2020 - 2021
Spring Semester

CME 3208
Principles of Embedded Systems

Lab 5
Baby Room Monitoring

In this lab work, you will use temperature, humidity and light data to monitor condition of a baby's room. You are required to create a circuit with an Arduino board, DHT11 temperature and humidity sensor, LDR light sensor, 10K potentiometer and other necessary equipment using Arduino Software (IDE).
You should measure the LDR maximum and minimum resistance values in order to build a voltage divider circuit with a 10K potentiometer. You will place an analog input of your Arduino's A0 pin between LDR and Potentiometer. LDR will be used to determine the day or night value by means of analog reading. The threshold of the Day and Night sensor should be around 400. Therefore, you need to calibrate your circuit with the potentiometer, and this step is **necessary**.

Experiment

You will design a circuit of LDR light sensor and DHT11 temperature and humidity sensor. You will write an Arduino program to monitor conditions of a room using temperature, humidity and light data concerning following thresholds.

Thresholds are:

```
Humidity ∈ [30%, 50%] → "Optimal Humidity"
Humidity < 30% → "Low Humidity"
Humidity > 50% → "High Humidity"
Light >= 400 → "Day"
Light < 400 → "Night"
Temperature during Day ∈ [20°C, 24°C] → "Optimal Temperature"
Temperature during Day < 20°C → "Cold"
Temperature during Day > 24°C → "Hot"
Temperature during Night ∈ [18°C, 21°C] → "Optimal Temperature"
Temperature during Night < 18°C → "Cold"
Temperature during Night > 21°C → "Hot"
```

Your program should display relevant description on the serial monitor window in an interval of **3 seconds**. The text format should be as follow:

```
Date: 03.06.2021 - Hour: 17:19 – Light: 580 Temperature: 30°C -
Humidity: 45%
Day – Hot - Optimal humidity
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Date: 03.06.2021 - Hour: 18:17 – Light: 353 Temperature: 23°C -
Humidity: 30%
Night – Hot - Low humidity
-----------------------------------
Date: 03.06.2021 - Hour: 19:53 – Light: 269 Temperature: 18°C -
Humidity: 70%
Night – Optimal temperature - High humidity
-----------------------------------
Date: 03.06.2021 - Hour: 20:14 – Light: 153 Temperature: 16°C -
Humidity: 29%
Night – Cold - Low humidity
```

Upload Requirements
You need to write source code for the experiment on Arduino Software (IDE). You also need to create a video of your project by screen casting, that explains how you created your project, how it works (both hardware and software) and shows its execution for the experiment.

The files you are required to upload are given below:

`(Student_Number)_(Student_Name)_Lab_5_BabyRoom_Exp_Code.txt`
(Source code you have written for the experiment 1)

`(Student_Number)_(Student_Name)_Lab_5_BabyRoom_Video.mp4`

The video you are going to make should be at most 5 minutes. Videos uploaded longer than this time limit will have their grade reduced. In addition, please make sure the video quality is good and your circuit and computer screen (when it is required) is clearly visible. Also, make sure to show the change of temperature, humidity, light and other variables on the serial monitor during the video.
You must also show your **student identity card** clearly and speak and confirm your identity verbally in this assignment video.

Your codes have to be original.

Good Luck to You All!