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 test boundaries are marked by *IR walls*. 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*: Three 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. *Retrieval Floor*: The floor in the retrieval zone will be covered with white paper. You can use the cliff sensor signal members of the oi_t struct (ex. cliff_right_sensor_signal) to detect when your robot is in the retrieval zone.

The objects and pillars in the test field will be randomly re-arranged before the demo of each project team. Craters, the retrieval zone, and the starting zone will remain constant.

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)
20 points - Demo of Part III (positioning the robot in the retrieval zone)
30 points - Coding Style, Documentation and Administrative
Total points 150 points

Additional Grading Comments

- Teams that do not submit the source code used for their demo will receive a 0 on the project.
- Part I, Part II, Part III, and Part IV are a single demo if the demo is successful. Otherwise, a team may request separate demos. A demo of Part I is necessary only if neither Part II, Part III, or Part IV works.
- Each team member will receive the same grade for their team's submission (excluding extra credit or absent penalties). The contributions of each team member must be stated in a lab notebook. Teams who feel a member did not contribute sufficiently may lodge a complaint accompanied by facts to support the complaint, and then differentiate grades may be given to team members.
- Although this is not a race, time is a small factor. You should be able to complete the demo in 15 minutes. Time limits are necessary in order to ensure every team has sufficient time to demonstrate within the scheduled lab period.
- There are a number of sensors that you can use for this project. Use of them is up to your team. **Hint:** Not all sensors are useful for all parts of the project.
- Points may 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, and IV.

Type	*Per Incident Penalty*	*Maximum Penalty*
IR wall crossing	5%	10%
Falling into a crater	10%	20%
Repeated flat material object contacts	2%	10%
High material object contact	5%	10%
Robot program crash	10%	20%

Over-time penalty: 1% for each minute over time. The maximum penalty is 20%. Time will be called at 1 hour.

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 20
At least 75% of the Rover inside the retrieval zone 15
At least 50% of the Rover inside of the retrieval zone 10
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**, that team member will incur a 5% penalty on the project. Teams who finish early will not be required to attend lab sessions after they have demoed their project.