# Bluetooth Controlled Robot using Arduino.

**Ammar Bin Amir**
**19B-004-EE**

**ZAIN ALI**
**19B-020-EE**

**Khallil Rehman**
**19B-028-EE**

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## Abstract:

A remote control vehicle is defined as any mobile device that is controlled by a means that does not restrict its motion with an origin external to the device. This is often a radio control device, cable between control and vehicle or an infrared or Bluetooth controller. A remote control vehicle(Also known as RCV) is always controlled by a human and takes no positive action autonomously. It is vital that a vehicle should be capable of proceeding accurately to a target area; maneuvering within that area to fulfill its mission and returning equally accurately and safely to base.

In this project we are using Bluetooth wireless technology to control our robot car which is a very simple communication system. The remote in this project is an android device which has Bluetooth feature built in. The user has to install an application on his/her mobile and turn on the Bluetooth in the mobile phone. User can perform various actions like moving Forward, Backward, move Left and move right using commands that are sent from the android mobile.

## Description:

### Components Required

- Arduino UNO.
- L298N Motor Driver Module.
- HC-05 Bluetooth Module.
- Geared Motors.
- Connecting Wires.
- Power Supply.
- Android Phone.
- Bluetooth Controller App.

## Arduino UNO:

Arduino Uno is a microcontroller board developed by Arduino.cc which is an open-source electronics platform based on easy-to-use hardware and software. It is an open-source platform where anyone can modify and optimize the board based on the number of instructions and tasks they want to achieve.

There are 14 I/O digital and 6 analog pins incorporated in the board that allows the external connection with any circuit with the board. The 6 analog pins are marked as A0 to A5 and come with a resolution of 10bits. These pins measure from 0 to 5V, however, they can be configured to the high range using analog Reference () function. Only 5 V is required to turn the board on, which can be achieved directly using a USB port or external adopter,

The Arduino boards are basically a tool for controlling electronics. With the Arduino, makers and electricians can easily prototype their products and make their ideas come to life.

## L298N Motor Driver Module.

L298N Motor Driver Module is a high power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC motors, or 2 DC motors with directional and speed control. L298N is a dual-channel H-Bridge motor driver capable of driving a pair of DC motors. That means it can individually drive up to two motors making it ideal for building two-wheel robot platforms.
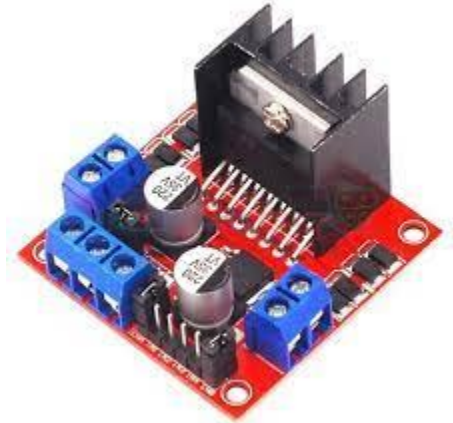
## HC-05 Bluetooth Module.

Bluetooth Communication is a 2.4GHz frequency based RF Communication with a range of approximately 10 meters. It is one of the most popular and most frequently used low range communication for data transfer, audio systems, handsfree, computer peripherals etc. The HC-05 is a very cool module which can add two-way (full-duplex) wireless functionality to your projects. You can use this module to communicate between two microcontrollers like Arduino or communicate with any device with Bluetooth functionality like a Phone or Laptop. There are many android applications that are already available which makes this process a lot easier.
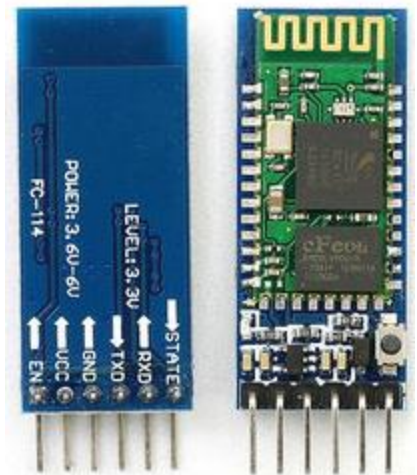
## Geared Motors.

A gearmotor delivers high torque at low horsepower or low speed. The speed specifications for these motors are normal speed and stall-speed torque. These motors use gears, typically assembled as a gearbox, to reduce speed, which makes more torque available. Gearmotors are most often used in applications that need a lot of force to move heavy objects.

## Connecting Wires.

Connecting wires allows an electrical current to travel from one point on a circuit to another because electricity needs a medium through which it can move. Most of the connecting wires are made up of copper or aluminum.

## Power Supply.

A battery is a device that converts chemical energy contained within its active materials directly into electric energy by means of an electrochemical oxidation-reduction (redox) reaction. This type of reaction involves the transfer of electrons from one material to another via an electric circuit.

## Android Phone.

An Android phone is a powerful, high-tech smartphone that runs on the Android operating system (OS) developed by Google and is used by a variety of mobile phone manufacturers.

## Bluetooth Controller App.

This is an Android app that allows users to use their devices to control any other present Android device.

## Working:

A Motor driver is connected to Arduino to run the car. Motor driver's input pins are connected to Arduino's digital pin. Here we have used two DC motors to driver car in which one motor is connected at output pin of motor driver 1 and 2 and another motor is connected at 3 and 4. A Battery is also used to power the motor driver for driving motors. Bluetooth module's rx and tx pins are directly connected at tx and rx of Arduino. And vcc and ground pin of Bluetooth module is connected at +5 volt and gnd of Arduino.

To run this project first we need to download Bluetooth app form Google play store. We can use any Bluetooth app that supporting or can send data. Here are some apps' name that might work correctly.

After installing app you need to open it and then search Bluetooth device and select desired Bluetooth device. And then configure keys. Here in this project we have used Bluetooth controller app.

- Download and install Bluetooth Controller.
- Turned ON mobile Bluetooth.
- Now open Bluetooth controller app
- Press scan
- Select desired Bluetooth device
- Now set keys by pressing set buttons on screen. To set keys we need to press 'set button' and set key according to picture given below:
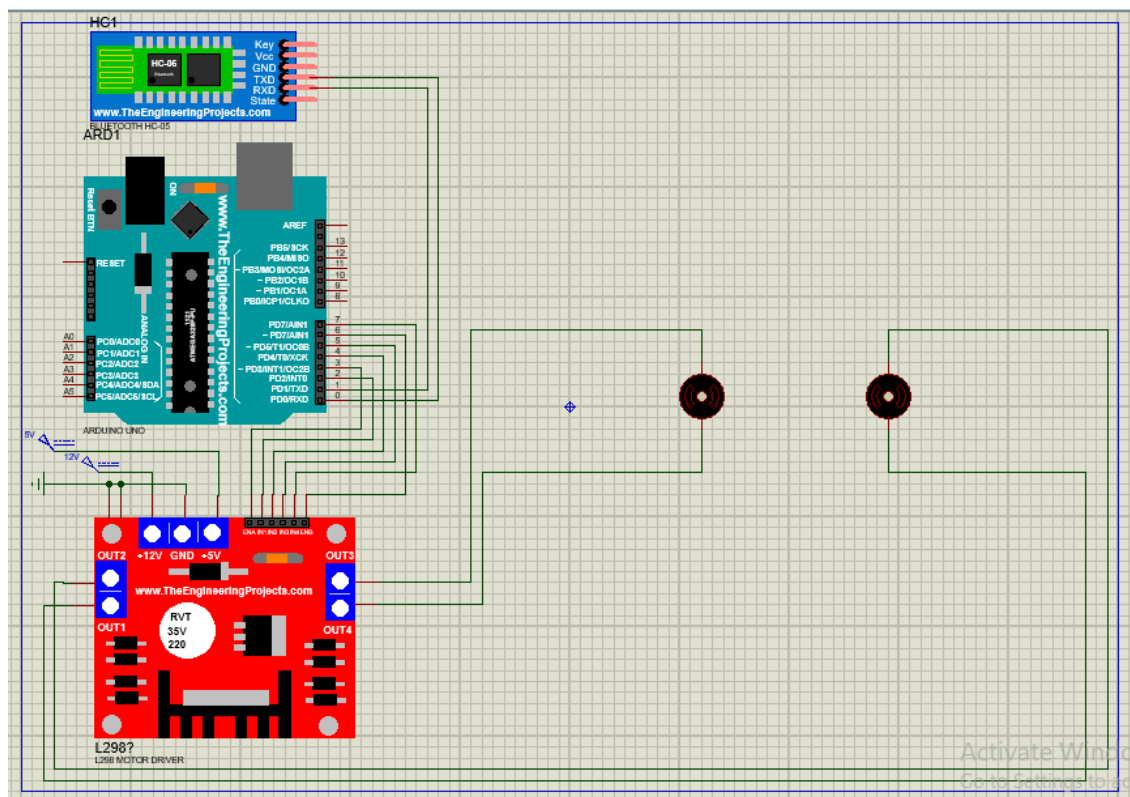
## Block Diagram:
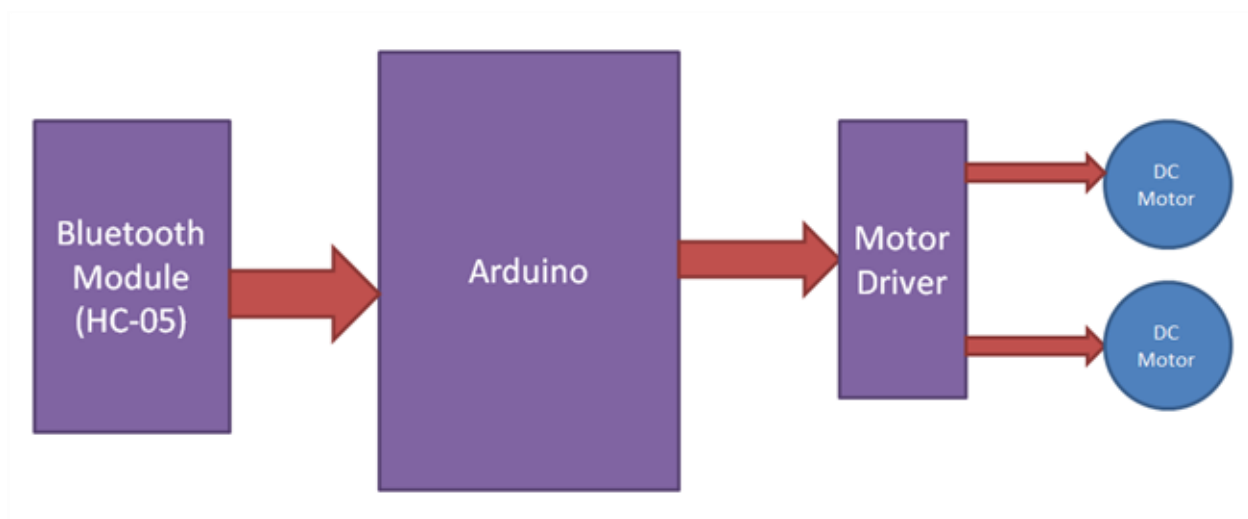
## Circuit Diagram:
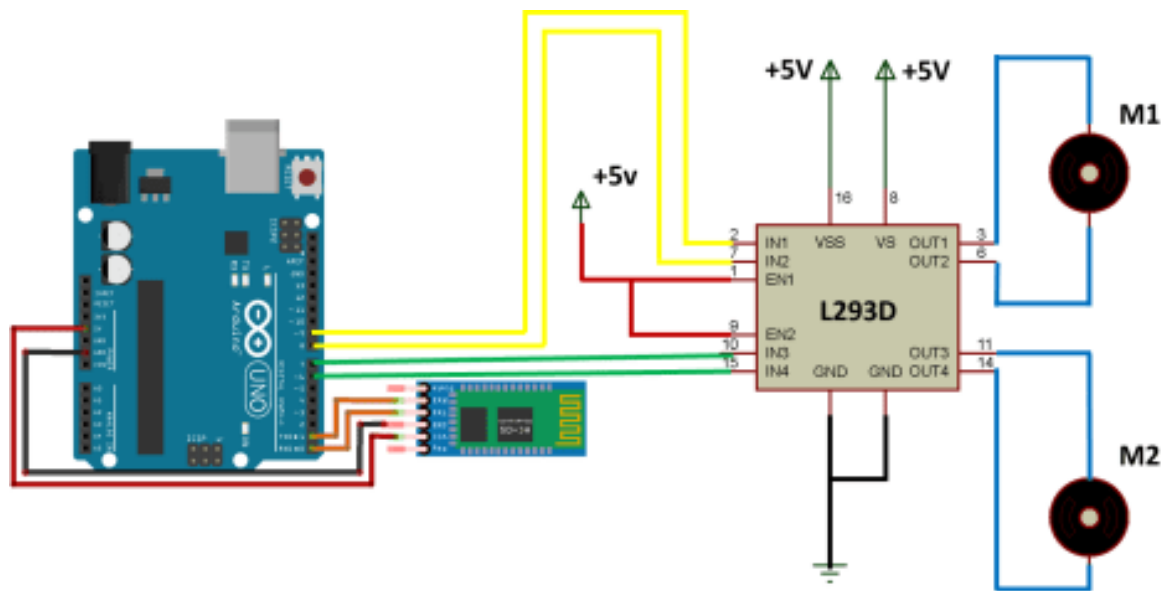


## Schematic.

**Code:**

```
char B;
void setup() {
 pinMode(2,OUTPUT); //Left Motor Pin 1
 pinMode(3,OUTPUT); //PWM Pin 1
 pinMode(4,OUTPUT); //Left Motor Pin 2
 pinMode(5,OUTPUT); //Right Motor Pin 1
 pinMode(6,OUTPUT); //PWM Pin 2
 pinMode(7,OUTPUT);  //Right Motor Pin 2
 Serial.begin(9600); //Enable Serial Communications
}
void loop() {
if(Serial.available()){
 B = Serial.read();
 Serial.println(B);
}

if(B == 'F'){
        digitalWrite(2,HIGH);//LM
        analogWrite(3,255);
        digitalWrite(4,LOW);
        digitalWrite(5,HIGH);//RM
        analogWrite(6,255);
        digitalWrite(7,LOW);
}
```

```
else if(B == 'B'){

        digitalWrite(2,LOW);//LM

        analogWrite(3,255);

        digitalWrite(4,HIGH);

        digitalWrite(5,LOW);//RM

        analogWrite(6,255);

        digitalWrite(7,HIGH);

}


else if(B == 'R'){

        digitalWrite(2,HIGH);//LM

        analogWrite(3,255);

        digitalWrite(4,LOW);

        digitalWrite(5,HIGH);//RM

        analogWrite(6,0);

        digitalWrite(7,LOW);

}


else if(B == 'L'){

        digitalWrite(2,HIGH);//LM

        analogWrite(3,255);

        digitalWrite(4,LOW);

        digitalWrite(5,HIGH);//RM

        analogWrite(6,255);
```

```
        digitalWrite(7,LOW);
}


else if(B == 'S'){
        digitalWrite(2,HIGH);//LM
        analogWrite(3,0);
        digitalWrite(4,LOW);
        digitalWrite(5,HIGH);//RM
        analogWrite(6,0);
        digitalWrite(7,LOW);
}
delay(100);
}
```

**Bill of Material/Costing:**

| NAMES | QUANTITY | PRICE IN RS | TOTAL |
|---|---|---|---|
| Arduino UNO. | 1 | 550 | |
| L298N Motor Driver Module. | 1 | 250 | |
| HC-05 Bluetooth Module. | 1 | 300 | |
| Geared Motors. | 2 | 300 | |
| Connecting Wires. | 10 | 50 | |
| Power Supply. | 2 | 240 | |
| TOTAL | | | 1690 |

**References:**

- https://pijaeducation.com/arduino/bluetooth/bluetooth-controlled-robot-car-using-arduino/
- https://circuitdigest.com/microcontroller-projects/bluetooth-controlled-robot-car-using-arduino