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Lab 1 Report

Task 1a Procedure

Task 1a I approached by following the tutorial and given code in the Lab 1 file. Task 1a then required me to turn on the 4 LEDS. So I looked into turning each LED on and then off, one-by-one. Then using a loop, I had one LED turn on then off before moving onto the next LED and repeating. Then I implemented an interval function to space these out and placed the interval between each LED turning on and off.

Task 1a Results

As shown in the Lab 1 Task 1 demo, the 4 LEDs on the TIVA board lit up sequentially. The best way to describe this would be to imagine like a traffic light with 4 lights and all lights are green. Only 1 light is on at a time and it goes from the first light, to the second light, etc until resetting back to the top light continuously. That was what was going on with the LEDs on the given board. I think that would be the easiest visualization.

Task 1b Procedure

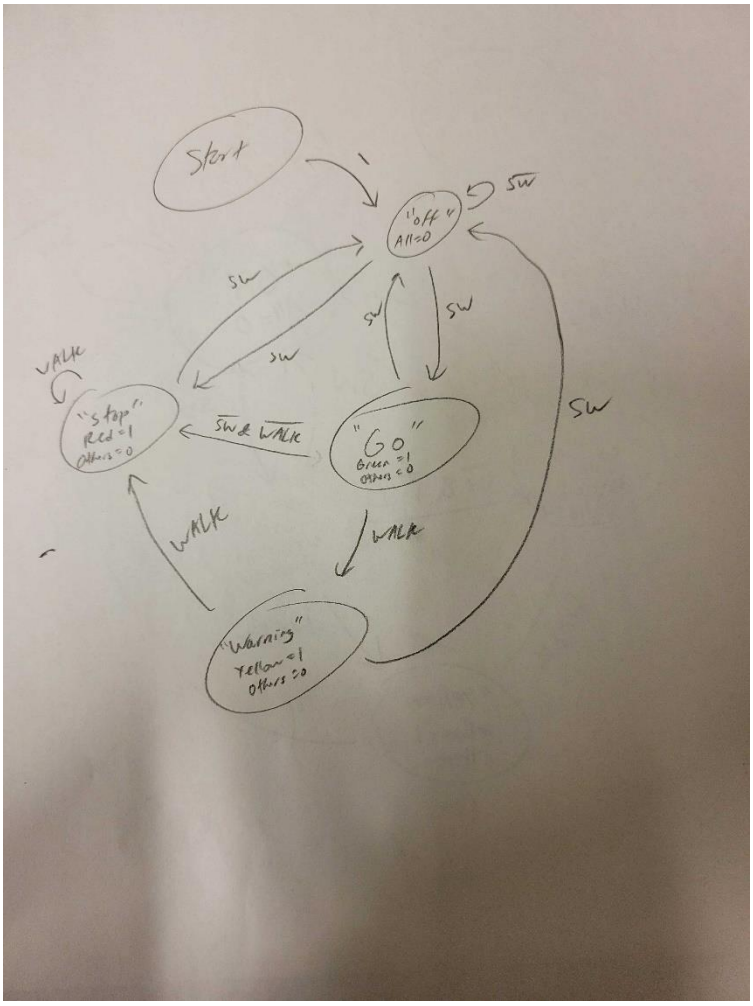
I found task 1b a little challenging. I needed to map LEDs to buttons but once I figured that out it became easier. I then mapped LED 1 to button/switch 1 and LED 2 to button/switch 2.

Task 1b Results

The result is also shown in the submitted demo video but when switch one was pressed then LED 1 turned on and if held would stay on. This is the same for LED 2.

Task 2 Procedure

First, I investigated the expected output and from that I drew my finite state machine diagram (pictured below). Using the FSM, I looked through the datasheet to see which pins to specifically pick for buttons and LEDs. Then I wrote out the next state logic in code, mapping buttons to different state changes. Then I coded the logic for each state's output, to figure out which light should turn on at which state. Once all the code was written, I worked on assembling the button circuit. I made sure to be careful because connecting pins in read mode requires ensuring that the current through them is not too high as to not break anything. Once the button circuit was assembled, I assembled the inverter circuit, connecting them to the pins on the board, and then I assembled the LEDs, ensuring they were connected to 220 ohm resistors, so as to not burn them out.



Task 2 Results

The results are the same as seen in the demo video submitted. Essentially, there is a button to turn the machine on and off. When the machine is off, all 3 LEDs are off. Then when the machine is turned on, it will either start in the ‘go’ or ‘stop’ state which respectively would turn the green LED or the red LED on. Then if there is no further input and the machine is on, then it will alternate between the ‘go’ and ‘stop’ states. There is also a pedestrian input. If a pedestrian input is detected when the machine is in a ‘stop’ state it will stay in the ‘stop’ state. If the pedestrian input is detected when the machine is in a ‘go’ state then the machine will transition to the ‘warning’ state before shortly changing to the ‘stop’ state and staying there. If the pedestrian input/button is held, then the state will stay in ‘stop.’ Then the machine can be turned off again and all LEDs will be turned off.