GEORGE MASON UNIVERSITY
Systems Engineering and Operations Research
OR750/610: Deep Learning, Fall Semester 2019: Homework Assignment 3. Due: XXX (before class)

1. Transfer learning Complete assignments from `hw3.ipynb`

2. Organic CNN Replace the fully connected layer from the first problem with the convolutional layer.

3. Initialization Implement four different initialization techniques and apply them to your CNN model

- Zeros initialization
- Random initialization. This initializes the weights to some random values.
- Xavier initialization, which scales the variance of the inputs to each layer are scaled to have variance of `sqrt(1./layers_dims[l-1])`.
- He initialization. This initializes the weights to random values scaled according to a paper by He et al., 2015. Similar to Xavier you need to scale the inputs so they have the variance `sqrt(2./layers_dims[l-1])`

4. Optimization Implement ADAM modification to the SGD and apply it to MNIST classification.

5. Dropout Implement forward and backward propagation with dropout. Apply to MNIST classification problem.