CSE490R: Final Lab

For the final lab you will be using your work from the prior labs to compete in a challenge. This project should not require too much more coding on top of your work in the past labs, but will allow you to see how all your modules combine to create a mobile robotics system. The final lab will be held in **Allen 691** and a unique map will be provided on demo day.

The date of the final lab demonstration will be Monday, June 10 from 8am-12pm. A survey will be posted on Sunday to be filled out for time slots. Please contact beforehand if you have a conflict during the demonstration time.

1 Waypoint traversal

A file will be provided with a list of waypoints with associated "point" values for the car to navigate to. The goal is to collect as many points as possible (ideally all) by navigating through the map to these points. How the car chooses which points to navigate to is up to you. Be creative!

2 Logistics

1. On the day of the final demonstration you will download a file with the waypoints listed with the format:

   ```
   X,Y,pointvalue
   X,Y,pointvalue
   ...
   ```

   For testing purposes you can get the waypoints file at:

   `https://courses.cs.washington.edu/courses/cse490r/19sp/waypoints.txt`

   On demo day you will be given a url to load the file from. Once downloaded, you will start your robot stack and start navigating around the room. Each waypoint will have a 1ft by 1ft taped box around the waypoint. Any part of the car traveling in the box will count as arriving at the waypoint.
2. Once your car has navigated to one waypoint, you will have "collected" that point value and can move to the next waypoint.
3. Teams whose car successfully navigates to **1 waypoint** will receive full credit for the demo. Teams who fail to do this will be awarded (lenient) partial credit based on effort, teamwork, and general spirits. The goal of this demonstration is to show off everything you've done this quarter.
4. You will be given the final map, starting location, and list of waypoints at the beginning of your demo time. Note that all locations/waypoints will be specified in **"world" coordinates** (the same coordinate space `rviz` works in). Each team will receive a block of **15 minutes** for their demo. **There will be anywhere from 2-5 waypoints.**
5. Your goal is to collect all waypoints. If your car collects all waypoints the trial will stop after successfully collecting the last waypoint. If you finish early, you can restart and try and get a faster time. Your fastest time will be kept.
6. You can also intervene in the middle of a run. This involves anything that interferes with the robot's autonomous behavior, such as picking up the robot or using `rviz` to re-localize the robot. However each intervention will result in the loss of one point for the run. The clock will keep ticking during your interventions.

7. Each group will nominate a team captain. Although other group members can voice their opinions, the team captain will have the final say on if/when/how interventions and restarts take place
8. You are allowed to change code/settings during your demo period. This will also count as part of the demo time.
9. You may (if you choose) move the car back to the start and restart the run at 0 points.
10. The team with the highest score will receive a prize and bragging rights! If more than one team collects all waypoints, then the team whose car collected all waypoint the fastest will win.

3 Deliverables

1. **Demonstration (50 points):** You will participate in the demonstration described above. Your score will be out of 50 points (~ 5.5 waypoints), where you get points from hitting the waypoints. Additional points will be for the competition but will not count as extra credit.
2. **Code and writeup (30 points):** You will submit all your code and an accompanying document that describes what you did you complete the problem.
3. **Simulation Video (10 points):** Show us a video of your module running in the simulator in Allen 022.
4. **Reflection (Per person) (10 points):** Please write a half-page reflection on the course. You can also use this to write feedback about the course to improve future offerings.