EECE 5550 Mobile Robotics
Homework Assignment 1
Due Date: Monday, February 4, 2:49pm

1. Create a Dropbox folder and name it **EECE5550-spring19-LastnameFirstname** and share it with Professor Padir, t.padir@northeastern.edu
2. Consider a 3-dimensional workspace consisting of a mobile robot, a table, an external stationary camera system, and an object on the table. Note that everyone will have a different environment, and hence the solution to this problem will be individualized.
   a) Create a visual of the workspace by labeling all distances and dimensions.
   b) Assign the world, robot, camera, table, and object coordinate frames.
   c) Using 4x4 homogeneous transformation matrices,
      i) Express the robot coordinate frame with respect to the world coordinate frame.
      ii) Express the table coordinate frame with respect to the world coordinate frame.
      iii) Express the camera coordinate frame with respect to the table coordinate frame.
      iv) Express the object coordinate frame with respect to the table coordinate frame.
      v) Express the object coordinate frame with respect to robot coordinate frame.
   d) Write a general equation that will relate the transformation matrix representing the object in robot coordinate frame in terms of the rest of the transformation matrices.
3. Complete the Getting Started, Coordinate System Transformations, Robot Operating System (ROS), Sensor Data tutorials at https://www.mathworks.com/help/robotics/index.html. To demonstrate your understanding of fundamentals of Mathworks RST, create a problem, perhaps a scenario similar to question 2, define your problem using specifics, and demonstrate the solution. This is an personalized learning experience.