CS 677 Deep Learning final exam review sheet

1. Neural networks
   a. Single layer neural networks
   b. Output of a test data point via a neural network

2. Convolutional neural networks (CNN)
   a. Convolution kernel
   b. Shared vs. layer-wise weights
   c. Pooling kernel: Max and average
   d. Flattening
   e. Determining output dimensions after successive layers
   f. Output of a test datapoint via a CNN

3. Transposed convolutions (Deconvolutions)
   a. Deconvolution of size 2x2 and stride 1 from 2x2 to 3x3 image
   b. Deconvolution of size 2x2 and stride 2 from 2x2 to 4x4 image
   c. U-Networks

4. Optimization of neural networks
   a. Objective for a single layer neural network with loss functions
      i. Least squares
      ii. Cross-entropy
   b. Stochastic gradient descent
   c. Objective for a simple convolutional neural network
   d. Adaptive learning rates:
      i. Momentum
      ii. Gradient weights

5. Gradient updates
   a. Single layer network
   b. Simple convolutional network
   c. Updates for networks given in course notes

6. Multiple choice:
   a. Self-supervised learning
   b. Adversarial attacks
   c. Data augmentation
   d. Batch normalization
   e. Automatic network generation

7. GPU programming with CUDA
   a. Memory architecture
   b. Coalescent access vs. non-coalescent
   c. Parallelizing dot products with CUDA