Building a functional prototype for automatic hydroponic food production, designing and implementing an API to store crop data, and creating an interface for control of the hydroponic growing system.

API
- Created by spring boot framework and the MVC methodology, and it allows the user to be able to retrieve stored data and objects.
- Provides functionality to CRUD Domes, Water Tables, and Growing Conditions, and the ability of a dome for self-provision.
- Subscribed to the data topics, so it receives and processes all of the messages, and stores the data.

Data Collection
- MySQL server is used as the datastore.
- The database is an AWS RDS instance running a variant of MySQL, and able to be queried by a variety of clients.
- The MQTT pipeline is the platform for transmitting data between the microcontroller and the database.

Microcontroller
- The device consists of Arduino as the microcontroller, and 2 different sensors to monitor and collect data.
- Responsible for maintaining the specified growing conditions by measuring the parameters (temperature, pH, electrical conductivity, oxygen level and water flow.)
- Must communicates over Wi-Fi to share data and control signals.

Overall, we have accomplished the work to be done to achieve the project objectives, and the results are as we expected. We collaborated with the front-end team to make sure they could integrate to our API’s. in addition, the cloud-based system we have provided should be durable and easily extendable for future development.

Recommendations
- The API has most of the required functions, but it does not have the durability and completeness as a production-level application.
- In order to scale the API and data collection system more easily and provide better redundancy, it would be better to run them on different resources separately.
- The AWS MQTT currently does not support the storing of messages if something is not able to receive them. Other broker with this ability will be beneficial.