Project III

Digital Systems and Microprocessors

Degree in Biomedical Engineering

Objetive

The general objective of this project is to demonstrate the use and skill using the Arduino System, and the handling of different types of sensors.

Description:

Connect the LDR and LM35 temperature sensor to the A0 and A1 analog inputs of the Arduino development board, respectively.

Exercise 1.

Write a code in which light incident on the LDR is measured and displayed on an 7-segment display the intensity of the measured amount of light. The measured incident light will be divided into 6 ranges from 0 to 5, and each range will be divided into 171 units (ADC conversion intervals)

When the sensor output voltage is between 0 and 171 (code generated by the ADC), range 0 is displayed, displaying the number 0, and so on. The minimum value displayed, range 0, is when the incident light on the LDR is maximum, while the maximum value displayed, range 5, is when the incident light is minimal, i.e no light.

The range of the light detected by the LDR should also be displayed on the serial monitor. Therefore, the following message "Measured light range:" should be displayed, after this message the numerical value of the range should be displayed.

Exercise 2.

Write a code where the temperature detected by the LM35 is measured and that temperature is displayed on the serial monitor. Two temperature ranges are selected, 25ºC and 30ºC, to establish a minimum and maximum working limit of the system.

When the temperature sensor detects a temperature below the minimum limit, the following message, "Temperature below minimum limit" appears on the serial monitor.

When the temperature sensor detects a temperature above the maximum limit, the following message, "Temperature above maximum limit" will be displayed on the serial monitor.

When the temperature sensor detects a temperature between the minimum and maximum limit, the following message, "Temperature normal" appears on the serial monitor.

> ➢ **The project has a maximum score of 10. 10% of the course grade**
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> ➢ **The project must be developed by 2 students**
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> ➢ **For the delivery of the project, a document. ZIP must be done and it should contain:**
>> ✓ **Files .ino with each corresponding code.**

- ✓ **A pdf document for each program and it must contain:**
    - ▪ **Justifications and conclusions of the written code.**
    - ▪ **Representative flowchart of the program.**
- ➢ **The name of the file will be surname_name**