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HOME AUTOMATION

A UNIFIED WEB INTERFACE FOR THE INTERNET OF THINGS

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PROJECT DESCRIPTION

GENERAL IDEA

The Internet of Things is transforming every corner of life: the home, the office, city streets and beyond. IoT products give us greater control over door locks, lights and appliances; offer insights into resource consumption habits; streamline business processes; and better connect us to the people, systems and environments that shape our daily lives.

Whether you're a homeowner looking for the best products to start building your connected life, or a business leader looking to take your company to the next level — this is the place to begin. We've collected the best and most popular options the IoT has to offer, from smart home devices to enterprise platforms to the software and tools you need to build your own smart, connected products.

Home automation is a web-based system that collects all home appliances and devices that can connect to the internet and be controlled remotely. Instead of each device having its own “companion app”, our platform will enable us to communicate and interact with a number of devices located in our home. As there will be various device types, each device will require a different UI to manage.

One key aspect that one can find in the Internet Of Things is that devices will be able to talk to one another. For example, if the weather channel says that it will start raining today, maybe the automatic sprinkling system should be disabled for today. We will not implement this in our system!

GENERAL TECHNICAL DESCRIPTION

In the following section we will provide a short description of the technical aspects of the application.

The application should be implemented using the latest version of the Spring Framework (Spring Boot) and deployed either on the latest version of the Tomcat server or as a standalone Spring Boot application. As a database you should use MySQL.

The design of the UI should be responsive as we will need to be able to view it in a number of different devices.

USER ROLES

Before a user can interact with our application he/she will have to sign up. The application will be using a login mechanism for security purposes. After logging in, a user will be able to perform various actions. The available actions provided will depend on his/her assigned role. The following two roles are available:

- **ADMIN**: the user will be able to add and remove devices from the system, as well as assign devices to users. He will also be able to change the schematics of the house (add/remove rooms and move devices around the house). The system can have multiple administrators.
- **USER**: A user will be able to interact with the devices he has been assigned. A simple user will not be able to view the content only available to an administrator of the system

SYSTEM ENTITIES

After an initial requirement analysis the following entities have been recognized:

PERSON

- The users of our system. A person has the following attributes: **ID, Name, Surname, email, Password and Role**
- A person can interact with zero or more devices

DEVICE

- A device has the following attributes: **ID, Name, Type, Status and information**
- A device can be accessed by multiple users
- A device is located in a room
- Each device can have a single type
- Examples of device Types: Air Condition, Thermostat, Lock, Coffee Maker, etc.
- status: On/Off
- Information: Will represent information for a device. For each device type the information will be different.
  Example: For an Air Condition you will be able to turn up or down the temperature, so the information should be the current temperature of the room.

ROOM

- A room has the following attributes: **ID, Name**
- In a room there may be zero or more devices

SYSTEM REQUIREMENTS

- A user will be able to sign-up and sign in (authentication with role assignment)
- Each user will be able to view a list with all the devices he can control
- By clicking on each device an interface will open for interacting with the device
- Each device type has a different way of interacting with it
- Administrators will also have extra functionality:
  - view a list of all users
  - view a list of all devices and the users that have access
  - add/remove/update users
  - add/remove/update devices

IMPLEMENTATION OF MICROSERVICES

For any team that implemented all the above a next level step is to create a microservice managing all devices of the same type. Each micro service will actually be a standalone spring boot application providing real time information for all devices of the same type located in our house. The main application and each microservice will communicate using RESTful web services.