

Final Project

Internet of Things

In this project you need to simulate a smart home with an Arduino Simulation in Proteus and python script on your PC. Smart home which you need to simulate contains 2 rooms. In each room there is a bulb which operates on 220V AC, it is necessary to have control over both of them with Arduino. Additionally, each room has one DC motor that simulates a ventilation system. While the ventilation system is turned on it has two operation modes: *supply of fresh air* - DC motor rotating in one direction and when rotate in opposite direction that is - *bad air suction*. These two modes alternate in an interval of 1 minute.

There are two sensors in both rooms, one sensor for measuring temperature and the other for measuring illuminance. Measurements of each sensor are sent to the PC after every minute.

To successfully do this part of the task, it is necessary to select the appropriate control devices and sensors.

For communication with a PC you need to use zigBee(xBee) Protocol and an appropriate device. Define the appearance of the message through which you will be able to send commands but also receive measurements.

Python script. In this part of the project, you need to create a script that, in addition to communicating with the Arduino, can send/read email and upload/download data to ThinkSpeak.com. Everytime when scripts receive measurements from an arduino, it uploads them to an appropriate field (one sensor, one field) on ThinkSpeak.

Arduino control is also sent via e-mail, as well as sending reports. It is necessary to define the structure of the Email Subject through which the command can be determined and which device is switched on in which room.

(examples: *Subject:LIGHT-ON-ROOM2* or *Subject:VENTILATION-OFF-ROOM1* or *Subject:GET-REPORT*)

The report consists of the average of the last 10 measurements from each sensor, get this data from thinkspeak.com, as well as the current state of the ventilation system and light.

Email Report Example

Subject: Report

Body: Room 1

Average temperature: 23.2°C

Average illumination: 20 lux

Current ventilation status:ON

Current light status:ON

Room 2

Average temperature: 27.3°C

Average illumination: 24 lux

Current ventilation status:OFF

Current light status:ON

Reports should be sent on each 10 minutes or when requested with an email command.

Delivery:

Students should mail their solution in a form of text file containing executable code, or a .zip file containing a full project. Code should contain comments that explain the logic of the solution. Solution should be mailed to the professor by e-mail: mtanaskovic@singidunum.ac.rs latest by Thursday 24.12.2020 at 12:00 (noon). Solutions that are not sent by this deadline will not be considered.

Defense:

In order to get the points for the final project, students have to defend their solution. Defence consists of practical demonstration that their code works, short oral explanation of what they did and a minor modification of the code on the spot. Defence will be organized on-line and you will be informed about the time by e-mail once you send your solution

Grades:

Students will get the points for their solution based on its accuracy and the knowledge that they show during defense. Maximal number of points that can be achieved is 30.

For any further questions regarding this project, you may contact the teaching assistant by MS Teams Chat or e-mail: udragovic@singidunum.ac.rs