EE437/537 Class project description R1.0
(Subject to change)

Project title: Luxmeter (Photo sensor) with resistive light sensitive sensor (LDR).

Project Description: Develop a complete embedded system for light intensity measurement using resistive photo-sensitive resistor (LDR) as sensor. For the measurement of the light intensity LDR sensor is available. The measurement result needs to be calibrated and displayed on a TFT - Graphical display as a chart as well as decimal numbers.

Minimum requirements:

1. **RaspberryPi 3/4** will be used for the central embedded processor and display control.
2. For analog data processing, TI- MSP432 Board will be used.
3. For programming language/library, any of native programming language for RBPi, (Python/ C++) can be used.
4. A 2.8 "TFT touch screen LCD will be used for various system functions and system calibration. (Adafruit PiTFT - 320x240 2.8" TFT + Touchscreen for Raspberry Pi).
5. Automatic detection of short or bad sensor. Automatic detection of missing sensor.
6. The essential functions; acquiring analog voltages, preprocessing, filtering, displaying, and saving to the SD-Card needs to be implemented.
7. Flow chart for programming: RBPi (C++, Python) and Launchpad (Sketch).
8. Flow chart (separate) for GUI functions.
9. Detailed and accurate wiring diagrams for the sensor, and RBPi/Launchpad.

GUI/Menu Details:

1. Display the results in Lux, Candela, and Lumen.
2. Automatic switch graph axis according to unit/format selection.
3. Provide menu option for measurement unit selection for Lux, Candela, and Lumen.
4. Provide menu option for unit calibration.
5. Provide menu option for recording (RECORD/START/STOP).
6. Provide menu option for x (time) and y-axis (Lux, Candela, and Lumen) range.
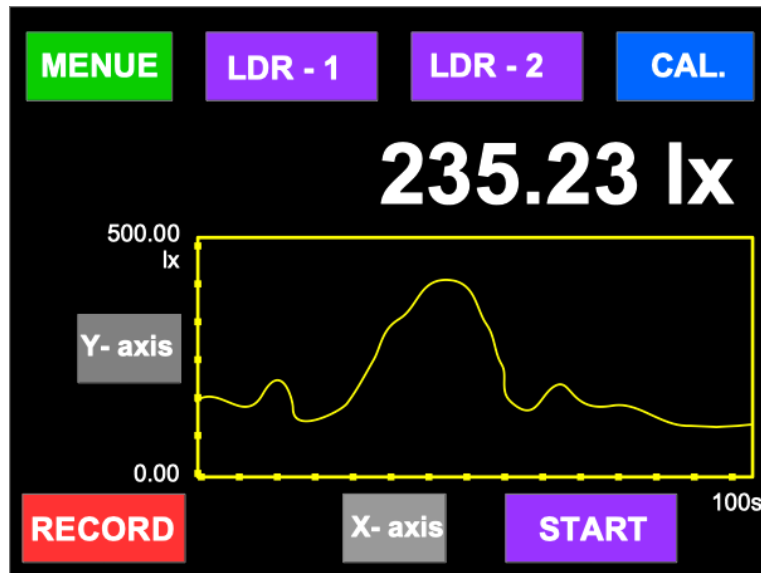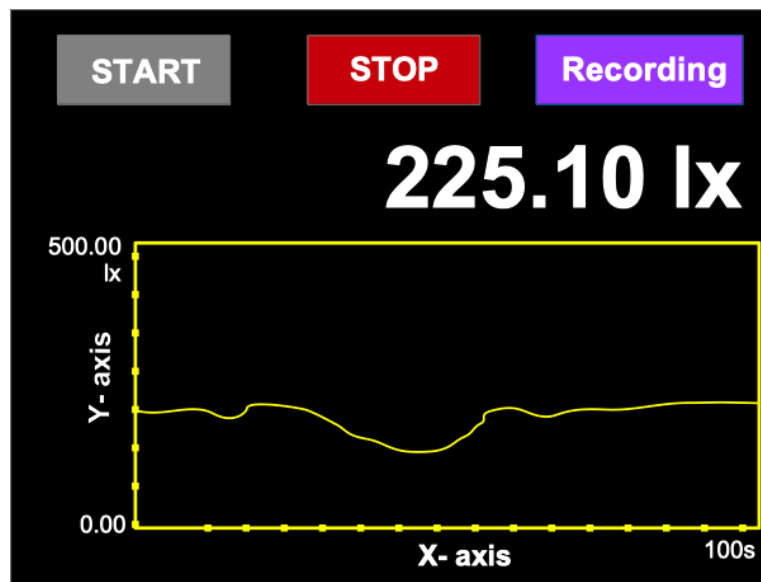7. Plot the result in a simple chart current light intensity vs. time.

Figure 1. Suggestion for x-y chart.

Figure 2: Suggestion for "Recording" Menu