SEP 4 Project Requirements

General

You must utilize SCRUM & AUP for the development process.

You must hand in a project- & process report. The project report must include authors for each section.

You must hand in links to the source code on GitHub.

You must hand in a link to a video demonstration on YouTube.

IoT

Design and implement a FreeRTOS based application in C for an AVR2560 MCU that interfaces to several sensors and actuators

Use LoRaWAN (IoT-Network) for transmitting and receiving data

Implement a Bridge Application in Java to receive data from Loriot Network Server and store them in a MongoDB Document database.

(Main part of drivers to sensors and actuators will be given)

Minimum requirements to the embedded software

- You must use at least five tasks.
- Some data must be used by more than one task.
- You must use semaphores, mutexes and queues.
- You must unit test parts of your application.

Minimum requirements to use of hardware

- Your software must run on your Arduino Mega2560 board with VIA-shield and make use of the following sensors and actuators:
  - Temperature/Humidity
  - CO2
  - LoRaWAN transceiver
  - RC-servo
  Optional:
  - Light
  - Sound
  - PIR sensor

Data Engineering

Apply knowledge of dimensional database modelling

Design and implement a dimensional model

Design and implement an Extract, Clean up, Transform, Load process for the data flow

Design and implement web services

Create paginated reports in Reporting services

Create analyses in Power BI

Cross Media

The application must retrieve and parse relevant data from a webservice

The application must be able to send data to a webservice to interact with actuators

The application must have a responsive user interface

The application should use lists to display sensor data

The application should utilize authentication to sign in

The application should have a settings menu

The application should persist some data locally on the device

The application could utilize Google Maps and Location API to display sensor data

The application must be under version control for the entire development process

The application must be developed using the official Android framework

The application must be developed with Java

The application should follow the Google Material Design guidelines

The source code should be structured using an architectural pattern