CME 4003 Embedded Systems Lab Experiment

Baby Room Monitoring

Preliminary Work

Study how to control **DHT11** Humidity & Temperature Sensor and Light Dependent Resistor (**LDR**) from Arduino Kits. Please examine the DHT11 and LDR datasheets and example codes. After that, 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) (*https://en.wikipedia.org/wiki/Voltage_divider*). LDR will be used for determining the day or night value by means of analog reading. The threshold of the Day and Night sensor should be around **400** for proper working. So, you need to calibrate your circuit with the potentiometer, and this step is a **MUST**. Please study and understand the necessity for the voltage divider circuit with LDR.

Intervals are:

Humidity ϵ [35%, 50%] → "Optimal Humidity"
Humidity < 35% → "Low Humidity"
Humidity > 50% → "High Humidity"
Light >= 400 → "Day"
Light < 400 → "Night"
Temperature during Day ϵ [23°C, 25°C] → "Optimal Temperature"
Temperature during Day < 23°C → "Cold"
Temperature during Day > 25°C → "Hot"
Temperature during Night ϵ [18°C, 20°C] → "Optimal Temperature"
Temperature during Night < 18°C → "Cold"
Temperature during Night > 20°C → "Hot"

You will print the sensor values with 2 seconds intervals and their meanings to serial monitor (Serial.print) in following format:

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Illumination: 483 - Humidity: 45% - Temperature: 30°C
Day - Optimal Humidity – Hot

Illumination: 415 - Humidity: 44% - Temperature: 24°C
Day - Optimal Humidity – Optimal Temperature

Illumination: 335 - Humidity: 20% - Temperature: 16°C
Night - Low Humidity – Cold
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Note that in order to read DHT11 measurements by Arduino, you need DHT11 Library. Please make your laptops ready by including this library before coming to lab. Also, without your circuit schematics you **cannot enter the lab**.

Hardware Requirements

1. Breadboard
2. DHT11 Sensor
3. 10K potentiometer
4. LDR
5. Connection cables

Lab Work

Design and implement your circuit over lab kits. Make the necessary connections between your circuit and lab Kits. After that you should write your own source code to test your program. Show the results to your lab assistants.