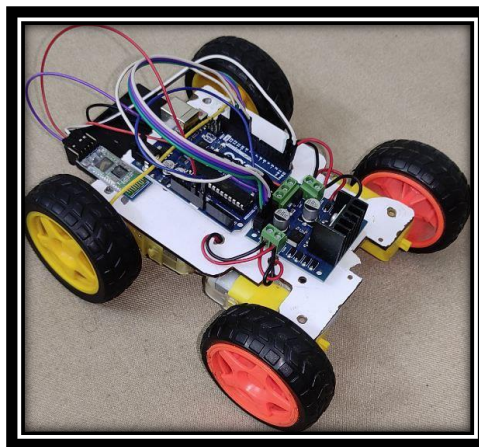


Report On

**Bluetooth Controlled Car**

**Subject Code - ECE 217**



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## **INTRODUCTION**

This project is about controlling a car using Bluetooth. We are using Arduino Uno as the controller and motor driver to control the car. The Bluetooth Module is used to control the car via Bluetooth.

The Arduino Uno sends data over serial port to motor driver and then motor driver controls the direction of the motor accordingly. The Bluetooth module is used for sending data over Bluetooth, which will be received by the smartphone app and then it will send command over serial port to Arduino uno for changing the direction of the motors.

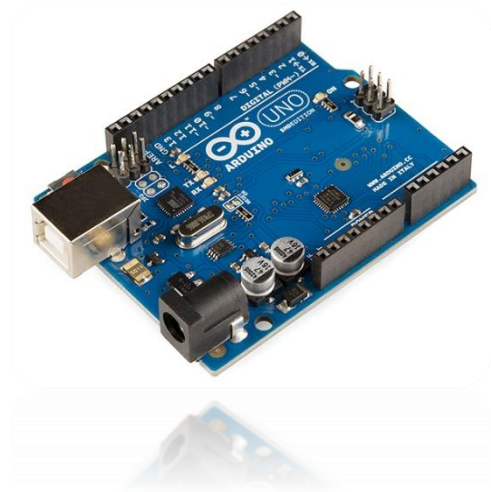
## **REQUIREMENTS**

- Wooden Plank – Car's Body
- M2F Wires
- Plastic toy Wheels
- Rechargeable Li-ion Battery (3.7V each)
- Arduino Uno
- Geared DC Motor
- Motor Driver
- Bluetooth Module HC-05
- Glue Gun
- Double sided tape

## DESCRIPTION

### Arduino Uno

- The **operating voltage** is 5V
- The recommended **input voltage** will range from 7v to 12V
- Digital **input/output pins** are 14
- **Analog i/p** pins are 6
- **DC Current** for each input/output pin is 40 mA
- DC voltage- 3.3V
- **Flash Memory** is 32 KB
- **SRAM** is 2 KB
- **EEPROM** is 1 KB
- CLK Speed is 16 MHz



### DC Geared Motor

- Operating Voltage: 3 to 12V.
- 100 RPM



## **Motor Driver**

Main Control Chip: L298N

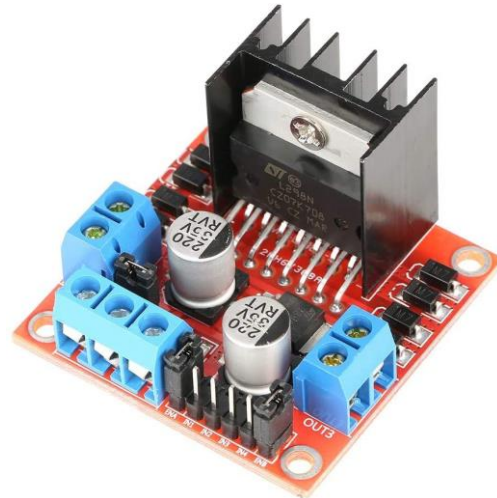
Logic Voltage: 5V

Drive Voltage: 5V-35V

Logic current: 0mA-36mA

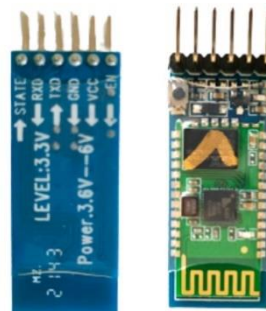
Drive Current: 2A

Max. Power: 25W



## **Bluetooth Module**

- Its operating frequency is 2.4 GHz ISM
- Its default baud rate is 9600 for data communication



Band

## **Male to Female Wires**

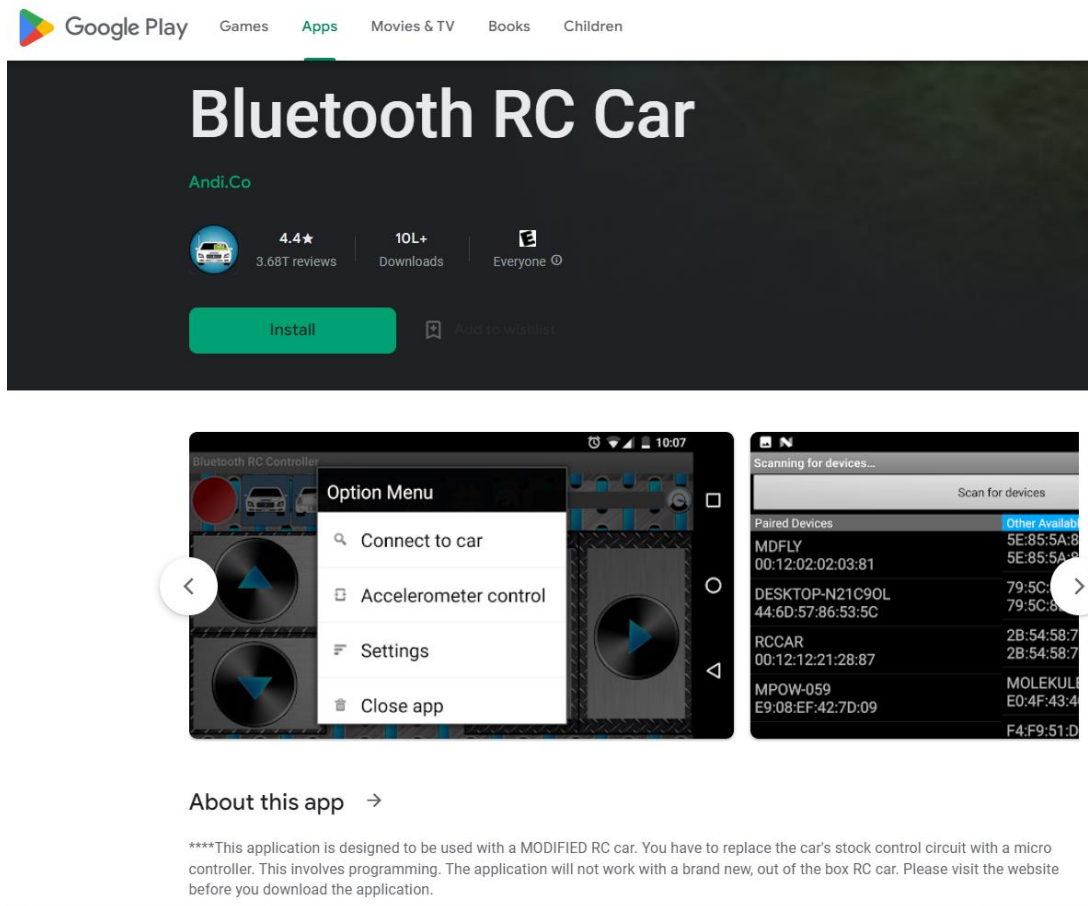
This cable is an electrical wire or group of them in a cable with a connector or pins at each end, which is normally for interconnecting the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Male ends have a pin protruding and can plug into things, while female ends do not and are used to plug things into.



## Smartphone application as Bluetooth Remote

The remote from which the car will be controlled via Bluetooth is a application downloaded from Google Play Store which provides all the features and controls of Bluetooth RC Car.



## PROCEDURE

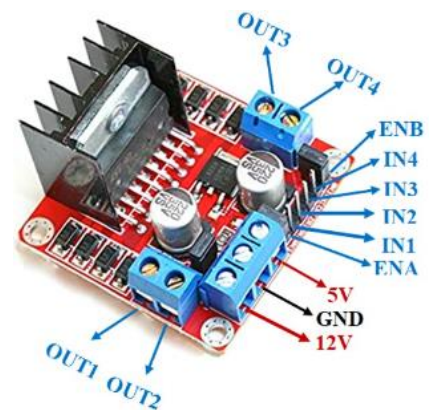
- 1) First, we will take the wooden plank and cut it accordingly so that every device fit on the plank.
- 2) Make holes in it for our wires to reach motors on the lower side of the plank.
- 3) Take the glue gun and fit our device i.e., Arduino Uno, Bluetooth Module, Motor Driver on upper side and 4 Geared DC motor and Battery Holder on the lower side of the plank.

- 4) Attach wheels and battery.
- 5) Do the connection and coding.

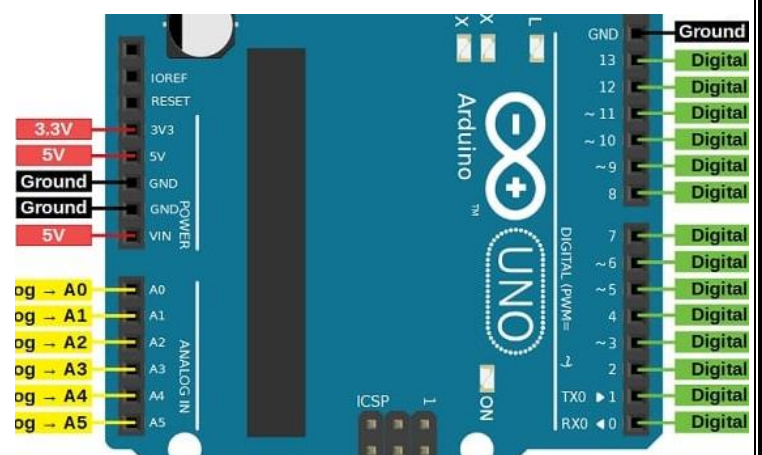
After this our model is ready and now, we have to make the connections of the devices and do the coding of the logic of the working of the car.

## WORKING

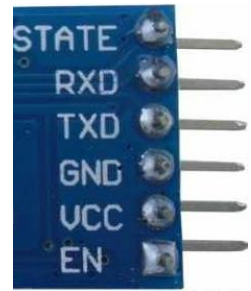
First the DC voltage from 12V equivalent battery is given to Motor Driver, and negative terminal of the battery is connected to **GND** of Motor Driver. Then left 2 DC Geared Motors are connected to the **OUT1** and **OUT2** with alternative positive and negative terminals. And right 2 DC Geared motors are connected to **OUT3** and **OUT4** with alternative positive and negative terminals. Then from **5V** output point of Motor Driver power is given to both Arduino Uno and Bluetooth Module.



The 5V wire from Motor Driver goes into **VIN** of Arduino Uno and one wire from **GND** of motor driver goes into GND of Arduino Uno. Now to control the motors via motor driver the command is given through digital pin number **10, 11, 12 and 13**. They are connected using Male to Female Wires to pin **IN1, IN2, IN3 and IN4** of Motor Driver respectively.



Now to connect to Bluetooth Module M2F wire from **Tx (pin 1)** of Arduino to **Rx** of Bluetooth Module and **Rx (pin 0)** of Arduino to **Tx** of Bluetooth Module is connected. Then the power source wire of 5V from Motor Driver is connected to **VCC** of Bluetooth Module and **GND** of BT is connected to other GND pin of Arduino Uno.



Now the connection part is done and we move to coding part. First, we connect the Arduino Uno to our laptop using cable connector of Arduino Uno and start writing code in Arduino Integrated Development Environment (IDE). In the code we have first initialized the character variable “t” which will store the value of command of motors i.e., Left, Right, Forward and Backward. Then pin numbers of Arduino Uno controlling the motors as m1, m2, m3 and m4. Now in void setup we are setting pin numbers 10, 11, 12 and 13 as output pins and setting up the baud rate of Arduino as 9600 to match with default baud rate of Bluetooth Module.

In void Setup we will check the command given from the remote whether it is left, right, forward or backward and will apply the if else loop accordingly. If the command is forward i.e., ‘F’ then we will rotate all four motors in clockwise direction, if the command is backward i.e., ‘B’ then we will move all motors in anti-clockwise direction, if the command is left i.e., ‘L’ then we will move two motors at right side in clockwise direction and two motors in left side in anticlockwise direction and finally if the command is right i.e., ‘R’ then we will move two motors at right side in anti-clockwise direction and two motors in left side in clockwise direction.

## Arduino Code

```
char t;  
  
int m1 = 10;  
  
int m2 = 11;  
  
int m3 = 12;  
  
int m4 = 13;
```

```
void setup() {

    pinMode(m1, OUTPUT); //Set pin as output for motor1

    pinMode(m2, OUTPUT); //Set pin as output for motor

    pinMode(m3, OUTPUT); //Set pin as output for motor

    pinMode(m4, OUTPUT); //Set pin as output for motor

    Serial.begin(9600); //Initialize serial module with 9600 baud rate

}

void loop() {

if(Serial.available()){

    t = Serial.read();

    Serial.println(t);

}

if (t == 'F'){

    // Rotate in CCW direction

    digitalWrite(m1, LOW);

    digitalWrite(m2, HIGH);

    digitalWrite(m3, HIGH);

    digitalWrite(m4, LOW);

}

else if (t == 'B'){

    digitalWrite(m1, HIGH);

    digitalWrite(m2, LOW);

    digitalWrite(m3, LOW);

    digitalWrite(m4, HIGH);

}
```



```
}

else if (t == 'R'){

    digitalWrite(m1, LOW);

    digitalWrite(m2, HIGH);

    digitalWrite(m3, LOW);

    digitalWrite(m4, HIGH);

}

else if(t == 'L'){

    digitalWrite(m1, HIGH);

    digitalWrite(m2, LOW);

    digitalWrite(m3, HIGH);

    digitalWrite(m4, LOW);

}

else if(t == 'S'){

    // stop the motor

    digitalWrite(m1, HIGH);

    digitalWrite(m2, HIGH);

    digitalWrite(m3, HIGH);

    digitalWrite(m4, HIGH);

}

}
```

Now to connect the Bluetooth to our remote that is “Bluetooth RC Car” application in our smartphone, we first have to pair the Bluetooth Module with our device Bluetooth connection. After pairing it will visible in the application in available devices of Bluetooth to connect. Then we have to connect it

and after it have successfully connected the green light will glow at the top-left corner of the application interface. Then we can use the buttons in the application to control the car.

