Project 1: The Monocular Pose (QR) Algorithm
Due Thursday, 2/22/18

This project is to measure a rigid object's pose using a single camera and knowledge of point locations in the object's coordinate system. Photos of a box are given, and the box corners are used as correspondence marks. The object locations of these marks are known (stored in Xomat). The corresponding image points have already been found manually and stored in X1 and X2 for the first and second images. They are loaded into matlab in line 18 of the provided program "monoPoseQRMotorBoxTemplate.m" From this information, the calibration matrices and poses will be found. A hand drawing of the box, illustrating the object coordinate system and fiducial mark locations, will be provided in lecture 8.

1. Copy the files located in wyocourses proj1monoPoseToClass to your own directory for use and modification. Using matlab, run "monoPoseQRMotorBoxTemplate.m" You should see the box photos along with the correspondence points, plus a 3d plot of the box corners. Replace lines 39 and 42 with your own subroutine for simultaneously finding the calibration matrices and pose. You may find the QR based algorithm and qrCommute.m useful.

2. Extensively test your algorithm. You may want to produce simulated random points with varying noise levels, use other correspondence points in the images, check the angles and aspect ratios of the reconstruction, use your own images, etc. Lines 10-15 give some hints for manually entering correspondence points using matlab.

3. Thoroughly document your algorithm, its performance, and the results of your tests.

High grades are given for keen observations, creative algorithm improvements, clear documentation, etc. Show me that you understand how to implement the algorithm, what its strengths and weaknesses are, ways to mitigate any problems, etc. A formal written report documenting the above is expected and will be graded for grammar and clearness of exposition.