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MC-3020 Lego Robot Materials

Overview

Samples, examples and documentation are helpful in various aspects of communicating software capability. These samples, examples and docs can be useful as part of sales demonstrations, conference demonstrations, teaching/training, evaluations and other situations. It is the goal of this work to develop and deploy samples, examples and documentation in the form of Lego® robots running BridgePoint® UML translated with the MC-3020 model compiler.

Good samples, examples and documentation are characterized by:

- simplicity
- interest
- ease of understanding
- applicability
- accessibility

Lego robots can be built very easily and simply. Materials are available cheaply and easily all around the world. Legos are universally loved by kids from age 2 to 102. The chique of robotics extends this interest level. The robots chosen demostrate subject material that is already understood by many people and easy to grasp by those to whom it is new. Lego Mindstorms® use a legitimate embedded controller that is non-trivial and useful in demonstrating translation technology.

The plan is to develop at least two Lego robots. A line following robot and sumo robot will be included among the robots. Each of these will be presented in the form of:

- photograph of completed robot
- detailed (graphical) assembly instructions
- BridgePoint UML model of robot application
- brickOS interface

The completed robots will be fully functional.

Development

Deliverables and Tasks

1. physical robot from single Mindstorms kit

The physical robot will be used to prove the system and do testing. It will also be photographed.

2. digital photograph of completed robot

   Provide a high resolution digital photograph of each robot. Give a reduced resolution image of the same for thumbnail. Both images will be used in web and printed documentation.

3. MLCad drawing

   The MLCad drawing will be used for the assembly instructions and will also be made available for use by users.

4. step by step instructions

   Using MLCad, build step-by-step instructions for building each robot. Add text instructions to the graphics. Incorporate into an HTML presentation.

5. BridgePoint UML model

   Build and test a BridgePoint UML model of each robot application. Model should include domain functions, related classes and at least one state chart.

6. PIO domain

   Build an interface layer between the modeled domain and the hardware/brickOS. This code should be minimal but provide flexibility to the modeler. The same PIO should work for all (3) robots.

7. `.lx` file of application

   Deliver a working `.lx` of the robot application along with the `.srec` of the associated brickOS kernel.

8. testing with translation server

   Once translation server has been enabled with H300 gcc, test applications using the translation server.

Order of Execution and Schedule

1. Build sumo robot.

2. Test with handcraft code.
3. Deliver photo.
4. Provide MLCad drawing file.
5. Deliver step by step assembly instructions.
6. Learn BridgePoint and MC-3020.
7. Build UML model of robot application.
8. Build brickOS interface (PIO).
9. Test on standalone system.
10. Build shell script to generate application.
11. Deliver `.lx` and `.srec` files.
12. Test with MC-3020 translation server.

Repeat with line follower. Repeat with navigation robot.