Constraints Document

Project: ECSE 211 Final project
Task:
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Edit History:
[14/10/2017] Frederic Cyr: set the format of the document. [15/10/2017] Justin Tremblay: Added Software constraints. [16/10/2017] Alex Hale: Expanded on all constraints; changed version system to WEEK.EDIT (e.g. it is currently week 1, edit 3 => 1.3).

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Environmental Issues

The robot will be operating on a smooth, brown wooden surface with black grid lines separating each square. The robot will be operating indoors, so the only significant variable element will be light levels in the competition environment.

Hardware Constraints

The hardware setup is limited to three kits' worth of LEGO Mindstorm EV3 equipment. If any additional connecting parts should be needed, there is the possibility of printing them with a 3D printer. There is no possibility of additional electronic equipment (i.e. bricks, motors, sensors, and wires) - only connecting pieces can be created.

Software Constraints

For the software, we are constrained to using the Java programming language for the whole project. Due to the way it is compiled, we have very limited optimization options. Since the EV3 system has very limited resources, we are also constrained by performance, meaning we cannot run too many threads at once without pausing and resuming them. Since we have very little memory available, it is also important to always use the smallest possible types for variables, i.e., if you don't actually need the precision of a double floating point variable, use a single floating point variable.

We are also constrained by the operating system of the EV3 brick, leJOS. It has multiple ways of communicating with other devices: USB, Wi-Fi and Bluetooth. It is a Linux system so it is possible to use SSH and SFTP to communicate with it. We may also use the EV3 monitoring tool that is included in the Eclipse leJOS plugin.

Availability of Resources

The team's schedules are bound to have many conflicts due to class schedules, so most in-person team meetings will occur in the evening or on the weekend. The large majority of work on the project will occur independently, communicating using tools like Slack and following the schedule outlined on the GANTT chart created by the project manager. Software and documents will be collaboratively created using tools like GitHub and Google Drive.

Budget

The delivery date of the final project is November 24, 2017. The delivery date for the final documentation is December 1, 2017. Along the way, each team member has a budget of 58.5 hours to work on the project.

Glossary of terms