**EECS498 Autonomous Robotics Laboratory**  
**Winter 2012**

**BotLab Competition Details**  
**March 19th, 2012**  
**10:10 am**

**OBJECTIVE:** The objective of this competition is to put the whole BotLab together into a complete system, requiring components from parts 1 through 2. In fact, a complete system for part 2 should meet the baseline for this competition. The most successful teams will build upon this minimal system. Teams will be tasked with exploring a maze, finding targets, and laser-identifying these targets.

**BASELINE:** Teams are expected, at a minimum, to autonomously find and laser identify 1 target and explore a non-trivial amount of the maze. Another way to say this is that teams need a non-zero score.

**DELIVERABLES:** No write-up is required for this part of the lab, but a simple GUI must be running during the competition on the desktop showing (include screenshot in BotLab writeup):

- Birds-eye-view display
  - Maze map (not actual maze, but your model of the maze)
  - Locations of known targets
  - Current robot location
  - Current goal (where the robot is heading now)
- Competition statistics
  - Elapsed Time
  - Phase (Exploration or Speed)
  - Number of targets detected ('seen')
  - Number of targets neutralized - laser-identified with 2 short pulses (no shorter than ½ sec each)
  - Points accrued
Competition Day Logistics

A random drawing will determine the contest ordering. Once the competition begins no teams are allowed to make code or parameter changes. We will give you a 5 minute warning were you can make your last-minute changes. Note that there are only a few battery chargers so if everyone works until the last minute there will be no charged batteries to use (get done early and ensure that YOUR team has a fully charged batteries, we make no guarantees on supply of batteries).

Competition Overview

Each team compete for points by exploring an unknown maze, finding targets, and laser-neutralizing these targets in a limited amount of time. The maze will be on the scale of 8’ x 8’ (but may not be square) and passageways will each be at least 18” wide. Corners may not be 90 degrees, but the wall pieces are straight, thus the walls will be piece-wise linear. The contest contain two phases and points are allotted differently in each phase:

1. **Exploration Phase** (4 minutes)
   - Objective: during this phase your robot should explore as much of the phase as possible, find the targets, and build up a map.
   - Points: 1 point for every target neutralized

2. **Speed Phase** (1 minute)
   - Objective: during this phase your robot should neutralize as many targets as possible. Your success here will be strongly correlated to the quality of your phase 1 map.
   - Points: 3 point for every target neutralized

See deliverables on cover page for GUI requirements.

**Winner:** The team with the most points wins

**Interaction:** At no time once the run begins are teams allowed to interact with their system, except for viewing the GUI. You will be given a few minutes to setup after the previous team completes their run.

**Baseline:** As part of BotLab, all teams are expected to find and neutralize at least 1 target. The rest is for fun!

**Number of targets:** On the order of 10 (but likely not exactly 10)

**Targets:** The targets are pink 3” equilateral triangles on white background. They will be placed above the walls at the laser pointer height and the triangle will point “up”.

**Target Neutralization:** The neutralization of a target consists of hitting the target with the laser pointer with 2 short bursts (off...on-off-on-off...). Points will be awarded only if both pulses hit the pink triangle.

**Robot Motion During Neutralization:** You are encouraged to neutralize with the robot stationary, although once you get your system tuned, you are fee to do so while moving but both pulses must be on the pink part of the target. Also, you will be penalized 20 points for simply driving around pulsing the laser.

**Note:** You are not penalized on time for this competition. You may decide (although no user input is allowed) to move to the speed phase at any time, but at the 4 minute mark the speed phase clock starts ticking. If your program does decide to move to phase 2 autonomously, please put a large count-down on your GUI so we can coordinate timers (e.g., 5, 4, 3, 2, 1, SPEED).