

EE447 - Project Pre Report

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In this project, we will be displaying the luminosity level measured by the light sensor on the LCD screen and light up the proper LEDs on the microcontroller board TM4C123GH6PM. For that purpose, there are two input devices and two output devices in this project. Inputs to the microcontroller board are luminosity sensor TSL2561 and potentiometer. Outputs are Nokia LCD screen and output LED (external led).

Among those devices, the first one to be inspected is the luminosity sensor. Initial step in the usage of sensor is to establish the serial communication between the microcontroller and the luminosity sensor TSL2561. This operation will be done by using I2C. Sensor will sample the luminosity value in a 256 elements array and will send it to our microcontroller board. After attaining that input, we will be calculating the mean of the sent data and it will represent the average luminosity. Required operations in the project will be done by using this average luminosity value.

Second device to be inspected is the potentiometer. By using the potentiometer, the user will set two threshold values on the luminosity level. One of the thresholds is the lower threshold and the other is the higher threshold. In initial configuration, there will be some constant values (given by project members) and the user can later change those thresholds if he/she wants to. If the average luminosity value is below the lower threshold, the red LED in the microcontroller board will light up. If the value is between lower and higher threshold, the green LED in the microcontroller board will light up, as well as the output LED. In this interval, the output LED will have brightness based on the luminosity level measured by the light sensor. For example, at the beginning of the ceiling of the lower threshold, the output LED will be very dim. As the luminosity level approaches the higher threshold, the brightness of the output LED will increase. The last interval is above the higher threshold, in which the microcontroller board will light blue LED. Note that the output LED will light up by using a transistor since GPIO pins of the microcontroller board will not produce sufficient current to feed the LED. Note also that threshold setting procedure can be also done by using 4x4 keypad.

The last unit in this project is the Nokia LCD screen. In this screen, current luminosity value, the LED that is currently ON (in the microcontroller board) and the lower & higher threshold values will be displayed. Current luminosity value will be updated every second, even if other entities do not change in that 1 second interval. If other entities also change, those changes will also be illustrated in the LCD screen.

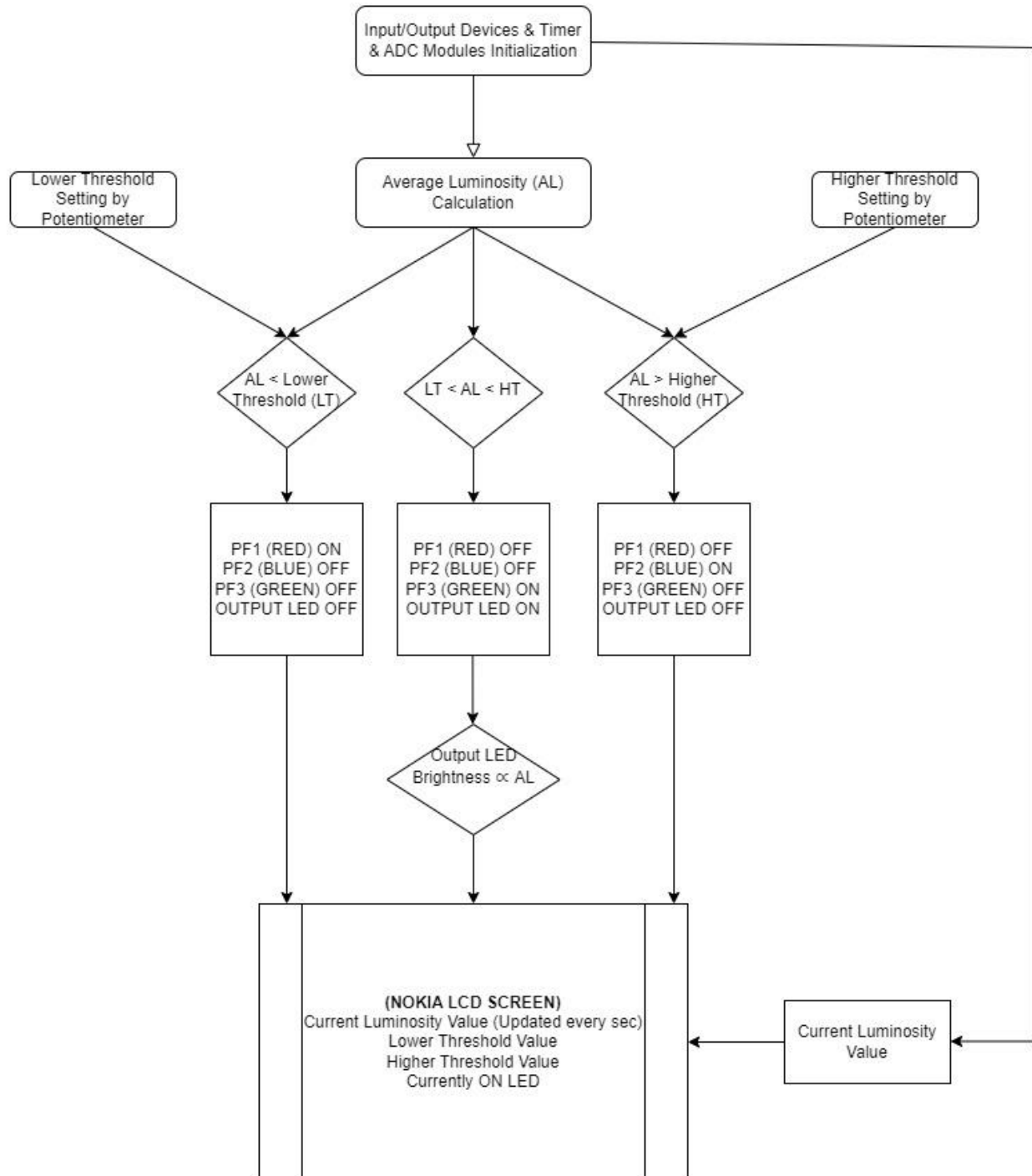


Figure 1: Flow Chart of the project.

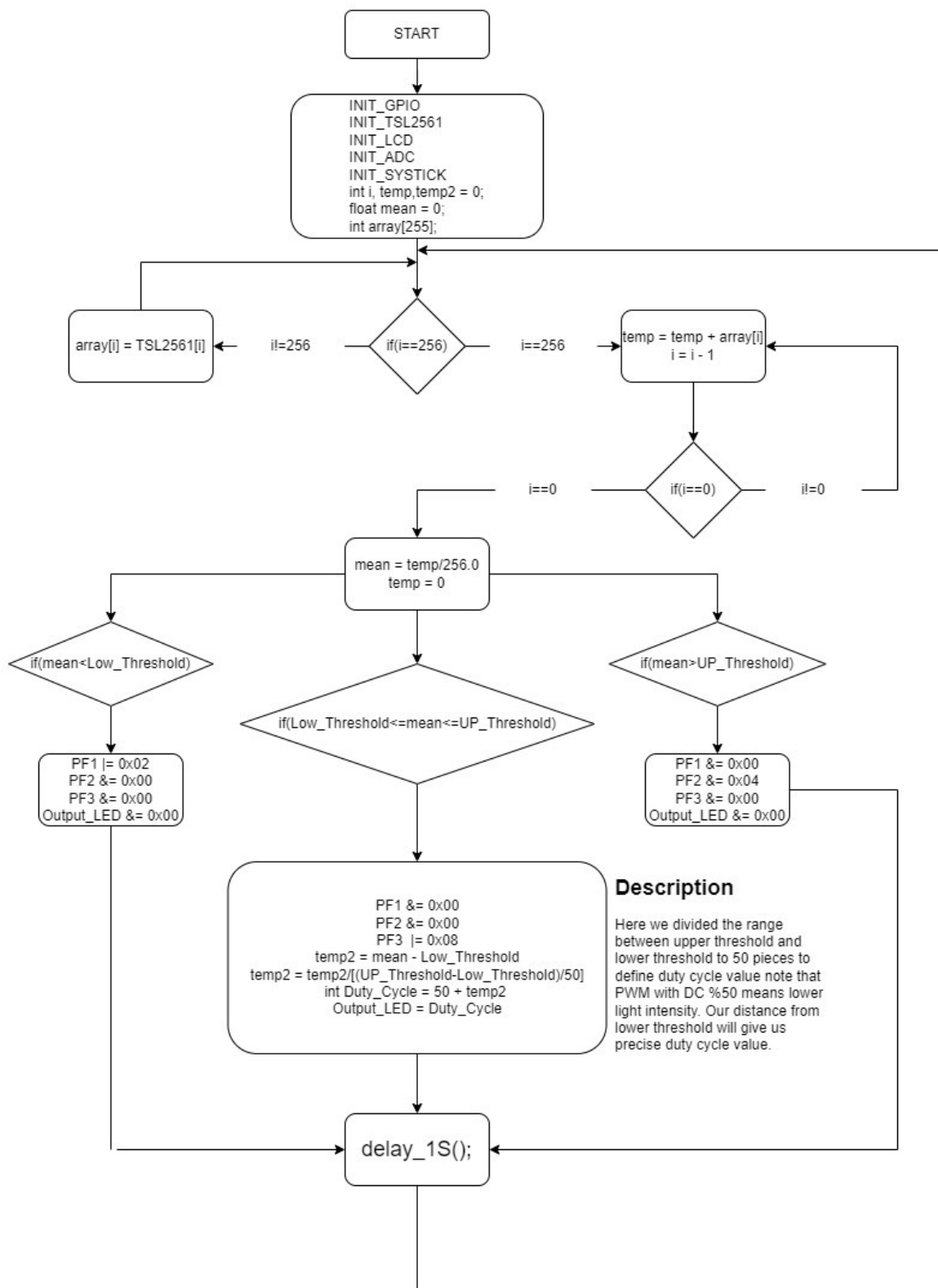


Figure 2: Pseudocode of the project illustrated on a chart.