**Week 3 Lab 1 Report**

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**Task 1:**

In the blink program under the example code for Arduino under "File > Examples > 01.Basics > Blink", initialize integer i to be 4000 (representing initial blink of 4 seconds) outside void() and inside setup(), which is the number inside delay() which controls the time taken for LED to blink on and off. Under loop(), divide i by 2 every time so that the blinks go from 4 seconds to 2 seconds and lastly, to permanently on, so with every iteration, i will be divided by 2, from 4000 to 2000 to 0, meaning blink on and off from 4 seconds to 2 seconds and then, to permanently on. Put i inside delay as delay(i) and divide this by 2 till it reaches 0.

**Task 2:**

Initialize 2 integers i and j to be 4000 outside void() and create 2 separate delay timings for both green and red LEDs with the same code, connected to different pins D4 and D5 respectively and initialize both LEDs as pinMode(D4, OUTPUT) & pinMode(D5, OUTPUT). Then, the 2 LEDs will follow the same procedure with the delays not affecting each other’s on and off timings, and hence, will be independent of each other. Put delay for D4 as i/2 and D5 as j/3 after digitalWrite(D4/D5, HIGH) and put these as delay(i) and delay(j) under loop().

**Task 3:**

Initialize initial brightness variable to 0 outside void setup(). Then initialize 2 integers i and j inside loop() while initializing D4 and D5 pins as output for the 2 LEDs as pinMode(D4/D5, OUTPUT). Under loop(), put an if statement loop with a while condition inside the if loop, to increment and decrement brightness based on whether the brightness is high i.e., 255 or low i.e., 0. If initial brightness is high i.e., 255 and while brightness is >0, decrement brightness to low i.e., 0 through brightness-- for both pins D4 and D5 using analogWrite(D4/D5, with brightness value) in loop() block. If initial brightness is 0 and while brightness is <255 (i.e., high), increment brightness to maximum value i.e., 255, through brightness++ to increment brightness.

**Task 4:**

To make the WeMOS debounce the switch, we need to use a much larger delay than was mentioned in the lecture notes (which was 30-50ms). In this case, I will use a delay of at least 150ms where the function I will create will check whether there is at least a 150ms worth of delay between each button press, and if no, then the button is debounced. To achieve this, create a global variable called lastDebounceTime() and set it to 0 and initialize debounceDelay to 150 i.e. the 150ms delay between switch pressing. Then add an if statement under loop() block which checks this condition: millis() - lastDebounceTime() > debounceDelay which is 150ms.

**Task 5:**

My code below checks the last time that the button was pressed with the current time, and whether it is greater than the debounceDelay. If yes, then change the state of the button, otherwise no. The debounceDelay variable can be adjusted to fit the particular button.

volatile int lastDebounceTime = 0;

volatile int debounceDelay = 150;

IRAM\_ATTR void toggle() {

if (millis() - lastDebounceTime > debounceDelay) {

state = !state;

}

timeElasped = millis();

}

**Task 6:**

In the example code on DHT\_Unified\_Sensor, we need to initialize an LED as output using pinMode(D5, OUTPUT) where LED is attached to Pin D5, and then we need to include an if loop in the void loop() section underneath the codes to display the temperature and humidity readings. So initialize a sample threshold value for temperature and humidity, then in the if loop, mention that if the temperature (reading from event.temperature) or humidity (reading from event.relative\_humidity) exceeds that threshold value that you initialized (if you blow the sensor to increase humidity or clasp your hands around it to increase temperature), set the LED as high as output as digitalWrite(D5, High) which will turn on if the threshold for temperature and humidity is exceeded, else, turn it off i.e. digitalWrite(D5, Low). This code explains my idea when I set humidity threshold to 50% and temperature threshold to 25 degrees:

If (event.relative\_humidity > 50 || event.temperature > 25) {

digitalWrite(D5, HIGH)

}

else {

digitalWrite(D5, LOW)

}

**Task 7:**

#include <Adafruit\_Sensor.h>

#include <DHT.h>

#include <DHT\_U.h>

#define DHTPIN D6 // Digital pin connected to the DHT sensor

#define DHTTYPE DHT11 // DHT 11

DHT\_Unified dht(DHTPIN, DHTTYPE);

uint32\_t delayMS;

Table

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A simple temperature alarm – the green LED (connected to pin D5) lights up when the temperature is below 25 degrees, and the red LED (connected to pin D4)lights up when the temperature goes above 25 degrees.