ECE 271A Statistical Learning 1, HW #1

1. The reasonable estimate for the prior probability is the number of the training set of a specific class divided by the total number of training sets.

* For this problem, random variable is the index of the second largest coefficient of each image block. can be represented as a vector where each element of the vector represents the probability of the random variable equals the index of that element.
* To solve this problem, for foreground and background training samples, we will count the frequency of each index that happens to be the index of the second largest coefficient of one training sample. Then divide the frequency with the size of the foreground (background) training sample to transform frequency to probability.
* Use an sliding window to convert a image matrix to image blocks.
* For each image block, compute the DCT and find the second largest coefficient within the block. Then transform the index within the matrix to the index of a vector using the zig-zag file and store each index in an array A\_matrix.
* For each element in A\_matrix compute:

If the then then the image block represented by should be labeled as foreground, which in our case is 1. Otherwise it should be labeled as background, which in our case is 0. Store the label of image block in a numpy array.

* Reshape the array as a so that the we can visualize the result.
* First we need to do some paddings around the picture so as to maintain the size of the picture, which is (255,270).
* Transform the image ‘cheetah mask.bmp’ as a numpy array transform the scale the numpy array to 1 (Divide by 255).