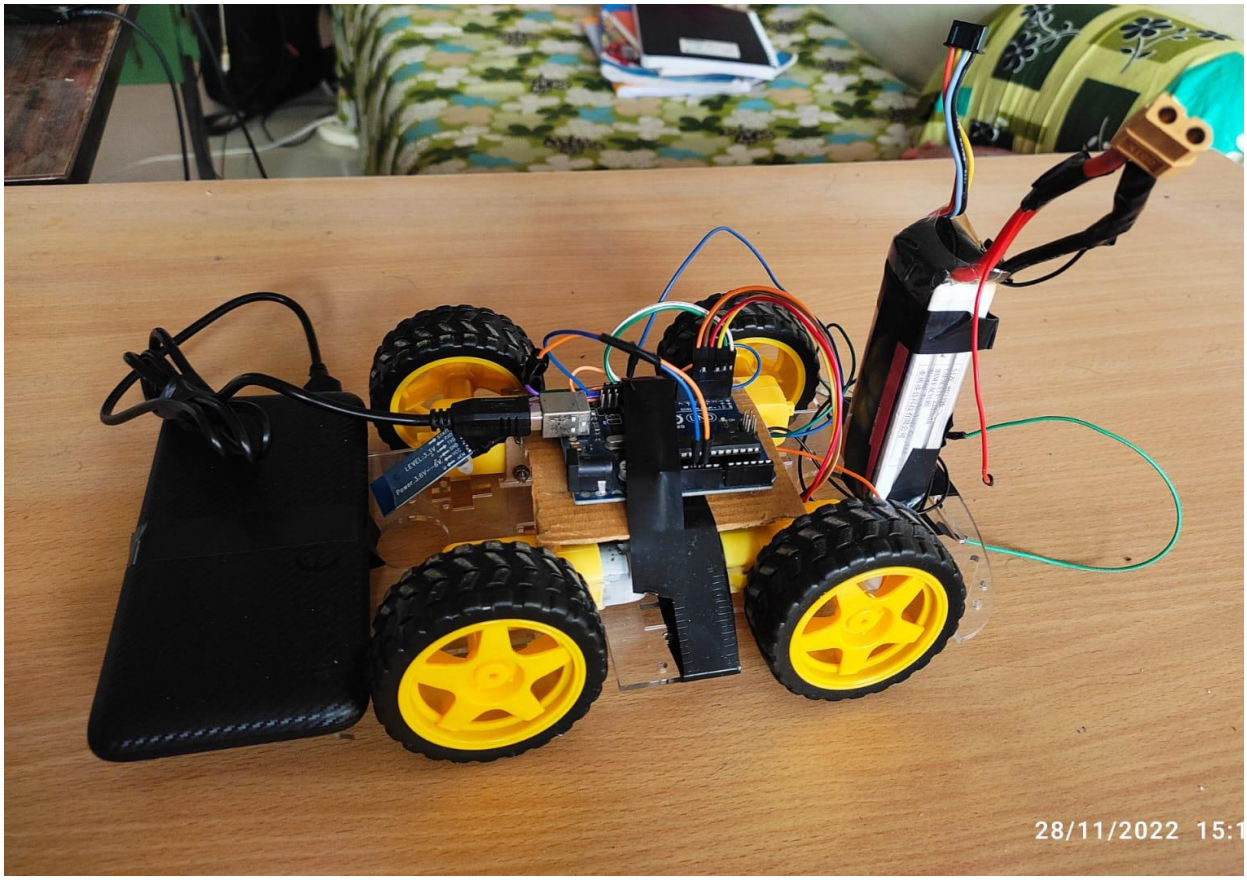
Problem Statement:

We chose to build a Bluetooth-controlled Robo-Car model using Arduino that used an android app as its remote controller.
This was a group project of Aritra Bhaduri (2101AI40) and Arkadeep Acharya (2101AI41).

Task Division

As this project has different domains like hardware and software, so we decided to divide our work into two major divisions, and I did the circuit design, while the Arduino code and designing the android remote, was done by Arkadeep. Although we initially started with divided tasks, later, our work overlapped after we had completed the initial prototype designs of circuits and the app.

Finished Model



Approach

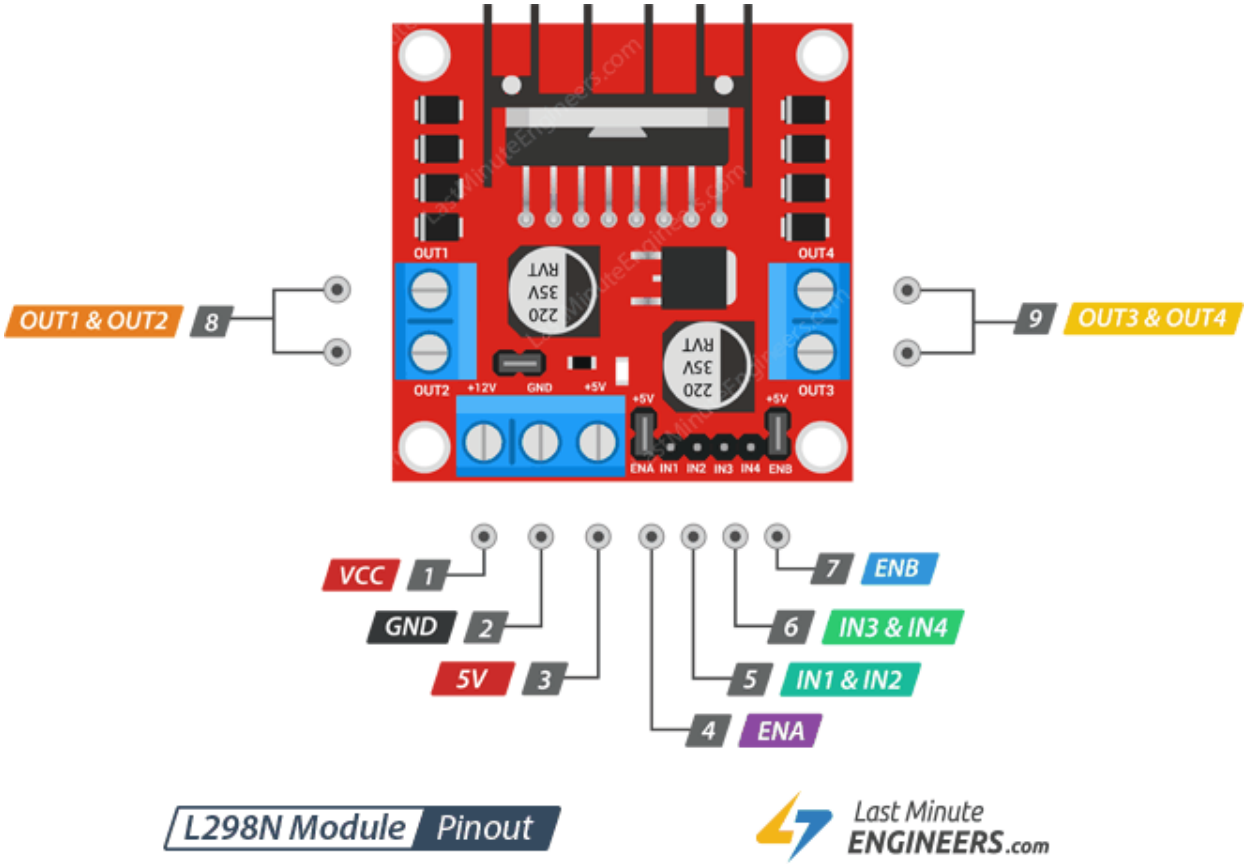
Parts required

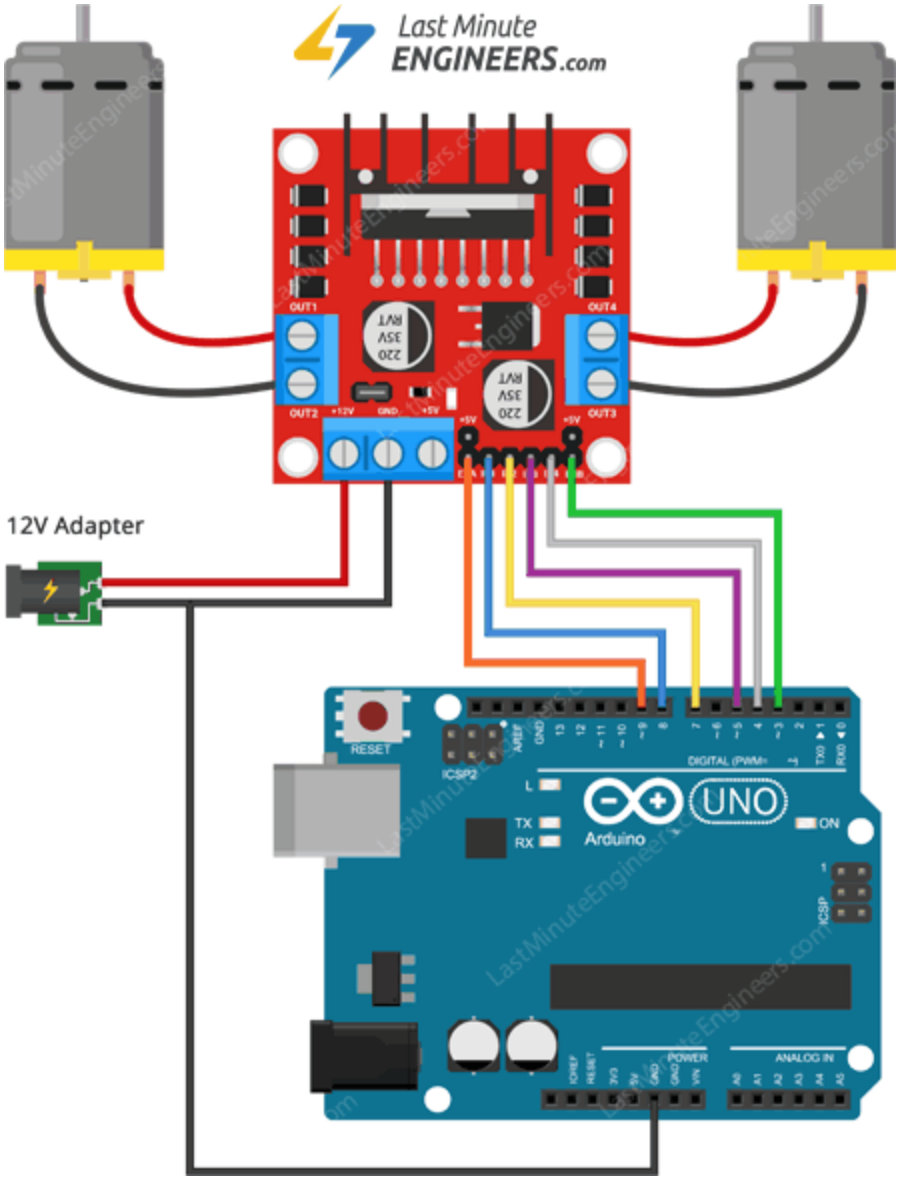
1. Arduino UNO
2. L298n motor driver
3. Car chassis
4. Wheels (4x)
5. Rotating motor (4x)
6. Jumper wires
7. HC-05 bluetooth module
8. Mobile power bank
9. Lithium polymer battery

I have created the motor driver circuitry first, and when it was working, I started to link bluetooth module with it. Initially we thought that we would require two arduino as we required two 5V pins, one for driving the motor, and other for the bluetooth power, but we ended up directly connecting the motor driver with the lippo battery.

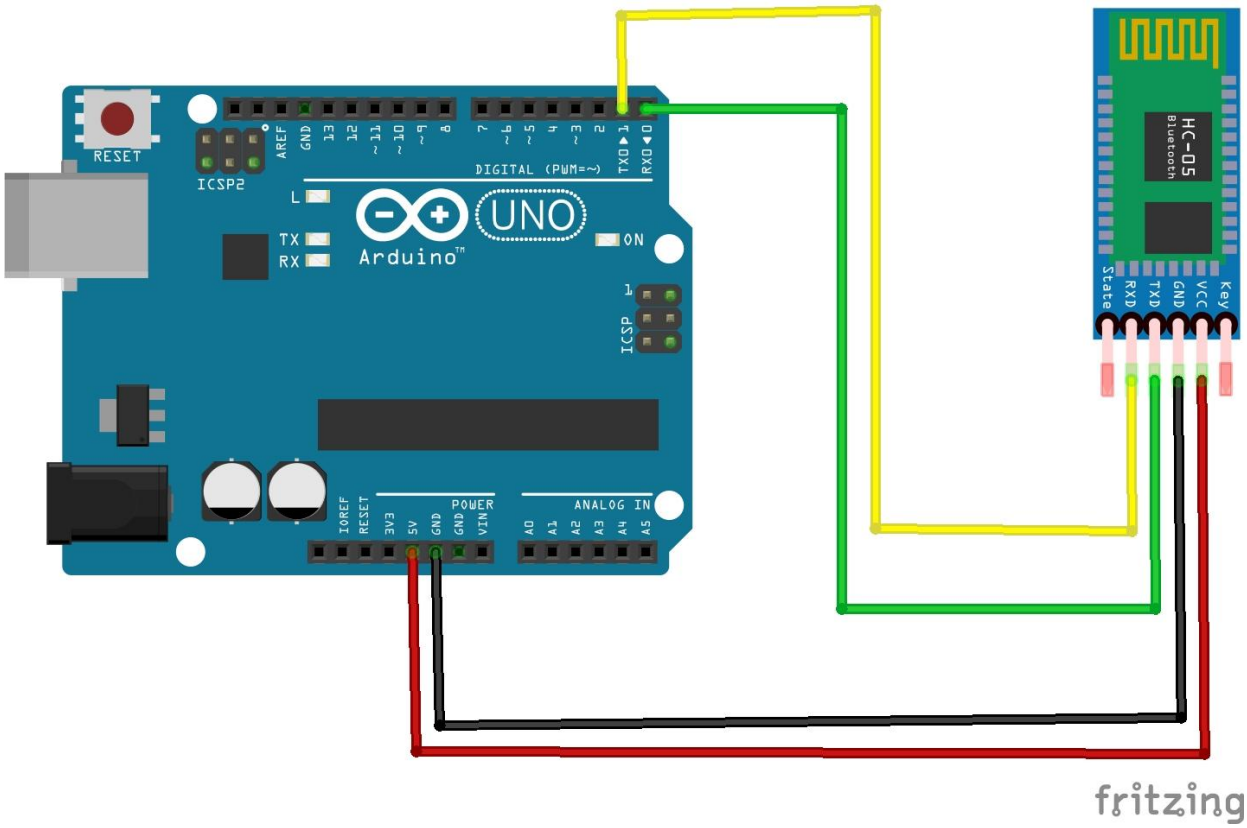
Implementation Details

Our task began with fixing the motors and wheels to the car chassis.
After that, we started connecting the motor driver according to the circuit diagram shown here





Although this was meant to drive only two motors, we had connected four motors with it hoping that it would work, although during our testing I saw that the wheels were rotating on a much slower speed than expected.
Then we connected the HC-05 bluetooth module using the sample diagram shown here.



The bluetooth module was working and properly connecting and receiving the signals. This completes the circuit implementation of Arduino robo car.

Problems faced

While building, we ran into a number of problems which and their solutions are listed:

- Problem uploading code into arduino: Many times we found out that arduino had trouble while uploading code showing error messages like unable to access port, programmer failed to respond. Mostly these were solved either by reconnecting the arduino, or in some unfortunate cases, replacing the entire arduino. In one case we faced this error because we were using the ports 0, 1 while uploading, and when we disconnected those ports it seemed to work again.
- Problem receiving and reading bluetooth signals: A lot time of the debugging was spent trying to fix the process of receiving the signals from bluetooth. Although the issue was mostly due to the circuit, we also had to fix the code as we did some errors in implementing the proper use of softwareserial library.
- Problem with battery: We tried to drive the car using 9V batteries, but it failed to provide enough power to run the car. Even a combination of 9x4 = 36V was not enough to get the car rolling. We fixed it by using a 12V lippo battery which provided enough power to run the car at full speed.