Task: Speed Control of DC Motor using PIC18F4550

Objective: The objective of this task is to interface a DC motor with the PIC18F4550 microcontroller and implement speed control functionality.

Requirements:
1. PIC18F4550 microcontroller board
2. DC motor
3. Motor driver circuit (e.g., L293D)
4. Power supply for the motor (e.g., battery or external power source)
5. Breadboard and jumper wires
6. PIC programming software (e.g., MPLAB IDE)
7. C programming knowledge

Task Steps:

1. Set up the hardware:
   a. Connect the PIC18F4550 microcontroller board to the computer using a USB cable.
   b. Connect the motor driver circuit (e.g., L293D) to the PIC18F4550 board according to the datasheet of the motor driver.
   c. Connect the DC motor to the motor driver circuit.
   d. Connect the power supply for the motor to the motor driver circuit.
   e. Make sure all the connections are secure and properly wired.

2. Write the C code:
   a. Open the PIC programming software (e.g., MPLAB IDE) and create a new project.
   b. Write the necessary code to initialize the PIC18F4550 microcontroller and configure the required pins for motor control.
   c. Implement a speed control algorithm using pulse width modulation (PWM) technique.
   d. Define suitable variables and constants for controlling the motor speed.
   e. Write code to vary the duty cycle of the PWM signal to control the motor speed.
   f. Add any necessary delay or loop to maintain the desired speed.

3. Compile and program the microcontroller:
   a. Compile the code in the PIC programming software to check for any errors.
   b. Once the code is error-free, program the PIC18F4550 microcontroller using the programming software and appropriate programming hardware (e.g., PIC programmer or USB bootloader).

4. Test and verify:

a. Connect the power supply to the motor circuit and power on the system.
b. Observe the motor behavior and check if the speed control is functioning as desired.
c. Adjust the speed control variables in the code to experiment with different motor speeds.
d. Make sure the motor responds accurately to the speed control inputs.

5. Documentation:
a. Prepare a detailed report documenting the task, including the hardware setup, code explanation, and test results.
b. Include relevant circuit diagrams, code snippets, and screenshots if necessary.
c. Provide a step-by-step explanation of the process followed to achieve the speed control of the DC motor.