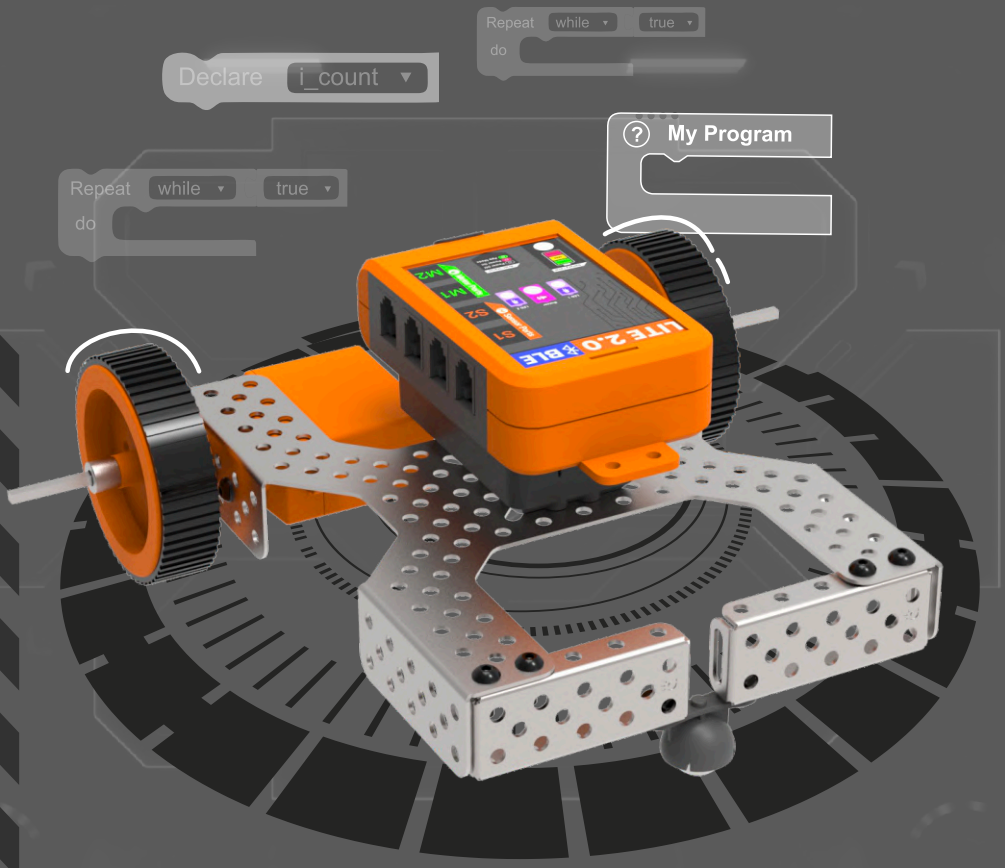
avishkaar

A BOT

Robots: Easy To Build, Easier To Code

Robotics Series

User Manual



www.avishkaar.cc

“ I never dream
about success.
I work for it.”

Sneak peak

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Make the Most Out of Your Kit

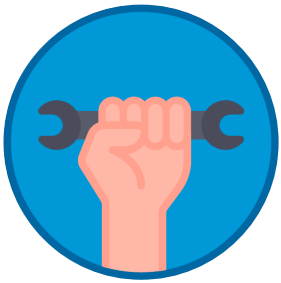
Innovate

Take the Innovator's Oath

Take the innovator's oath mentioned on page 6 and understand what it means to be an innovator.

Learn using Manual/Videos

Follow detailed instructions in the manual and learn how to build exciting robots with your kit.



Build, Code & Control

Build innovative projects using your kit, and control the Robots using Avishkaar Remote and Code using Avishkaar Maker Studio.

Share → Win

Join Let's Avishkaar

Join our FB community - connect with innovators and get latest updates on webinars.

Upload Project

Upload projects on Avishkaar Community and share them with innovators globally.

International Competitions

Participate in weekly, monthly and annual competitions and win glory globally.

Innovator's Oath

Take the Innovator's Oath below to pledge yourself to lifelong commitment towards Innovation and Problem Solving. Share a photo on the Let's Avishkaar FB Community.

I *(write your name)* _____

solemnly swear that, since I am now on the path of innovation, I will not give up until my innovation, my project is ready. I will hone my skills and tools and use them well. Innovation and I will be inseparable. I will always share my innovations with other innovators and learn with them.

Your Signature

Armour Check

Electronics

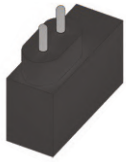
LITE 2.0 BLE Brain x 1

High Speed Motors x 2

Programming Cable x 1

Connecting Cables x 2

Avishkaar Battery x 1
(attached behind the brain)

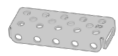


Avishkaar Charger x1

Construction Parts and Tools

Wheels x 2

3.5” Axles x 2



2.5” U-Beam x 2

Chassis x 1

Allen key x 1

Spanner x 1

Caster Wheel x 1

12mm Bolts x 10
6mm Bolts x12

K-Nuts x 10

Axle lock x 6

Zip Ties x 5

Fillers x 6

Robotic LITE 2.0 BLE Brain

Programming Buzzer

The programming of tones and time give you many different sounds to play with.

Two Programmable RGB LED

You can program the intensity of red,blue and green colors produced by the LEDs and make many colors.

Battery Level Indicator

An indicator will show you the energy level of your robot.Whether it is feeling low or full of energy .

DC Jack

Connect the 9V Battery to this Port.

Power Button

This button helps you to turn the brain ON or OFF.

Sensor Ports

These Ports help you connect sensors to the brain.

Motor Ports

These Ports help you connect motors to the brain.

Progamming Port

Connect your Programming wire to this port.

Progammable Brain

Compact Size

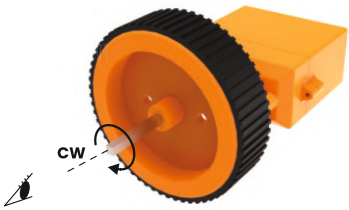
In built Bluetooth & WiFi

External Battery

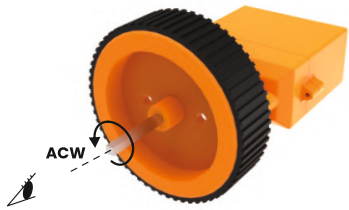
Interfacing with Motors

Identify the rotation direction of motor by looking at it with Axle facing you.

Clockwise Rotation



Anticlockwise Rotation



Robots move in the different directions by the combination of the rotation from each wheel.For example-

Forward Direction

Backward Direction

Left Direction

Right Direction

Basics of Building

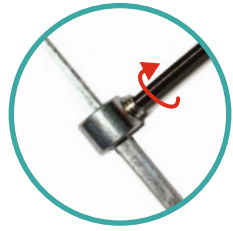
Let's understand some basics of building

Tightening Screws

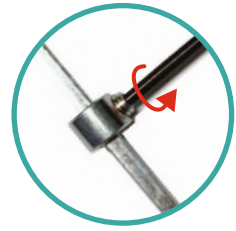
Tighten
(Rotate Clockwise)

Loosen
(Rotate Anti-clockwise)

Tightening Axle Lock



Tighten
(Rotate Clockwise)

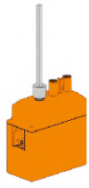


Loosen
(Rotate Anti-clockwise)

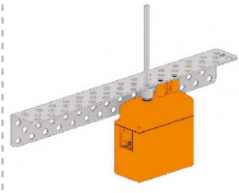
Tightening a Motor to a Plate

01
Insert Axle

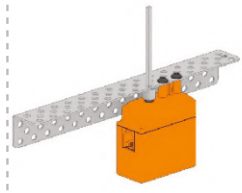
02
Lock Axle Lock



03
Insert Plate



04
Insert Bolts



**Actual metal plate my vary from the image shown but principally will function the same way.*

Attaching Battery to Brain

01 Firstly take the battery and brain.

02 Angle the lower part of the battery as shown below:

03 Now push the battery into the brain.

04 After this release the tab on the top of the battery to lock it in a place.

Removing Battery from the Brain

01 Firstly take the battery and brain.

02 Press the locking tab of the Battery with your thumb & pull it out away from the Brain.

03 Now, disengage the lower tab of the battery.

04 The battery will be removed and can be kept safely in the box.

Deep Dive Into Building Robots

Control Method 1: **Avishkaar App**

Download the Avishkaar App

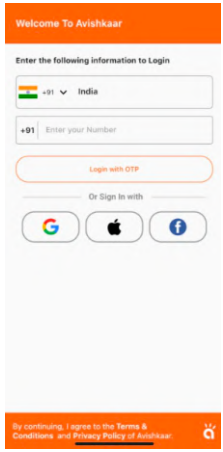
Download the Avishkaar App by scanning the QR codes below:

GET IT ON Google Play

Available on the App Store

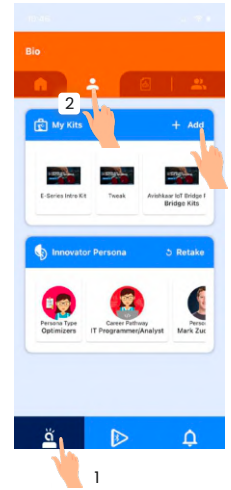
1 Create an Account

Open the app and follow the on-screen steps to make an account.



2 Register your Kit

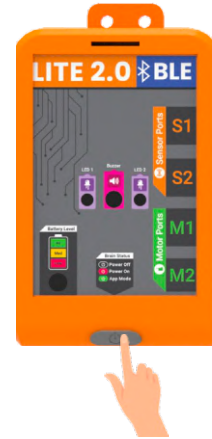
Go to the 'Profile' section in the app and click on '+ Add More' in the 'My Kits' section to register your kit by scanning the QR code below. This step is important to control your robot.



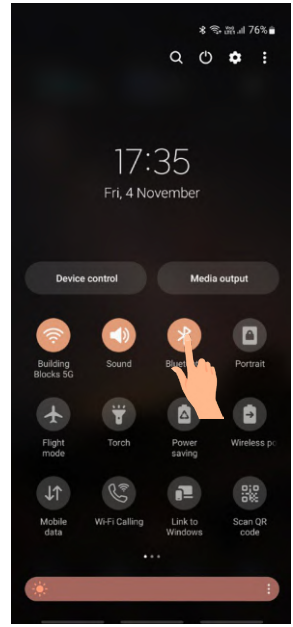
Product Registraion Sticker

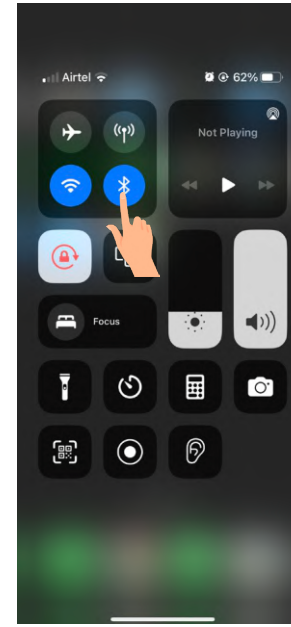
3 Connecting the LITE 2.0 BLE Brain to the App

i Turn **ON** the brain

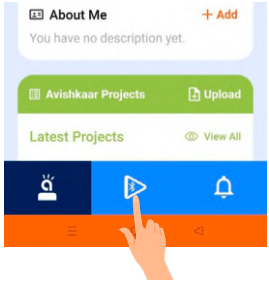


ii Turn **ON** the bluetooth on your phone.

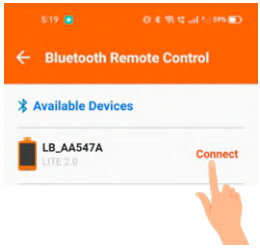




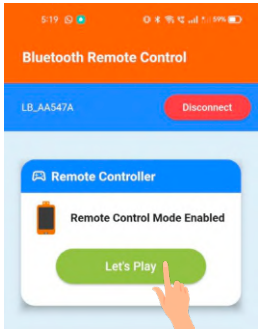
iii Open the Avishkaar App and click on the ‘Play’ button inside the ‘Home’ section.

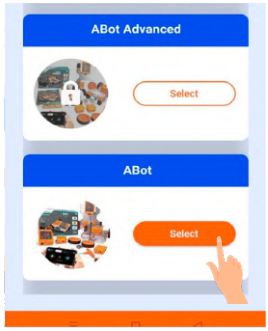


iv Click on ‘Connect’. Your app should be able to find your LITE 2.0 BLE Brain if it is turned ON.
Click on ‘Connect’ once your app detects your LITE 2.0 BLE Brain.

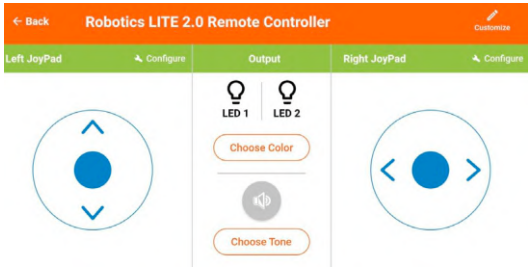


v Click on ‘Let’s Play’ and select ‘**Abot**’ in the kit selection menu.



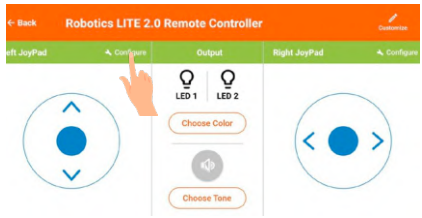


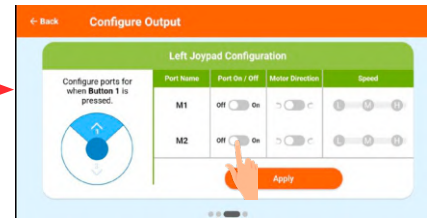
vi The remote control screen will open up which will allow you to control the LEDs, buzzers on the brain and the motors connected to it.Have fun!

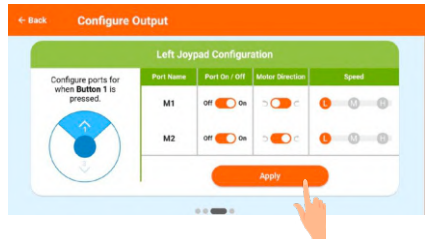


4 RC Car Configuration

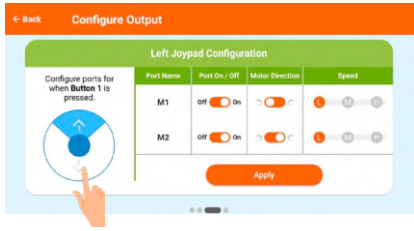
Move Forward

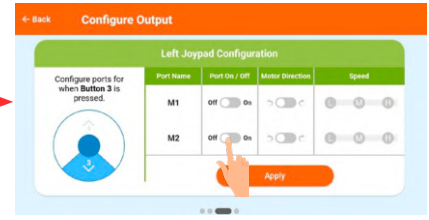


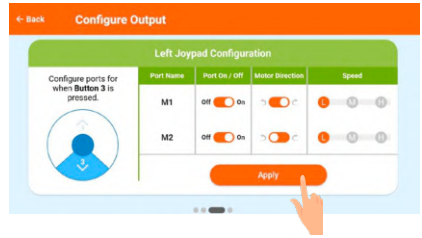




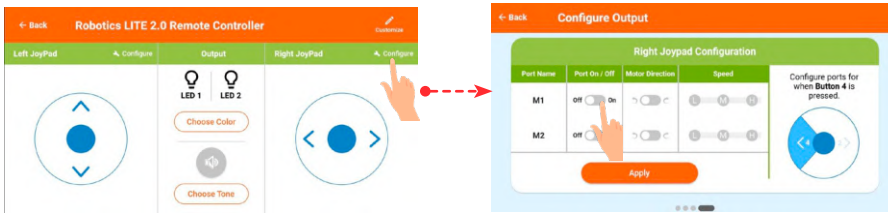
Move Backward

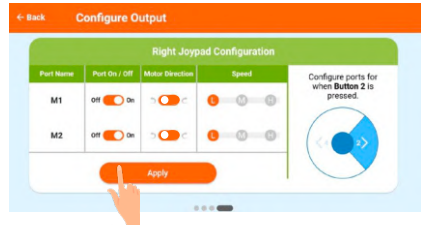




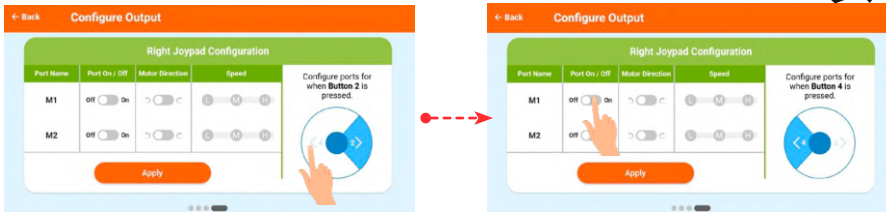


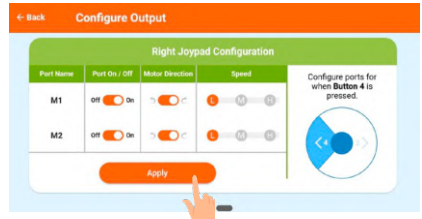
Move Right





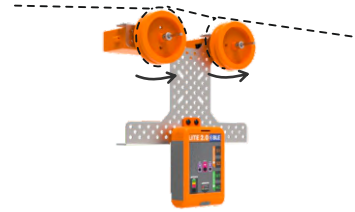
Move Left





5

Rope Car Configuration



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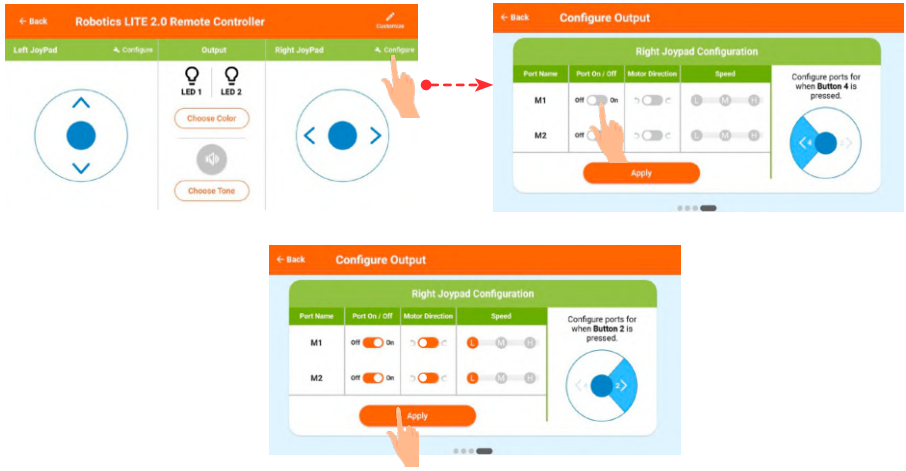
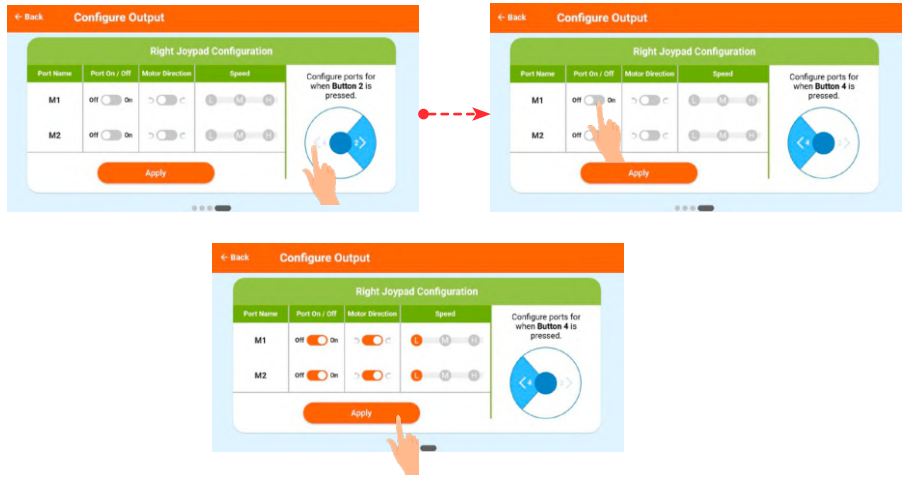


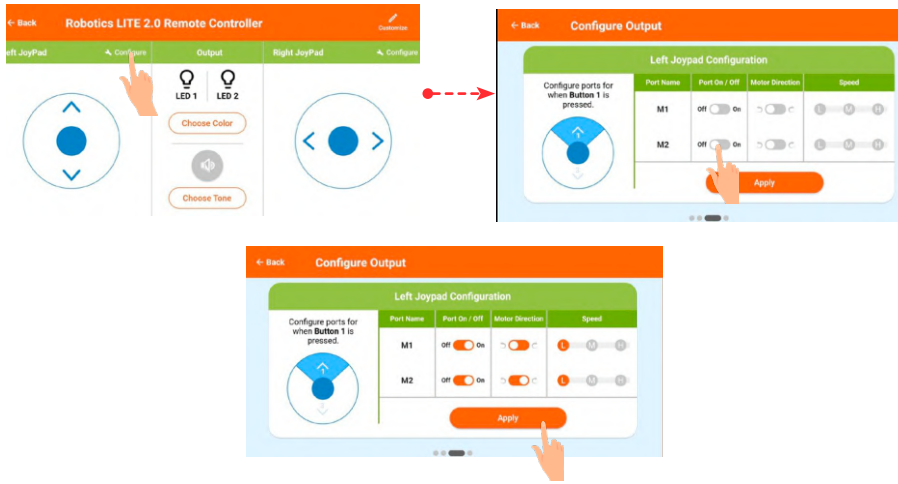
Move Left



6

Humanoid Bot Configuration

Move Forward



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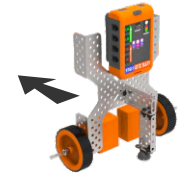

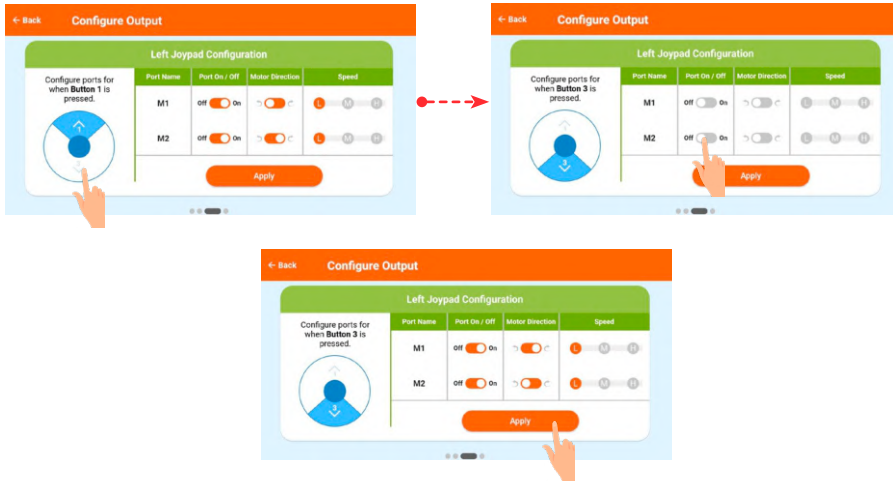

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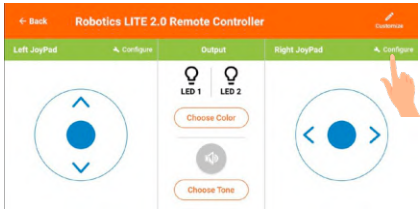
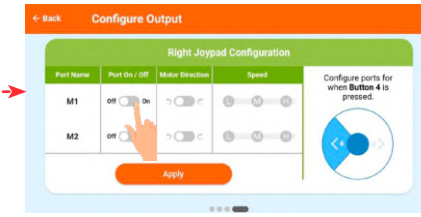
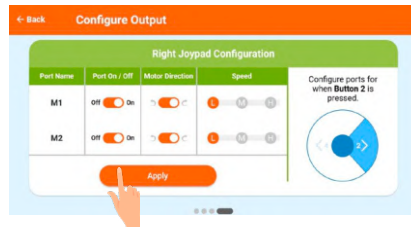
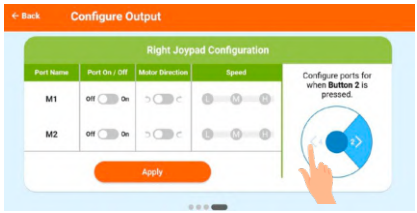
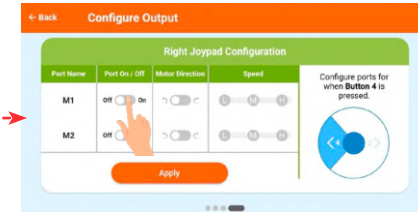


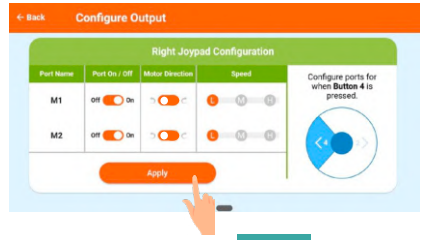




Move Left







Project 1: **RC Car**

Things we need

LITE 2.0 BLE Brain x 1

High Speed Motors x 2

Connecting Cables x 2

Avishkaar Battery x 1

Avishkaar Charger x 1

Wheels x 2

3.5” Axles x 2

2.5” U-Beam x 2

Chassis x 1

Allen key x 1

Spanner x 1

Caster Wheel x 1

12 mm Bolts & K-Nuts x 6

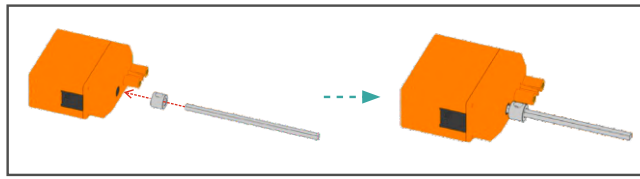
6mm Bolts x 6

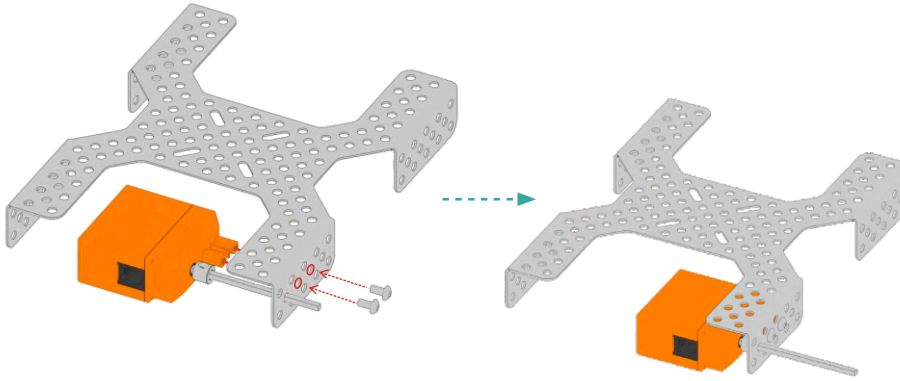
Filler x 2

Axle Lock x 4

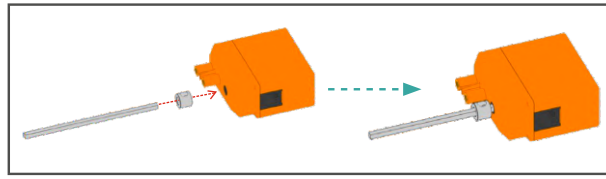
Let's Build!

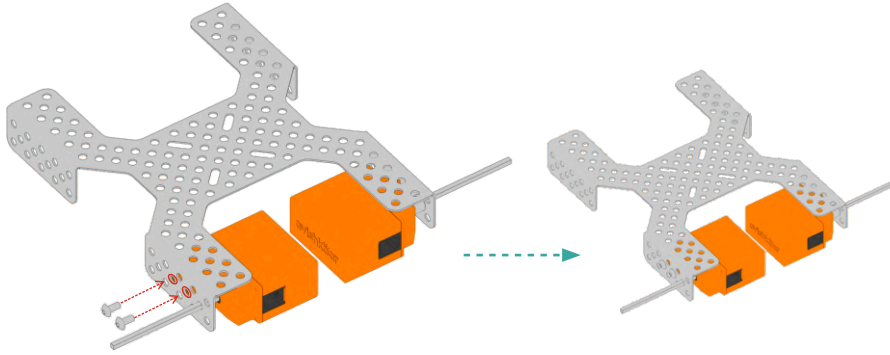
1





2





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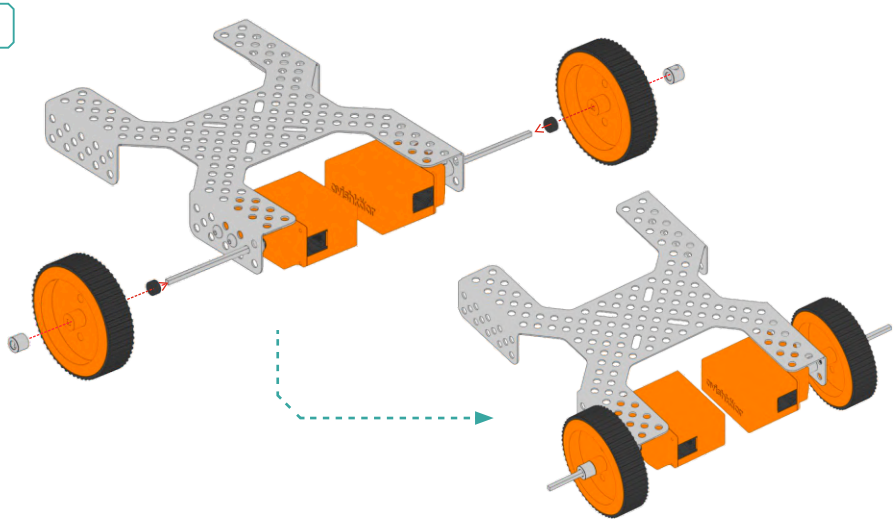

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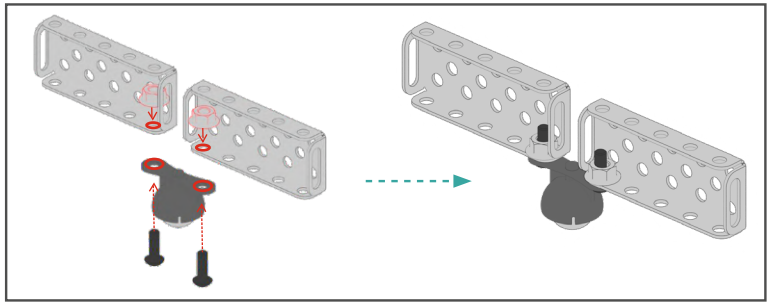

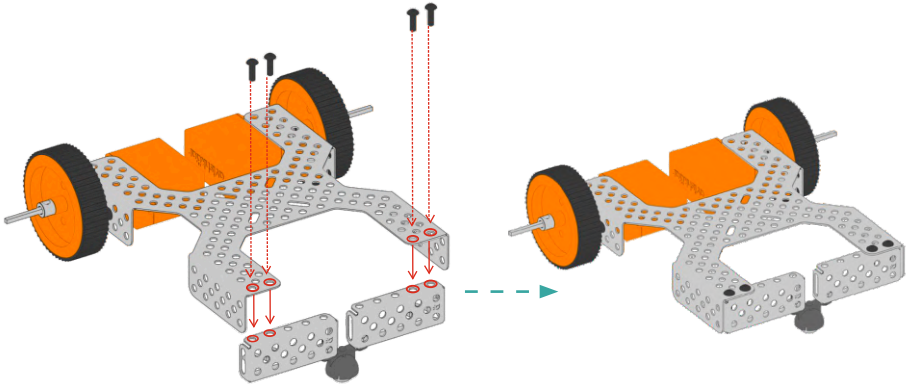

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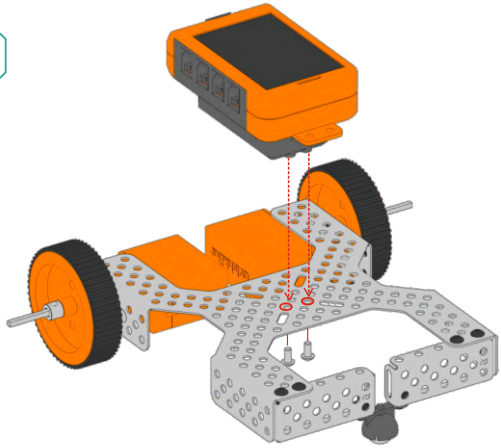
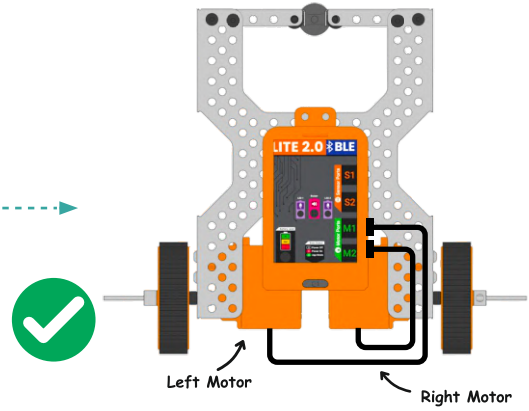


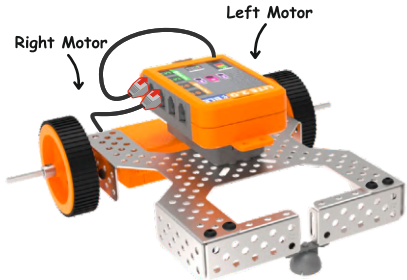
- Connect Left Motor to M1.
- Connect Right motor to M2.
- Turn ON the LITE 2.0 BLE brain.
- Use the remote in your Avishkaar App to control your robot.



Your bot is now ready!

Let's Play

Go to Pg 14 to know how to download the app and use it to control your race car!



Congratulations on Completing this Project!

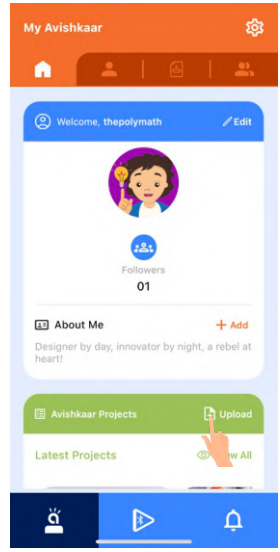
Excited to play with it using the Avishkaar App?

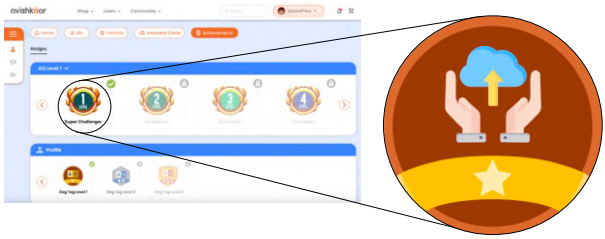
Go to Pg 14 for detailed instructions on how to download the app and control your bot using it.

Share your Creation with the World and Win the 'Scratch the Surface' Level 1 Badge

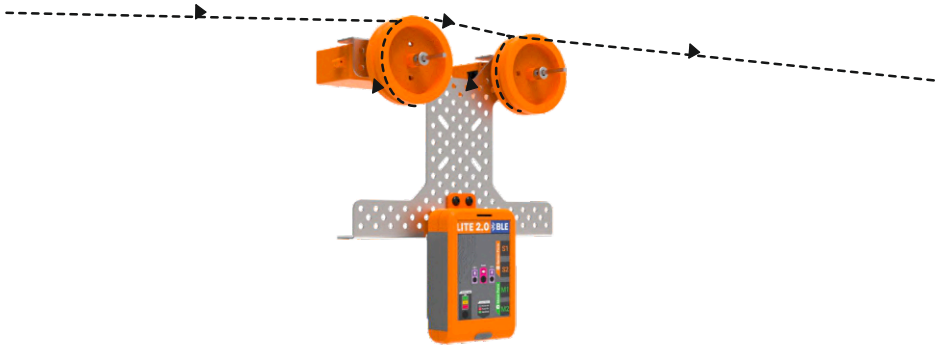
Upload photos or videos of your projects using the Avishkaar Project Section and win points, rank on leaderboard and win badges. You get the 'Scratch the Surface 1' badge for your first project.

See all your collected badges in the Achievements section of your profile. Explore all other badges to be collected and win them all!





Project 2 : **Rope Car**



Things we need

LITE 2.0 BLE Brain x 1

High Speed Motors x 2

Connecting Cables x 2

Avishkaar Battery x 1

Avishkaar Charger x 1

Wheels x 2

3.5” Axles x 2

Chassis x 1

Allen key x 1

Spanner x 1

12 mm Bolts & K-Nuts x 2

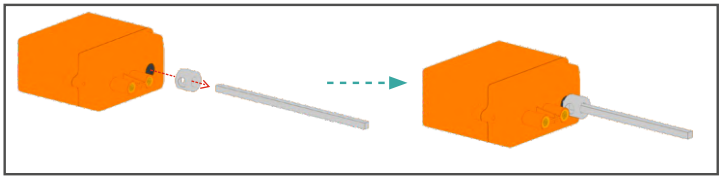
6mm Bolts x 4

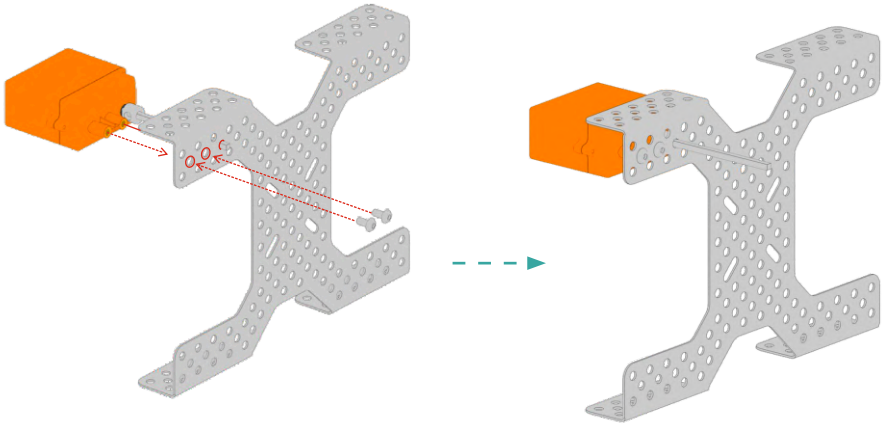
Filler x 2

Axle Lock x 4

Let's Build!

1





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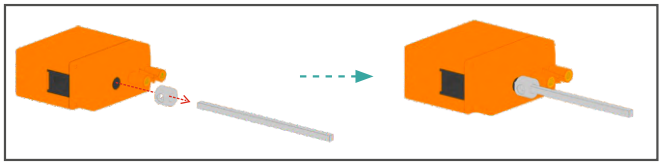

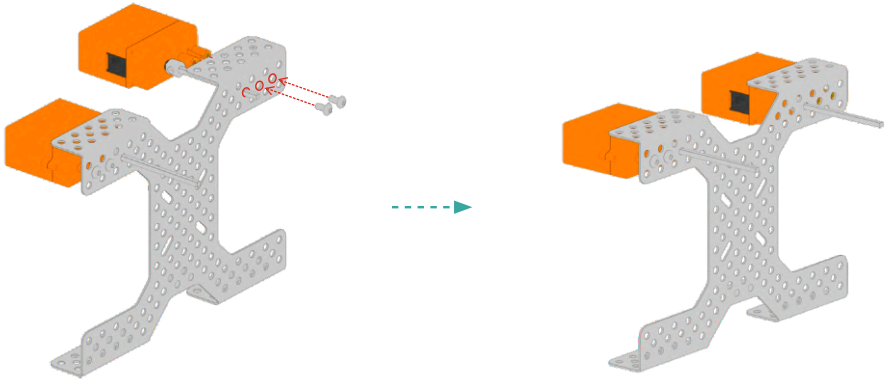

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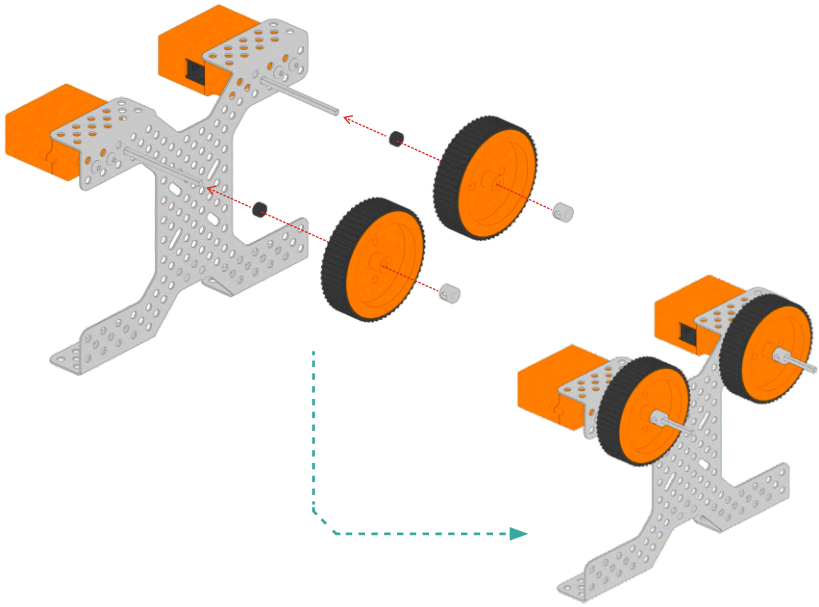

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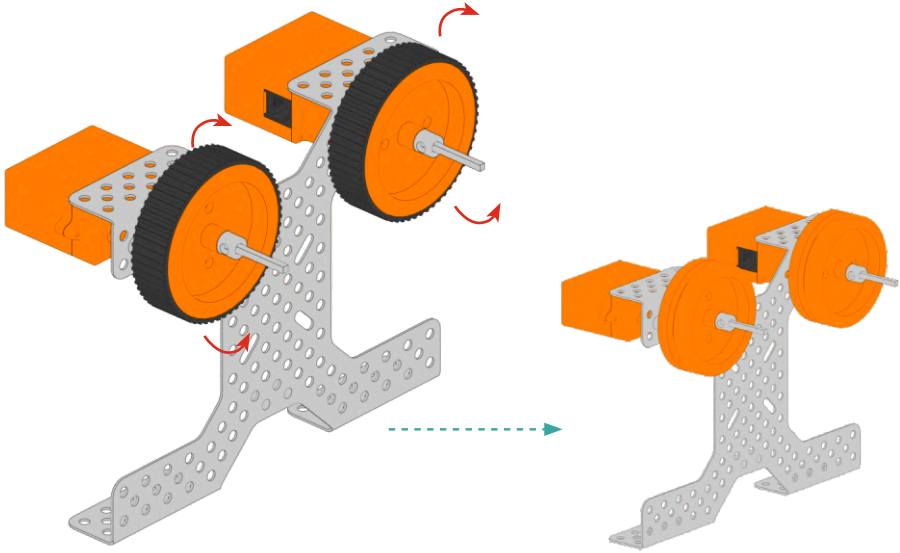

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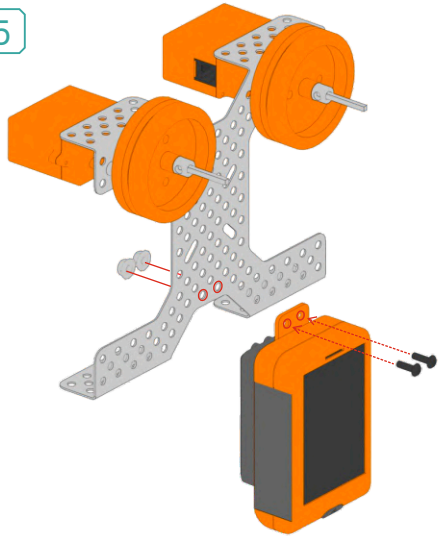
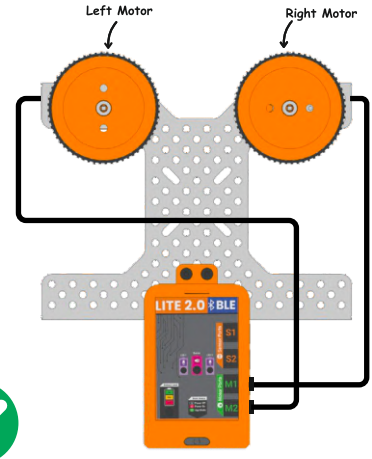


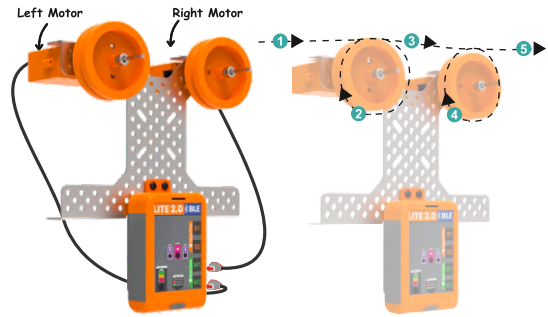
- Connect Left Motor to M2.
- Connect Right motor to M1.
- Turn ON the LITE 2.0 BLE brain.
- Use the remote in your Avishkaar App to control your robot.



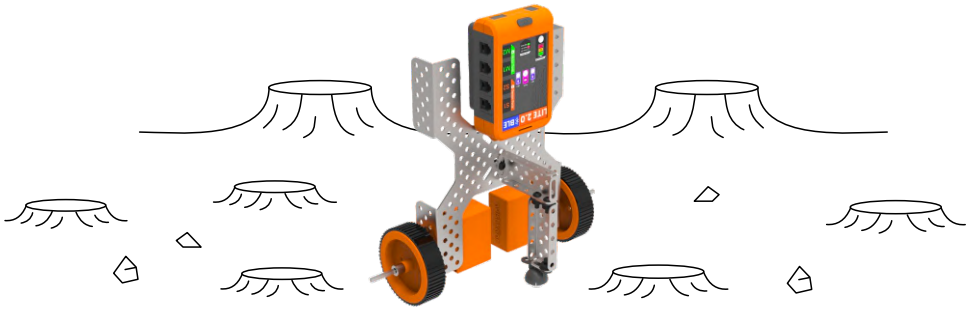
Your bot is now ready!

Let's Play

Go to Pg 14 to know how to download the app and use it to control your race car!



Project 3: **Humanoid Bot**



Things we need

LITE 2.0 BLE Brain x 1

High Speed Motors x 2

Wheels x 2

Connecting Cables x 2

Programming Cables x 1

2.5” U-Beam x 2

Avishkaar Battery x 1

Avishkaar Charger x 1

Chassis x 1

3.5” Axles x 2

Allen key x 1

Spanner x 1

Caster Wheel x 1

12 mm Bolts & K-Nuts x 10

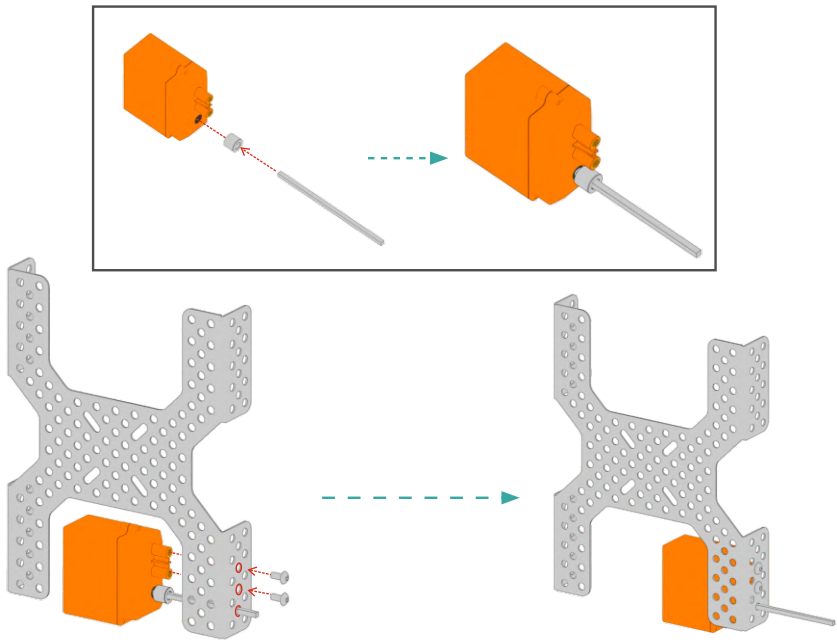
6mm Bolts x 4

Filler x 2

Axle Lock x 4

Let's Build!

1



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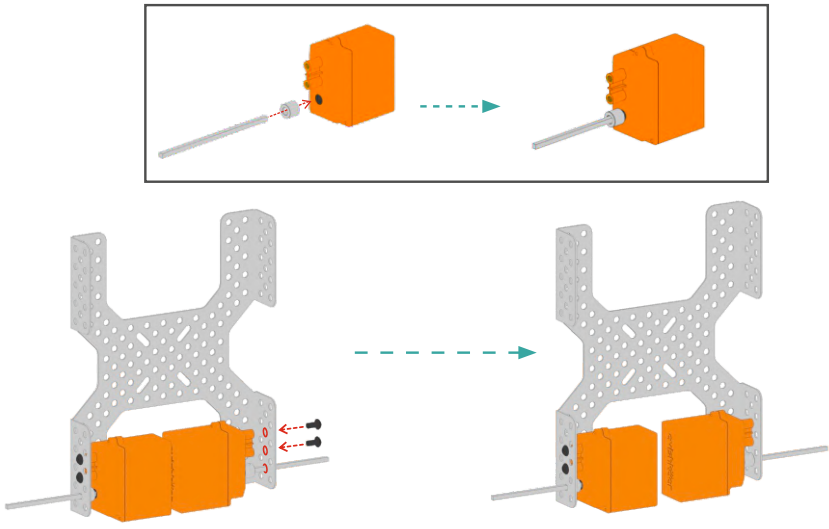

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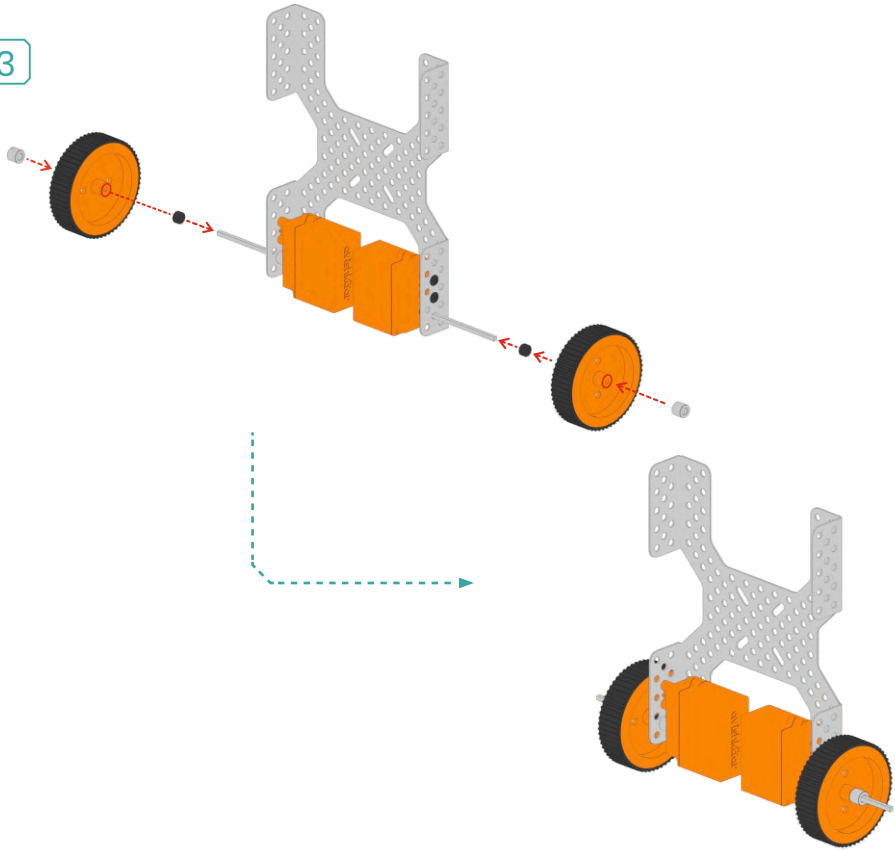

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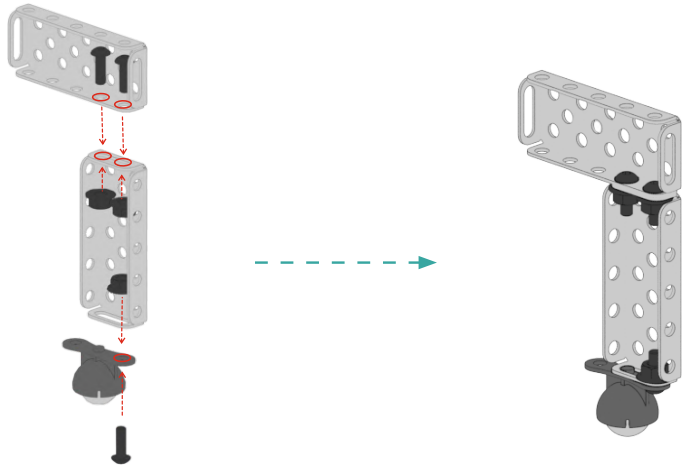

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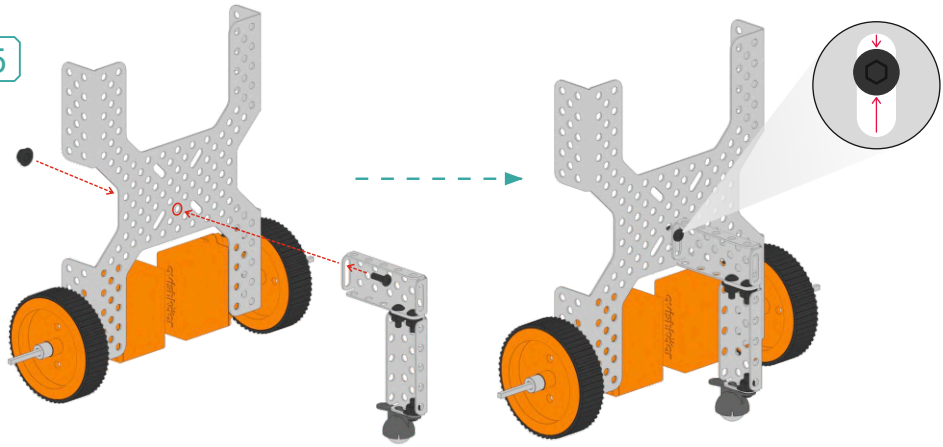

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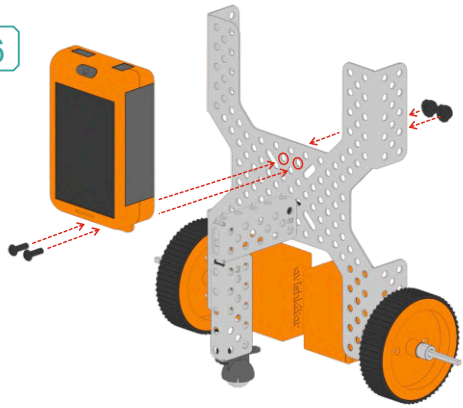
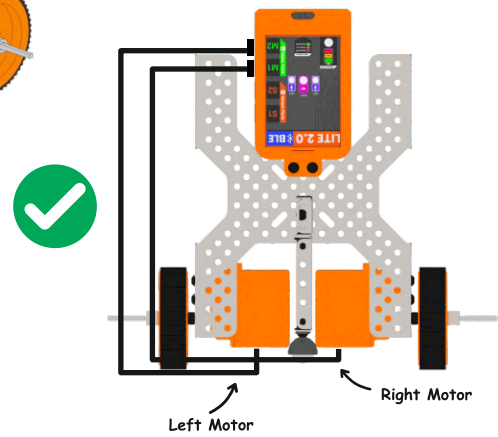


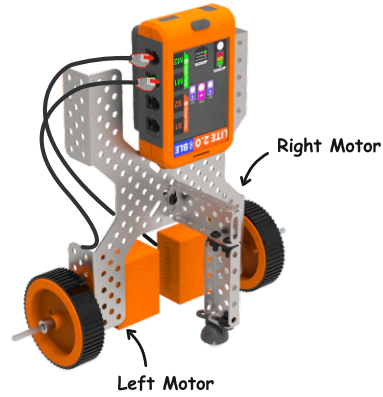
- Connect Left Motor to M2.
- Connect Right motor to M1.
- Turn ON the LITE 2.0 BLE brain.
- Use the remote in your Avishkaar App to control your robot.



Your bot is now ready!

Let's Play

Go to Pg 14 to know how to download the app and use it to control your Humanoid Bot !



Congrats!

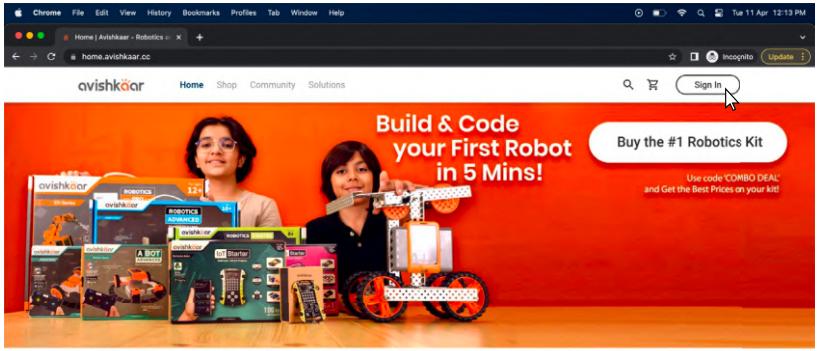
Share all 3 projects to win the **'Scratch The Surface 2'** badge.

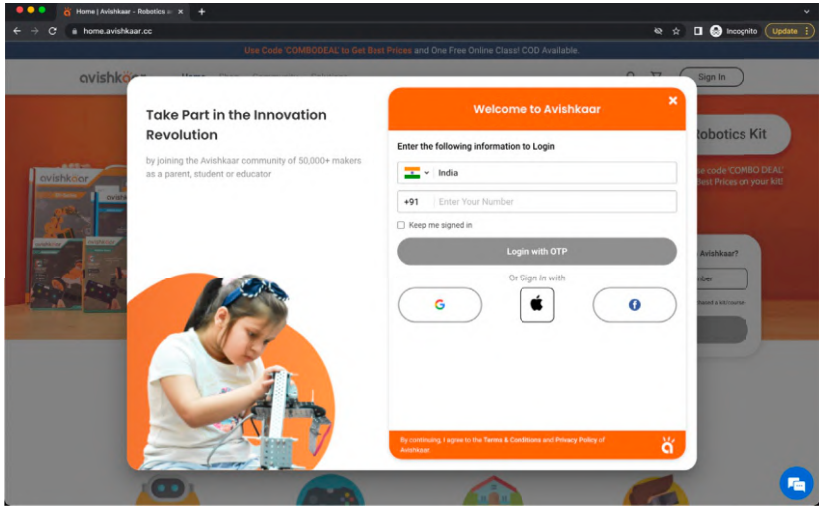
Control Method 2: **AMS Setup**

Using Online AMS

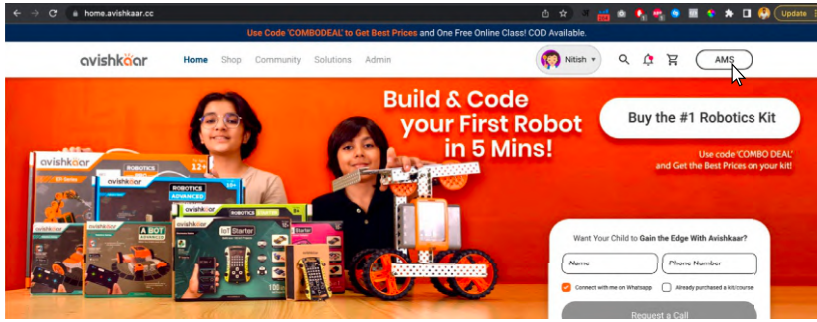
Avishkaar Maker Studio (AMS) is an integrated development environment to program **Robotics LITE 2.0 BLE Brain for your kit.**

1 Open Avishkaar.cc and sign up/ login by clicking on the button on the top right.

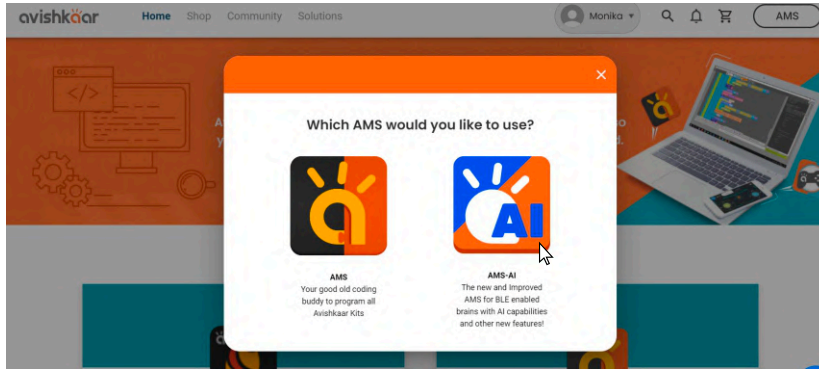




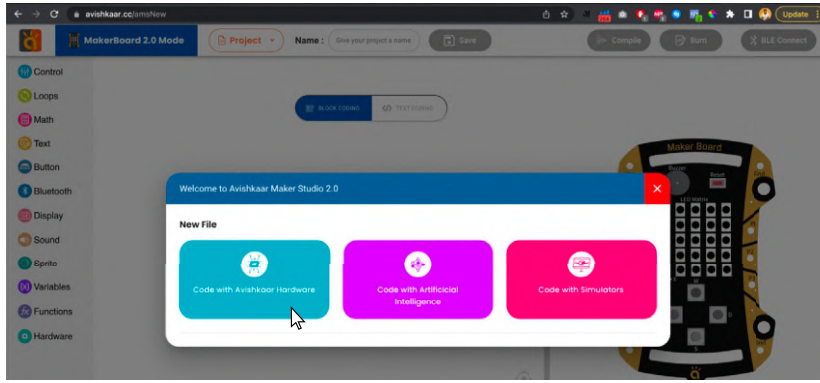
2 Open AMS Online by clicking on the button on the top right.



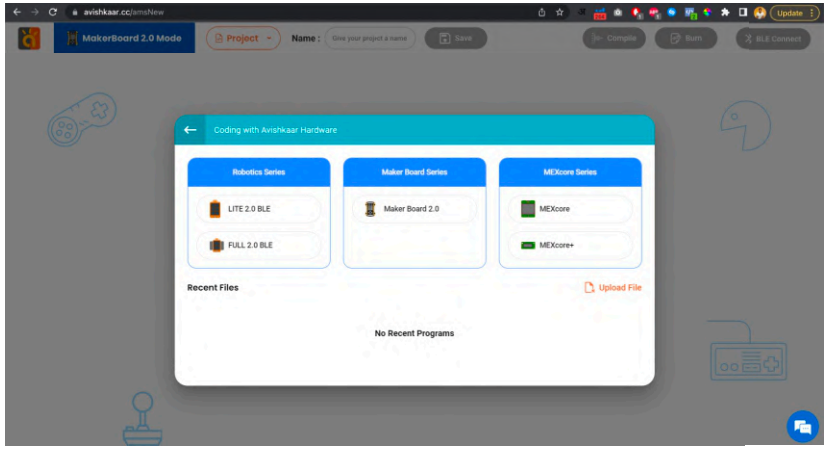
3 Click 'AMS -AI'.



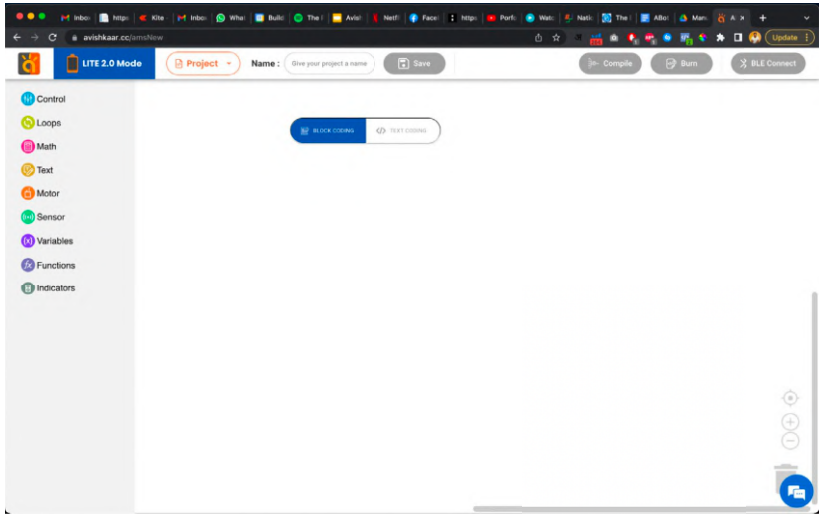
4 Create a Program using the 'Code with Avishkaar Hardware'.



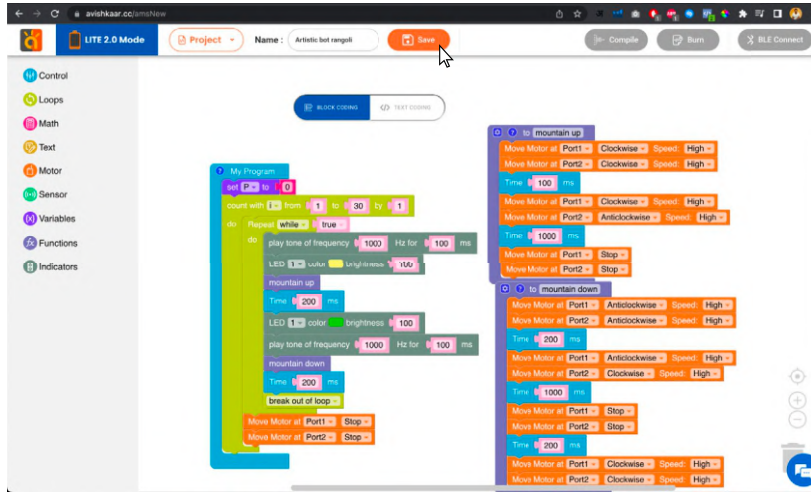
5 Select LITE 2.0 BLE brain here.



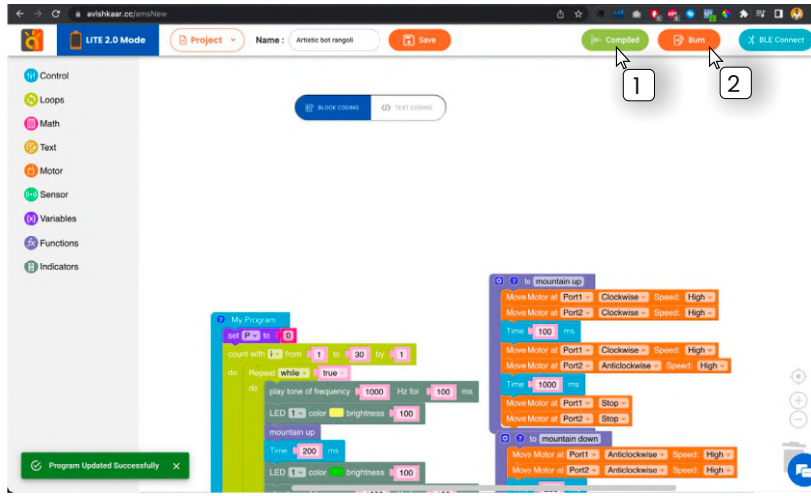
6 Drag code blocks from left side bar (highlighted) onto the blank space to create the logic for your bot.



7 Give your code a name and click on ‘Save’.

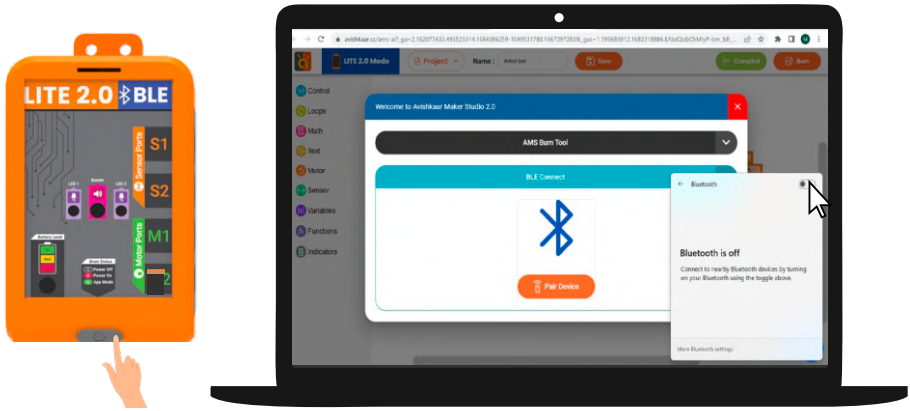


8 After saving, click on ‘Compile’ and then ‘Burn’.

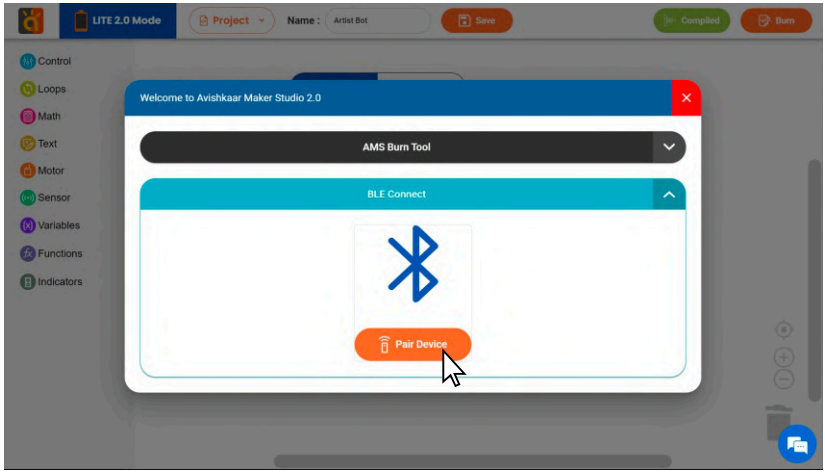


Burning the code on the brain using BLE.

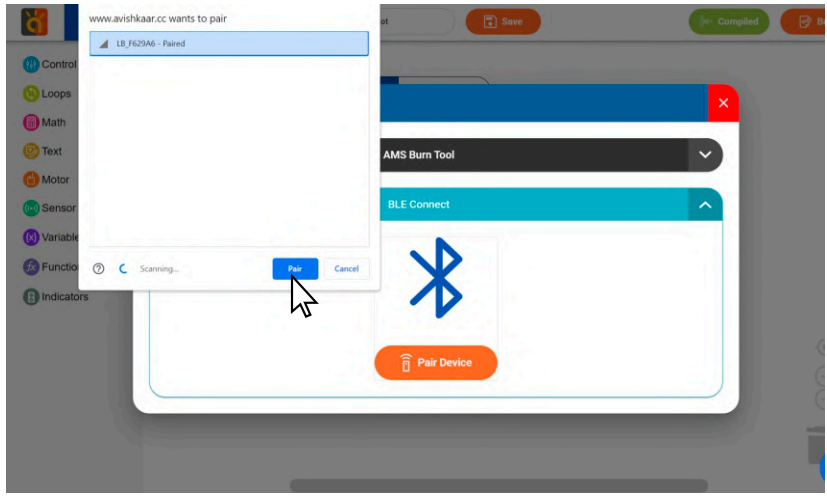
9 Ensure the battery is plugged in the brain and turn ON the LITE 2.0 BLE brain.Turn on bluetooth on your laptop as well.



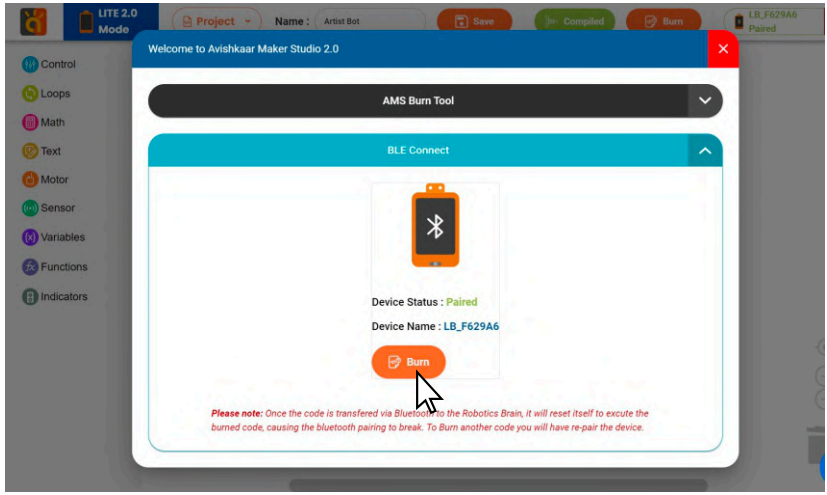
10 Click the 'Pair Device' button.



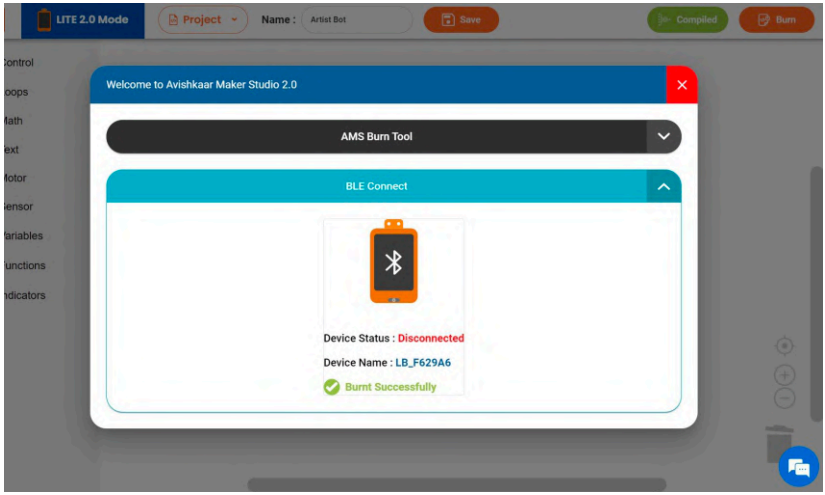
11 Click on ‘Pair’ button to establish a bluetooth connection with the detected brain.



12 After your Lite 2.0 BLE brain is paired, then click the ‘Burn’ button.



13 Once the code is burned successfully on the brain, that's it! Your bot is ready to play around with!

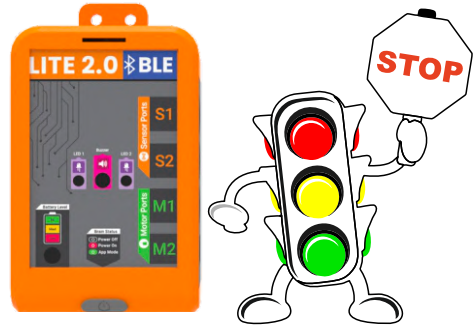


Burning the code on the brain using offline ABT with the USB cable.

Avishkaar provides a universal Burn Tool, a software that burns programs downloaded from AMS called **AMS Burn Tool(ABT)** .

If you do not have bluetooth connection on your computer, check this video to understand how to burn program using the USB Port.

Project 4: **Traffic Light**



Things we need

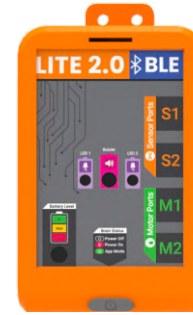
LITE 2.0 BLE Brain x 1

Avishkaar Battery x 1

Avishkaar Charger x 1

Let's Build!

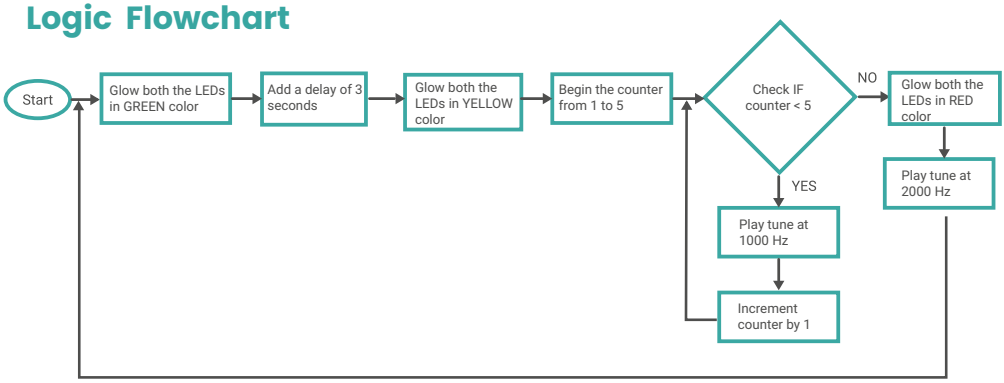
1 This is a coding related project so you need only to program the brain.



Understanding the Algorithm

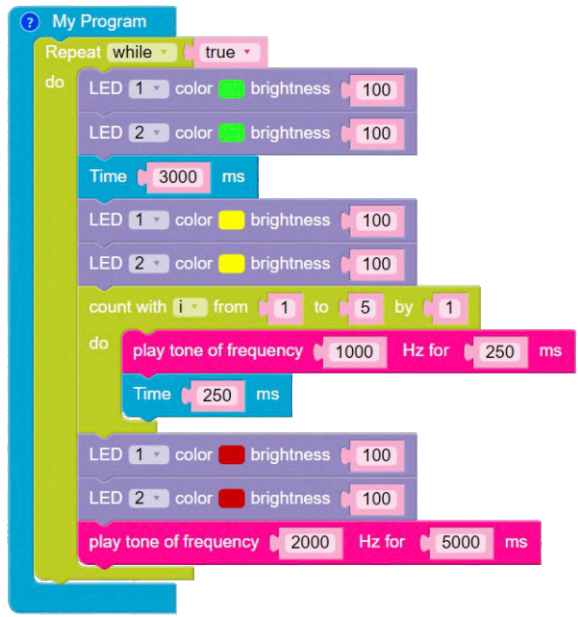
- Begin by glowing the LED1 and LED2 in Green color for 3 sec.
- After the green light, the same LEDs in Yellow color show the 2nd color of the Traffic Light.
- Play a beep tone for 5 times count by using the play tone frequency block With a frequency value of 1000Hz for 250 milliseconds (ms).
- Then make the LEDs glow in Red LED color and play the tone of 2000 Hz for 5000 Milliseconds

Logic Flowchart



Let's Code!

Go to Pg 36 to write the code below on online AMS and use offline ABT to burn the code on the LITE 2.0 BLE brain



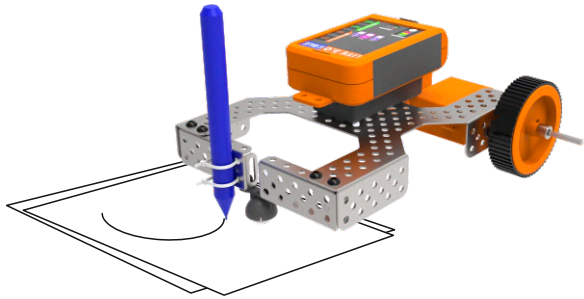
Let's Play

- Refer to page 12 for attaching battery to brain.
- Turn ON the LITE 2.0 BLE Brain

How to Play

- The brain will now show the traffic light with sound.

Project 5: **Artist Bot**



Things we need

LITE 2.0 BLE Brain x 1

High Speed Motors x 2

Connecting Cables x 2

Avishkaar Battery x 1

Avishkaar Charger x 1

Wheels x 2

3.5” Axles x 2

2.5” U-Beam x 2

Chassis x 1

Allen key x 1

Spanner x 1

Caster Wheel x 1

12 mm Bolts & K-Nuts x 6

6mm Bolts x 6

Filler x 2

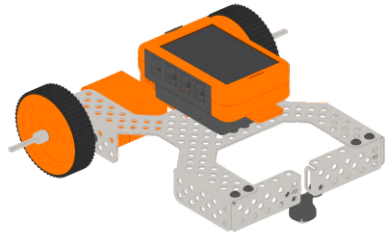
Axle Lock x 4

Zip Ties x 2

Pen x 1

Let's Build!

1 Refer to RC Car from step 1 to step 5 on page 23. Your model should look like this.



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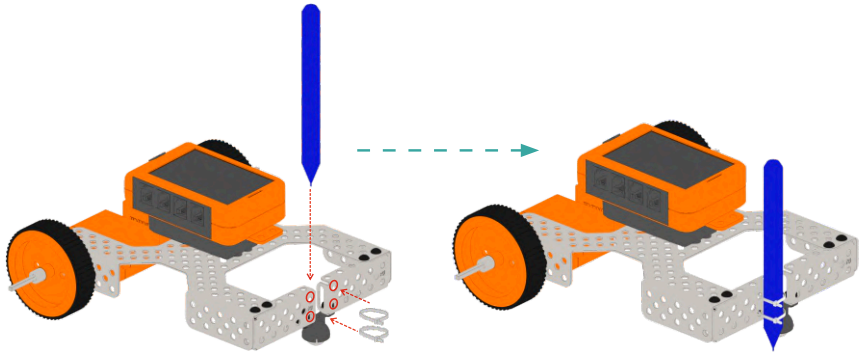
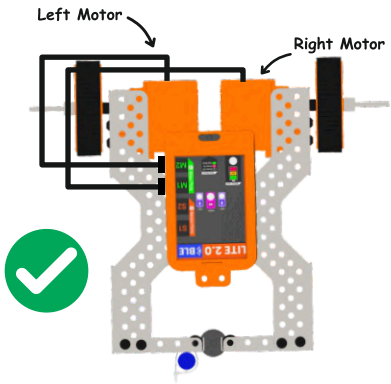




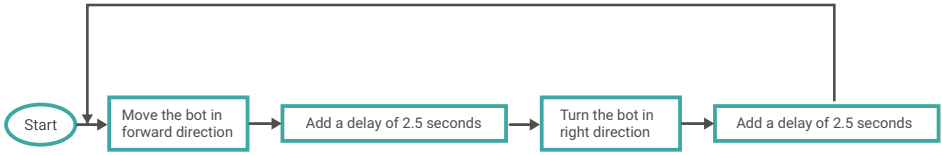
- Connect Left Motor to M2.
- Connect Right motor to M1.

Your bot is now ready!

Understanding the Algorithm

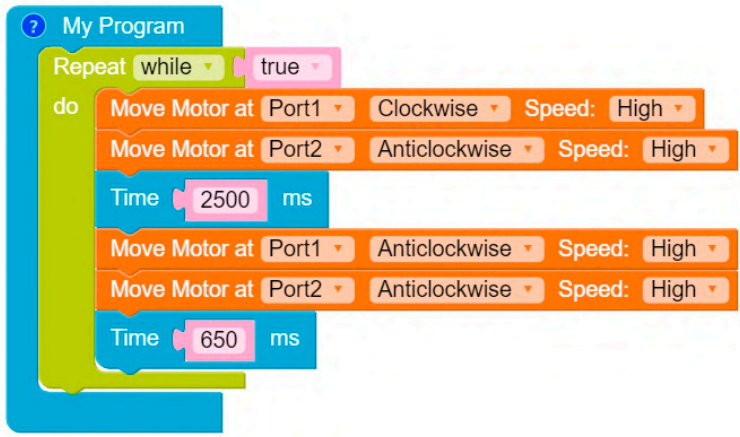
- Begin by moving the Motor at Port1 in Clockwise direction and motor at Port2 in Anticlockwise direction with High speed for 2500 ms to move it in forward direction
- Then, change the motion and set the Motor at Port1 and Port2 to rotate in Anticlockwise direction with High Speed for 2500 ms to move it in right direction.

Logic Flowchart



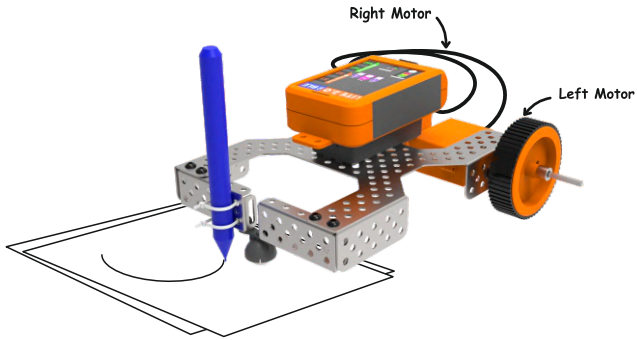
Let's Code!

Go to Pg 36 to write the code below on online AMS and use offline ABT to burn the code on the LITE 2.0 BLE brain



Let's Play

- Turn ON the Brain
- Place the bot on a plane surface and it will start making shapes according to the program.



Congratulations on Completing this Project!

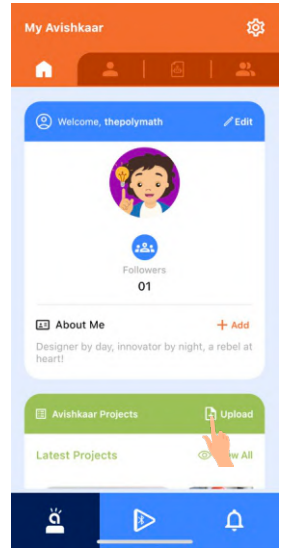
Excited to play with it using the Avishkaar App?

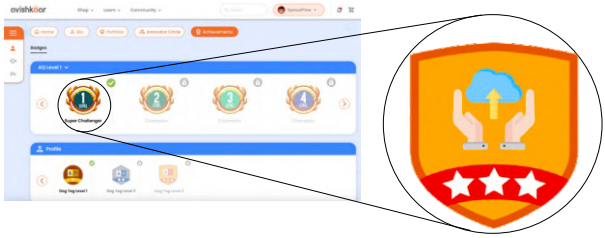
Go to Pg 14 for detailed instructions on how to download the app and control your bot using it.

Share your Creation with the World and Win the 'Scratch the Surface' Level 3 Badge

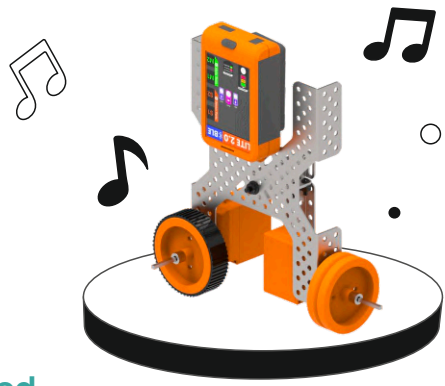
Upload photos or videos of your projects using the Avishkaar Project Section and win points, rank on leaderboard and win badges. You get the 'Scratch the Surface 3' badge for your fourth project.

See all your collected badges in the Achievements section of your profile. Explore all other badges to be collected and win them all!





Project 6: **Dancer Robot**



Things we need

LITE 2.0 BLE Brain x 1

High Speed Motors x 2

Wheels x 2

Connecting Cables x 4

Programming Cables x 1

3.5” Axles x 2

Avishkaar Battery x 1

Avishkaar Charger x 1

2.5” U-Beam x 2

Chassis x 1

Allen key x 1

Spanner x 1

Caster Wheel x 1

12 mm Bolts & K-Nuts x 10

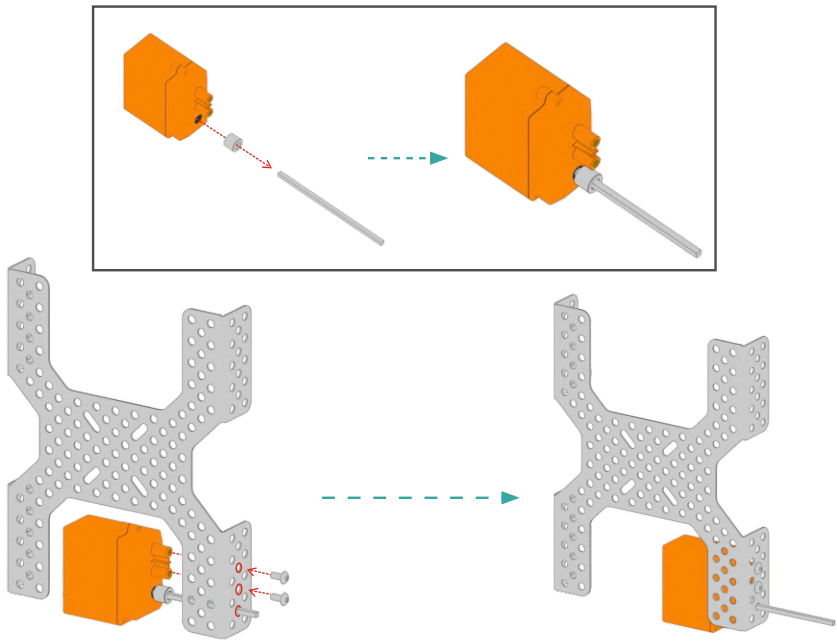
Filler x 2

6mm Bolts x 4

Axle Lock x 4

Let's Build!

1



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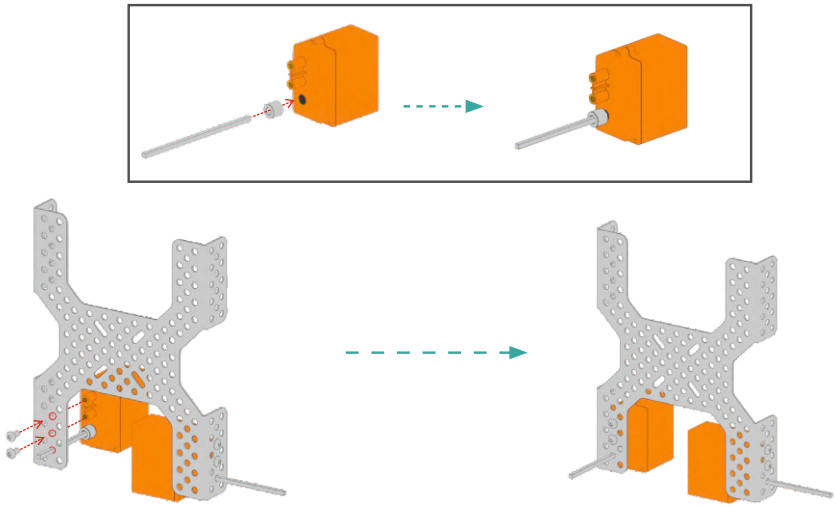

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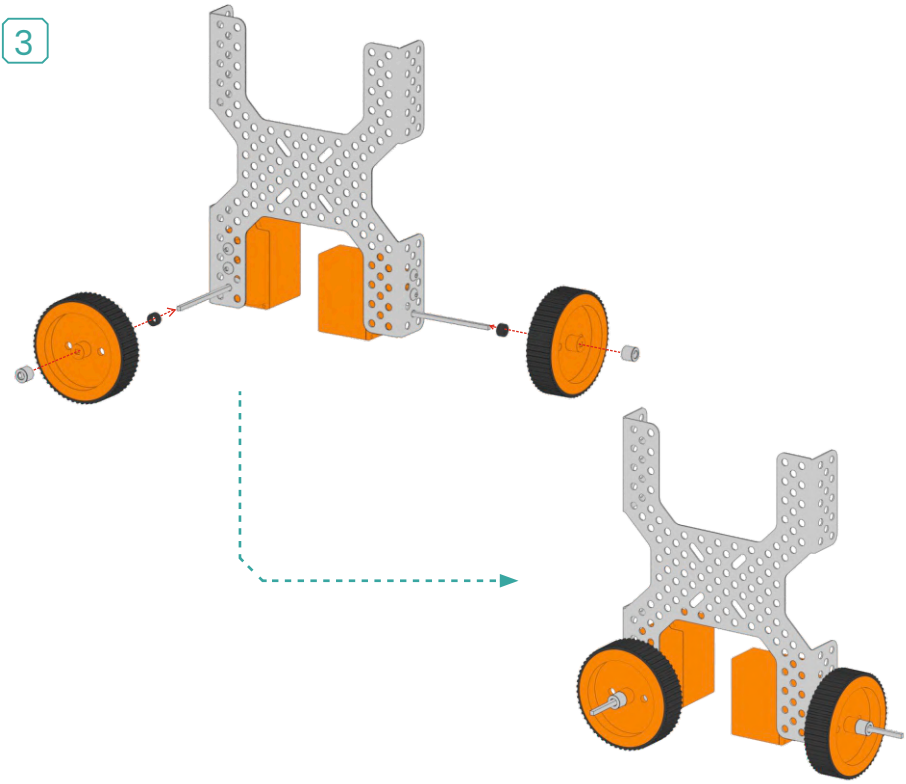

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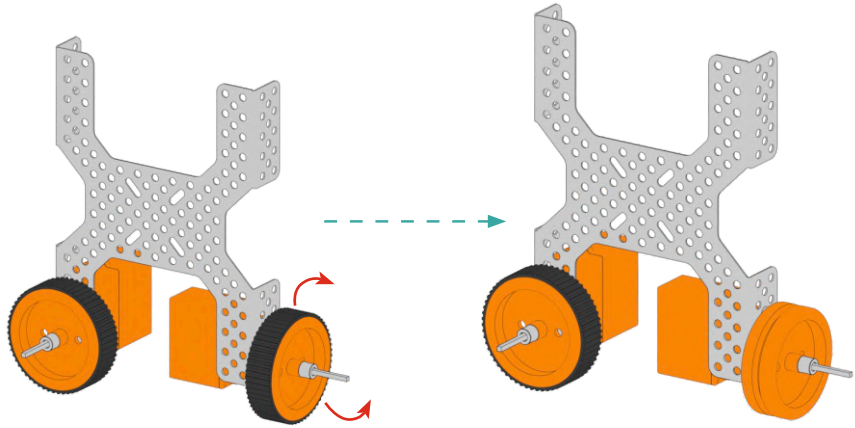

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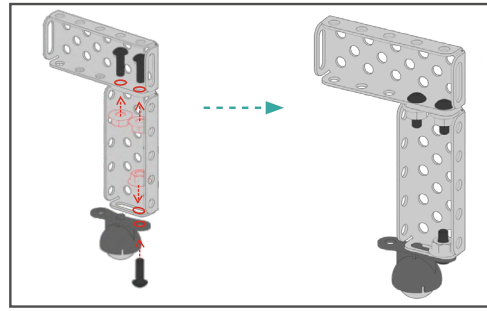

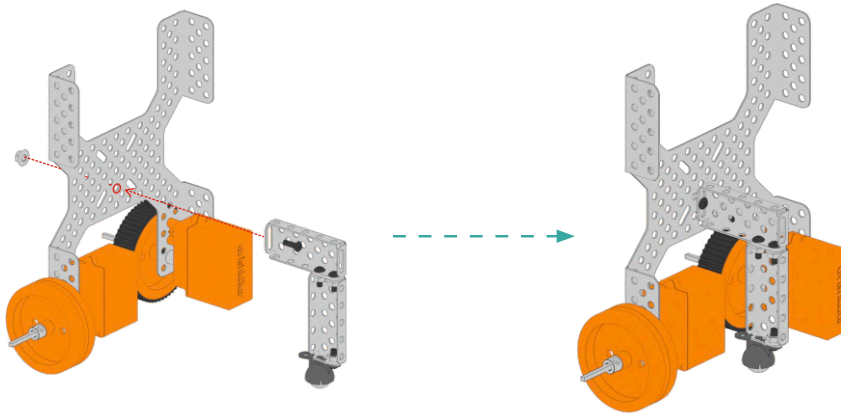

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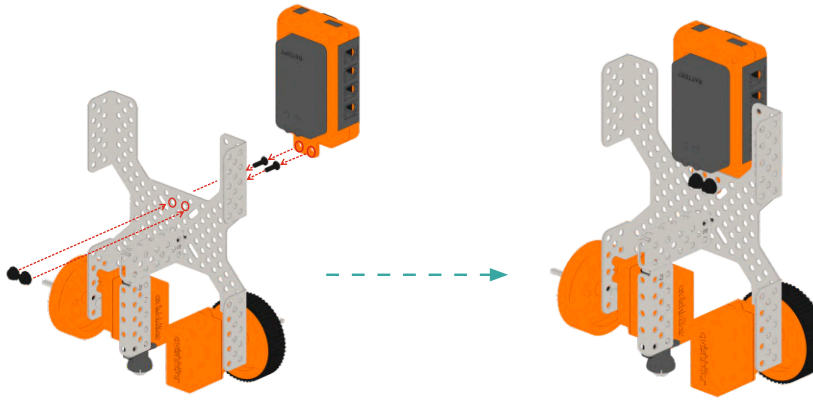
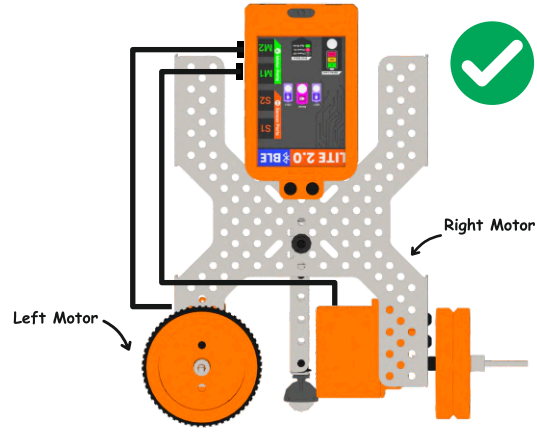


- Connect Left Motor to M2.
- Connect Right motor to M1.



Your bot is now ready!

Understanding the Algorithm

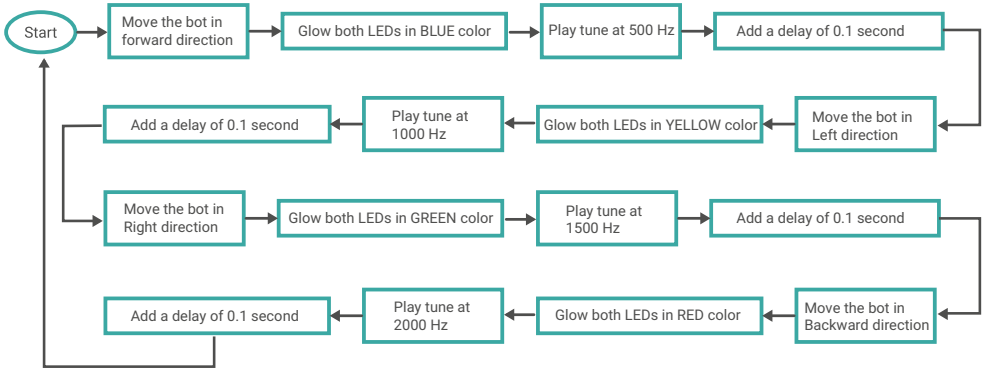
- Begin by moving the robot in Forward direction by setting the motor movement to one of them as Clockwise and another as Anticlockwise, with glowing LED 1 and LED 2 with Blue color. Also, the buzzer will buzz for 2 seconds. After 0.1 sec, the robot will move in left direction by setting rotation of both motors to Clockwise direction.

- As the movement of the bot is changed, change the color of the Bot LEDs to Yellow to make the change in dance move visible, again the buzzer will buzz for 2 seconds. Similar to the previous case, after 0.1 sec next dance move of moving the robot in right direction will be observed, by setting rotation of both motors to Anti-Clockwise.

- Again to visualize the change in bot movement, change the color of the LEDs by setting brightness of LED 1 and LED 2 to 100 and color as Green. Add the play the tone of 1500Hz for 2 seconds with the time delay of 100 milliseconds. Finally, in the last dance step of the bot, set rotation of the motor at Port 1 to Anticlockwise and set rotation of the motor at Port 2 to Clockwise by using the Move Motor block.

- Again change the brightness of LED 1 and LED 2 to 100 and color as Red to show changes in the bot movement. Add play the tone of 2000Hz for 2 seconds with the time delay of 0.1 seconds.

Logic Flowchart

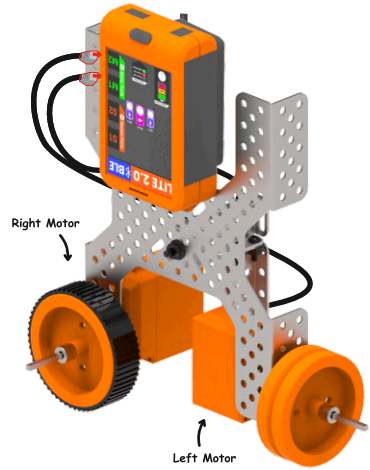


Let's Code!

Go to Pg 36 to write the code below on online AMS and use offline ABT to burn the code on the LITE 2.0 BLE brain

Let's Play

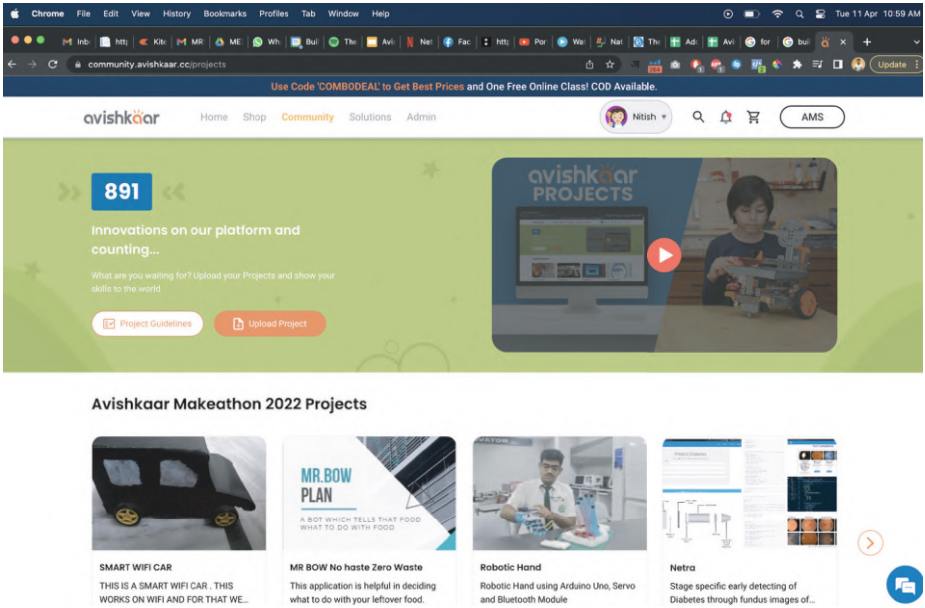
- Turn ON the Brain
- Place it on plane surface, it will dance with light and sound



Can you Make your Own Robots?

Now that you've made these six basic models- you can use these Metal and electronic parts to make hundreds of designs.

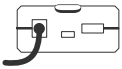
Use projects page on avishkaar.cc website or the app to upload your projects. The best design will get a chance to be showcased on 'Featured Projects' section of the website and win the '30 Seconds of Fame' badge!



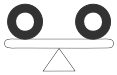
Troubleshooting

Check if you have connected the ports as mentioned in the chapter.

Check if the axle shaft is properly connected.



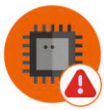
Check whether the wire is connected properly or not.



Check your structure is stable or not.

Facing an issue?

Software Issues

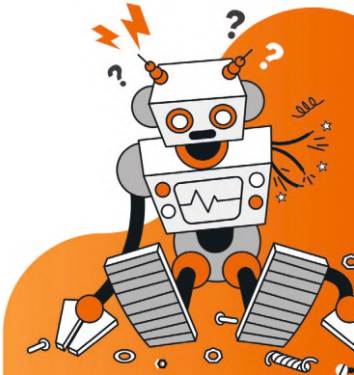


Hardware Issues

Usability Issues

Contact support by scanning the QR Code.

- support@avishkaar.cc
- +91-8506931515



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