KIIT, Deemed to be University
School of Computer Engineering
Sensors And Automation [EC28005]

EXPERIMENT-8
Interfacing DC Motor/Actuator

Aim:

The aim of the Interfacing DC Motor/Actuator experiment is to exhibit the practical application of interfacing and controlling a DC motor or actuator using a microcontroller or control device for regulating speed and direction through software commands.

Objective:

- To establish the physical connections between the microcontroller, motor driver, motor, and power supply.
- To generate specific control signals from the microcontroller to regulate the speed and direction of the DC motor.
- To demonstrate the interfacing and control of a physical actuator through electronic circuits and programming.
- To gain practical experience in motor control, interfacing, and the utilization of software commands in regulating the physical behavior of the DC motor.

Component/Software Used:

Component/Software	Specification
Arduino Uno	-
Bread Board, Cables, Connecting Wires, Laptop/Computer,7,L293D,DC	-

Motor	
Software(s) Used	Arduino IDE 2.2.1

Theory:

The Interfacing DC Motor/Actuator experiment involves the practical application of interfacing and controlling a DC motor or actuator using a microcontroller or control device. This experiment is based on the principles of motor control, interfacing, and practical application of software commands to regulate the speed and direction of the motor.

Principle of Working:

The principle of working involves the following steps:

1. **Interfacing:** The microcontroller or control device is connected to the motor driver module, which in turn is connected to the DC motor. This physical connection allows the control device to send commands to the motor driver, controlling the motor's speed and direction.

2. **Control Signals:**The control device generates specific signals, typically in the form of digital pulses, that are sent to the motor driver module. These signals determine the speed and direction of the motor based on the input provided by the user or programmed commands.

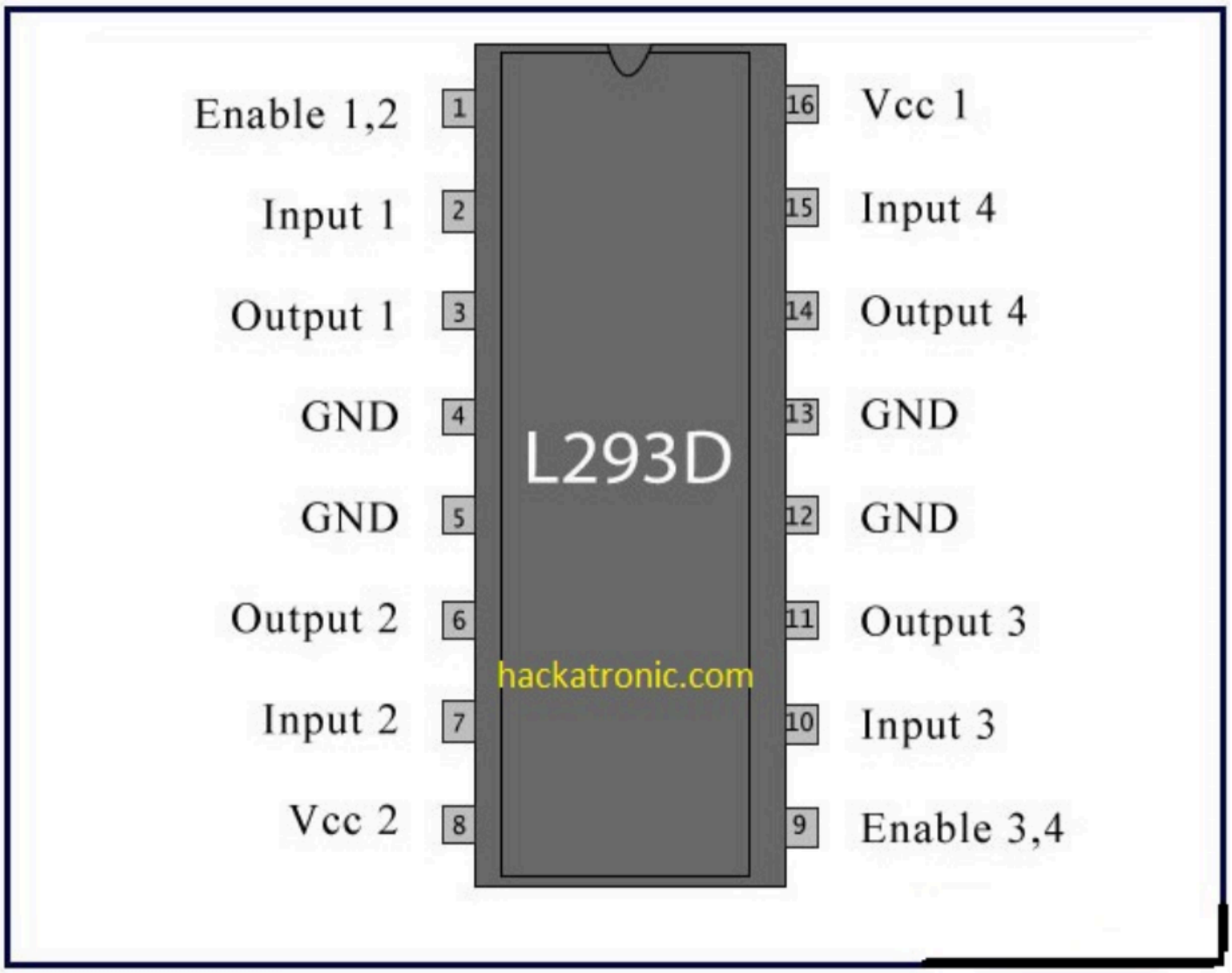
3. **Motor Driver Module:** The motor driver module acts as an interface between the control device and the DC motor. It amplifies the control signals from the microcontroller to provide the necessary power and direction control for the motor.

4. **Motor Operation:**Based on the control signals received from the microcontroller through the motor driver, the DC motor operates at the

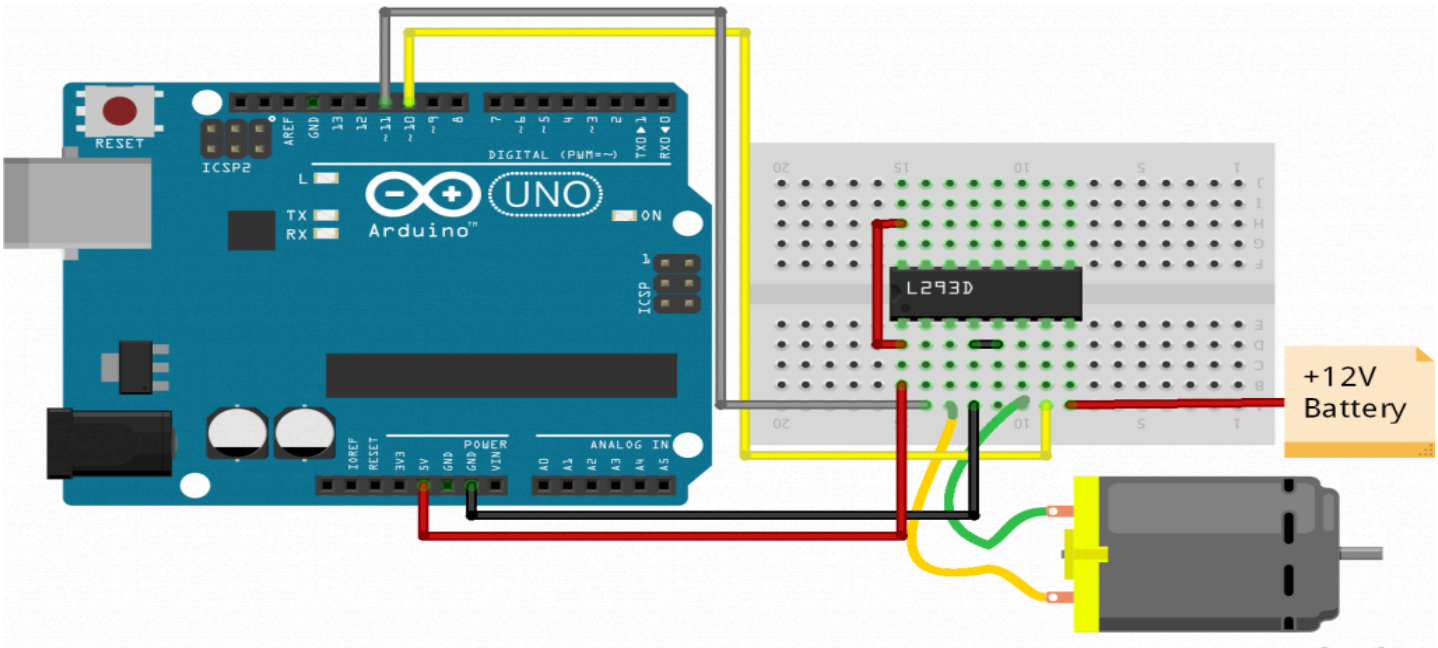
desired speed and direction, thus demonstrating the practical control and manipulation of the motor through the control device.

This experiment illustrates the fundamental concepts of motor control, interfacing, and the practical application of software commands to regulate the physical behavior of a DC motor or actuator.

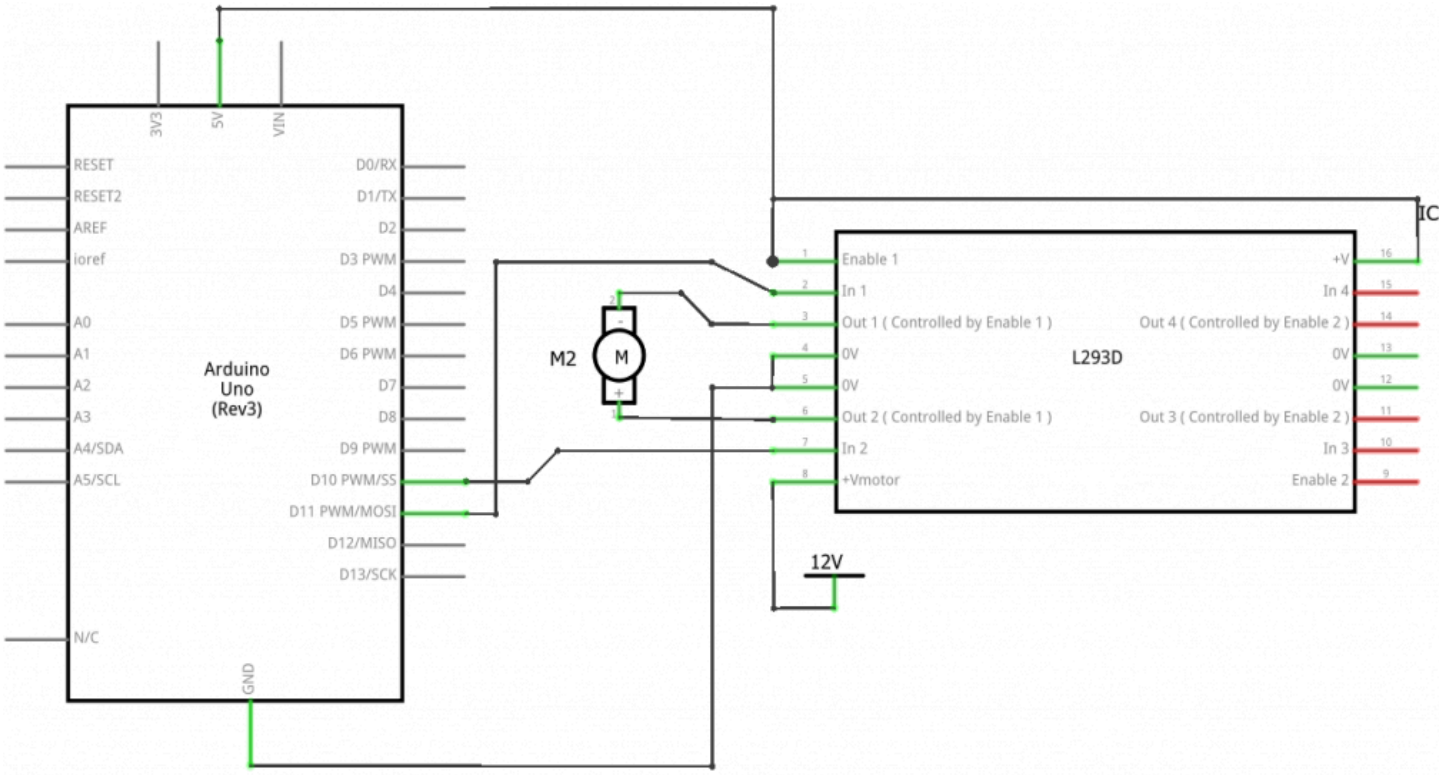
L293D Pin Diagram of Motor Driver IC:



Circuit Diagram (Single DC Motor Circuit Arduino):



Schematic Diagram (DC Motor Arduino Connection):

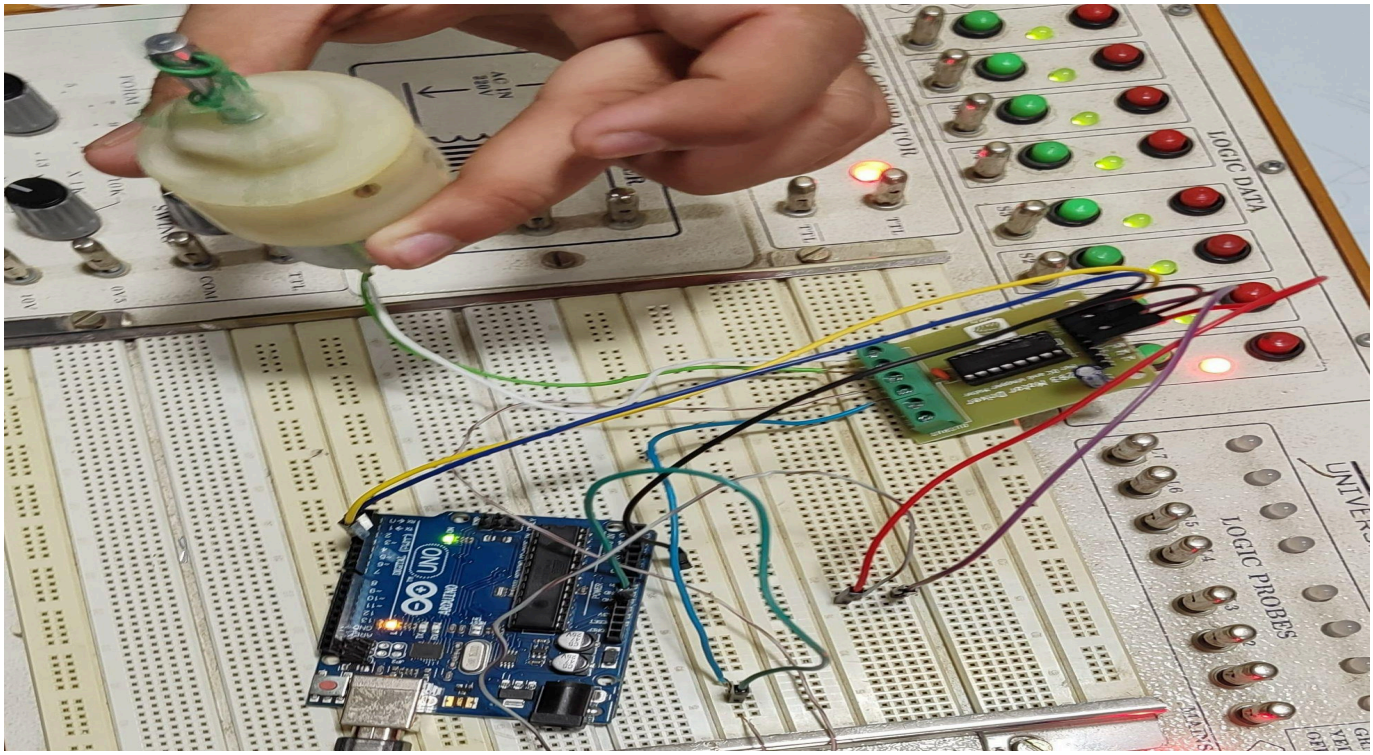


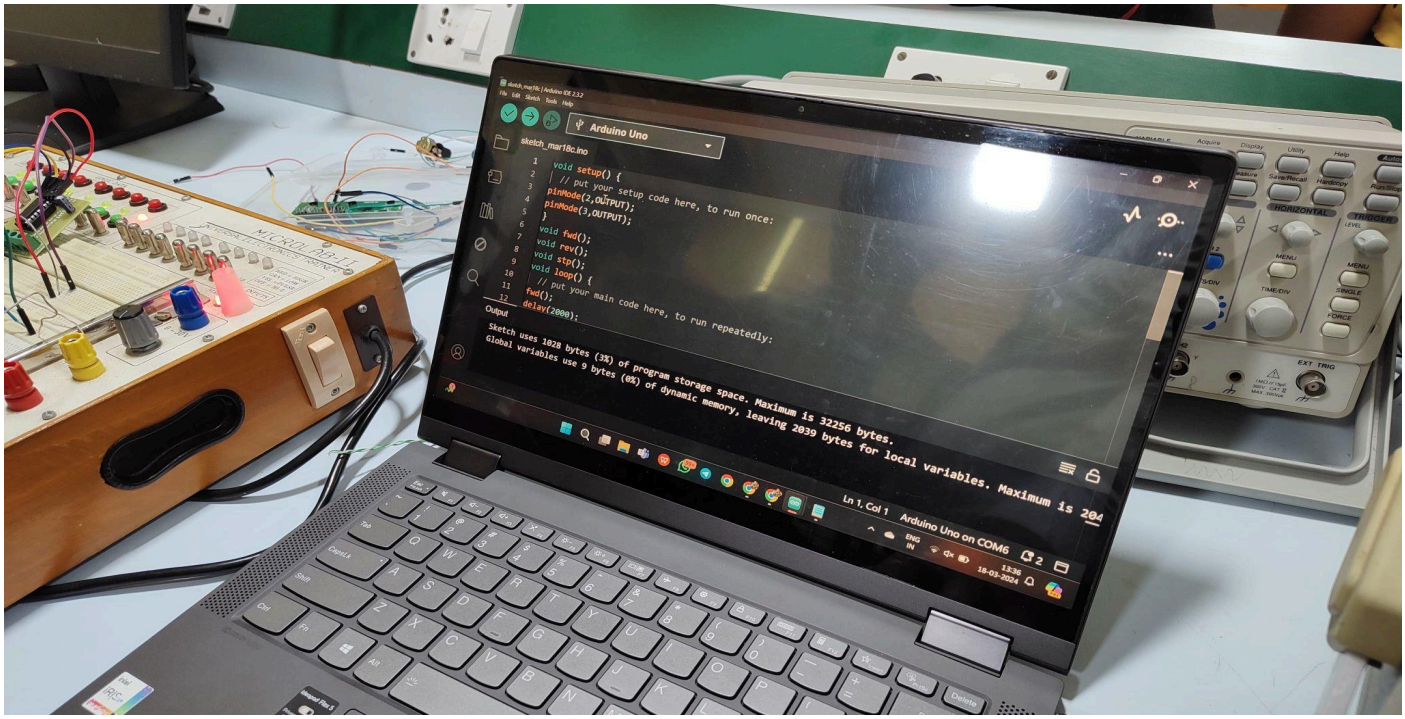
Program:

```
void setup() {
  // put your setup code here, to run once:
pinMode(2,OUTPUT);
pinMode(3,OUTPUT);
}
void fwd();
void rev();
void stp();
void loop() {
  // put your main code here, to run repeatedly:
fwd();
delay(2000);
stp();
delay(200);
rev();
delay(2000);
stp();
delay(200);
}
void fwd()
{
  digitalWrite(2,1);
```

```
digitalWrite(3,0);
}
void rev()
{
  digitalWrite(2,0);
digitalWrite(3,1);
}
void stp()
{
  digitalWrite(2,1);
digitalWrite(3,1);
}
```

Result picture:





Conclusion:

The Interfacing DC Motor/Actuator experiment provided valuable insights into the practical application of interfacing and controlling a DC motor or actuator using a microcontroller or control device. Through this experiment, we gained a comprehensive understanding of the principles of motor control, interfacing, and the utilization of software commands to regulate the speed and direction of the motor.

Key takeaways from the experiment include the significance of proper interfacing, the role of the motor driver module in amplifying control signals, and the direct impact of software commands on the operation of the DC motor. The experiment successfully demonstrated how a microcontroller or control device can effectively manipulate the physical behavior of a motor, emphasizing the importance of precise control and signal processing in real-world applications.

By successfully interfacing and controlling the DC motor, we have not only gained practical experience in motor control and interfacing but also enhanced our

understanding of the broader concepts of signal processing and hardware-software interaction in the context of electronic control systems. This experiment serves as a crucial foundation for further exploration and application of control systems and robotics in various engineering and technological domains.

In conclusion, the Interfacing DC Motor/Actuator experiment served as a comprehensive hands-on learning experience, consolidating theoretical knowledge with practical implementation and providing valuable insights into the control and manipulation of physical actuators using electronic circuits and programming.

Name: Aditya Bahadur
Roll No: 2205787
Class: CSE 38
Group No: 04