**Introduction**  
The goal of this lab was to toggle an LED on/off in a microcontroller using the blue button on the same microcontroller of the LED we want to turn on/off. This Lab is designed to help us understand how to access the different types of registers of the microprocessor and how we can access and use different types of ports to “communicate” with each other by accessing the IDR register.

**Functionality and Correctness**

We first programmed the clocks to “on”, for both the LED and blue button ports on the microprocessor. The LED we want to use is on Port A pin 5 (PA5), while the blue button is located on port C pin 11 (PC11). We then activated the registers for both ports that we needed so the LED and the blue button were “active”. The next step was to get the blue and the LED to “communicate” with each other. To do this we used a while loop; inside the while loop is an if statement. In the if statement we used the IDR register for PC11. The condition of the if statement is if the button is pressed and the value is 0, then light up the LED by XNOR keyword (^) for the LED ODR value. We then made another while loop with same condition as the if statement and make it do nothing so the LED can be toggled. Overall, this method did work.

**Pre-lab assignment**

A close up of a text

Description automatically generated

A close-up of a paper

Description automatically generated

A close-up of a test

Description automatically generated

A close-up of a test

Description automatically generated

A close-up of a white board with black writing

Description automatically generated

A screen shot of a computer screen

Description automatically generated

**Post-lab assignment**

We used push pull so we can reliably read the output value as 0 or 1 whereas with open drain, we wouldn’t be able to read clearly if the output value is 0 or 1 because it’s always “floating”. This means that very little current is going through reliably.

**Conclusion**

Overall, the lab was successful. We made the LED light up and toggled it in the way it we were supposed to. I didn’t have much difficulty for this lab. The while loops were a little difficult when first seeing it because we didn’t understand how the IDR worked at first. But once we learned, the programming became more understandable.