

ECE 4550 – Prelab 2

1. The purpose of this lab is to help students understand the functioning of microcontrollers and how their use can be optimized through the understanding of how to juggle between the technical reference document, the schematics and data sheets for many of the internal registers and GPIOs of the chip. It is also to help students learn how to manually set and use several GPIO pins as I/O as well as to as peripheral pins. Moreover, learning how to use FLASH alongside RAM, and to reduce delay time through the use of resetting select registers as opposed to resetting all registers is one of the other major learnings through this lab. Correctly selecting the right pull-up/pull-down resistors internally can help reduce power consumption.
2. For the first part of 4.2, we will first define which registers/pins are going to be used as inputs, and which as outputs. Next, we will define the pushbutton input to be a pull-up resistor such that it goes high when pressed. We do this since on reset, any pull-ups are defaulted to pull-down. We will read from the pushbutton pin and write to the blue LED pins. We will force the RED LED to always be low.

Blue LED is GPIO31 on port A

```
GPAGMUX2.bit.GPIO31 = 0; // Make MUX GPIO
GPAMUX2.bit.GPIO31 = 0;
GPADIR.bit.GPIO31 = 1; // Define it as an output
GPAPUD.bit.GPIO31 = 0; // Enable pull-up resistor and turn LED off
```

RED LED is GPIO34 on port A

```
GPAGMUX1.bit.GPIO34 = 0; // Make MUX GPIO
GPAMUX1.bit.GPIO34 = 0;
GPADIR.bit.GPIO34 = 1; // Define it as an output
GPAPUD.bit.GPIO34 = 0; // Enable pull-up resistor and turn LED off
GPBSET.bit.GPIO34 = 1; // led off
```

Pushbutton is on GPIO0

```
GPAGMUX1.bit.GPIO0 = 0; // Make MUX GPIO
GPAMUX1.bit.GPIO0 = 0;
GPADIR.bit.GPIO0 = 0; // Define it as an input
GPAPUD.bit.GPIO0 = 0;
```

Along with the above, we will be using GPSET, GPCLEAR to track switch state.

For the second part of 4.2, we will use the GP?TOGGLE registers in order to drive the RED LED pins to an opposite level every 10^5 cycles without disturbing other pins. Along with that we will use

some of the tricks mentioned in 3.4 of the lab 2 manual, in order to program to specific registers in the flash memory instead of resetting the entire flash memory.

- 3.** We will need to enable the pushbutton input pin to be a pull-up so that whenever the button is pressed, we get a low signal, and when the signal is low, we can trigger the blue LED to turn on.