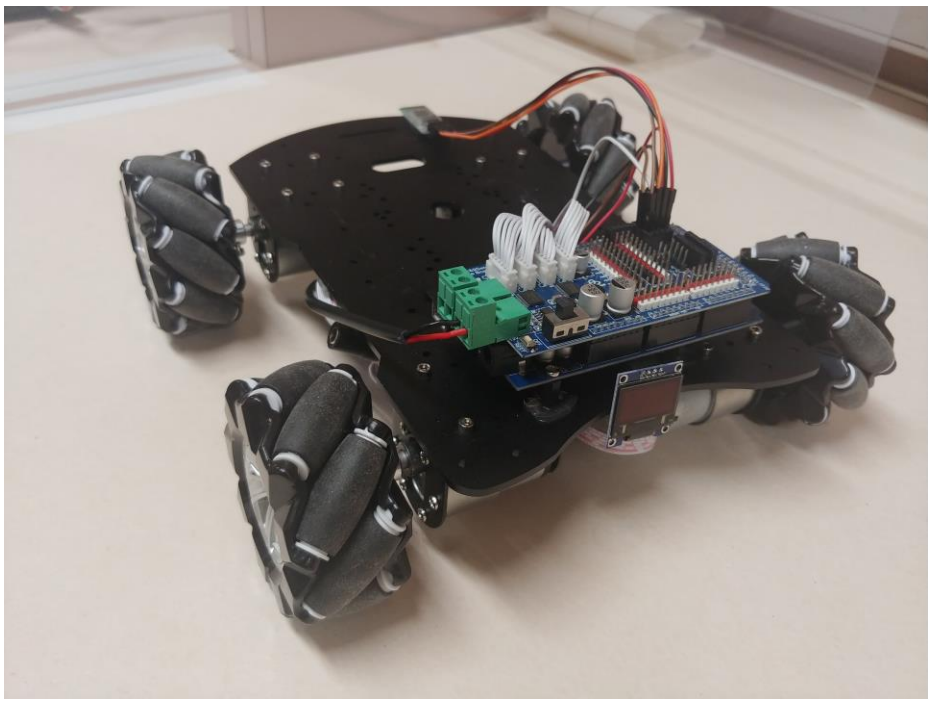
Robot Body Assembly:

Overview:

Before:

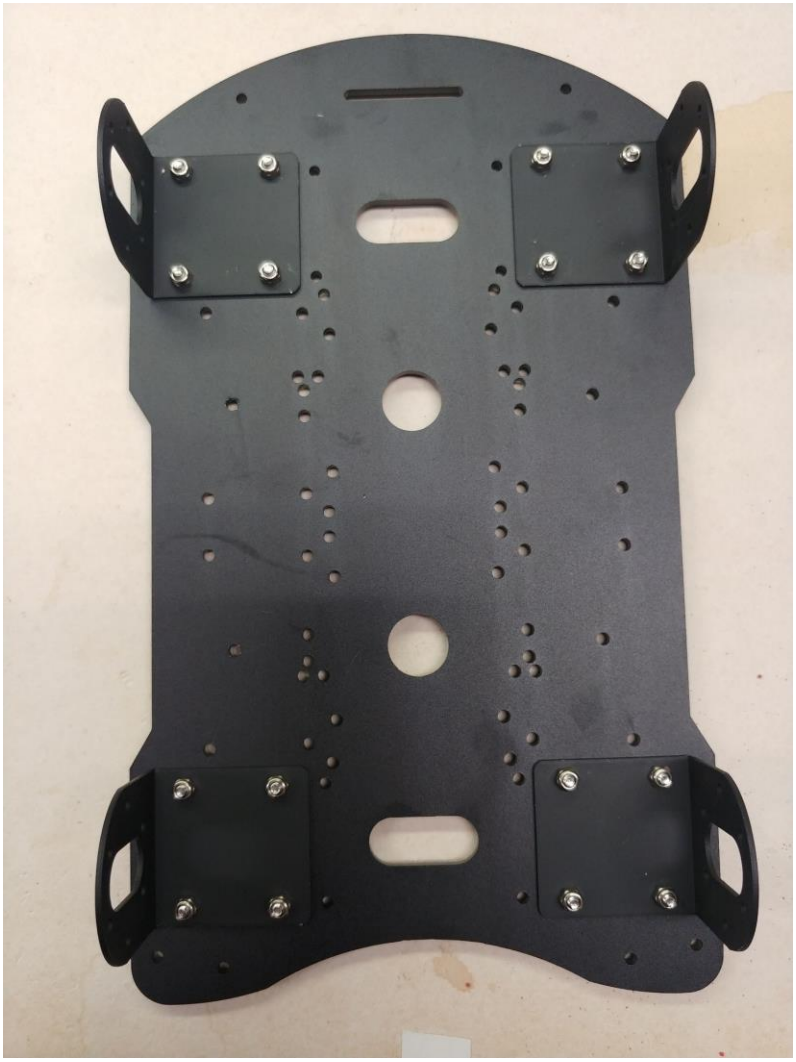
After:



1. Car Body Assembly

Step 1.1

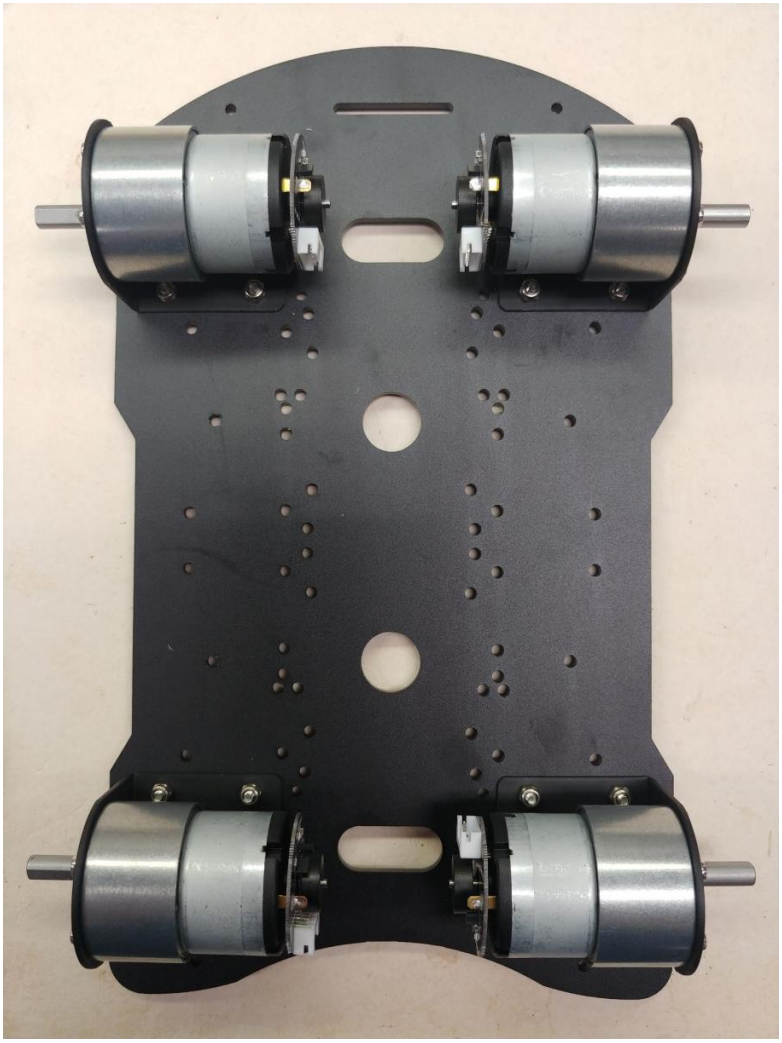
Attach the wheel mounts to the body of the vehicle using the screws shown below.



Step 1.2

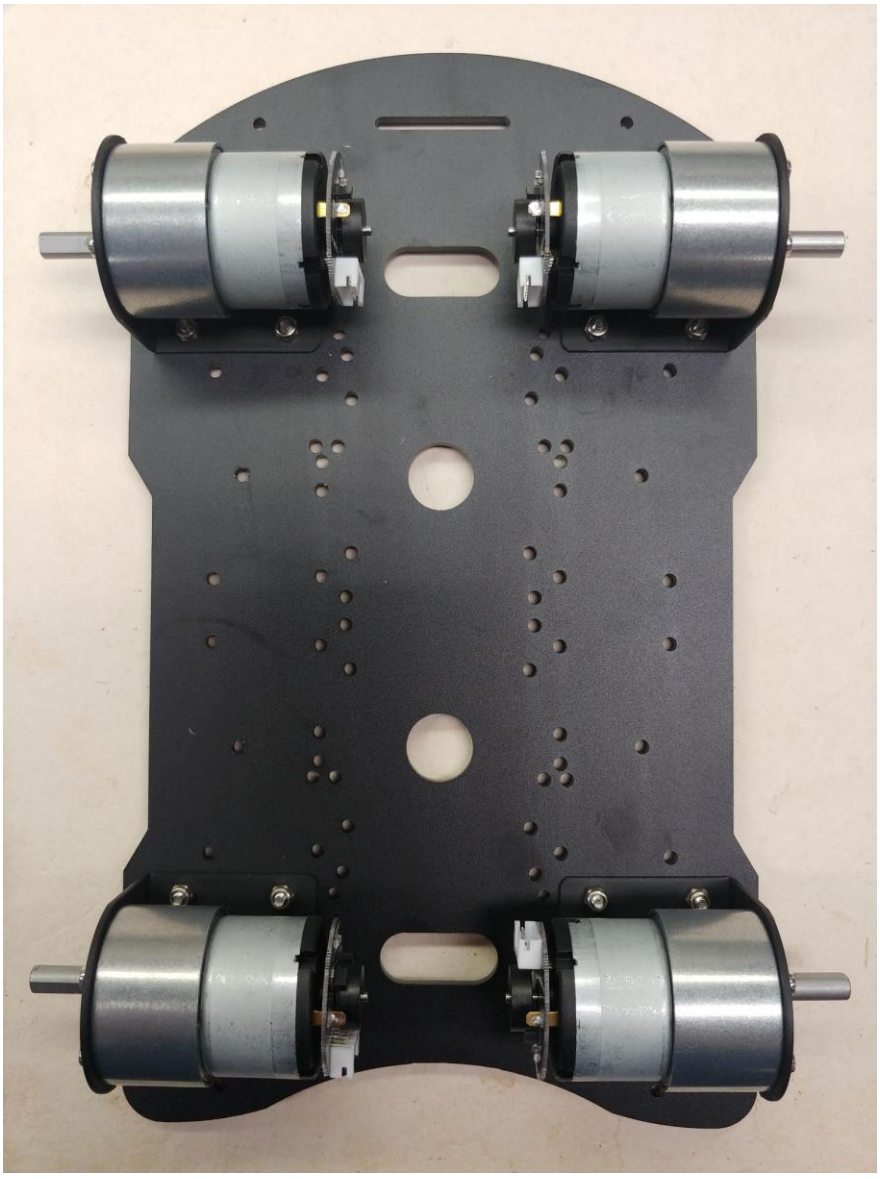
Attach the motors to the wheel mounts.

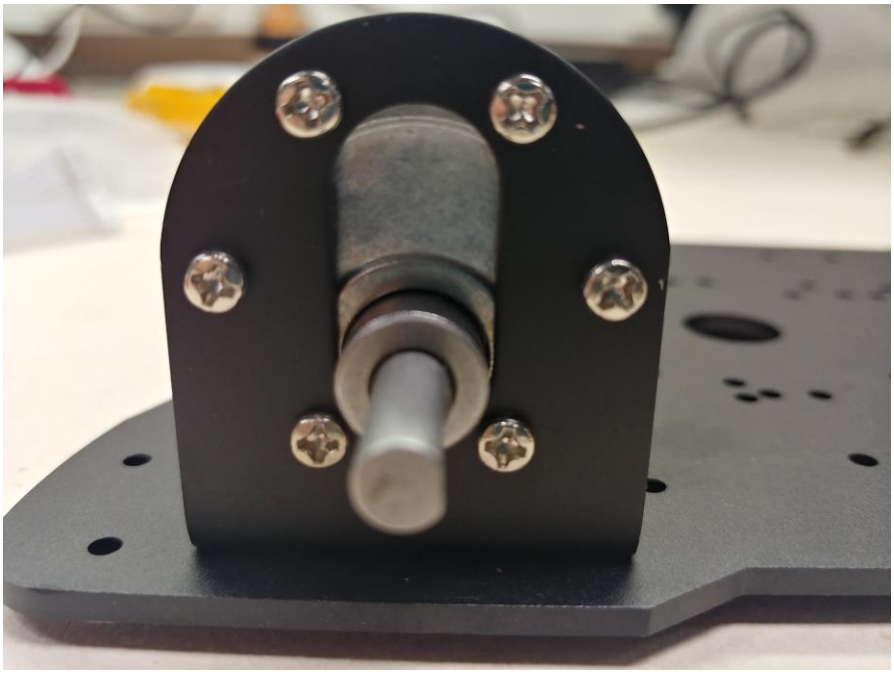
Note: The direction of the motor's connectors does not affect the operation of the vehicle.



Step 1.3

Screw the motors onto the wheel mount with the screws shown below.

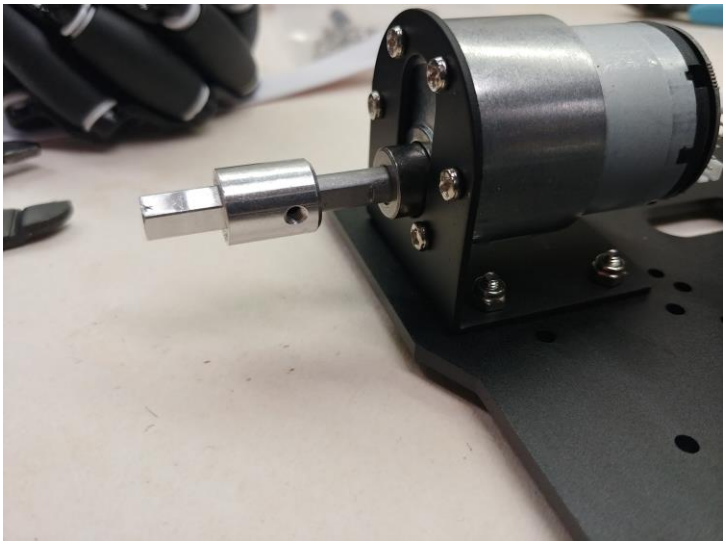




Step 1.4

Use the screws as shown below to screw the set screw (hexagon socket head screw) to the axis of the motors.

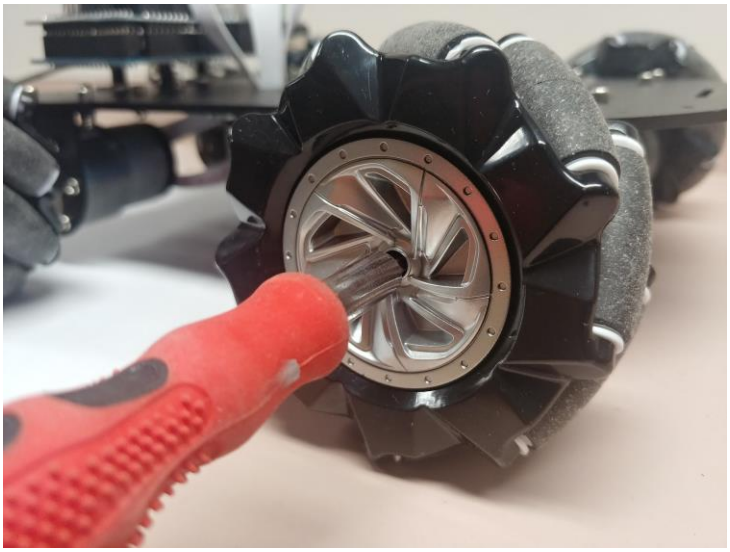
Pay attention to the surface of the motor's axis. The set screws should be screwed onto the flat surface of the motor's axis.

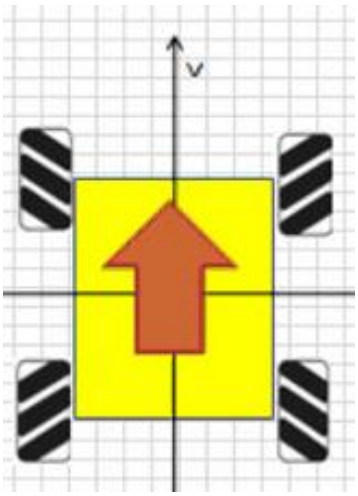


Step 1.5

Mount the wheels on the axises of the motors and screw them in place with the remaining screws (the cross head screws).

Warning: Pay attention to the orientation of the wheels. Refer to the diagram below for the correct orientation.

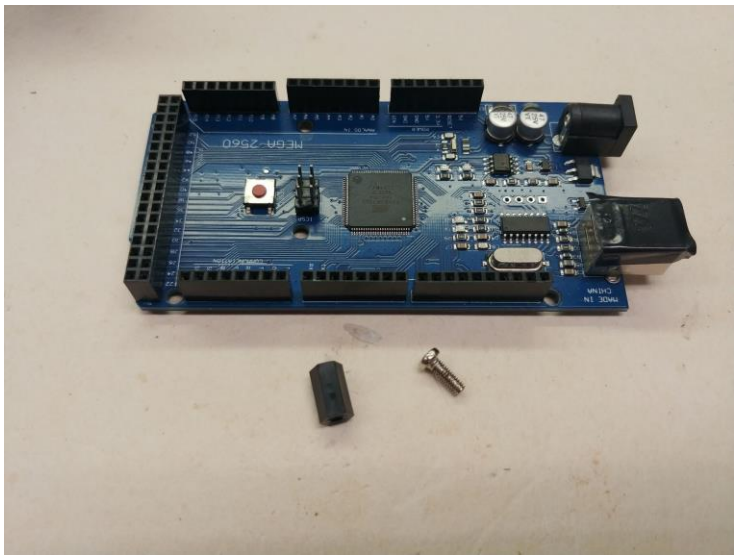


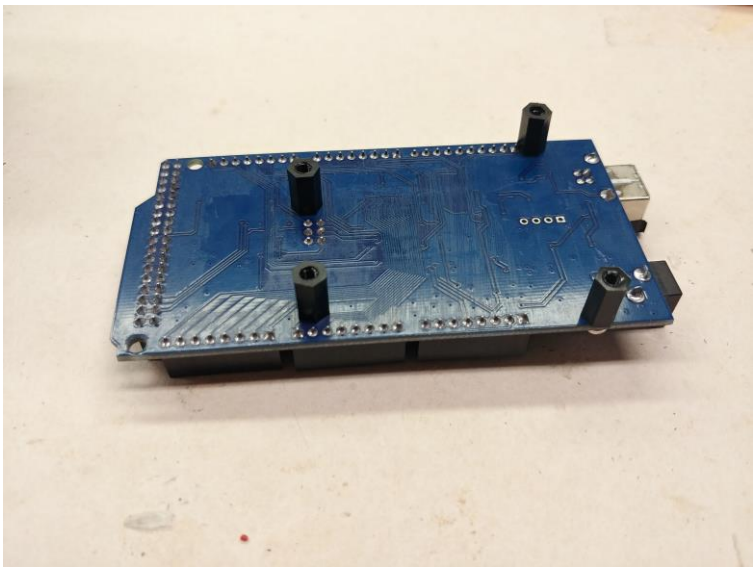


2. Controller Assembly & Installation

Step 2.1

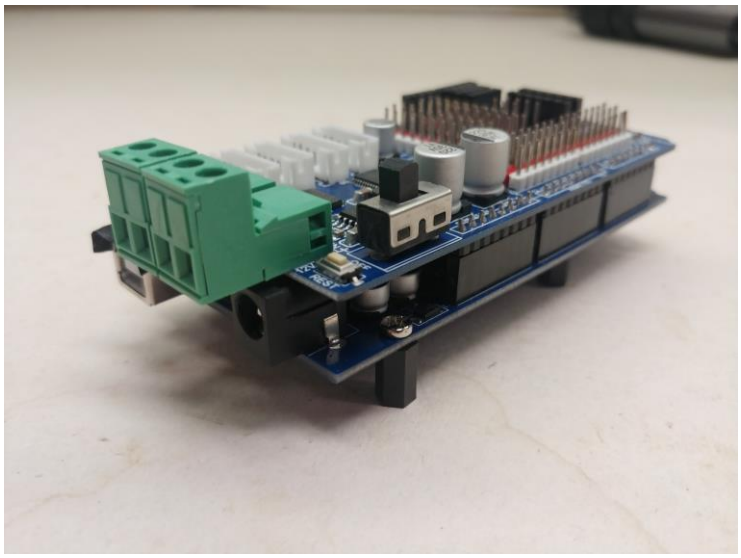
Mount the plan mounting points on the Arduino board.





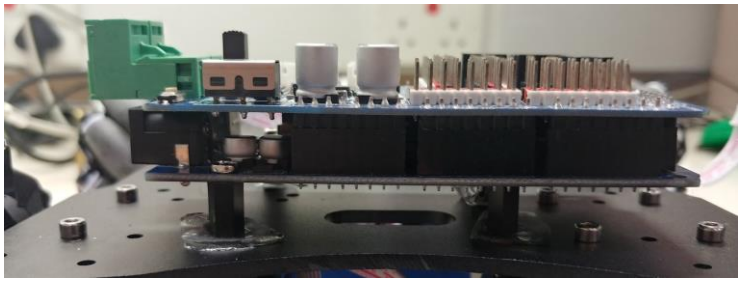
Step 2.2

Attach the Arduino expansion board onto the Arduino board as shown below.



Step 2.3

Mount the Arduino board onto the vehicle’s body as shown below with the use of Mileqi adhesive tape to secure it.

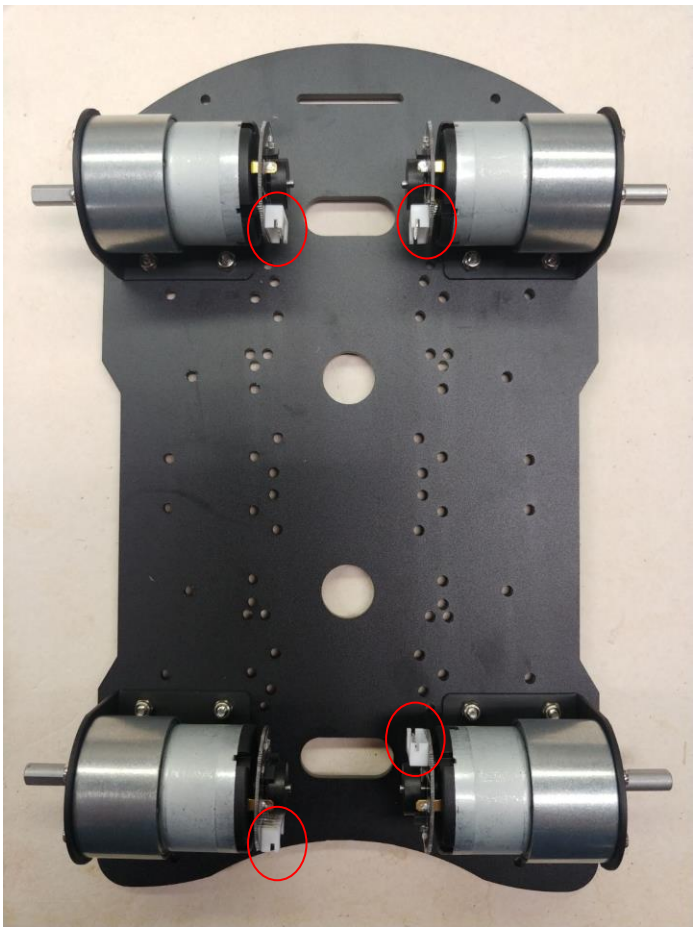


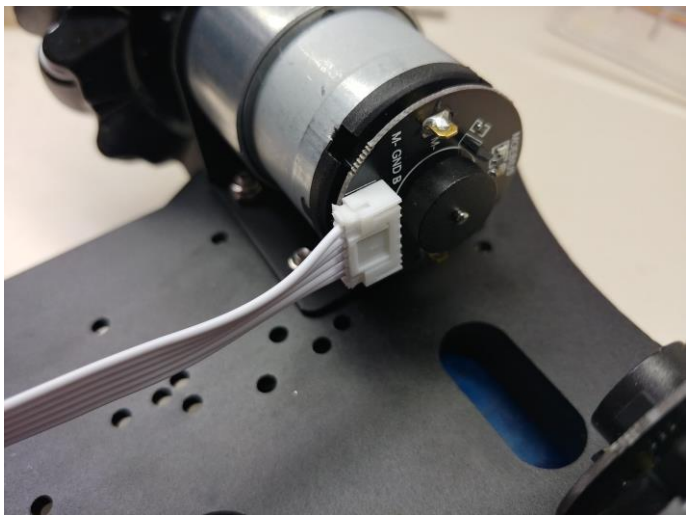
Step 2.4

Prepare the motor cables and split each cable into 2 cables. You should have 4 cables in total.

Step 2.5

Attach the motor cables to the motors’ connectors.

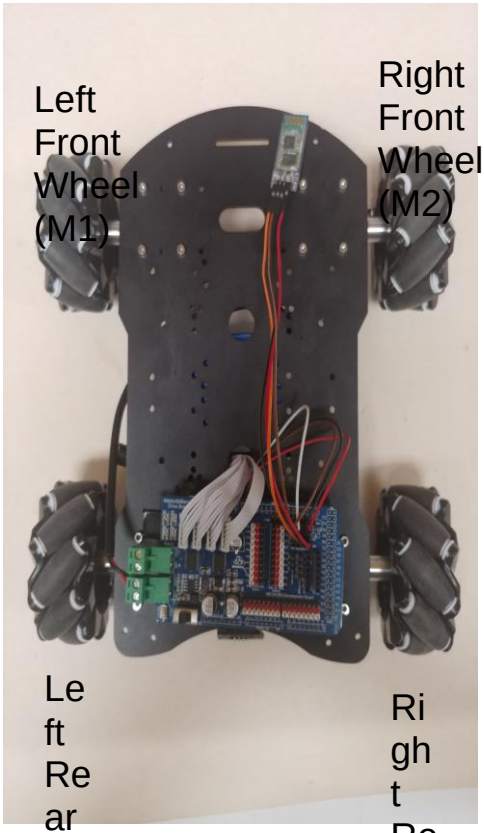


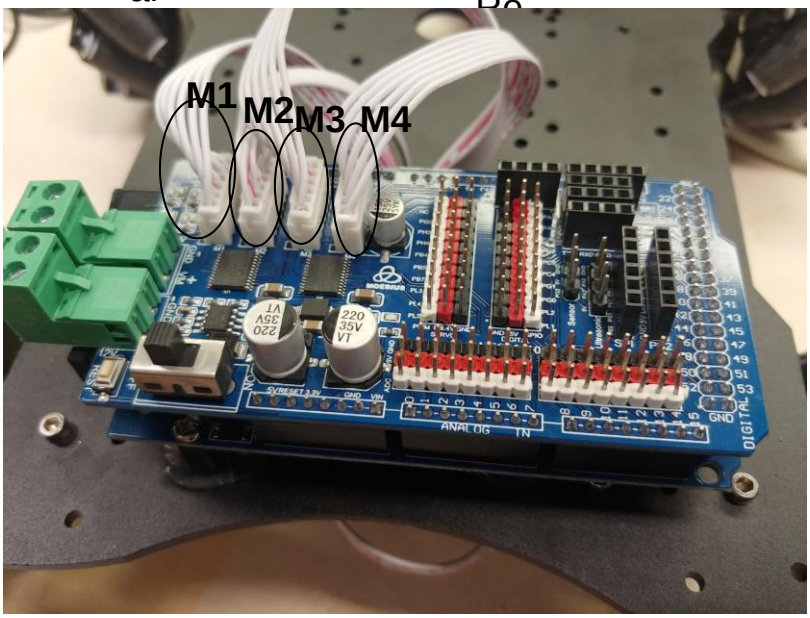


Step 2.6

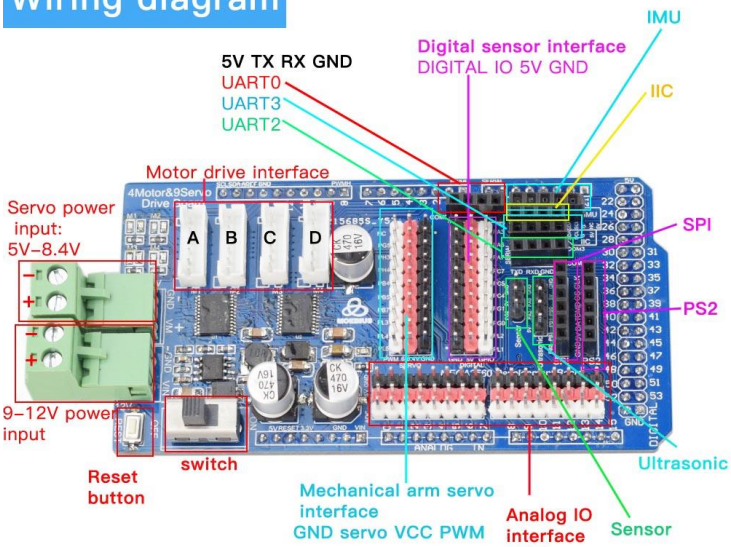
Connect the other side of the motor cables to their respective pinouts on the Arduino expansion board.

M1: Left front wheel
M2: Right front wheel
M3: Left rear wheel
M4: Right rear wheel





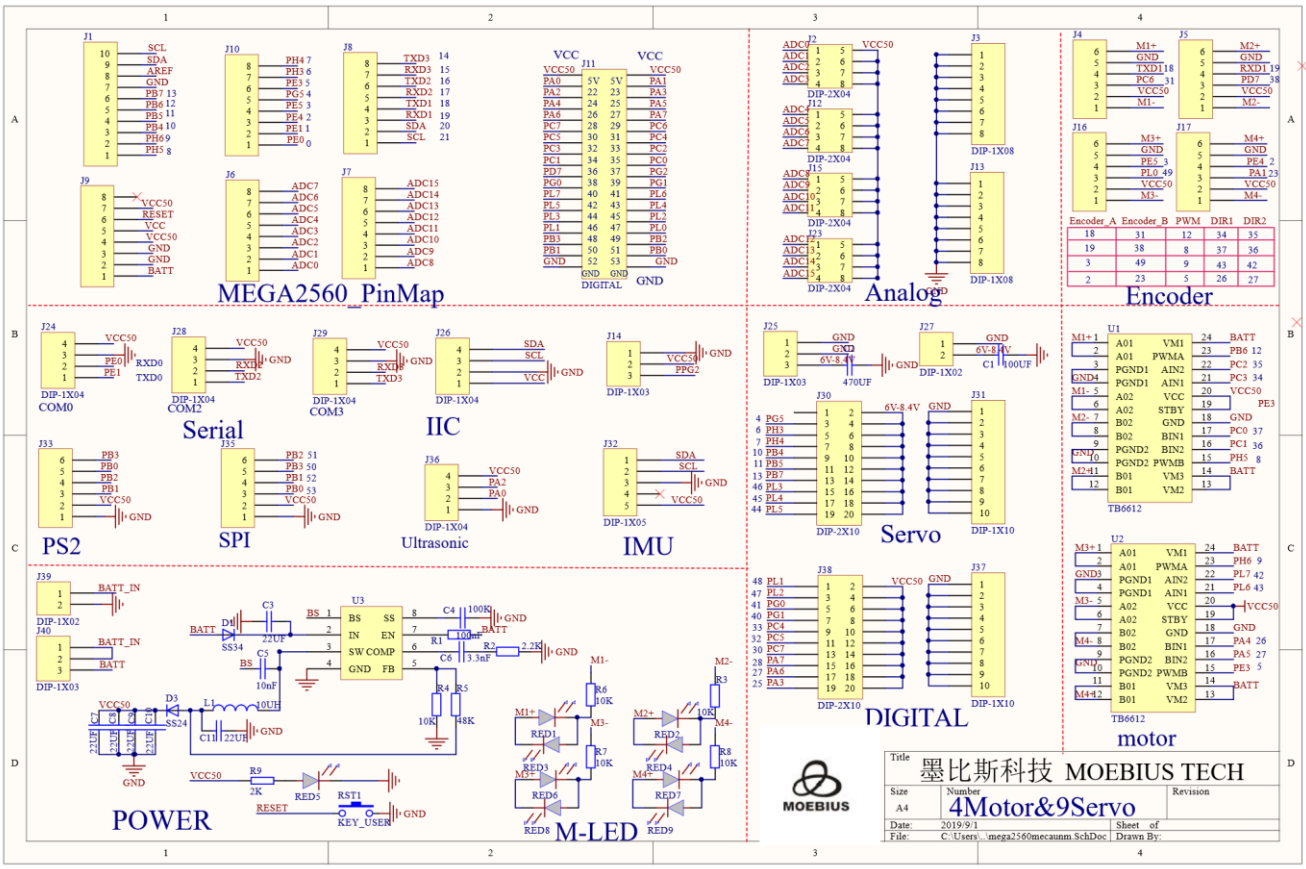
Wiring diagram

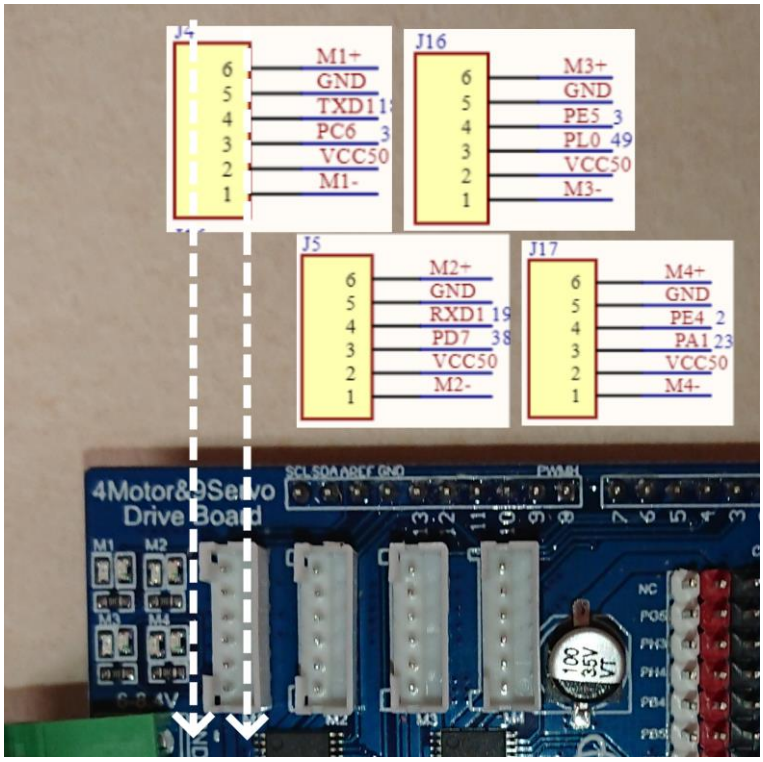


Mecanum wheel motor wiring:

A (M1) : Left front wheel
B (M2) : Right front wheel
C (M3) : Left rear wheel
D (M4) : Right rear wheel

https://github.com/MoebiusTech/MecanumRobot-ArduinoMega2560





Note: If you wish to know where do the pins in the socket connect to, you can refer to the above diagram

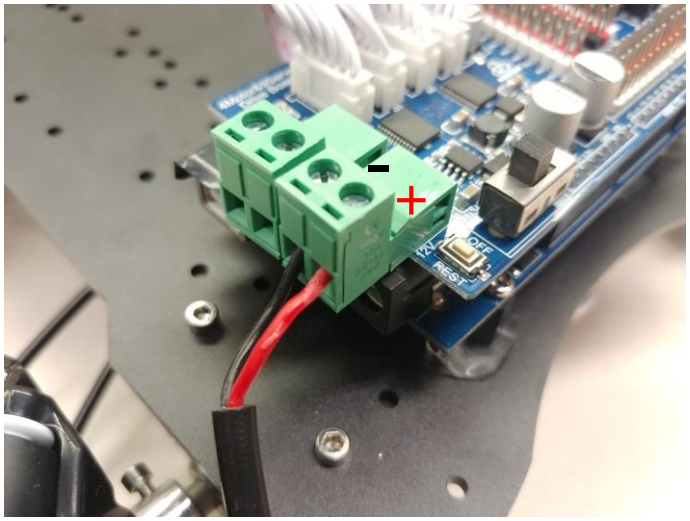
Step 2.7

Attach the battery to the bottom of the vehicle's body with the use of some Mileqi adhesive tape.

Step 2.8

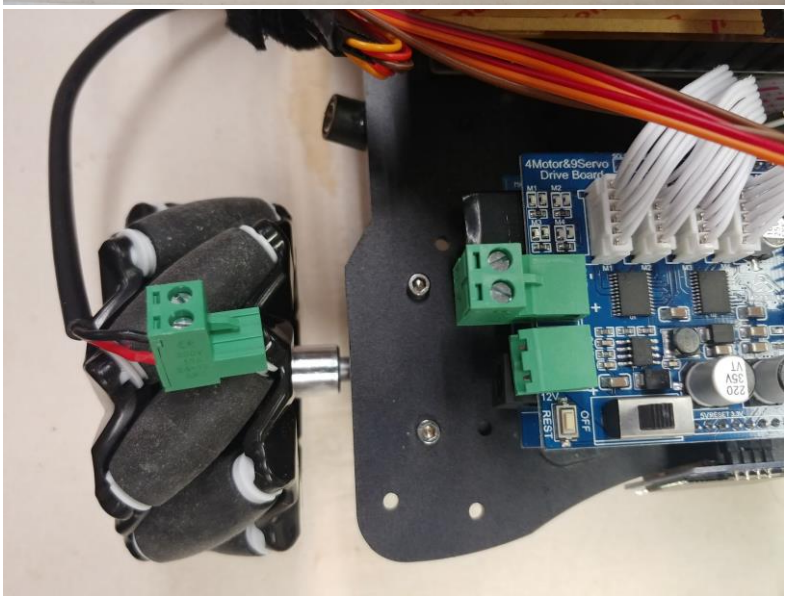
Connect the battery to the Arduino expansion board as shown below. Please do not connect the wires to the battery at this moment.

Warning: Do not reverse the connection or the Arduino board may break.



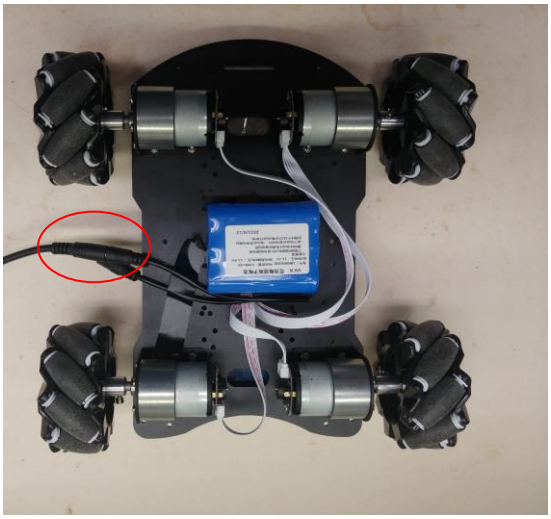
Step 2.9

Remove the green connector where the cables are connected as shown below



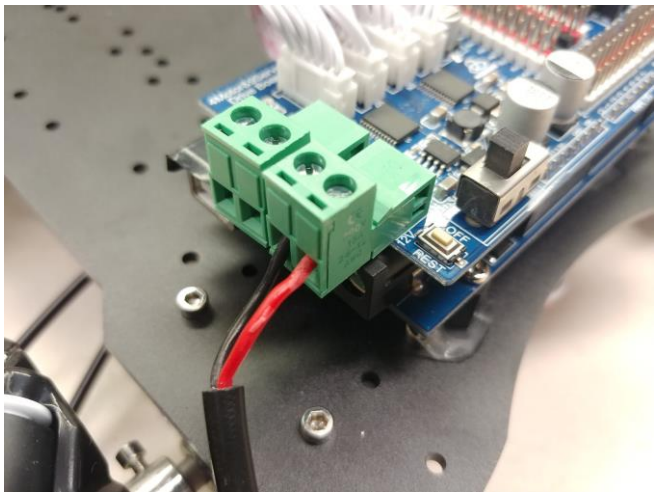
Step 2.10

Connect the battery adaptor to the battery as shown below.



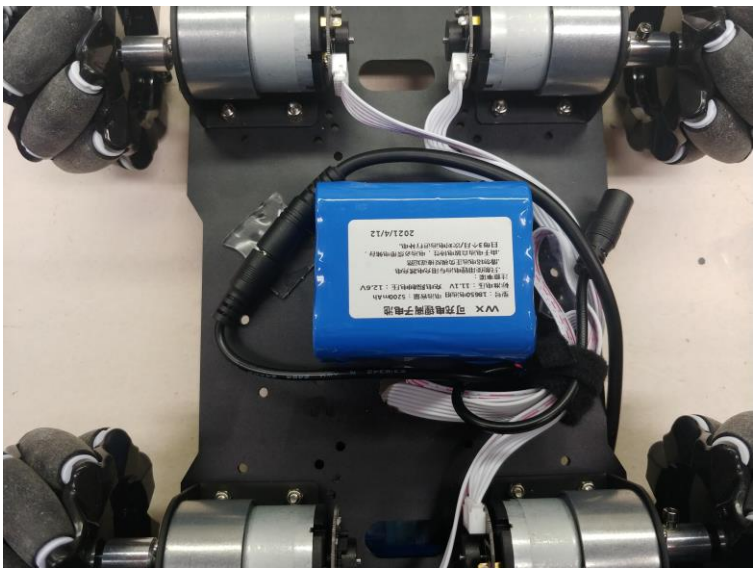
Step 2.11

Re-attach the green connector back to the Arduino expansion board.



Step 2.12

Manage the cables.



Step 2.13

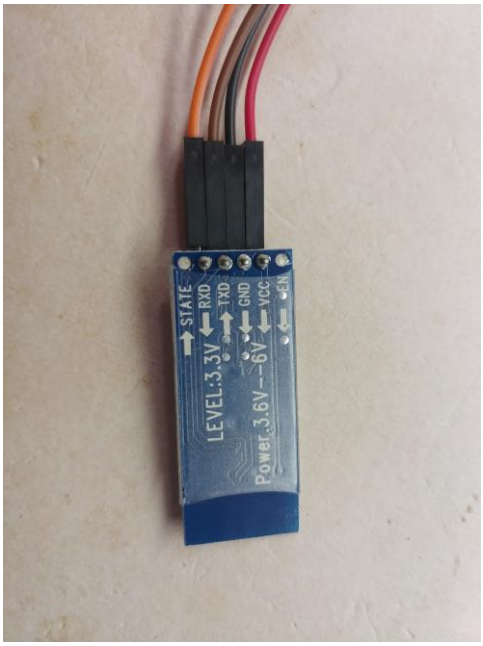
Connect the Bluetooth module

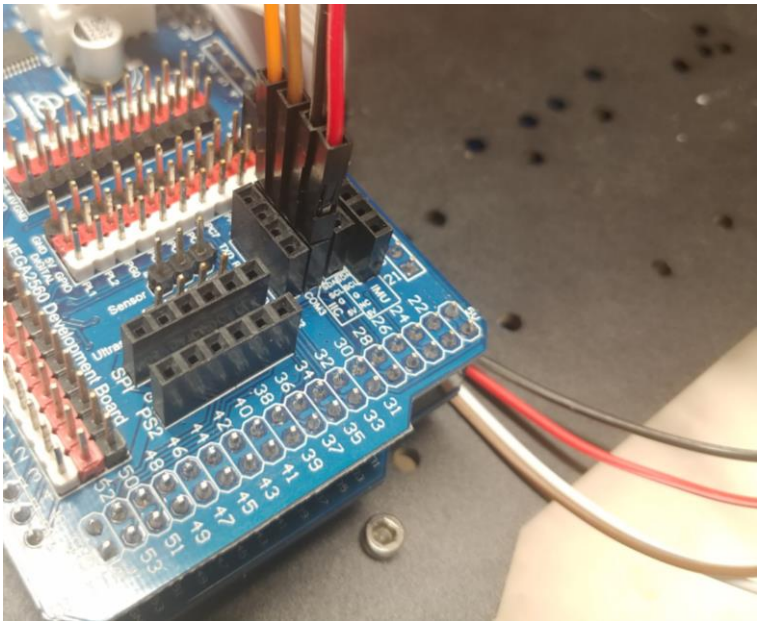
Note: Follow the colour scheme

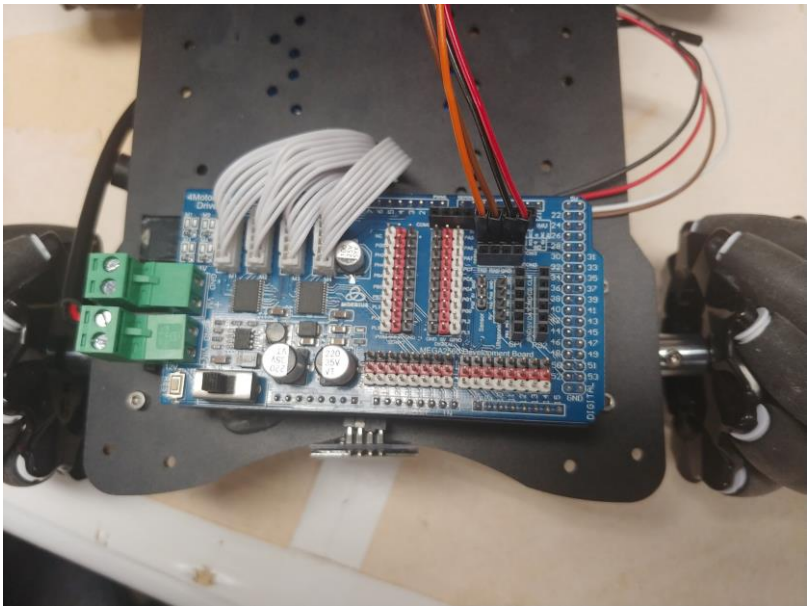
Note 2: Use the male to female cables to connect the Bluetooth module to Arduino

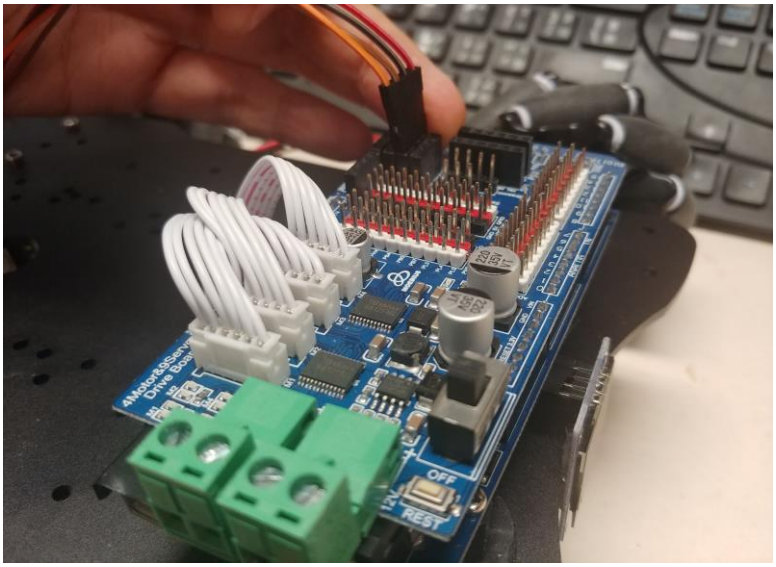
Cables to Bluetooth Module:
VCC: Red
GND: Black
TXD: Brown
RXD: Orange

Cables to Arduino: Connect to COM3 connectors. Connect the cables according to the photo below. It is important to follow this color scheme. Thanks.




MEGA2560 Development Board
SPI
PS2





Step 2.14

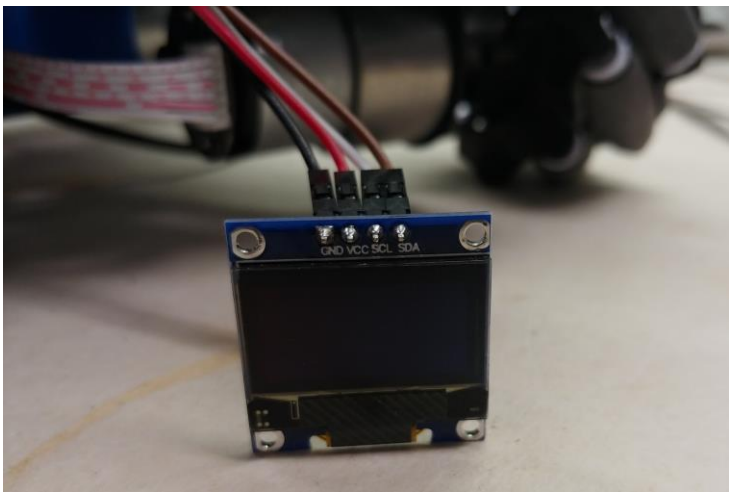
Connect the OLED display to its respective connectors as shown below.

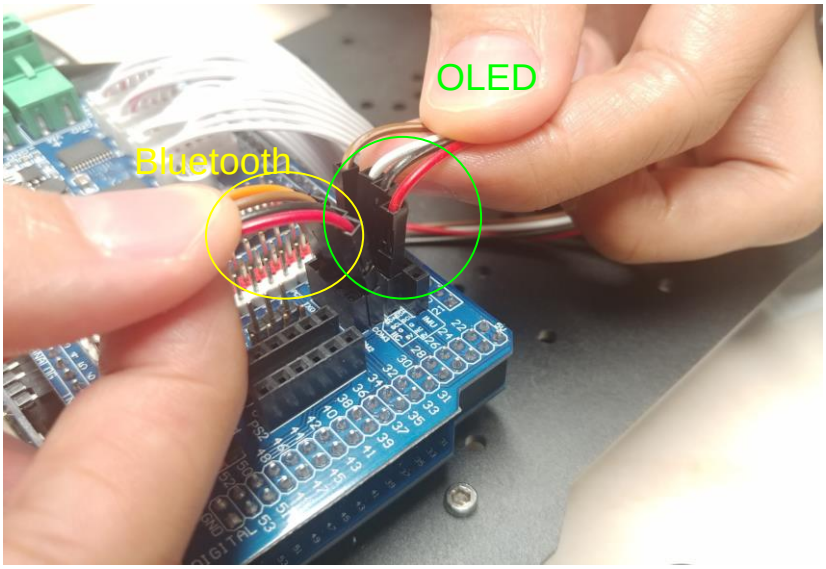
Note: Follow the colour scheme

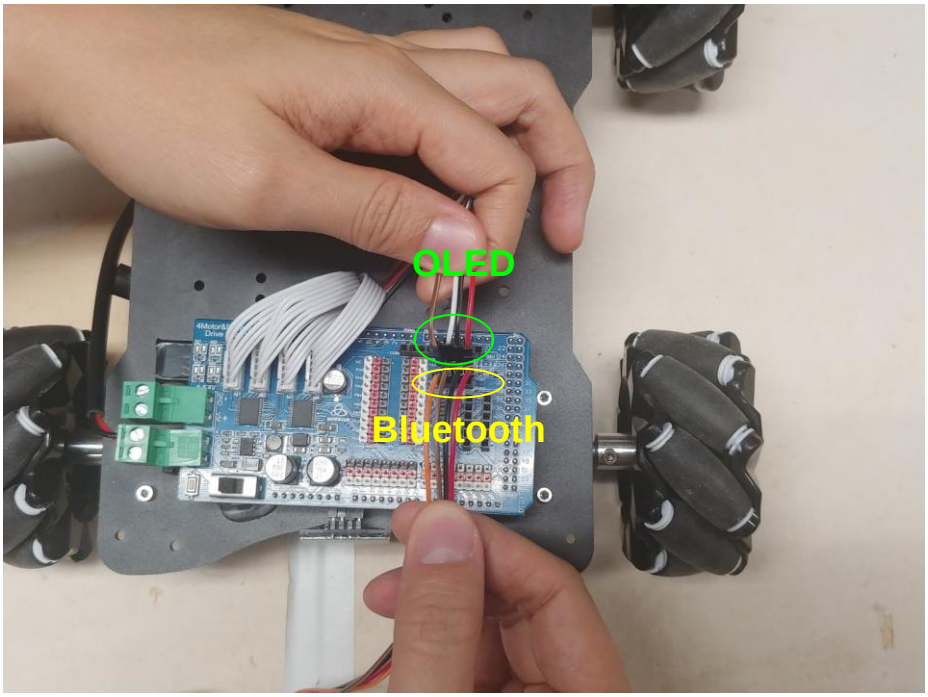
Note 2: Use the male to female cables to connect the OLED display to Arduino

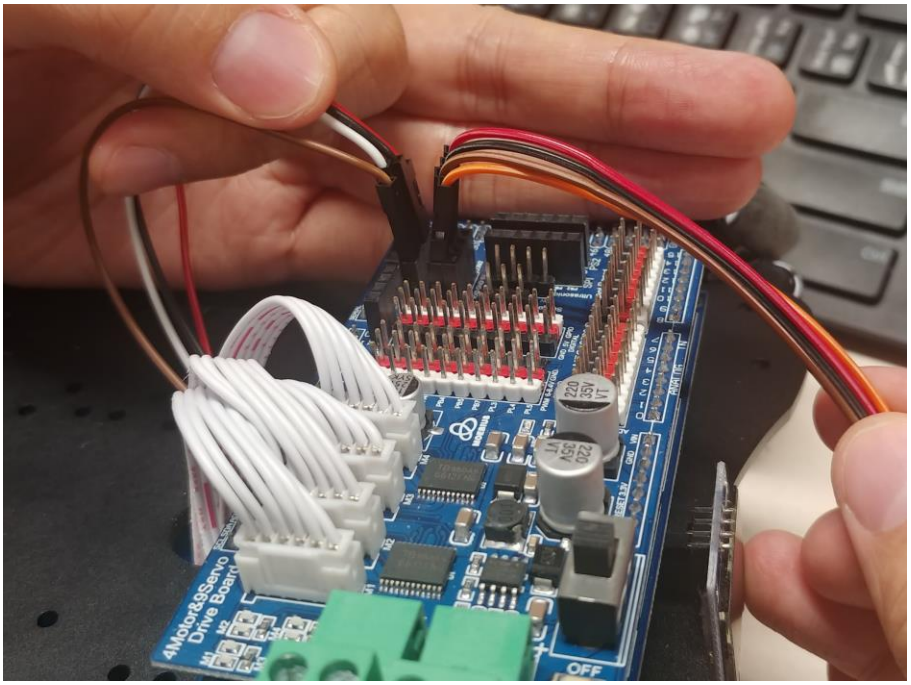
Cables to OLED:
GND=Black
VCC=Red
SCL=White
SDA=Brown

Cables to Arduino: Connect to the IIC connectors according to the photo below It is important to follow the color scheme. Thanks..

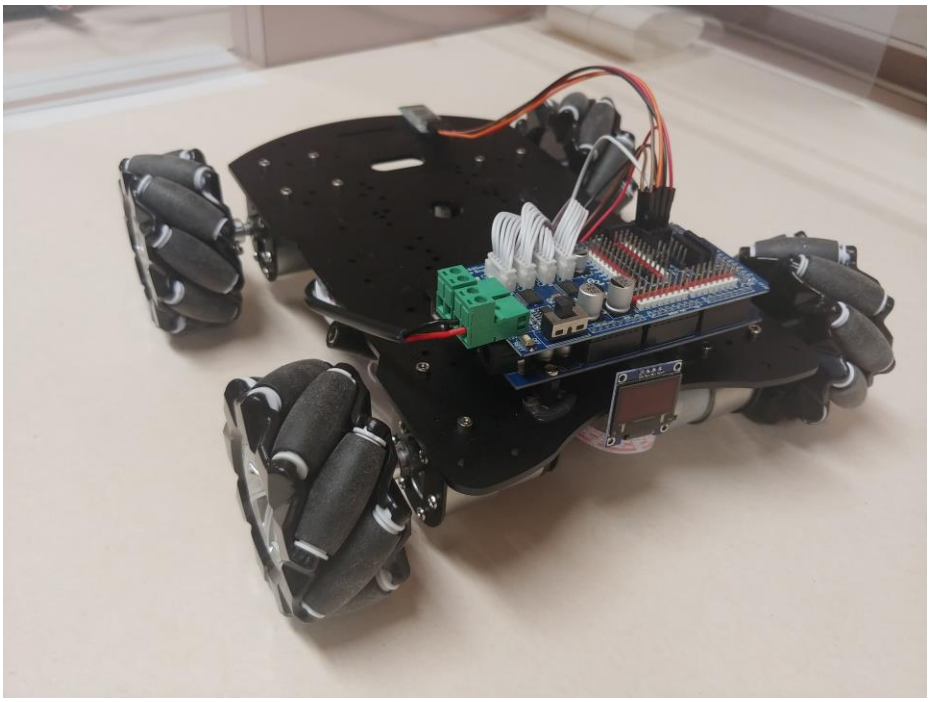



OLED
Bluetooth

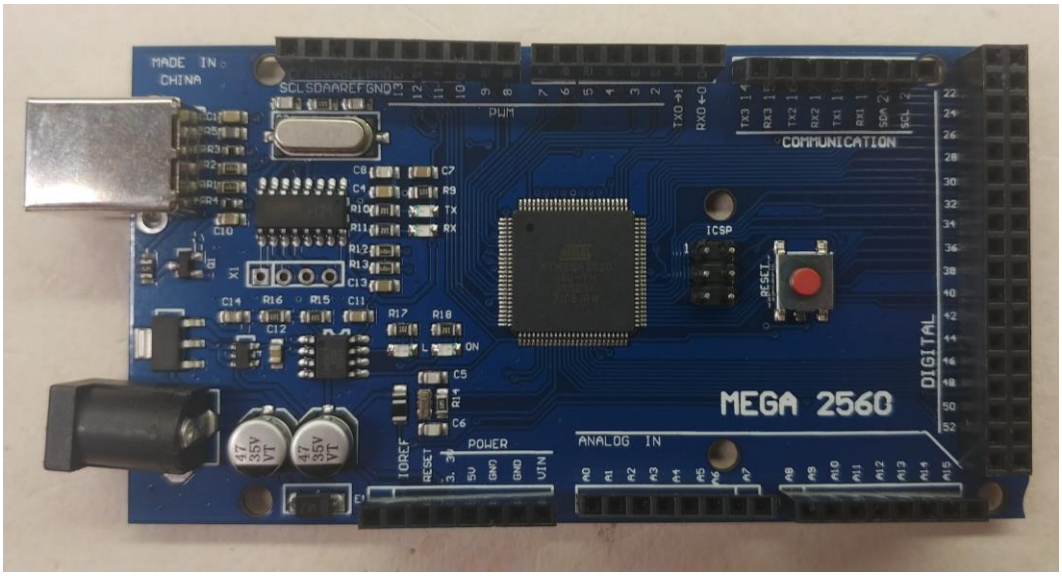

OLED
Bluetooth

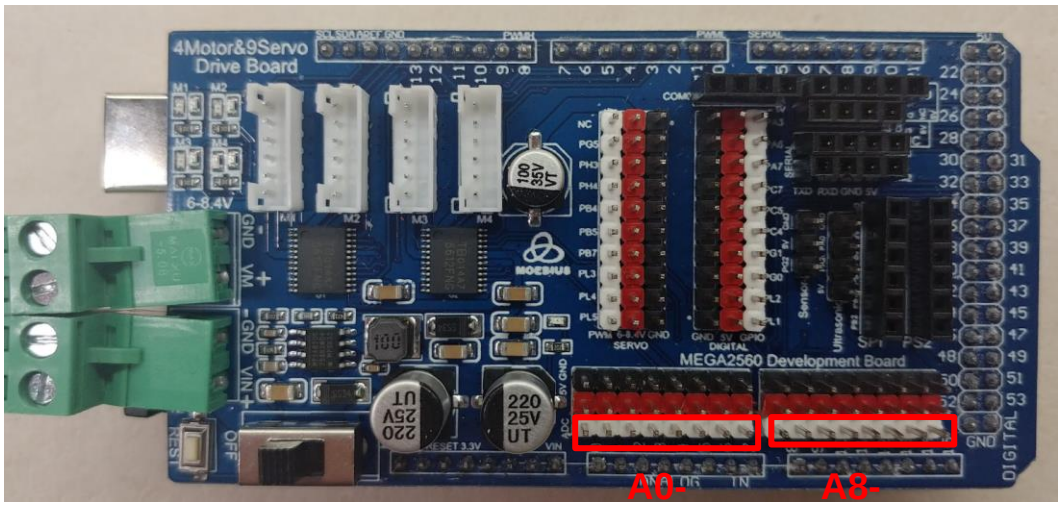


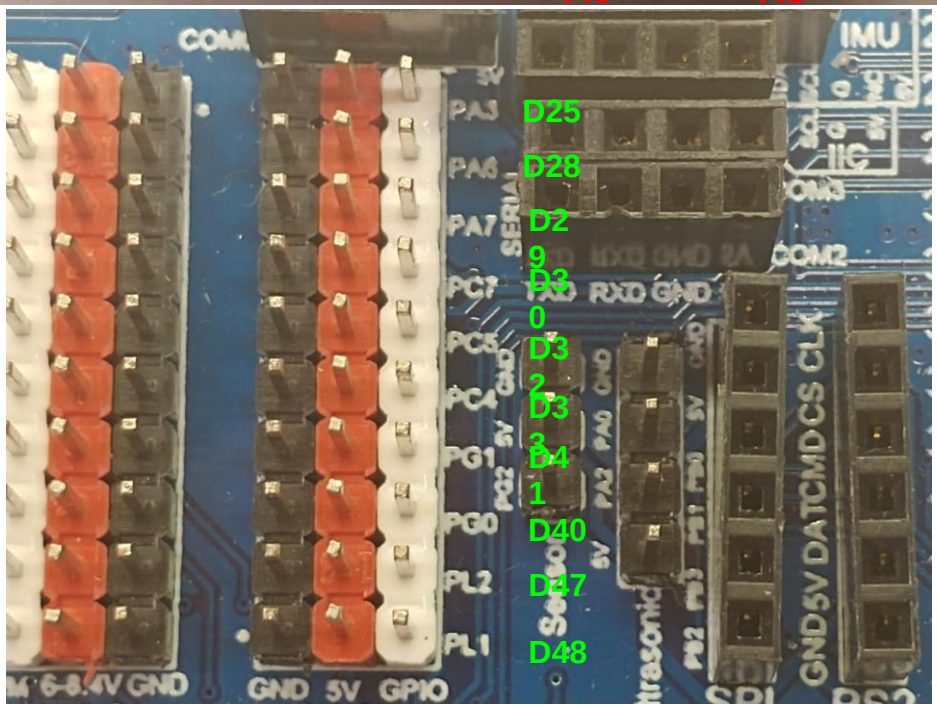
Your final product should look like this. Do not turn on anything. Please ask the TA to check the wiring. Thanks.



Extra information: Arduino Mega to expansion board mapping:







Arduino AVR pinout to Mega expansion board:

Pin Number	Pin Name (Mega Expansion Board)	Mapped Pin Name (Arduino Mega)
1	PG5 (OC0B)	Digital pin 4 (PWM)
2	PE0 (RXD0/PCINT8)	Digital pin 0 (RX0)
3	PE1 (TXD0)	Digital pin 1 (TX0)
4	PE2 (XCK0/AIN0)	
5	PE3 (OC3A/AIN1)	Digital pin 5 (PWM)
6	PE4 (OC3B/INT4)	Digital pin 2 (PWM)
7	PE5 (OC3C/INT5)	Digital pin 3 (PWM)
8	PE6 (T3/INT6)	
9	PE7 (CLK0/ICP3/INT7)	
10	VCC	VCC
11	GND	GND
12	PH0 (RXD2)	Digital pin 17 (RX2)
13	PH1 (TXD2)	Digital pin 16 (TX2)
14	PH2 (XCK2)	
15	PH3 (OC4A)	Digital pin 6 (PWM)
16	PH4 (OC4B)	Digital pin 7 (PWM)
17	PH5 (OC4C)	Digital pin 8 (PWM)
18	PH6 (OC2B)	Digital pin 9 (PWM)
19	PB0 (SS/PCINT0)	Digital pin 53 (SS)
20	PB1 (SCK/PCINT1)	Digital pin 52 (SCK)
21	PB2 (MOSI/PCINT2)	Digital pin 51 (MOSI)
22	PB3 (MISO/PCINT3)	Digital pin 50 (MISO)
23	PB4 (OC2A/PCINT4)	Digital pin 10 (PWM)
24	PB5 (OC1A/PCINT5)	Digital pin 11 (PWM)
25	PB6 (OC1B/PCINT6)	Digital pin 12 (PWM)
26	PB7 (OC0A/OC1C/PCINT7)	Digital pin 13 (PWM)
27	PH7 (T4)	
28	PG3 (TOSC2)	
29	PG4 (TOSC1)	
30	RESET	RESET
31	VCC	VCC
32	GND	GND
33	XTAL2	XTAL2

34	XTAL1	XTAL1
35	PL0 (ICP4)	Digital pin 49
36	PL1 (ICP5)	Digital pin 48
37	PL2 (T5)	Digital pin 47
38	PL3 (OC5A)	Digital pin 46 (PWM)
39	PL4 (OC5B)	Digital pin 45 (PWM)
40	PL5 (OC5C)	Digital pin 44 (PWM)
41	PL6	Digital pin 43
42	PL7	Digital pin 42
43	PD0 (SCL/INT0)	Digital pin 21 (SCL)
44	PD1 (SDA/INT1)	Digital pin 20 (SDA)
45	PD2 (RXDI/INT2)	Digital pin 19 (RX1)
46	PD3 (TXD1/INT3)	Digital pin 18 (TX1)
47	PD4 (ICP1)	
48	PD5 (XCK1)	
49	PD6 (T1)	
50	PD7 (T0)	Digital pin 38
51	PG0 (WR)	Digital pin 41
52	PG1 (RD)	Digital pin 40
53	PC0 (A8)	Digital pin 37
54	PC1 (A9)	Digital pin 36
55	PC2 (A10)	Digital pin 35
56	PC3 (A11)	Digital pin 34
57	PC4 (A12)	Digital pin 33
58	PC5 (A13)	Digital pin 32
59	PC6 (A14)	Digital pin 31
60	PC7 (A15)	Digital pin 30
61	VCC	VCC
62	GND	GND
63	PJ0 (RXD3/PCINT9)	Digital pin 15 (RX3)
64	PJ1 (TXD3/PCINT10)	Digital pin 14 (TX3)
65	PJ2 (XCK3/PCINT11)	
66	PJ3 (PCINT12)	
67	PJ4 (PCINT13)	
68	PJ5 (PCINT14)	
69	PJ6 (PCINT 15)	
70	PG2 (ALE)	Digital pin 39

71	PA7 (AD7)	Digital pin 29
72	PA6 (AD6)	Digital pin 28
73	PA5 (AD5)	Digital pin 27
74	PA4 (AD4)	Digital pin 26
75	PA3 (AD3)	Digital pin 25
76	PA2 (AD2)	Digital pin 24
77	PA1 (AD1)	Digital pin 23
78	PA0 (AD0)	Digital pin 22
79	PJ7	
80	VCC	VCC
81	GND	GND
82	PK7 (ADC15/PCINT23)	Analog pin 15
83	PK6 (ADC14/PCINT22)	Analog pin 14
84	PK5 (ADC13/PCINT21)	Analog pin 13
85	PK4 (ADC12/PCINT20)	Analog pin 12
86	PK3 (ADC11/PCINT19)	Analog pin 11
87	PK2 (ADC10/PCINT18)	Analog pin 10
88	PK1 (ADC9/PCINT17)	Analog pin 9
89	PK0 (ADC8/PCINT16)	Analog pin 8
90	PF7 (ADC7)	Analog pin 7
91	PF6 (ADC6)	Analog pin 6
92	PF5 (ADC5/TMS)	Analog pin 5
93	PF4 (ADC4/TMK)	Analog pin 4
94	PF3 (ADC3)	Analog pin 3
95	PF2 (ADC2)	Analog pin 2
96	PF1 (ADC1)	Analog pin 1
97	PF0 (ADC0)	Analog pin 0
98	AREF	Analog Reference
99	GND	GND
100	AVCC	VCC

References

https://github.com/MoebiusTech/MecanumRobot-ArduinoMega2560