Constraints Document

Project: LIBERTY

Task: General Description of Constraints

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2. ENVIRONMENTAL ISSUES

The system might be affected by:

CON - GEN - 2.1:   changing light due to the sun or shadows varying the readings of a light sensor.

CON - GEN - 2.2:   the opponent's ultrasonic sensor which would create additional noise

CON - GEN - 2.3:   the previous rounds which drained the battery voltage.

CON - GEN - 2.4:   the WIFI connection is unstable or overloaded.

3. HARDWARE CONSTRAINTS

The system is limited to:

CON - GEN - 3.1:   3 EV3 Mindstorms kits which each contain:

- a brick with 4 sensors ports, 4 motor ports and a ARM926EJ-S core @300 MHz **[CON - GEN - 3.1.1].**
- a wifi dongle for communications **[CON - GEN - 3.1.2].**
- multiple sensors such as an 1 ultrasonic sensor which detects distances; a color sensor which also detects light levels; and an accelerometer. (See **Test Document - Sensor Characterization** for the accuracy of the sensors.) **[CON - GEN - 3.1.3].**
- 4 EV3 motors and 1 NXT servo motor **[CON - GEN - 3.1.4].**

CON - GEN - 3.2:   a 3D printer (Maker Replicator 2), taken from the **Project Description (v 1.2F) :** "In addition, a MakerBot Replicator 2 rapid prototyping machine is available for fabricating parts".

CON - GEN - 3.3:   For any other hardware, taken from the **Project Description (v 1.2F):** "Only materials in the Mindstorms kits can be used unless permission is obtained from the instructors." and on the subject of glue: "Glue can be used to secure parts, but it must be of the removable variety."

4. SOFTWARE CONSTRAINTS

CON - GEN - 4.1:   As per the **Project Specification (v 1.2F):** "All computation must be done on board the EV3 brick(s); no offloading to an external machine is permitted."

CON- GEN - 4.2:   The order of ultrasonic and light localization can not be altered because ultrasonic location offers a rough location of the robot, and only if based on the rough location, light localization will offers a more accurate result.

CON - GEN - 4.3:   The wall must be continuous without any gap for ultrasonic localization to perform.

CON - GEN - 4.4:   Navigation can only drive the robot along the way. The robot cannot drive between 2 points using minimal distance, as said in *Software - Design; 7.3.*

CON - GEN - 4.5:   The programming language to build the system is limited to Java

5. BUDGET

CON - GEN - 5.1:   Each team member is allocated 9 hours of work time per week for 6.5 weeks. For this group, this entails a total budget of 292.5 hours. Referring to document: **ECSE211-Meetings-Fall 2017 v1:** "The total time on the project between oct 15th and dec 1st is 6.5 weeks giving a budget of 58.5 hours per team member"