COMP329 — Robotics & Autonomous Systems — Assessment Two

This assessment is primarily about *mapping* the environment and secondarily about *communication* using Bluetooth.

- You are required to write a robot program that will enable your robot to explore the arena and produce a *map*.

- The robot will start from a known location, with the color sensor located at (x, y) coordinate (20cm,20cm) from the bottom left corner of the arena, facing directly ahead (i.e., along the y axis).

- The arena will have a small number (between 2 and 4) of *obstacles*, which will be placed at random locations. These obstacles will be about 8.5 inches width, 13 inches depth, and 8.5 inches high. (In fact we will use empty photocopier paper boxes.) They are intended to be easily detectable!

- Your robot should explore its arena and produce a map using *occupancy grid* techniques. A sophisticated solution would involve Bayesian updating, but this is not required. Assume grid cells are about the size of the robot (say 10 inches long, 8 inches wide). The arena's are about 78 inches be 60 inches, so this means the occupancy grid will be about 8 x 7 in size.

- The map produced by the robot can be displayed either on the robot's LCD panel (!) or for higher marks, sent back to a PC via Bluetooth.

- To assist with localisation, you can use landmarks/waypoints (e.g., a blue strip of paper crossing the arena) at known locations, which can be detected by your robot.

- The map you produce should give an indication of the probability of cells being occupied, and should indicate when no information is available (i.e., no observations of cell).

- You should:

  - Demonstrate the working solution (or as much as you were able to accomplish) to the demonstrator, who will make a note of all groups that demonstrate their code. Partial marks will be awarded for partial solutions. Demonstrating the solution will be worth 50% of the mark for this assignment.

  - Hand in a printout of your documented code, complete with the usual plagiarism forms, to the student office by the deadline. You may also choose to include a statement about division of labour within the group (e.g., that you all contributed equally). The code will be assessed in terms of elegance of solution and correctness. The code will be worth 50% of the mark for this assignment.

DEADLINE: Friday, 25th November 2011.