

DFRobot report

Semester 3 Research & and Realization

Introduction

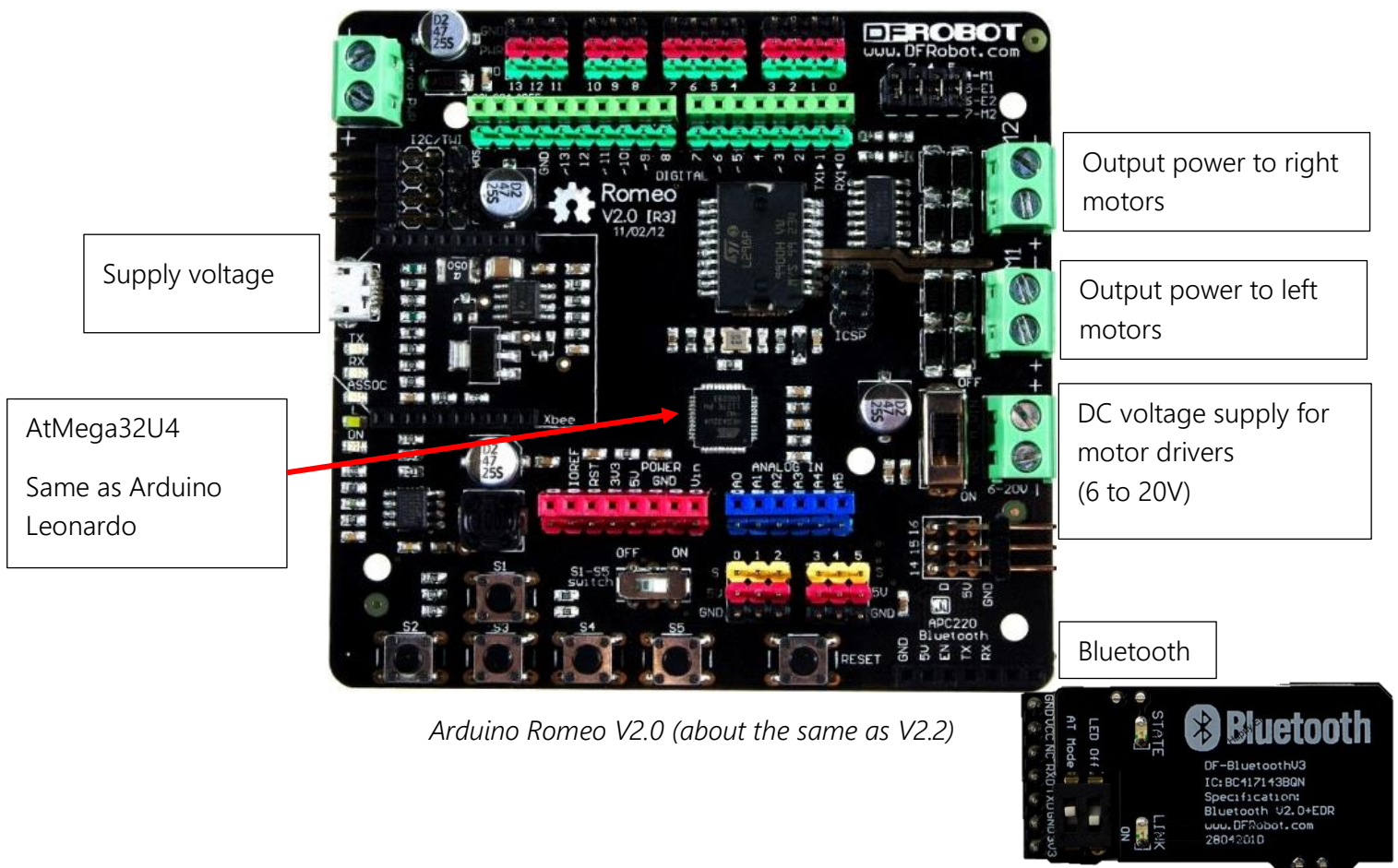
This 4 wheeled robot is distributed by the Chinese company, DFRobot founded in 2008. DFRobot is a world-leading robotics and open source hardware provider who creates and sells small Arduino and Raspberry Pi kits for beginners and amateurs from all around the world.

The purpose of our 3rd semester project of this 2nd year of "GELL", is to control one of these robots with our smartphones via Bluetooth connectivity.

Arduino Romeo

For this project, we will use the Arduino Romeo V2.2 board which can easily handle :

- DC motor drivers
- Bluetooth connectivity
- Basic Arduino abilities
- Many more ...



Bill of material (BOM)

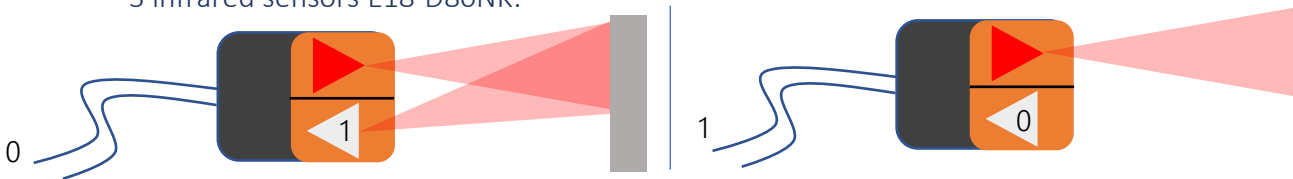
9 batteries:

9 batteries are needed to run this robot:

- 4 for the Arduino (4* 1.2V 2650mAh)
- 5 for the motors (5* 1.2V 2600mAh)

In theory we have 4.8V on the Arduino and 6V on the motors

3 infrared sensors E18-D80NK:

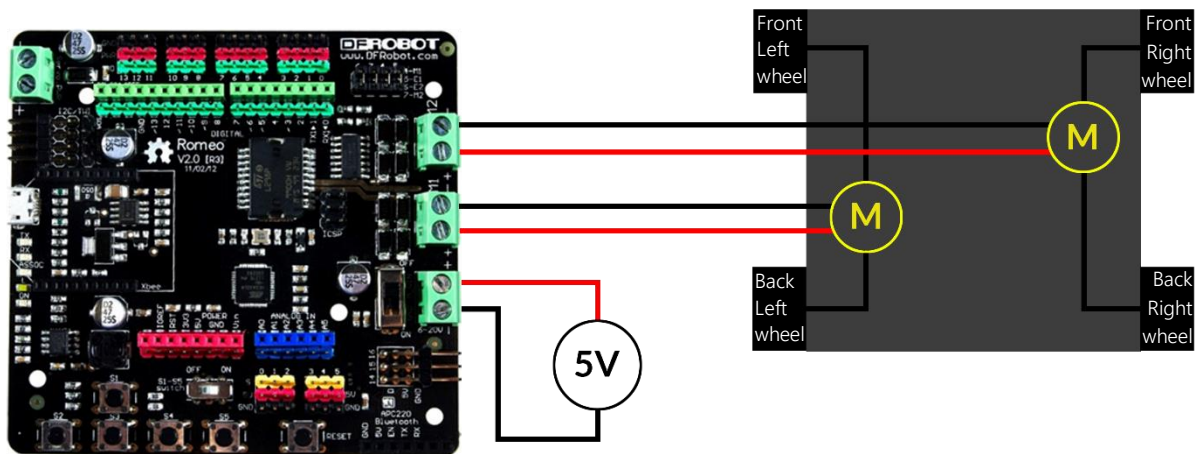


The infrared sensors detect obstacles by sending a IR beam and waiting for an answer.

3 wires are linked to the sensor : 5V supply voltage, ground, and sensor signal.

A continuous 4V signal is sent to the Arduino if nothing is detected, and 0V if an obstacle is seen. (we will invert the value of the signal in the Arduino code for better understanding)

4 wheels driven by a set of 2 trains of motors (left and right):



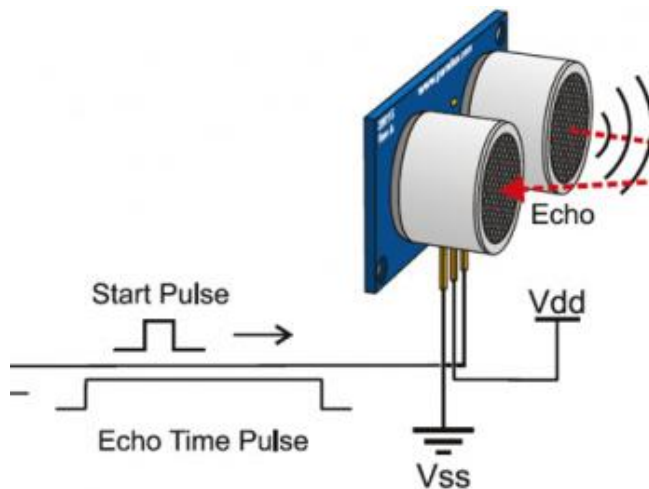
Bluetooth receiver/transmitter CSR BC417143:

The Bluetooth module is added to the Arduino Romeo, and is very easily controlled thanks to the second serial *interface* : Serial 1

CSR BC417143 datasheet for more information:

http://image.dfrobot.com/image/data/TEL0026/TEL0026_Datasheet.pdf

2 ultrasonic sensors VRM37



The Ultrasonic sensors use sound echoes to calculate distance.

By knowing the speed of sound, and measuring time pulse, distance is easy to determine.

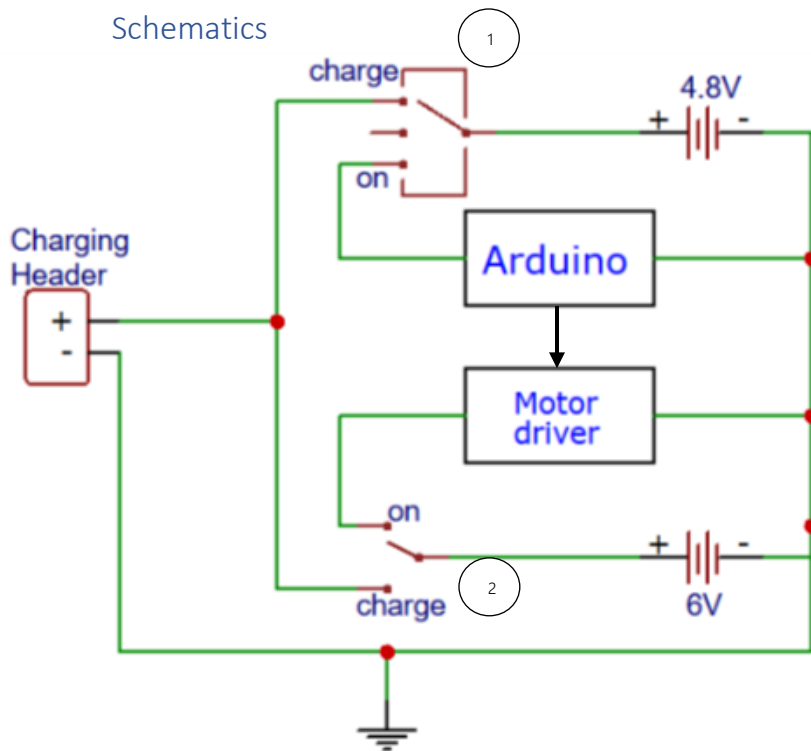
Stepper motor DF05BB

To run the stepper motor, we will be using the Servo.h library. We connect the power supply of the servo to the 5 batteries (motors power voltage), otherwise there will be too much current consumption on the Arduino board.

Actuator and sensor ports assignation

- 3 infrared sensors on Arduino PORT F
Left sensor : F5 Middle sensor : F1 Right sensor : F4
- Wheels on Arduino PORT D, C and E
Left wheels speed : C6 Left wheels direction : D4
Right wheels speed : D7 Right wheels direction : E6
- 1 of the 2 ultrasonic sensors on Arduino PORT D and B
PWM : D0 trigger : B5
- Stepper motor on Arduino PORT B
Stepper Signal : B6

Schematics



1st Switch:

- "ON" position: will provide power to the Arduino board
- "charge" position: will charge the Arduino board batteries
- 3rd position: no state

2nd Switch:

- "ON" position: will provide power to the motor driver module
- "charge" position: will charge the "motor" batteries

THE 2 SWITCHES MUST NOT BE POSITIONED TO CHARGE MODE AT THE SAME TIME