Rocket league.

Inspire Team

Team members name:

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2-Mahmoud Ibraheim Elsharqwey.

3-Mohamed Walid Elsharoud.

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5-Mustafa Mohamed Mustafa.

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8- Mariam Mohamed Nabil.

9-Mona khaled Ali.

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Software:

(1) Variables Definition:

```
#define in1 6
#define in2 7
#define in3 8
#define in4 9
#define enA 10
#define enB 5
float motorSpeed  = 255;
```

Code begins with variables initialization.

1- In(1 to 4) are pins to control directions of our motors.
2- enA and enB are connected to PWM pins to control the speed of our motors.
3- motorSpeed is a variable to store the speed we want our motor to have which is 255 (MAX).

(2) Setup function:

```
void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
  pinMode(in1, OUTPUT);
  pinMode(in2, OUTPUT);
  pinMode(in3, OUTPUT);
  pinMode(in4, OUTPUT);



  pinMode(enA, OUTPUT);
  pinMode(enB, OUTPUT);


  analogWrite(enA, motorSpeed);
  analogWrite(enB, motorSpeed);
}
```

In setup() we started to determine the mode of each pin. In(1-4) pins will be OUTPUT since we will use them to enter values either HIGH or LOW. enA and enB will be OUTPUT too since we will use them to enter values to control motor speed so we will use values that range from zero to 255. We used pinMode() function to determine the mode of each pin and analogWrite() to enter the speed we want (the speed is stored in motorSpeed variable = 255).

We also started using serial to read values form our Bluetooth module in the car.

(3) Movement functions:

(1) Forward():

```
void forward() {
  digitalWrite(in1, 0);
  digitalWrite(in2, 1);
  digitalWrite(in3, 1);
  digitalWrite(in4, 0);


}
```

To make our Car moves forward we will invoke a function called forward().

The function simply makes all of our motors moves in the same direction which is obviously **FORWARD**. We used digitalWrite() function to determine whether our motor will move forward or back and that is by entering 0 or 1.

(2) Right():

```
void right(){

  digitalWrite(in1, 0);
  digitalWrite(in2, 1);
  digitalWrite(in3, 0);
  digitalWrite(in4, 1);
}
```

To make our Car moves right we will invoke a function called right().

The function makes our **RIGHT** motors move **BACKWARD** and our **LEFT** motors move **FORWARD** so that our car will end up moving **RIGHT**.

(3) Left():

```
void left() {

  digitalWrite(in1, 1);
  digitalWrite(in2, 0);
  digitalWrite(in3, 1);
  digitalWrite(in4, 0);
}
```

To make our Car moves left we will invoke a function called left().

The function makes our **RIGHT** motors move **FORWARD** and our **LEFT** motors move **BACKWARD** so that our car will end up moving **LEFT**.

(4) Stop():

```
void stopAll() {
  digitalWrite(in1, 0);
  digitalWrite(in2, 0);
  digitalWrite(in3, 0);
  digitalWrite(in4, 0);
}
```

To make our Car stop we will invoke a function called Stop().

The function makes all of our motors stop by simply making all values entered **ZERO**.

(4) Loop function:

```
void loop() {
  // put your main code here, to run repeatedly:
  if(Serial.available() > 0)
  {

    char command = Serial.read();
    stopAll();
    switch(command)
    {
      case 'F':
        forward();
        break;
      case 'B':
        back();
        break;
      case 'R':
        right();
        break;
      case 'L':
        left();
        break;
      case 'I':
        right();
        break;
      case 'H':
        left();
        break;
      case 'J':
        right();
        break;
      case 'G':
        left();
        break;
    }
  }
}
```

This is the main functionality of our car.

Our program will start to determine if there is available data to read and if there is the we used Serial.read() method to read that value then we stored it in a variable named command (type char because our Bluetooth module sends characters).

Our car will be in the stop mode until a change occurs.

Our switch condition simply makes the decision of what function to invoke depending on the character sent by Bluetooth module.

Character	Function
F	forward()
S	stop()
R	right()
L	left()

A PROJECT REPORT ON ROCKET LEAGUE

What is rocket league challenge ?

In the Rocket League challenge, teams of young engineers design, build, and program two RC robots to compete against another team in matches.To be successful, participants must demonstrate skill in programming, robotics, electronics and mechatronics. Teams are also expected to contribute to the advancement of the community as a whole by sharing their discoveries with other participants and by engaging in good sportsmanship, regardless of culture, age or result in the competition. All are expected to compete, learn, have fun, and grow.

1-Robot chassis
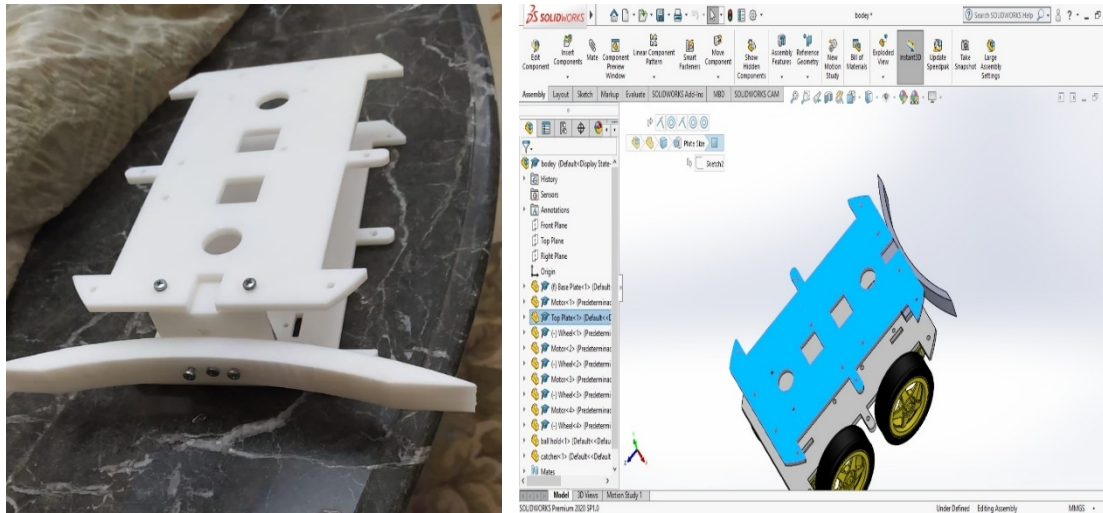
The body of the robot is made of acrylic material and all the components of the robot are placed on it. It is designed for a four-wheeled robot .
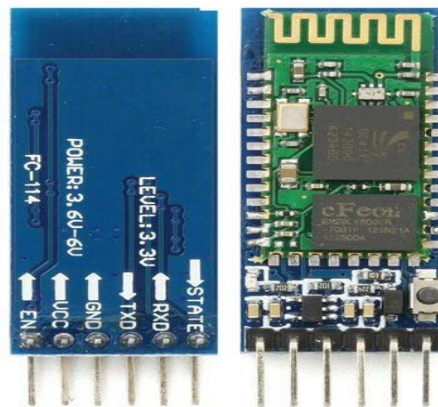
2-Wheels

We used 4 wheels in our robot to move easily

3-Controller

We used Arduino Uno in our robot as a microcontroller.

4-Bluetooth module

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. ... HC-05 Bluetooth module provides switching mode between master and slave mode which means it able to use neither receiving nor transmitting data.

5-Actuators (Drivers)
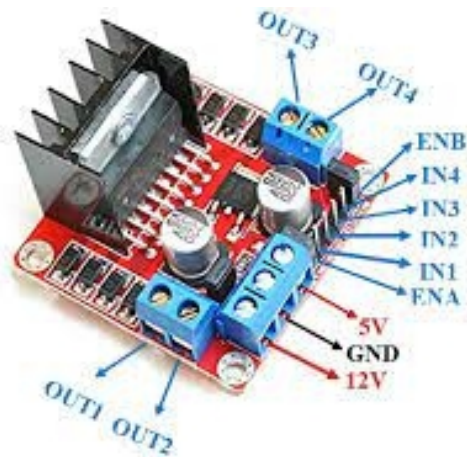
Motor drivers acts as an interface between the motors and the control circuits. Motor require high amount of current whereas the controller circuit works on low current signals. So the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor.

5-Actuators (Motors)

DC motor converts direct current electrical energy into mechanical energy.

6-PowerSupply

We used 3 rechargeable lithium batteries and battery holder .

6-Jumpers

Two types of jumpers were used Male/Male and Male/Female.