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Practical Work with Report 2

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Recommended Citation

Title: Practical Work with Report 2

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Programme and year on which assessment was offered

MSc Computing

Description

Develop a solution to a robotics challenge and write a short report about it.

What have you found are the advantages of using this form of assessment?

- Students had a blank slate on which they could develop a solution to a robotics problem.
- Fun competitive aspect in which students competed in a robotics competition.
- Connects classroom work to the bigger practice and research communities.

What have you found are the dis-advantages of using this form of assessment?

- Flexibility was a challenge for some students.
- There was a considerable mechanical engineering aspect, albeit in Lego, to the assignment (building a robot) that didn't necessarily align with the content of the module (primarily software).
- Some issues associated with group work.

Alternatives

Essay type assessments can be separated into collection /review of relevant resources, development of plan/schedule/synopsis of proposed work, concept map/flow chart of work in progress, executive summaries, bibliographies etc

Assessment in Practice

- Not suitable for very large classes due to the need for building physical robots.
- Ideal for group work.

Assessment Time

- Preparation time: ~16 hours
- Student time to complete: ~25 hours
- Marking time: ~10 hours
- Ease of Feedback: Written feedback to each group and immediate feedback from their performance in the competition.

Additional Resources

Your team has been tasked by the Irish Space Agency to develop an autonomous rover robot as a tender for the job on an upcoming mission to the newly discovered planetary moon Pandora. The mission is seeking to perform drilling on the Pandoran surface in order to collect samples in the hope of finding the valuable mineral Unobtainium.

The job of your robot will be to deliver drilling packages to a series of locations on the surface so that samples can be collected. Luckily the surface of Pandora is amenable to this job in that the surface itself is flat and black, and Unobtainium present at possible drilling locations results in the appearance of white circles. However, a local tribe, in an effort to thwart our mission, have placed dummy deposits which appear as greyish circles and should be avoided. Also, before the task begins astronauts accompanying the mission will place fences around the area of interest for sample collection. These astronauts will also be available to help at certain times in the mission. Figure 1 shows a schematic diagram of this task.

All teams invited to tender for this development task will be asked to bring their robots to a demonstration at which they will compete against each other.
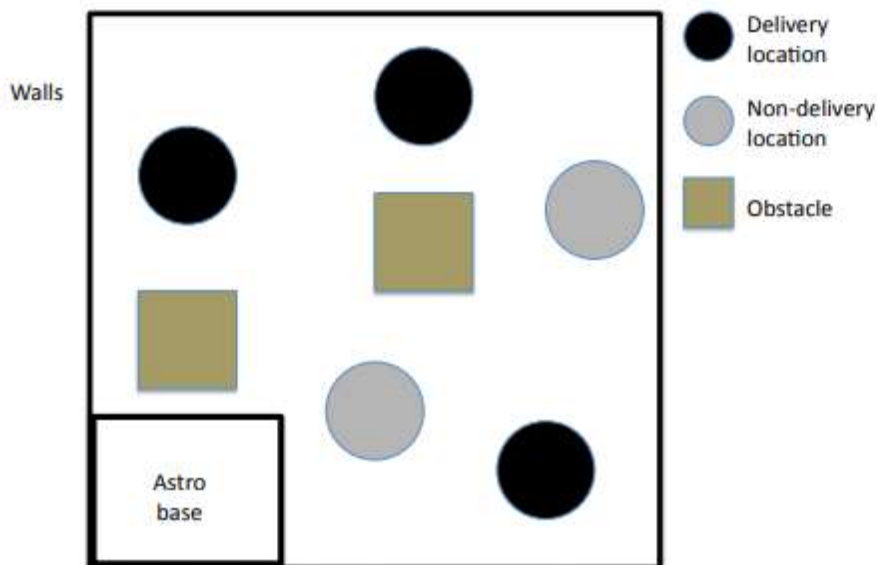
Figure 1: A schematic of the Pandora mission

Challenge Rules

The rules for the challenge are as follows:

- Robots should be developed using Lego Mindstorm NXT kits and the Lejos operating system
- The use of Lego pieces or other materials that are not part of the standard NXT kit **IS** allowed and encouraged
- Robots must be fully autonomous – remote control is not allowed
- Robots must deliver a single drilling package to each of a given number of potential drilling locations on the surface
- If a robot returns to the Astro Base during the mission it can be physically manipulated by the development team (e.g. reoriented, or given a drilling package) but cannot be replaced outside the Astro Base

Submission

The challenge will take place in the robotics lab from 16:00 – 18:00 on Tuesday May 11th, 2010. Late submissions will **NOT** be accepted. Your submission (only one required per group) should include:

- A photograph of your robot
- A document describing your solution and outlining the design and development choices (both mechanical and control) made. Make sure to discuss what went well and what did not.
- All source code

Electronic copies of all required articles should be submit through the module Webcourses site.

Marking

Submissions will be scored based on the following criteria:
- Completion of the demonstration
- Speed of completion of the demonstration
- Accuracy of drilling package delivery
- Quality of discussion document
- Quality of source code

Each team will receive a mark based on the above criteria. Individual members of a team will receive their team's mark multiplied by the percentage of robotics labs they have attended – if you are not in the lab you are obviously not helping your team.

- Assessment Rubric
- Video of Assignments