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# Assignment 3

## Start your Motors

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## Program Description

For the program start your motors we are going to use the WaveShare Motor Drive HAT with the Raspberry Pi Zero to control our two-wire motor. For this assignment we need to implement a way for the motor to go forwards and also in reverse. We also need a way to speed up, slow down, and stop the motor. We also need to implement a push button to actually start our motor when the program is executed. We will be using the PCA9685 and DEV\_Config 'C' files and header files as those four files will allow us a way to initialize the HAT and also a way to read and write bytes to it.

## What was done

The first thing that we need to do is initialize the wiringPi GPIO pins and the PCA9685 hat controller so that we can have a way to control the motor. We then choose our GPIO pin that are going to read the button press to get our motors running after the program has already been executed. Once the program sees that the button is pressed, we give the motor the forward direction and give it a 100% duty cycle. After we have the motor running in the forward direction for at least two seconds we need to gradually slow down the motor to a 15% duty cycle. Once we are at a 15% duty cycle, we need to stop the motor for one second and switch the direction of the motor to run in reverse for the next set of requirements in the assignment. We then slowly speed up the motor until we are back to a 100% duty cycle but in reverse this time. Finally, we stop the motor so that when the program completes the motors wont still be running.

## Issues and how they were overcome

With the sample code provided on the WaveShare website getting the motor running was pretty simple using their code. The first thing that I had an issue with was wiring up the motor to the motor drive hat. The way I was able to solve this issue was by looking into the documentation and understanding what the individual pins and connections were for. The next issue I had was getting the button wired up so that the GPIO pin would go low when the button was pressed. I was able to solve this issue by using a multimeter to understand how the button worked when pressed and also looked at some examples online to how similar buttons were connected to the raspberry pi.

## Circuit Diagram

WaveShare Motor Drive HAT sits on top on Raspberry Pi Zero but is drawn separately in this circuit diagram for a better understanding.

