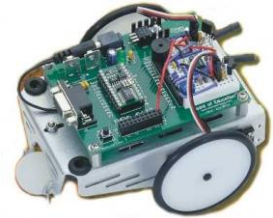# Assignment 4, Due December 3ʳᵈ, 2010
(Worth 12.5%)

In all the questions use the provided Boebot robot.

1. **25**%) Using the light sensor implement a light following behavior. Use a flashlight as a light source. During in class demonstration you would have time to adjust the appropriate thresholds.
2. **25**%) Use the BoeBot robot to implement a random walk guided by the sonar sensor. Keep the sonar pointing forward and keep sensing until you come close enough to an obstacle, then stop and perform a random rotation, then continue driving forward.
3. **25**%) While driving in question one use the speaker to emit a sound inversely proportional to the measured sonar distance.
4. **25**%) Implement one of the following questions:
   a. Use the sonar sensor, facing 90 degrees to the right, to follow a wall. Implement a PD controller similar to assignment 3.
   b. Implement an interesting idea.
   c. Move the robot forward on a straight line for a limited time while collecting sonar data, then stop and move it backwards. Collect the following data:
      i. Time stamp,
      ii. Estimated velocity
      iii. Distance to an obstacle (sonar return)

   Offline, use a 1D Kalman filter formulation to estimate the position of the robot. Every time the robot stops measure the actual distance from the robot to the obstacle. Report on the accuracy of the KF.

Your assignment should consist of a pdf document that discusses your approach, difficulties and potential improvements, and a copy of your source code for verification purposes. You are supposed to work in teams of two. Last day of classes would be a demonstration day.