College of Engineering
Computer Science & Eng. Dept.
Course: COE 457 Internet and IoT Programming (Lab)
Date: 14th November 2020
Location: Online

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Homework 3: Express, MQTT, Cookies and MongoDB

Objectives:

- To use the Express framework in building Node.js web applications.
- To use MQTT for sending/receiving data.
- To use cookies for session management.
- To use MongoDB for storing data.

Submission instructions:

This is an **individual** assignment.

- You should push your solution to your GitHub repository.
- Upload on iLearn:
  - The solution document with cover page, link to your GitHub repository, code, screenshots of outputs.
  - The code files.

Due Date: **Thursday 30th November, 2020 11:59 pm**

Useful Resources:

- Lectures: Introduction to Express, Cookies with Express, MongoDB, MQTT.

In this homework assignment, you will extend and refactor Homework 2 by using **Express**, **MQTT**, **cookies** and **MongoDB**.

- This is how the application should work:
  - A new user creates an account using a registration form to be able to use the web application.
  - If users already have an account, they log in using a login form.
  - Upon successful registration or login, the user is redirected to the web page that has the interactive map.
  - When the user is logged in, the navigation bar on the page shows the user's name and option to log out.
  - If this is not the first time the user uses the application, the web page displays "*Welcome back <user's name>!*" and the last time the user visited the page.
  - When the user sets the destination on the map, it publishes messages of the current and destination locations' coordinates to the MQTT broker. The moto device uses the messages published to update the arrow's direction. (*Figure 1*)
  - If the user is not logged in, any attempt to access inner pages (such as the map) displays an error message of unauthorized access and a link to the login page.
  - If the user checked the "Remember me" option in the login form, and only closed the browser, the user will not need to login again to access the application.

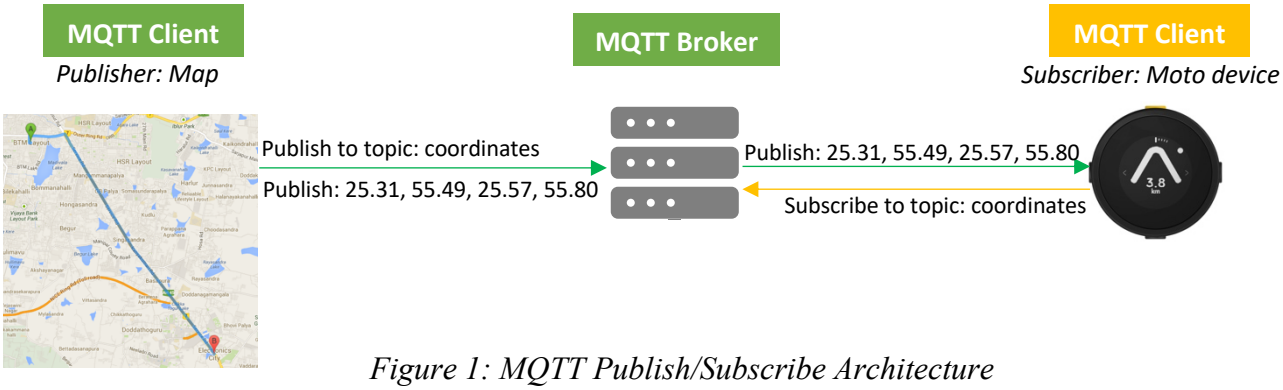

Figure 1: MQTT Publish/Subscribe Architecture

- **Notes:**
  - Feel free to use your solution of Homework 2.
  - Use Bootstrap to set up the login and registration forms.
  - The user's details and locations' coordinates should be saved in the MongoDB document database.
  - When the user opens the application in the browser, a session is created and the application connects to the MQTT server.
  - Use session cookies to preserve the user's logged in state, the last access time and date.
  - The authentication cookies should expire within 30 days.
  - When the user logs out, the session is deleted and the cookies should be cleared.
  - You should not save plain passwords in cookies for security reasons.
  - Following the regulations under the General Data Protection Regulation (GDPR), you should notify the user that your website uses cookies and receive their consent before using cookies. If the users do not accept, they should still be able to use the website.