ECE 448/528 – Application Software Design
Spring 2023

Project 2: Control IoT Simulator via Web Pages

Due: 02/19 (Sun.) by midnight Chicago Time

IMPORTANT:	***You must sign and date below acknowledgment statement on the title page of your report*.** **Failing to do so, or any violation of this rule will result in an automatic failure for this course.**
Acknowledgment:	I acknowledge all works including figures, codes and writings belong to me and/or persons who are referenced. I understand if any similarity in the code, comments, customized program behavior, report writings and/or figures are found, both the helper (original work) and the requestor (duplicated/modified work) will be called for academic disciplinary action.

I. Overview

In this project, we are going to work on features that allow us to control the IoT simulator via Web pages using the HTTP protocol. For actual smart plugs, these features make it possible to turn a light on or off just by using a browser on your smart phone without the need to install any apps. You may access the web page following *Section III.C of the Project Instructions* but please keep in mind the web page may or may not work depending on your progress of this project.

User story is a widely used tool for requirements analysis in Agile software develop- ment. Each user story uses a short and informal piece of natural language to describe one or more desired features for both end users and developers. Usually, one organizes a user story using the template "As a ... (who), I want ... (what), so that ... (why)." Using such a template will help to meet the so-called SMART criteria for the user story to be specific, measurable, achievable, relevant, time bound. Indeed, end users prefer to communicate using natural language but too much of informal description makes de- velopers hard to evaluate what should be done – user stories achieve a balance between the two.

You should be able to find the user stories describing the requirements in the next section. You will implement the features in the HTTPCommands class so please first read its source code. Pay attention to the method *report* as you could call this method to generate web pages. Locate the comment starting with // P2: and your code should go there.

Once you have some rough ideas on how to implement the features, you should start to create unit tests in a file like src/test/java/ece448/iot_sim/HTTPCommandsTests.java. Follow the red-green cycle to add unit tests and to implement desired features.

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II. User Stories

1. Plug Report

As an end-user, I want to access the web page containing a report of the plug with the name "plugName" at the path /plugName without any query string, so that I can view the report using a browser. The report should include whether the switch is on and its power reading.

2. Toggle or Switch a Plug On/Off

As an end-user, I want to control the plug with the name "plugName" at the path /plugName with a query string, so that I can control the plug using a browser. To toggle a plug, the query string is action=toggle. To switch a plug on, the query string is action=on. To switch a plug off, the query string is action=off.

3. Control Feedback

As an end-user, I want to receive the up-to-date report as the response to the path /plugName with a query string, so that I can verify that the plug acts properly.

III. Testing Procedures

The testing procedures are implemented in ece448.grading.GradeP2. It should be fairly straightforward to verify all user stories are covered.