

# NSU CEC robotics workshop 2.0(soccer bot)

- Instructor :

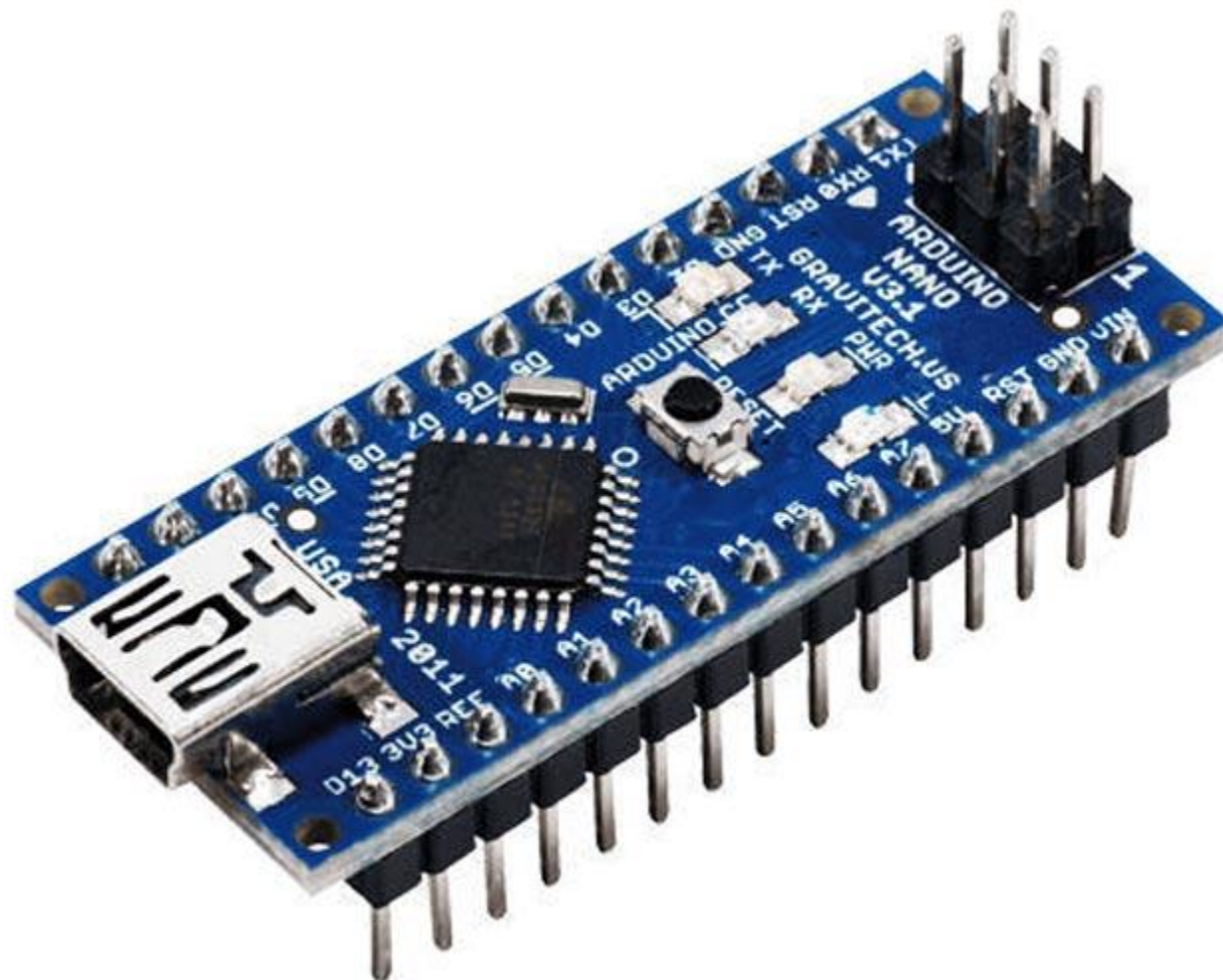
Md. Wasik Mehran (ECE CSE 2233510)

Washio Ferdous (ECE CSE 2231107)

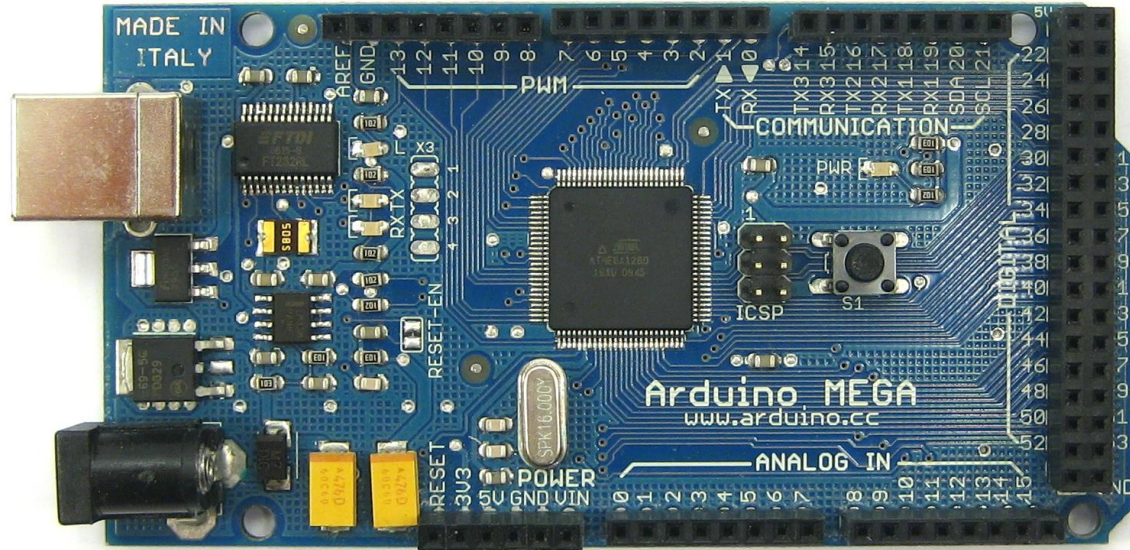
Iftisham Hossain Sajjil (ECE EEE 2413004)



UNO

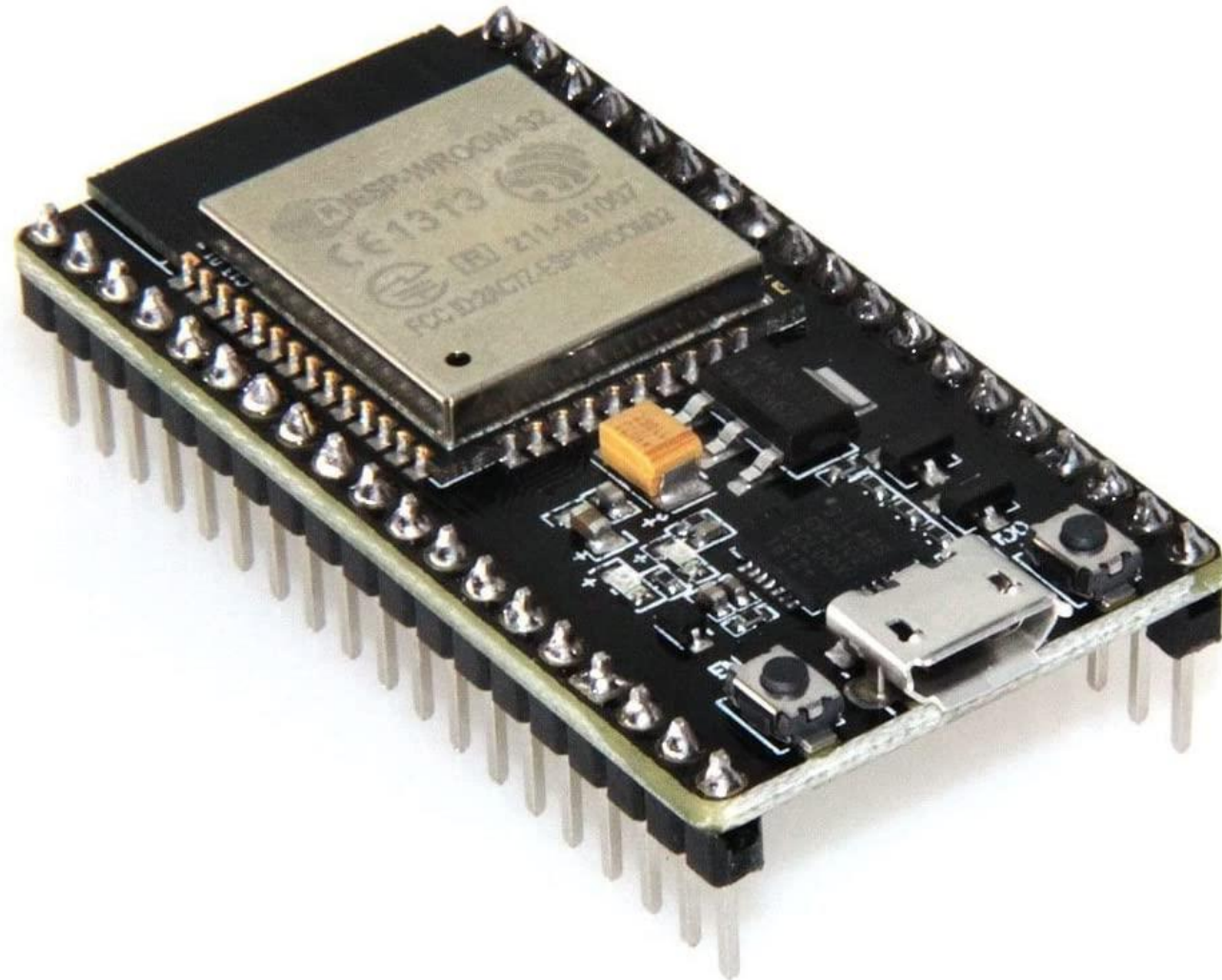


NANO



**MEGA**

**ESP-32**

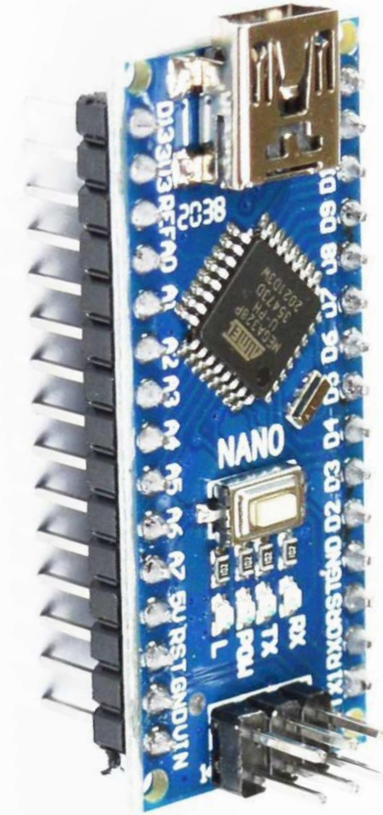




# Why are we using esp 32 ?

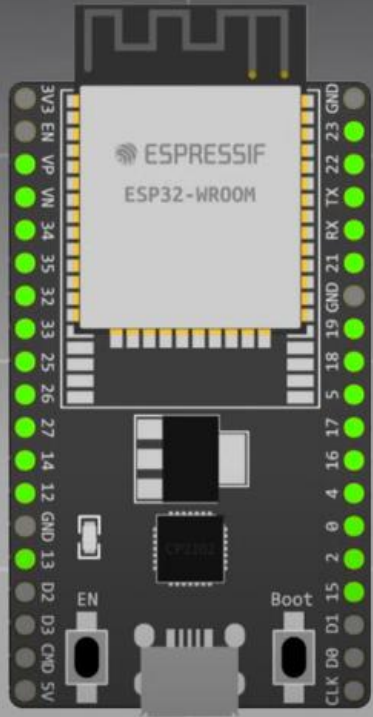


# VS

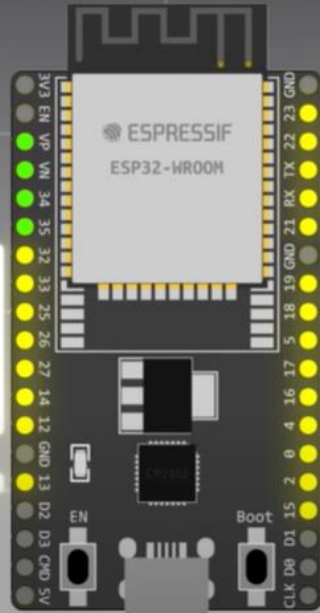


- esp                  arduino
- 240Mhz              16MHz
- Esp has integrated wifi and Bluetooth
- Number of pin is huge compare to Arduino
- But esp is very fragile compare to Arduino

26 GPIOs



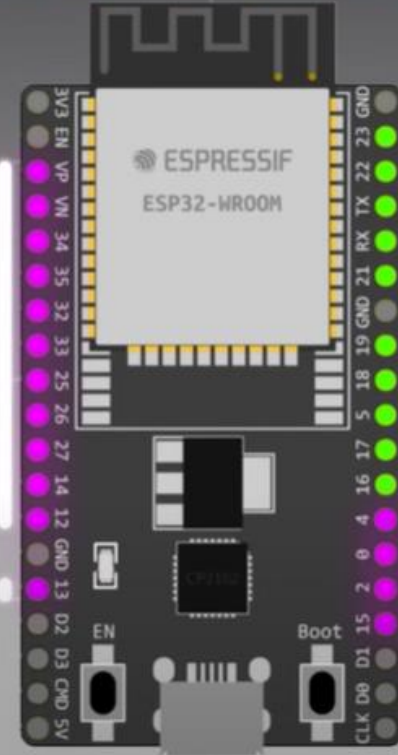
22 GPIOs



PWM  
16-bits



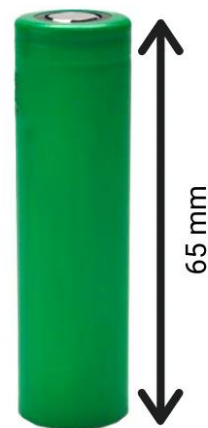
16 Pins



Analog

# Lets learn about batteries

- In a series connection, the voltage across each cell adds up
- Nominal Voltage: A single LiPo cell has a nominal voltage of 3.7V.
- Fully Charged Voltage: A fully charged LiPo cell has a voltage of 4.2V.
- Discharge Voltage Limit (Minimum Safe Voltage): The minimum safe voltage for a LiPo cell is typically 3.0V





# CHARGER :



B3



B6

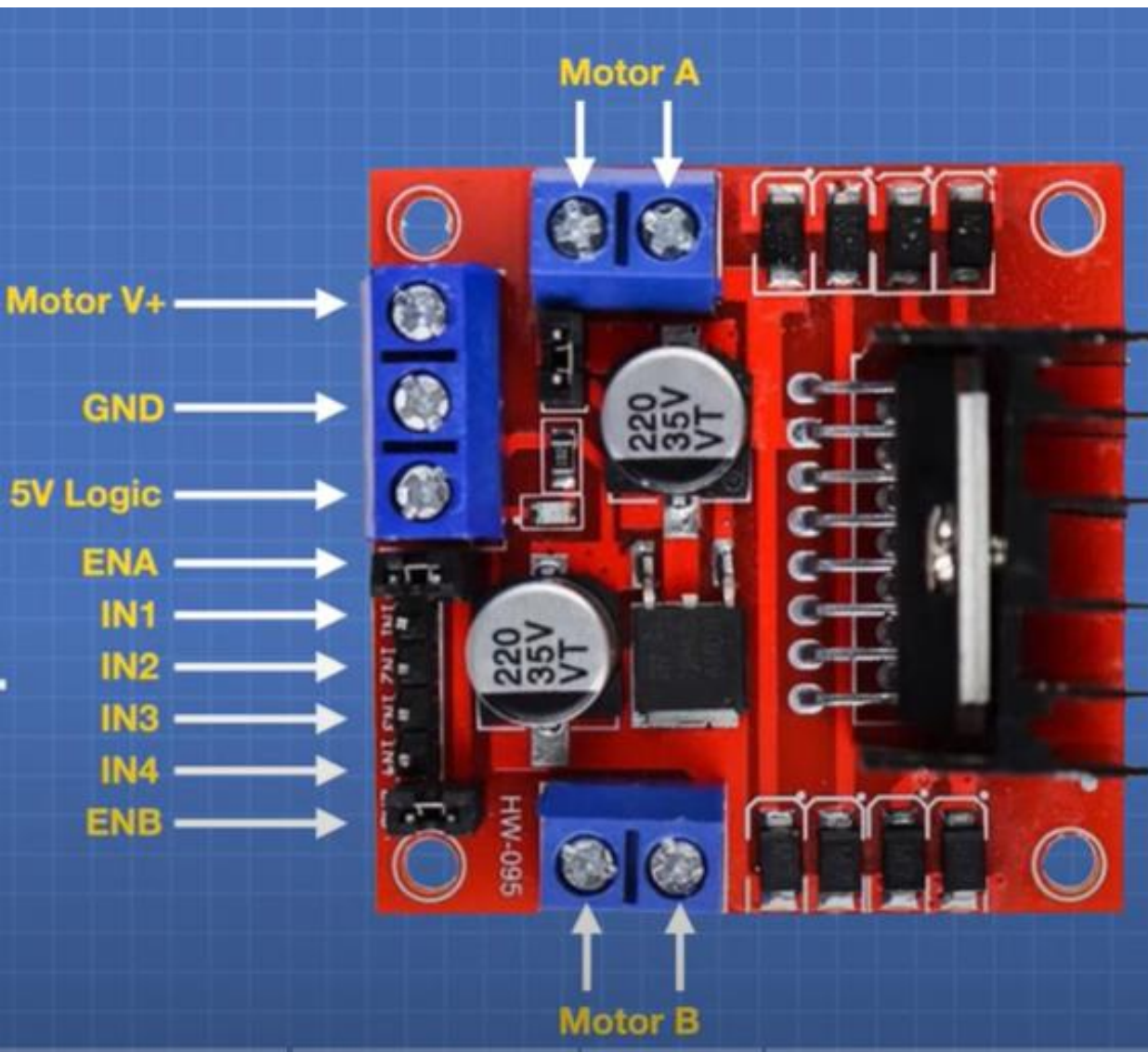


18650  
CHARGER



ISDT

# Time for Motor Drivers



## L298N Dual H-Bridge

Motor Voltage

5 - 35 Volts

Continuous Current

2 Amperes

Peak Current

3.5 Amperes

Logic Voltage

3.3 - 5 Volts

# MORE ABOUT L298N

- The ENA and ENB pins on the L298 motor driver module are enable pins used to control the operation of the two motors connected to the driver.
- HIGH (Logic 1): Enables Motor A/B to receive signals from the control inputs (IN1 and IN2) or (IN3 and IN4) .
- LOW (Logic 0): Disables Motor A/B, effectively stopping it regardless of the signals on (IN1 and IN2) or (IN3 and IN4).
- Speed Control: ENA and ENB can accept a PWM signal, allowing you to control the speed of the motors
- Direction Control: Use IN1 and IN2 for Motor A (or IN3 and IN4 for Motor B) to set the direction.

## LETS SEE AN EXAMPLE

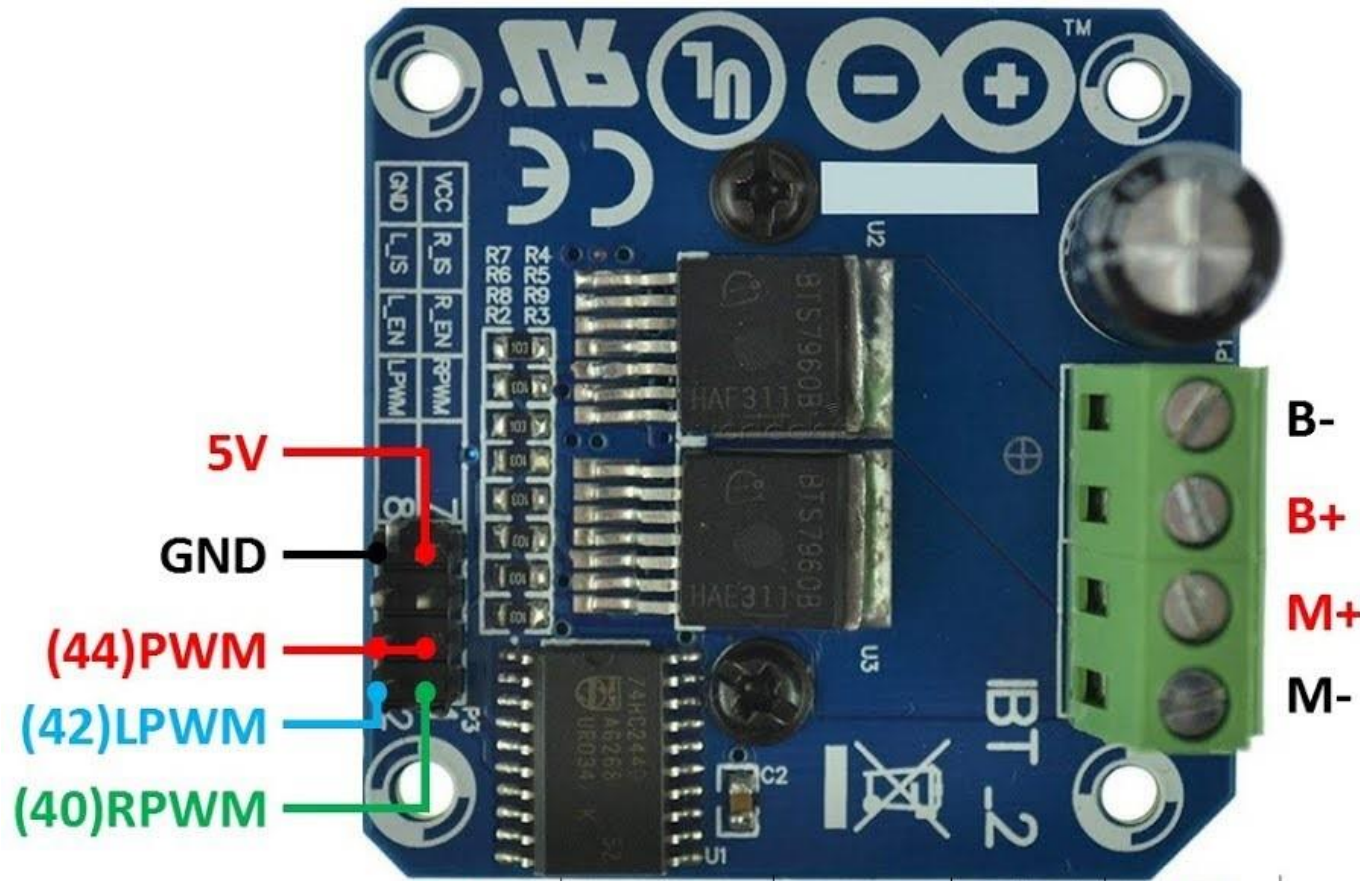
IN1 = HIGH, IN2 = LOW → Motor spins forward.

IN1 = LOW, IN2 = HIGH → Motor spins backward.

IN1 = IN2 = LOW → Motor stops (brakes).

ENA = PWM Signal → Controls speed.





## IBT2 (BTS7960) H-Bridge

Motor Voltage

6 - 27 Volts

Continuous Current

30 Amperes

Peak Current

43 Amperes

Logic Voltage

3.3 - 5 Volts

What is PWM ??

- PWM (Pulse Width Modulation) is a technique used to control the amount of power delivered to a load by varying the width of digital pulses in a signal. It is commonly used for applications like motor speed control, LED dimming, and audio signal modulation.

for BTS:

Both REN and LEN control which side of the motor is active

REN: Activates the right side of the H-bridge when HIGH.

LEN: Activates the left side of the H-bridge when HIGH.

- Forward Motion:**

- One side of the H-bridge is activated, allowing current to flow in one direction through the motor.

- To enable forward motion:

- Set **R\_EN (Right Enable)** **HIGH** to activate the right half-bridge.
- Apply a PWM signal to **R\_PWM** to control the motor speed.
- Keep **L\_EN** and **L\_PWM** **LOW**.

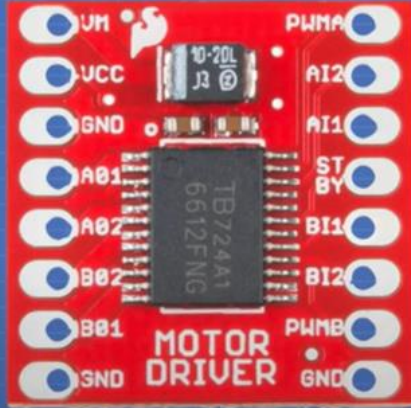
- Reverse Motion:**

- The other side of the H-bridge is activated, reversing the current flow through the motor.

- To enable reverse motion:

- Set **L\_EN (Left Enable)** **HIGH** to activate the left half-bridge.
- Apply a PWM signal to **L\_PWM** to control the motor speed.
- Keep **R\_EN** and **R\_PWM** **LOW**.

# TB6612FNG Dual H-Bridge



# TB6612FNG Dual H-Bridge

Motor Voltage

4.5 - 13.5 Volts

Continuous Current

1.2 Amperes

Peak Current

3.2 Amperes

Logic Voltage

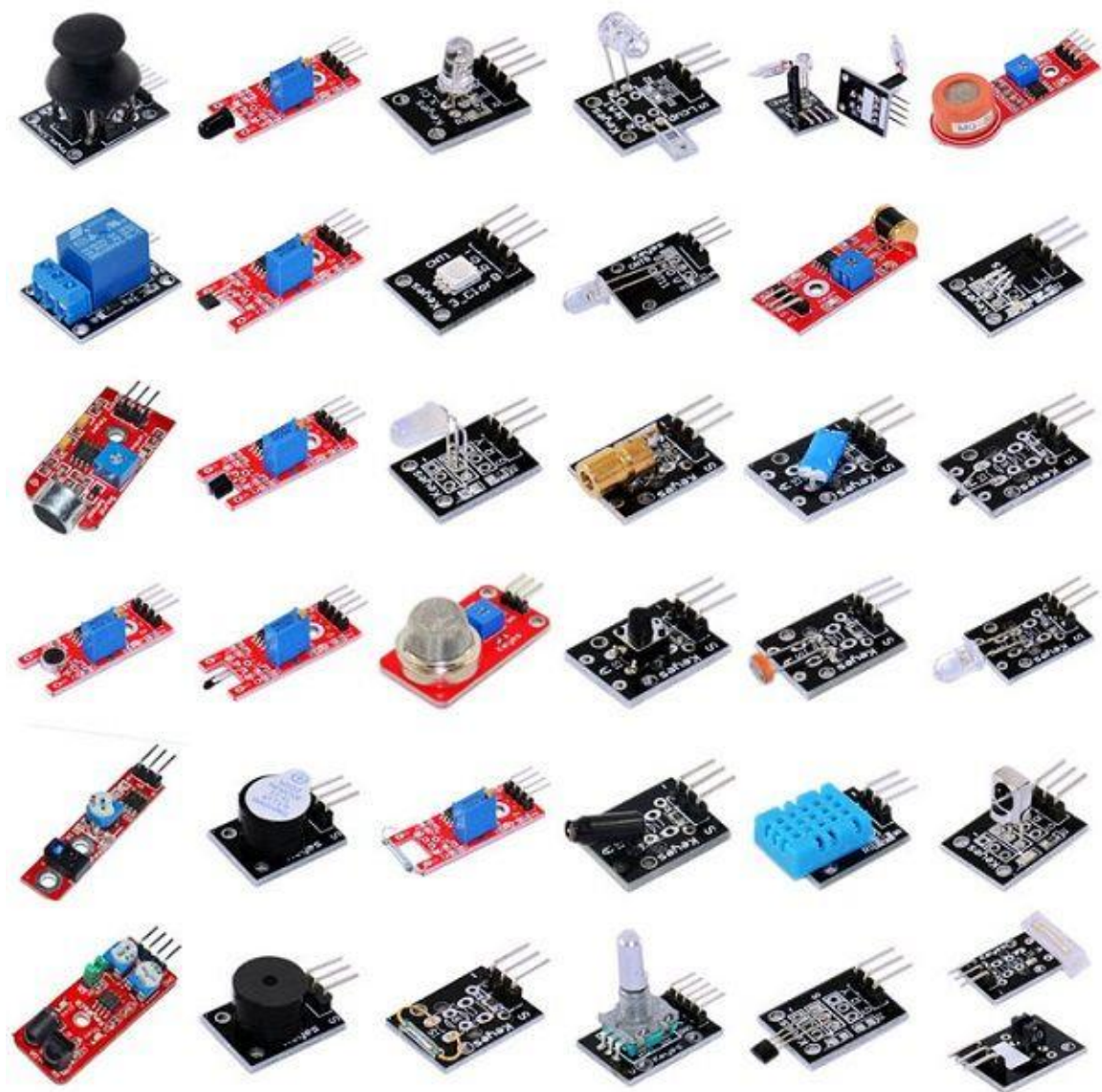
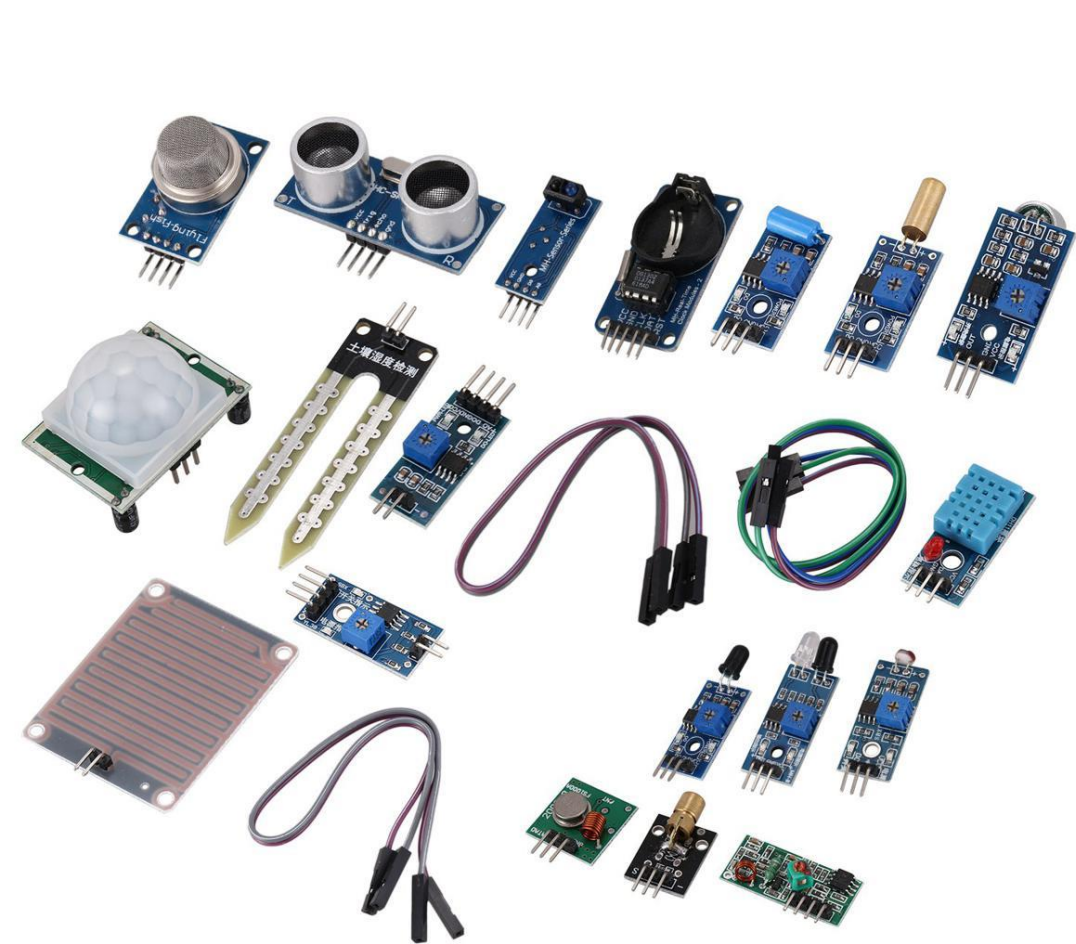
2.7 - 5.5 Volts



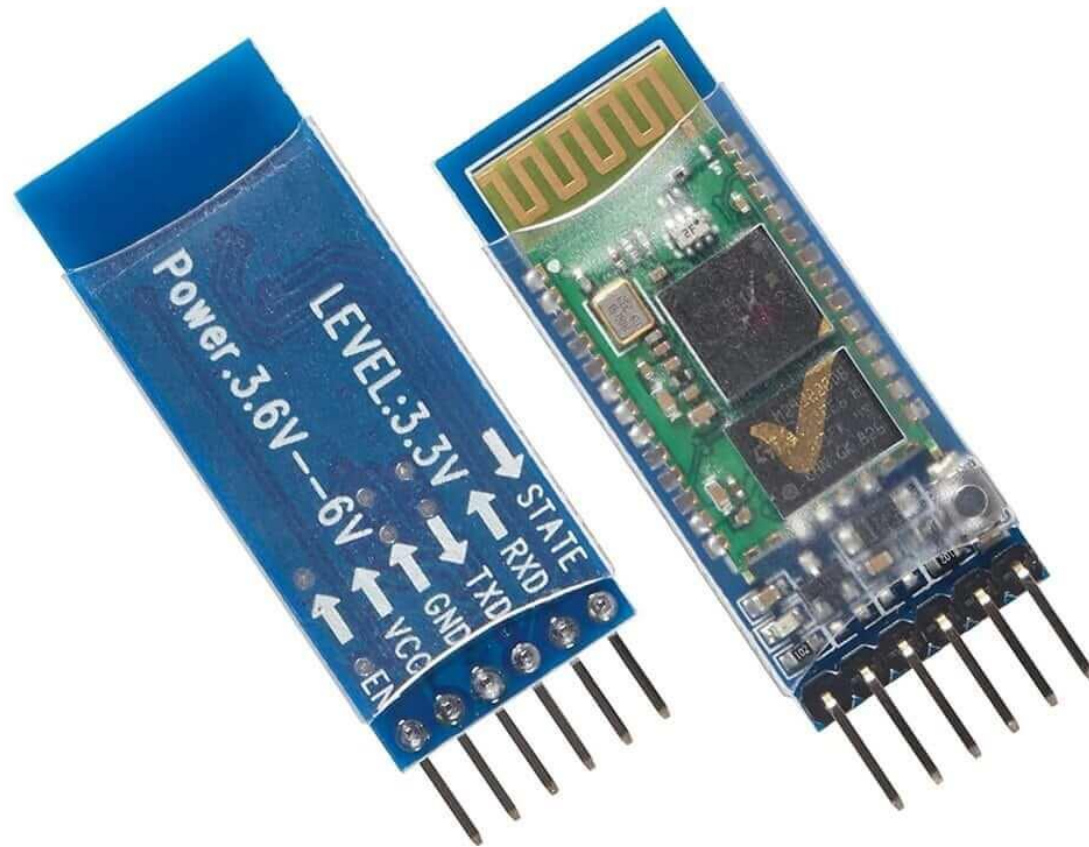
# LETS TALK ABOUT MOTORS



# SENSORS



# BLUETOOTH MODULE FOR ARDUINO:





# TOOLS WE NEED







And its finally done!  
Ready for KUET!



NSG 2.0 ❤️❤️

