SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution

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with 'A++' Grade
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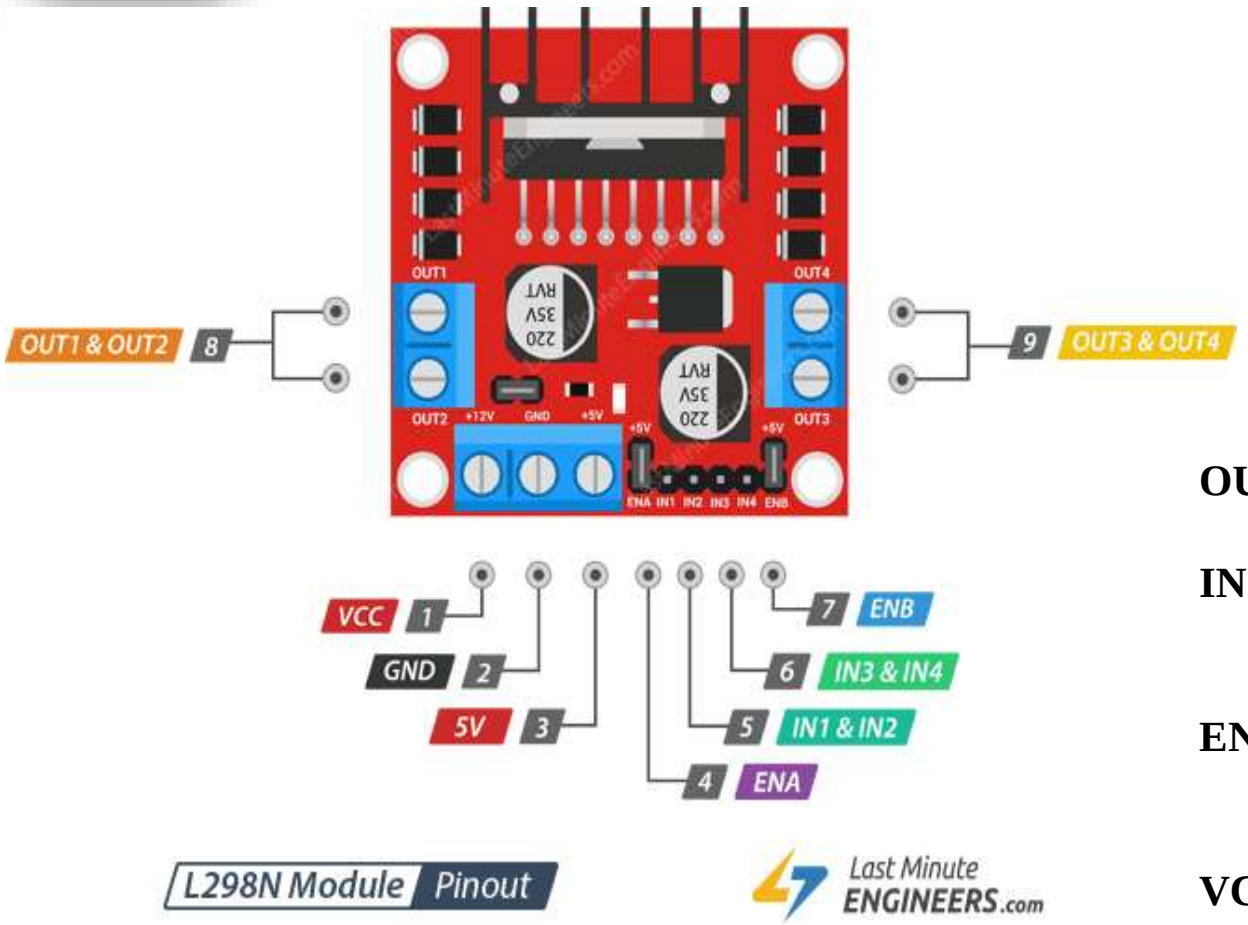
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT213-IoT SYSTEM ARCHITECTURE

II YEAR/ IV SEMESTER

UNIT 3 – ACTUATORS AND IOT NETWORKING DEVICES

Interfacing DC Motor with L298N Motor Driver Controller



Importance of drivers in controlling DC Motors

- Voltage and Current Regulation
- Direction control
- Speed Control
- Efficiency and Energy Savings
- Protection Features.

OUT1, OUT2, OUT3, OUT4:
Motor output pins for connecting to the motors.

IN1, IN2, IN3, IN4:
Control input pins for controlling the direction and speed of the motors.

ENA, ENB:
Enable pins for enabling or disabling the motor driver outputs.

VCC, GND:
Power supply pins for providing the necessary voltage and ground connections.

Components Required

- Arduino board
- DC motor
- L298N motor driver controller
- Power supply
- Jumper wires

Interfacing DC Motor with L298N Motor Driver Controller

- L298N is a popular and widely used dual H-bridge motor driver IC (Integrated Circuit).
- It is designed to control two DC motors simultaneously, making it a versatile choice for various motor control applications.
- L298N can drive motors with voltages ranging from 5V to 35V and currents up to 2A per channel

Dual H-Bridge Design:

The L298N consists of two H-bridges, allowing it to control two DC motors independently or a single stepper motor with bipolar winding.

Wide Operating Voltage Range:

Supports motor supply voltages from 5V to 35V, making it suitable for a wide range of motors.

High Current Capability:

Can handle continuous current up to 2A per channel and peak current up to 3A per channel.

Built-in Protection Diodes:

Each H-bridge has built-in protection diodes for back-EMF (Electromotive Force) protection, enhancing the reliability and safety of the connected motors.

Enable and Direction Control Pins:

Allows for precise control over the direction and speed of the motors using PWM (Pulse Width Modulation) signals and digital high/low signals.

Thermal Shutdown Protection:

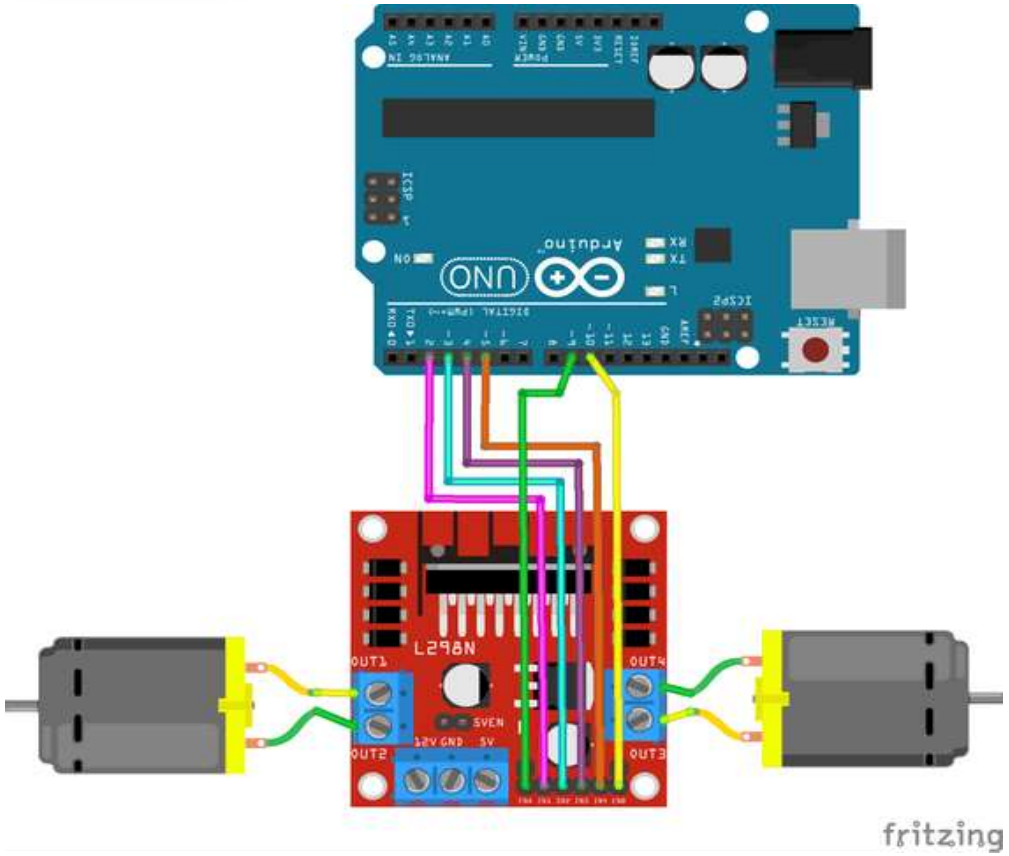
Integrated thermal shutdown protection circuitry to prevent the IC from overheating during operation.

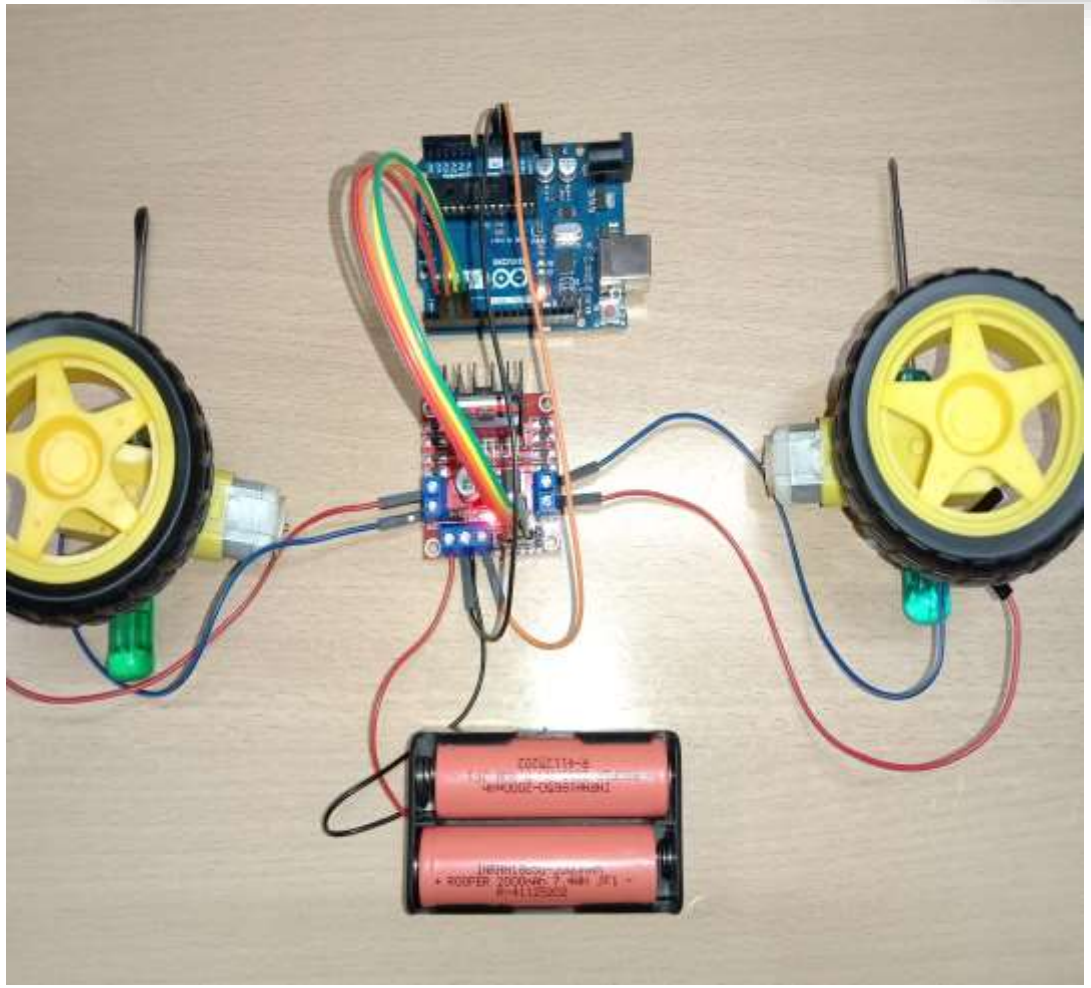
Interfacing DC Motor with L298N Motor Driver Controller

```
int motor1pin1 = 2;
int motor1pin2 = 3;

int motor2pin1 = 4;
int  motor2pin2 = 5;

void setup() {
  // put your setup code here, to run once:
  pinMode(motor1pin1, OUTPUT);
  pinMode(motor1pin2, OUTPUT);
  pinMode(motor2pin1,  OUTPUT);
  pinMode(motor2pin2, OUTPUT);

  //(Optional)
  pinMode(9,  OUTPUT);
  pinMode(10, OUTPUT);
  //(Optional)
}
```

```
void loop() {
  // put your main code here, to run repeatedly:
  //Controlling speed (0  = off and 255 = max
speed):
  analogWrite(9, 100); //ENA  pin
  analogWrite(10, 200); //ENB pin

  digitalWrite(motor1pin1,  HIGH);
  digitalWrite(motor1pin2, LOW);

  digitalWrite(motor2pin1, HIGH);
  digitalWrite(motor2pin2, LOW);
  delay(3000);

  digitalWrite(motor1pin1,  LOW);
  digitalWrite(motor1pin2, HIGH);

  digitalWrite(motor2pin1, LOW);
  digitalWrite(motor2pin2, HIGH);
  delay(3000);
}
```

Interfacing DC Motor with L298N Motor Driver Controller

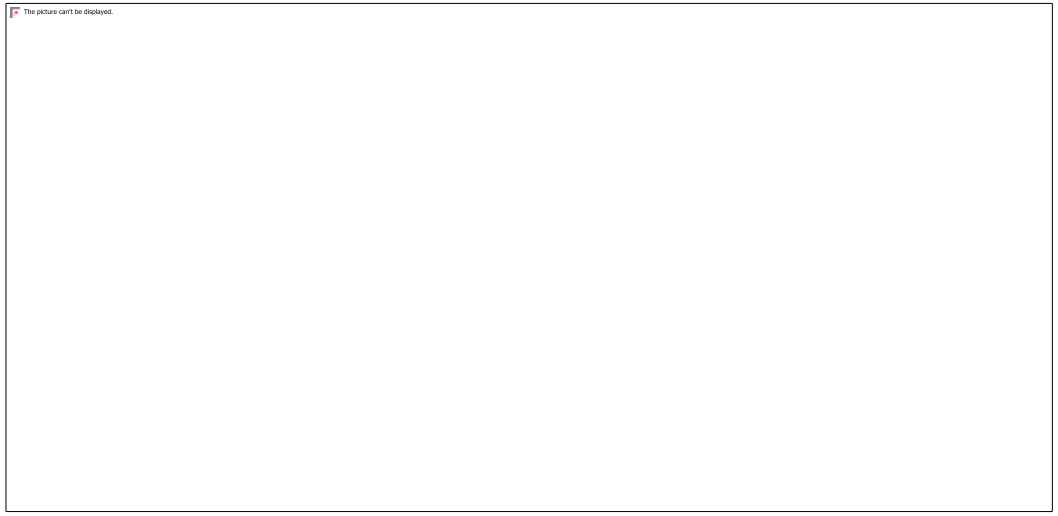




Interfacing DC Motor with L298N Motor Driver Controller

- PWM, or pulse width modulation is a technique which allows us to adjust the average value of the voltage that's going to the electronic device by turning on and off the power at a fast rate.
- The average voltage depends on the duty cycle, or the amount of time the signal is ON versus the amount of time the signal is OFF in a single period of time.

Interfacing DC Motor with L298N Motor Driver Controller

H-Bridge DC Motor Control

For controlling the rotation direction, we just need to inverse the direction of the current flow through the motor, and the most common method of doing that is by using an H-Bridge. An H-Bridge circuit contains four switching elements, transistors or MOSFET with the motor at the center forming an H-like configuration. By activating two particular switches at the same time we can change the direction of the current flow, thus change the rotation direction of the motor.