

1. Control loop:

We read lux value from the BH1750, run the PI controller, output the result as the LED brightness using the PWM. Configure the timer interrupt to 200ms, LED should maintain constant brightness.

2. Creating the user input and disturbance:

We want to change the brightness target value to be changeable using the rotary encoder. We also add the disturbance LED that we can switch on and off with that blue button on the Nucleo.

We read the rotary encoder to update the target_lux variable, the disturbance LED just goes on/off.

3. Creating visual feedback:

We want to see what's going on without the computer. We use an OLED display (or LCD, but with OLED we can do more things) to see the actual lux target and lux value given by the sensor.

We are just sending that previous target_lux and measured_lux to the display.

4. Connectivity features:

We add the ESP-05 Wi-Fi module to send data through Wi-Fi to our python script. We also need to add checksum to the serial port connection. We should make also some UI in python to receive this data and maybe some virtual rotary encoder to set the values as well.

5. Make it ready:

Separate .c files from .h files and remember to commit to Git frequently. Also write the MATLAB script to model out step response of our PI controller.