CS 6550 Computer Vision
Homework #2
(Due 6pm, 11/7/2011)

1. (30%) Implement the K-means segmentation to segment the following color images. Apply it on the RGB color space and try it with different K values (4, 5, 6) and show the results. You should use 30 random initial guesses for the K centers to select the best result based on the objective function for each K.

2. (30%) Use the K-means segmentation results in Problem 1 to determine the initial guess for the mixture of Gaussians distribution model. Apply the EM algorithm to obtain the probabilistic clustering results for K=4, 5, and 6. Show the probability maps for the segmentation results.

3. (40%) Implement the mean-shift algorithm for image segmentation.
   (A) Apply the mean-shift algorithm to segment the same color images. Use an appropriate choice for the parameters in the Epanechnikov Kernel on the RGB color space to achieve best image segmentation.
   (B) In addition, combine the color and spatial information into the kernel for mean shift segmentation and find the optimal parameters for best segmentation result. Compare the segmentation results in (A) and (B).