

CprE 288 Final Project

Supplemental Specifications

The document describes additional details for the lab project.

Testing Field

The testing will be located in the back of the room Coover 2041. The following objects and hazards will be present in the field:

1. **Tall objects:** These objects are detectable by the Ping and IR sensors, and have a diameter of no less than 6 inches. These are dangerous materials, so the robot should NOT make any contact with them.
2. **Short objects:** These objects are not detectable by the IR sensor. They may or may not be detectable by the Ping sensor, depending on the distance from the sensor to the object. It's safe for the robot to make slight contact with them, but the robot should move around them if detected through the bump sensors.
3. **Craters:** Craters are created by pulling out the floor tiles. The robot should not fall into any craters. The cliff sensors and wheel drop sensors of the iRobot platform can detect a crater and be used to make sure the robot does not fall into a crater.
4. **Pillars:** Four round pillars that are 3 inches in diameter mark the retrieval zone. Each pillar is detectable by the Ping and IR sensors. The robot should NOT make any contact with the pillars.
5. **Out of bounds:** Out of bounds will be marked with Tape. You can use the cliff sensor signal members of the `oi_t` struct (ex. `cliff_right_sensor_signal`) to detect when your robot has reached the bounds of the test course.

All objects in the test field can be randomly re-arranged before the demo of each project team.

Grading Guidelines

The following is the grading rubric for the final project:

- 40 points - Demo of Part I (basic communication and control)
 - 60 points - Demo of Part II (navigating the robot to the retrieval zone)
 - 30 points - Demo of Part III (positioning the robot in the retrieval zone)
 - 20 points - Coding Style, Documentation and Administrative (Mandatory)
- Total points 150 points*

Additional Grading Comments

- **Mandatory Requirements:** Teams that do not submit these will receive a 0 on the project.
- **Peer Reviews:** While typically all team members of a team are given the same project grade. Exceptions can occur due to Peer Reviews reflecting team members not contributing to the project. If your team has team members not contributing to the project, then report this early to your TA and document this in you Peer Review. Also Team members will lose points for not attending lab during the project (i.e. -10pts for each lab session missed).
- **Time Limit:** There is a **20 minute** time limit for demos. Time limits are necessary in order to ensure every team has sufficient time to demonstrate within the scheduled lab period.
- Points may also be deducted for administrative reasons; for example, failing to submit team membership on time or breaking lab hardware carelessly.

Penalty Table and Base Score Deduction

The following penalties apply to the Demo of Parts II, III.

| Type | Per Incident Penalty | Maximum Penalty |
|--------------------------------|----------------------|-----------------|
| Robot leaving testing field | 5 pts | 10 pts |
| Falling into a crater | 10 pts | 20 pts |
| Repeated Short Object contacts | 2 pts | 10 pts |
| High Object contact | 5 pts | 30 pts |
| Robot program crash | 5 pts | 10 pts |

Over-time penalty: 1pts for each minute over 20 minutes (up to 5 minutes or when TA ends demo).

Partial completion on Part II: If the rover does not make it inside the retrieval zone (or an adjacent tile), partial credit may be awarded based on the team's demo and the instructor's discretion.

Partial completion on Part III: If the rover is only partially inside the retrieval zone, partial credit will be given as follows:

- The Rover fully inside the retrieval zone 30
- At least 75% of the Rover inside the retrieval zone 25
- At least 50% of the Rover inside of the retrieval zone 15
- At least 1% of the Rover inside of the retrieval zone 5

Absent Team Member Penalty: Attendance will be taken during the lab project. If a team member is absent without notifying both the team and the instructor **prior to the absence**, and being excused by the instructor, then that team member will incur 10 point penalty for each meeting missed. Teams who finish early will not be required to attend lab sessions after they have demoed their project.