Project 3: IoT Simulator and MQTT

I.

Overview

In this project, we are going to work with the MQTT protocol that allows us to control the IoT simulator and report its status. For your convenience, the Eclipse MosquittoTM MQTT broker is installed in our course virtual machine.

You should be able to find the user stories describing the requirements in the next section. While we are going to discuss possible class designs and implementations in the lectures, you are free to choose designs and implementations you are comfortable with. Don't forget to follow the red-green cycle to add unit tests.

II.

User Stories

1.

Plug On/Off Updates

As an end-user, I want to receive MQTT messages when a plug is turned on or off, so that I can monitor the plug on/off events using an MQTT client. For a plug with the name "plugName" and a configuration string "prefix", the topic should be prefix/update/plugName/state, and the message should be either "on" or "off". Note that the prefix can have the character / multiple times, e.g. illinois-tech/ece448/unit_test.

2.

Plug Power Updates

As an end-user, I want to receive MQTT messages when the power consumption of a plug is measured, so that I can monitor the plug power consumption using an MQTT client. For a plug with the name "plugName" and a configuration string "prefix", the topic should be prefix/update/plugName/power, and the message should be the power consumption in plain text.

3.

Toggle or Switch a Plug On/Off

As an end-user, I want to send MQTT messages to toggle or switch on/off a plug, so that I can control the plug using an MQTT client. For a plug with the name “plugName” and a configuration string “prefix”, the topic should be prefix/action/plugName/actionString, where the actionString is one of “toggle”, “on”, or “off”.

III.

Testing Procedures

The testing procedures are implemented in ece448.grading.GradeP3. It should be fairly straightforward to verify all user stories are covered.