataset 2: 0.0000 nats / dim

Placeholder

Placeholder

Question 3: PixelCNNs

(a) **[10pt] PixelCNNs on Binary Data**
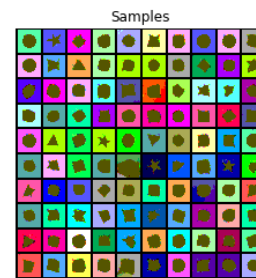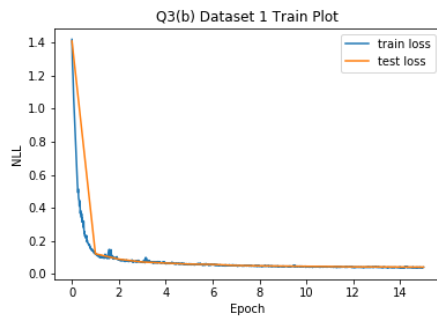
Final test loss for dataset 1: 0.0420 nats / dim

Final test loss for dataset 2: 0.0000 nats / dim

Placeholder   Placeholder

(b) **[10pt] Independent Color Channels**

Final test loss for dataset 1: 0.0444 nats / dim
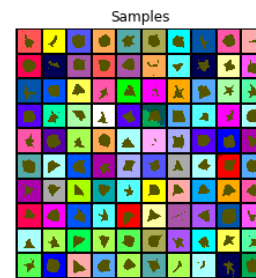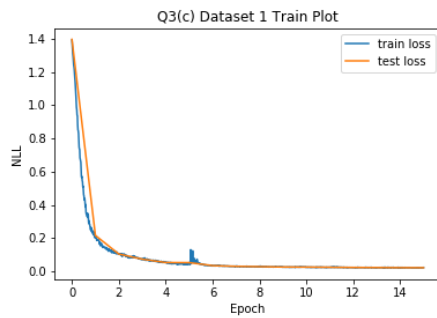

Q3(b) Dataset 1 Train Plot

Samples

Final test loss for dataset 2: 0.0000 nats / dim

Placeholder

Placeholder

(c) **[10pt] Dependent Color Channels**

Final test loss for dataset 1: 0.0236 nats / dim
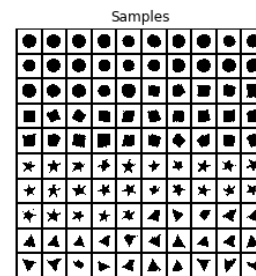

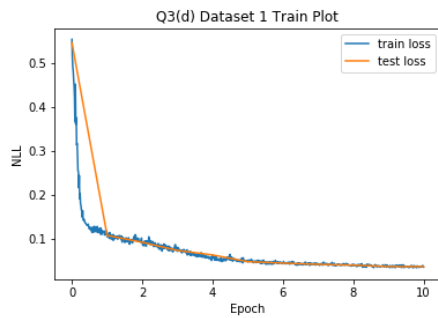Q3(c) Dataset 1 Train Plot

Samples

Final test loss for dataset 2: 0.0000 nats / dim

Placeholder   Placeholder

(d) **[10pt] Conditional PixelCNNs**

Final test loss for dataset 1: 0.0368 nats / dim

Final test loss for dataset 2: 0.0000 nats / dim

Placeholder   Placeholder

Bonus Questions (Optional)

[10pt] Gated PixelCNN

Final test loss: 0.0000 nats / dim

Placeholder   Placeholder

[10pt] PixelCNN with Mixture of Logistics

Final test loss: 0.0000 nats / dim

Placeholder   Placeholder

[10pt] Conditioning on Auxiliary Variables

Final test loss: 0.0000 nats / dim

Placeholder   Placeholder

[10pt] Faster Sampling

Final test loss: 0.0000 nats / dim

Placeholder   Placeholder