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. Generative networks – mainly transposed convolutions

7. Adversarial attacks
    a. Accuracy vs robustness of classifiers
    b. Transferability of adversarial examples
    c. White box vs black box attacks
    d. Corruption robustness vs adversarial robustness

8. Text data
    a. Tf.idf document representations
    b. Word2vec word representations
    c. Applications – predicting the next word, document search

9. Multiple choice:
    a. Self-supervised learning
    b. Image retrieval
    c. Unsupervised feature learning
    d. Batch normalization
    e. Automatic network generation
    f. Applications of deep learning in basic science and engineering

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