HouseControl

HouseControl is an application that wants to control and monitor a house, it wants to be a house automation application. This application is composed by a server (Java) and by a client mobile application (Android).

The main goal of this application is to control the lights, blinders, HVAC, doorbell, and other systems in a house. This means that this application should control and monitor the current system status (light on/off, blinder up, inside temperature, etc.).

The server application, which needs to be developed in Java, should have the following features:

- Access to a real-time database (Firebase Realtime Database) where all the data (sensors configurations, users and current status) from the systems to be controlled needs to be stored;
- This server should be implemented with the Functional Programming paradigm in mind;
- All the application logs need to be implemented using the Aspect Oriented Programming;
- Each user that will use this application needs to be registered in the system using the Firebase Authentication platform;
- A notification should be triggered every time that a threshold is achieved (temperature too low, someone pressed the doorbell, etc.). These notifications should be sent using the Firebase Cloud Messaging platform;
- All the status and configurations should be possible to be visualized and edited in this server application;
- This server should have a socket that will receive the systems status changes and it will be on this socket that the user actions should be delivered.

The mobile application, which needs to be developed in Android, needs to have the following features:

- Synchronize the systems status with the server;
- Modify the house systems current state (turn off some lights, change the HVAC temperature, etc.);
- Receive and present notifications given by the server;
- Present in real-time the current status of each system, as well as some history about each one;
- Do not forget that each user can have multiple mobile devices and controls his house using those different devices.

Do not implement only the requested features, be creative with the application and evolve it according to your feel for new features. All the efforts made on the implementations of additional features will be valued.

Do not use only the tools given on the class, do some research on tools that can be used and that can improve the work quality and the development times.

Groups formation

This work needs to be developed in groups composed by a maximum of two students.

The detection of fraudulent works will invalidate the grade to all the involved groups. It is considered as fraudulent, all the works that we identify that were done by people which do not belong to the original group. This is applicable for a complete work of just part of it.

Delivery and evaluation

This work should be delivered on Moodle until the **24th of June of 2019**. It needs to be composed by two components: developed applications and a final report in digital format (PDF). All the components should be delivered in a single ZIP file with the following name: pedwm_studentnumber(s).zip.

All the works delivered after the deadline will not be considered. In situations of a partial delivery: just the application or just the report, the work will also be considered as not delivered.

The final report needs to describe the following:

- State of the art;
- Implemented features, and the ones which were not implemented;
- Requirements to run the applications;
- Test environment used to test the complete system;
- System architecture and how server and client applications connect between each other;
- Code and application aspects that could add value to the application, or justify the taken choices during the applications developments;
- Conclusions.

For the final evaluation, the developed application will have an weight of 90% and the report a weight of 10%. The final grade of the work will be multiplied by a value (percentage) got on the work's presentation

Example: Work grade 15 values * 80% presentation = 12 values (Final Grade)

Presentation

The work presentation will be in the day given by the university for the exam realization during the corresponding evaluation period. If the student does not present the work, his work will not be valid for a grade. During the presentation the student could be asked about any question related with the course, as well as been asked to change some features inside the delivered work.