

CSSE 374: Lab 8-1

Background

Assume that your work for the iRobot company. You are part of the team that is designing the wall following module of Roomba robots for the first time. The wall following module utilizes an IR sensor that is located on the right side of the robot. The intensity of the IR signal grows higher as the robot moves closer to the wall and grows lower as the robot moves away from the wall. Here is the calibration of the robot under normal working environment:

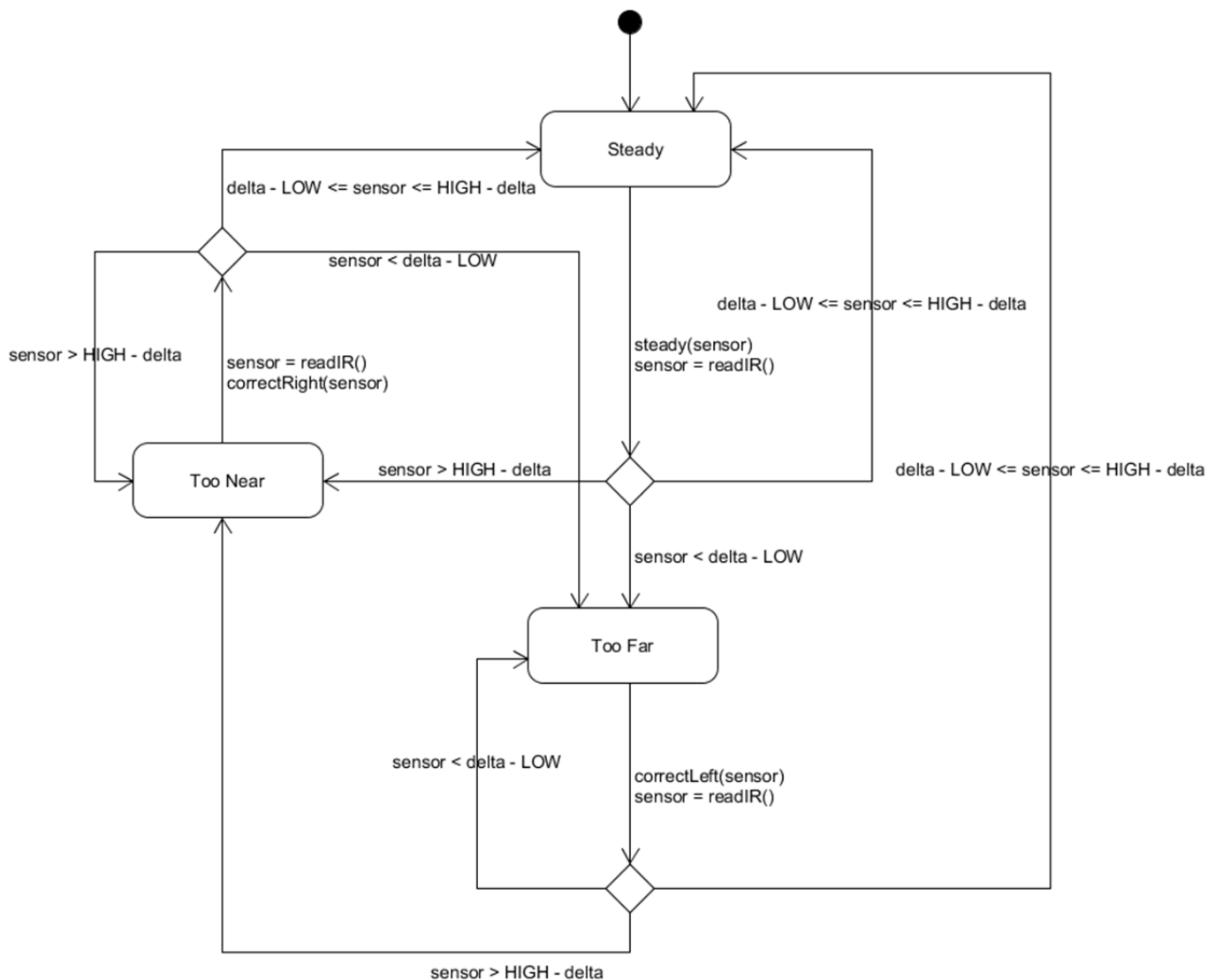
LOW: 0

HIGH: 4000

delta: 1000

Feature

As a proof of concept, your manager has asked you to implement a prototype for the following bang-bang control in Java:



Also, your manager has asked you to make meaningful simplifying assumptions in your implementation. Here are a few:

1. The sensor readings of the robot can be simulated by using a queue of integers (in the given range). Every time **readIR()** is called, a value is polled out of this queue and used.
2. All of the relevant Robot's actions and statuses can be printed to System.out.

Note that this is just a prototype and it is expected that the system will have several more states. You need to design the system such that adding new states introduces minimum changes to the system.

Design

Create **Lab8-1/docs/Answer.pdf** with answers to the following problems:

Q1. Create a **UML Class Diagram** to present your design idea. Explain the design in a few lines. **[10 points]**

Implementation

Q2. Implement your code in the **Lab8-1/src/problem** package. **[25 points]**

Testing

Q3: Implement necessary test cases in the appropriate subpackages of the **Lab8-1/test/problem** package. **[15 points]**

Deliverable

Bundle your project in the **zip** format **[not rar]** and turn it in on Moodle.