Lab #1
Introduction to ESP8266 Board and Arduino IDE
CSCE 5612 - Embedded Hardware/Software Design
Fall 2018

100 Points
Due: 09/19/2018, 11:55 PM

Instructions: TA will be available during the office hours or by an appointment to grade your lab. You are most welcome to demonstrate the lab to the TA before the due date. Please don't wait till the last minute to complete the lab as you may not get the required resources like PCs or boards. Make sure you have a printed lab report (one per team) and turn it in when the demonstration starts. Your lab grader will ask you questions during the demonstration. Questions are worth **20 points** and will be graded according to your answer to the questions. After the demonstration is completed, immediately upload the report and the zipped project to Canvas. **Not following the above instructions could result up to 50% deduction from your lab score**. **Late demonstrations and submissions are not allowed.**

Objectives:

This lab introduces the ESP8266 board and the Arduino IDE software tool. This lab also gives you hands-on experience to use the push buttons and the RGB LED.

Requirements: (30 Points)

1. Turn the red LED (RGB LED) on when push button S1 is pressed and turn it off when S1 is again pressed
2. Turn the green LED (RGB LED) on when push button S2 is pressed and turn it off when S2 is again pressed
3. Avoid debouncing of the switches (S1 and S2). Do not use any delay functions or delay loops to handle debouncing of the switches and make sure interrupts are not used.

Procedure:

1. Setup the ESP8266 Module on a breadboard and connect the micro USB cable to the USB port of the board. Do not connect to computer

2. Connect the anode of the red LED (RGB LED) to port D0 with a series 1 KΩ resistor and connect the anode of the green LED (RGB LED) to port D1 with a series 1 KΩ resistor. Also, connect the common cathode to ground
3. Connect one pin of the push button (tactile) switch (S1) to D2. Pull the pin D2 to Ground (G) using a 1 KΩ resistor. Connect the other pin of the switch (S1) to 3.3 V
4. Connect one pin of the push button (tactile) switch (S2) to D3. Pull the pin D3 to Ground (G) using a 1 KΩ resistor. Connect the other pin of the switch (S2) to 3.3 V
5. Install and setup Arduino IDE 1.8.6 from https://www.arduino.cc/en/Main/Software
6. Follow the instructions and install the required board manager from http://henrysbench.capnfatz.com/henrys-bench/arduino-projects-tips-and-more/arduino-esp8266-lolin-nodemcu-getting-started/
7. Run the example code from File→Examples→ESP8266→blink and you should see red LED blinking
8. Arduino IDE reference is available here https://www.arduino.cc/reference/en/
9. Use the example codes and the Arduino reference to meet the requirements and complete the lab
10. Record your observations in the report.

Demonstration: (30 Points)

1. Demonstrate turning on of the red LED when push button S1 is pressed and turning off of the red LED when the S1 is again pressed
2. Demonstrate turning on of the green LED when push button S2 is pressed and turning off of the green LED when the S2 is again pressed
3. Demonstrate that there is no bouncing of switches when the switches S1 and S2 are pressed.

Deliverables: (20 Points)

1. Use the lab template posted on the Canvas page
2. Answer all the questions asked in the lab template
3. Type the lab report and turn in the printout of the lab report when the lab is demonstrated.
4. After the demonstration is completed, upload the report (one per team) and the zipped project (one per team) to Canvas.