CSC 615 Assignment 3 – Motors & Motor Shield – Zoom

This is an INDIVIDUAL assignment. You can (and should) work in groups to research how to do the assignment, but each person should code their own version and make their own submission.

This is a physical class, so I will want to see what you do in action. Documentation, including short video clips (can use your cell phone) are required as part of the submission. It can be by the Hardware Manager of recorded via the WebCam.

You will also need to submit hardware drawings. These should be neat (can be either electronic or hand drawn, then scanned) of how the hardware is connected to the Raspberry Pi. This includes which pin (physical and GPIO), positive and negative flow, resisters, etc. I, and the Hardware Manager, should be able to rebuild your setup from this diagram and then run your program and get the same results. Also see https://www.circuit-diagram.org/editor/# if you want to use that (they have a Raspberry Pi template.

Assignment Description

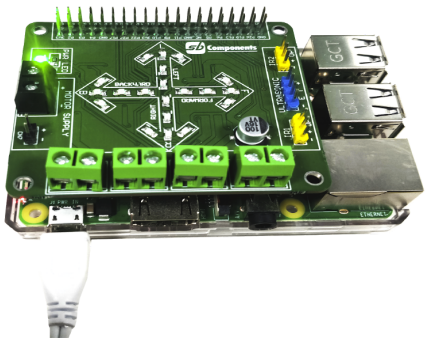
1. Read the following page "Component Knowledge".

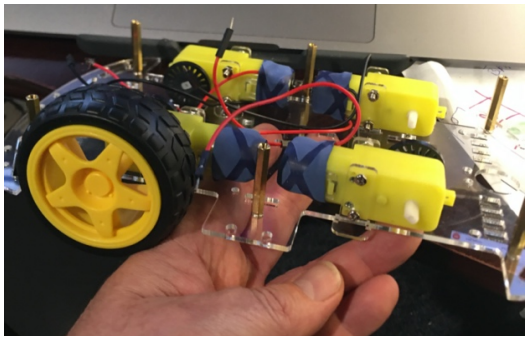
2. This is the first of a two part assignment. In this first part you will control two motors. They should stop, go forward, backward, as well as speed control (Pulse Width Modulation).

3. You are to connect the motors to two channels on the Motor Shield. See the motor shield specifications to determine the pins and the pin numbers.

4. Submit your homework on iLearn per the submission details below

Component Knowledge





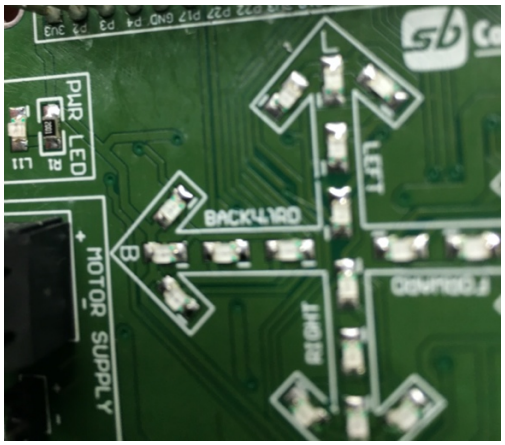
There is a repository for the Motor Shield that has documentation and also has sample Python code, while your code has to be in C, you may use the Python code as a template for your C code.

Note: Assembly of the car is not required, but if you do – please take care when putting on the wheels. Make sure to support the motor as you push the wheel onto the motor so as to not break the plastic support.

SB Motor Shield Repository: https://github.com/sbcshop/MotorShield

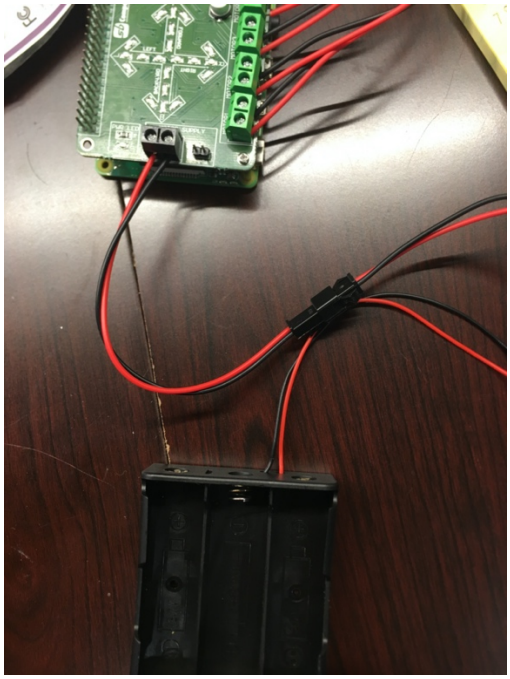
IMPORTANT – Powering the motors

To power the motors, you need a separate power source. This is what the 3 Yellow 18650 batteries are for. Take note that the motor supply connector at the end of the motor shield has a positive and negative marked as shown in the picture below.



Use the power connector in the kit to connect the battery pack to the motor shield. My connector is a little different but see the picture below. Make sure to observe the polarity. By doing this, it is easier to connect and disconnect the battery from the Pi and reduces the chance of getting the polarity wrong.

Make sure to observe the polarity of the batteries into the battery case. Once inserted and connected, then connect the regular battery power to the Raspberry Pi.



Submission Details

You need to submit the following files:

1. All .c and .h source code files.

2. A makefile file to build your program (the file MUST be called **`makefile`**). The executable output files MUST be called **`assignment3`**.

3. A PDF that is clear and readable with your hardware diagram (make sure to indicate polarity and pin numbers).

4. A mp4 file showing your motors in action (show both the motor and the motor shield).

All parts of the submissions must have your name and student ID number. For Video's please have at least a 2 second clip at the beginning with your Student ID card clearly visible. (In absence of **your student ID card print out your Name and ID number on paper and film that**).

Please post questions to the slack channel.

Grading Criteria

Grading criteria will be based on the following:

Completion and success of the assignment	25%
Code well structured, original and well documented	50%
Hardware Diagram	15%
Video	10%

Instructions followed (this includes submission requirements) This is only a detractor from your grade, i.e. failure to follow the instructions will result in a reduction from the grade calculated from the criteria above.	-50%