EXCERCISE REPORT

About the project

The objective of the project is to build a temperature measurement device that communicates with a remote system by IoT protocol MQTT or CoAP. Main components of the device are Raspberry Pi 3 singe board computer and Dallas DS18B20 temperature sensor.

Preparing the project

In the beginning of the projcet I subscribed on Trello and created a board for the project.

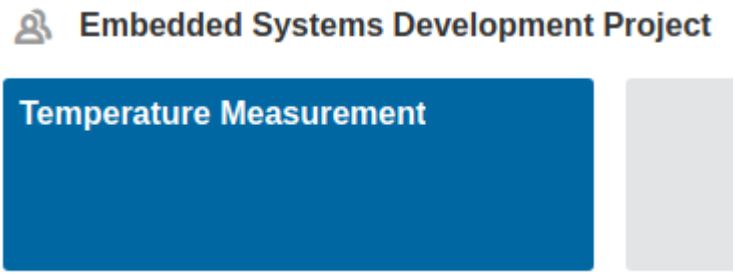

Image 1: Project board on Trello

Trello is new to me, so I'd had to spend few hour to get start with it. Finally, I managed to create Backlog and other cards required in this project.

I also created a new Github repository to handle version control and share the files of the project. The location of the project repository is:

https://github.com/t5maja03/Embedded1

After I had both management platforms ready for the project, I invited teacher to my Trello board.

Assembly

The objective of this project is to build a temperature measurement device that communicates with a remote system by IoT protocol MQTT or CoAP. Main components of the device are Raspberry Pi 3 singe board computer and Dallas DS18B20 temperature sensor.

The assembly contains Raspberry Pi 3 board, Dallas DS18B20 sensor, 4,7kΩ resistor, breadboard and connection wires.

The assemply uses 3.3V voltage and GPIO-pin to read sensor value. In this assembly, Raspberry Pi is connectet to local network by ethernet interface and it is controlled remotely by secure shell connection (ssh).

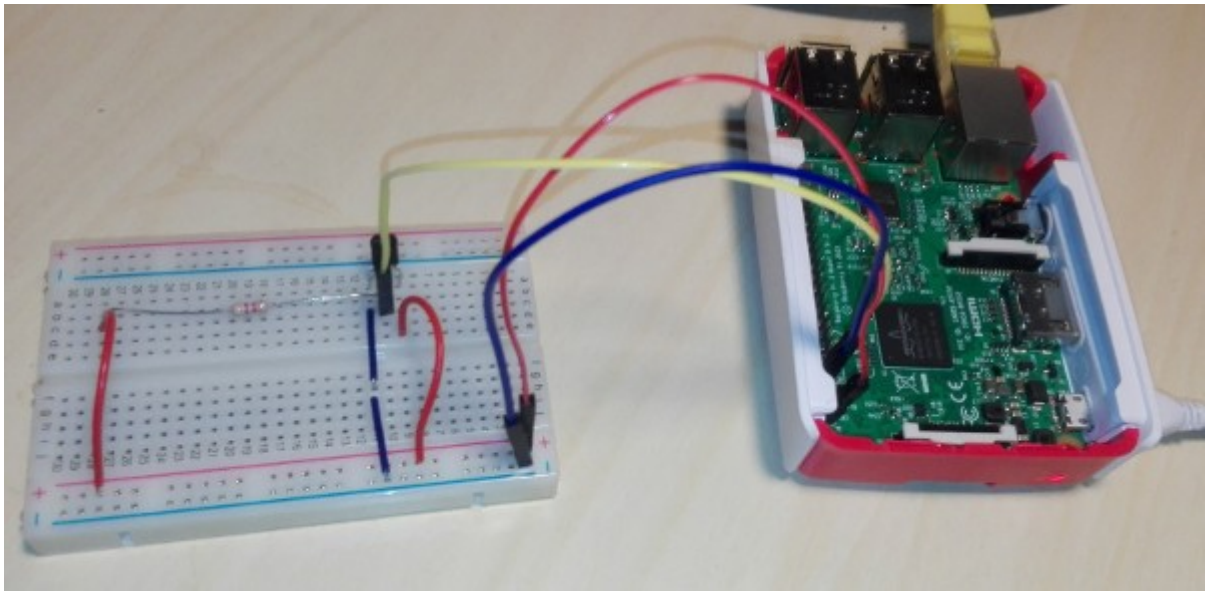

Image 2: Raspberry Pi 3, Dallas DS18B20 connected using GPIO pin, 3.3V voltage and 4.7 kΩ resistor

Preparing Raspberry PI

Raspberry Pi 3 uses a mini-SD card as a bootable hard drive which in this case wasn't bootable at all. So, the first task was to initialize the disk with reliable operating system and drivers.

I formatted the disk by SD Card Formatter:

https://www.sdcard.org/downloads/formatter_4/

The OS installation was made by Noobs

https://www.raspberrypi.org/downloads/noobs/

The Operating system's Debian based Raspian Linux

http://www.raspbian.org/

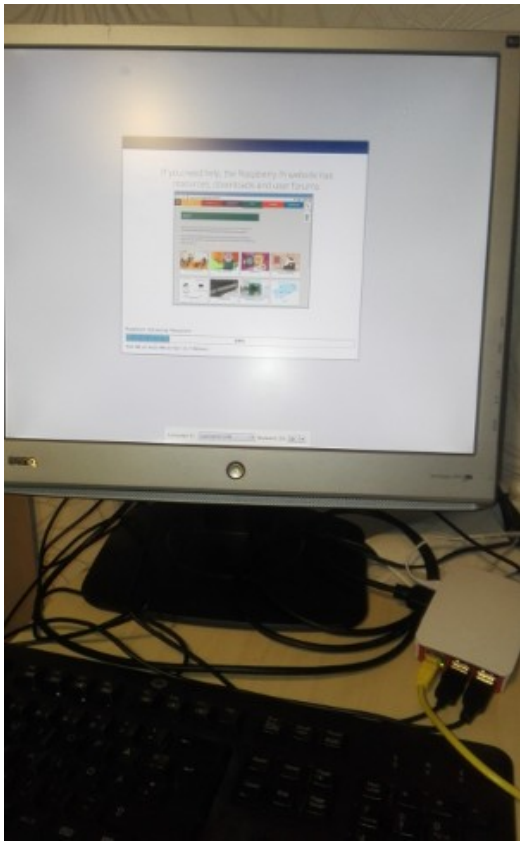

Image 3: Installing Raspian OS by using Noobs

Testing components and assembly

I tested components and assembly by using simple python script found on this site:

https://www.modmypi.com/blog/ds18b20-one-wire-digital-temperature-sensor-and-the-raspberry-pi

The test script simply reads and parses a file in sensor device folder. Then it converts the data to Celsius and Farenheits and prints the result out. To be able to do that, it is necessary to import OS interface and system time, as well as the drivers for GPIO and 1-wire devices.

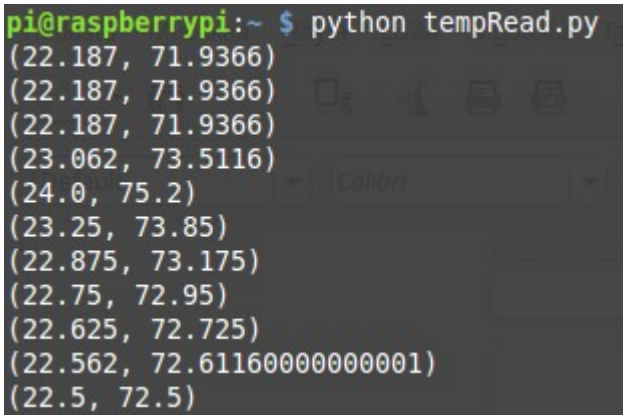

Image 4: Testing assembly in bash console. The output is temperature in Celsius and Farenheit degrees

I wrote the script and run it in bash console. I also warmed the sensor by holding it in my hand to see that it responds correctly for changing temperature.

The test result shows that the assembly works properly and it is ready for further development as an IoT thermometer.