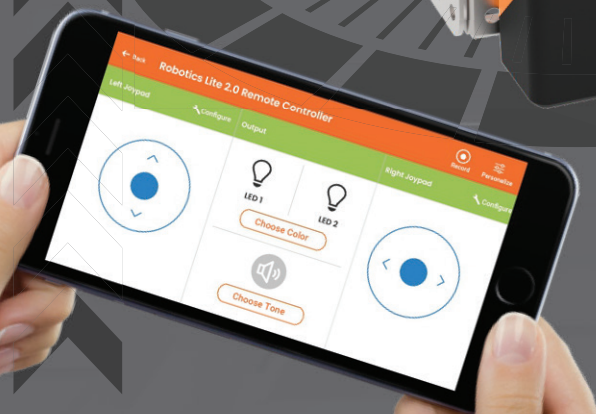
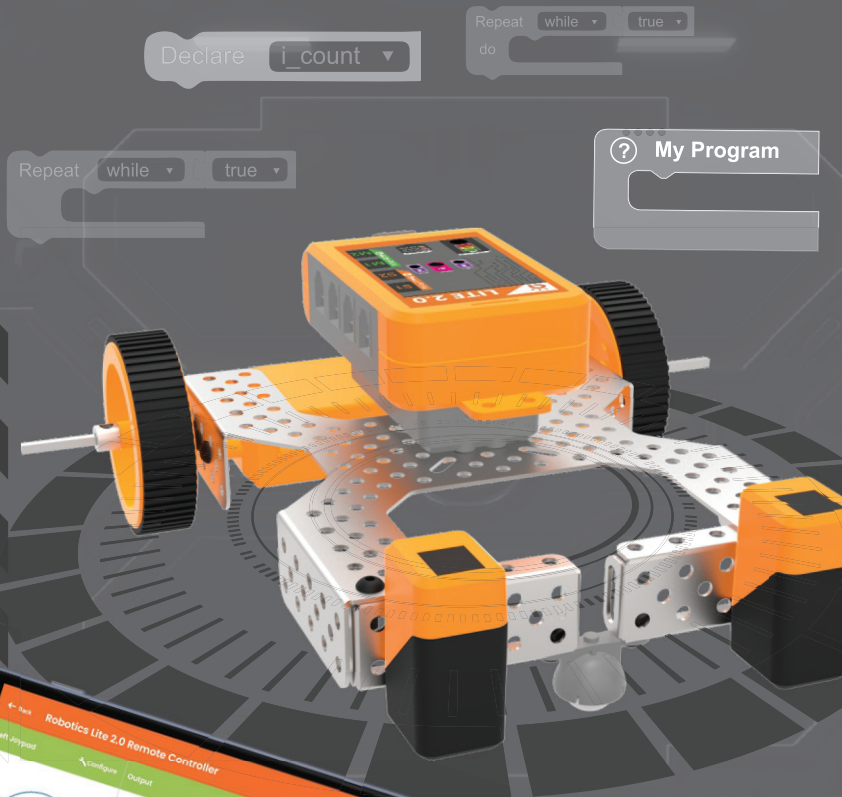


Robotics Series

User Manual

A BOT ADVANCED

Robots: Easy To Build, Easier To Code





**" I never dream
about success.
I work for it."**

Sneak peak

Make the most out of your kit	04
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Make the Most Out of Your Kit

Innovate - - - - -



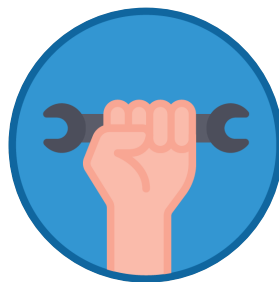
Take the Innovator's Oath

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.



Join Let's Avishkaar

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



Upload Projects

Upload projects on www.avishkaar.cc 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



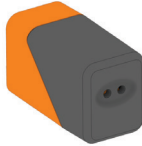
**Explore
your Kit**

Armour Check

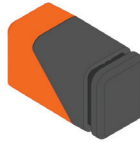
Electronics



BLE LITE 2.0
Brain x 1



IR Sensor x 2



Touch sensor
Sensor x 1



High Speed
Motors x 2



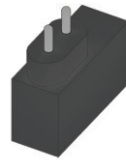
Programming
Cable x 1



Connecting
Cables x 4

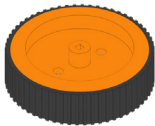


Avishkaar
Battery x1



Avishkaar
Charger x1

Construction Parts and Tools



Wheels x 2



3.5" Axles x 2



2.5" U-Beam x 2



Chassis x 1



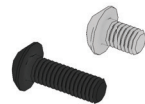
Allen key x 1



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 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.



Programming Port

Connect your Programming wire to this port.



Sensor Ports

These Ports help you connect sensors to the brain.



Motor Ports

These Ports help you connect motors to the brain.



Programmable
Brain



Compact Size



In built Bluetooth
& WiFi

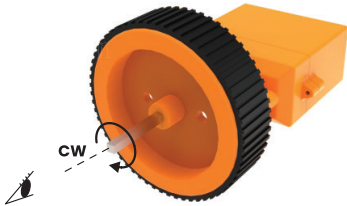


External
Battery

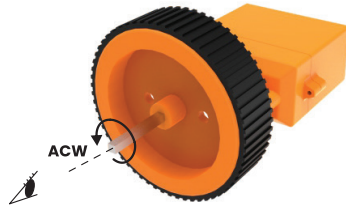
Interfacing with Motors

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

Clockwise Rotation



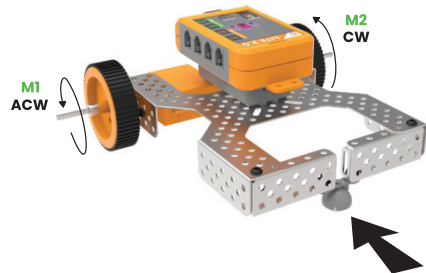
Anticlockwise Rotation



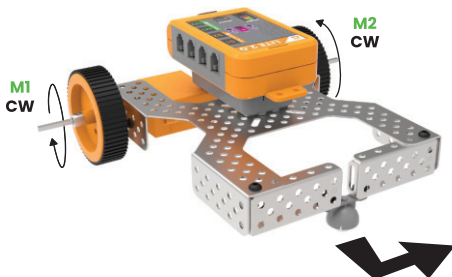
Robots move in the different directions by the combination of the rotation from each wheel. For example-



Forward Direction



Backward Direction



Left Direction



Right Direction

Interfacing with Sensors

Touch Sensor

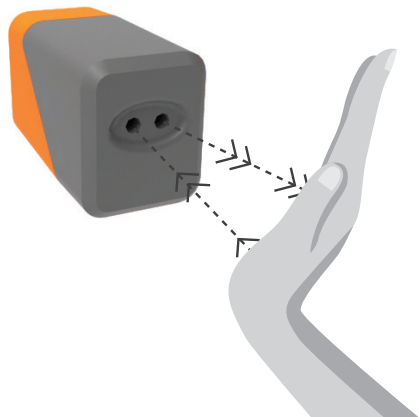
Touch sensor works like a push button or a limit switch. it simply gets triggered when it is touched or pressed.

In a touch Sensor. the sensor state is HIGH when the sensor is pushed with any object.



IR Sensor

All but the very closest object emit radiation in the form of the heat that can be detected by infrared sensors. As infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment.



In an IR sensor, the sensor state is HIGH when a reflective object is in front of it. Black or dark colored objects do not reflect IR rays.

Basics of Building

Let's understand some basics of building

Tightening Screws

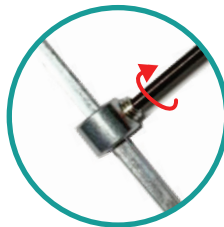


Tighten
(Rotate Clockwise)

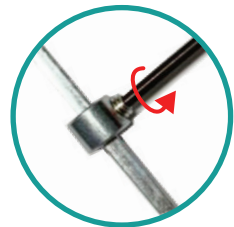


Loosen
(Rotate Anti-clockwise)

Tightening Axle Lock



Tighten
(Rotate Clockwise)



Loosen
(Rotate Anti-clockwise)

Tightening a Motor to a Plate

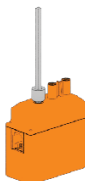
01

Insert Axle



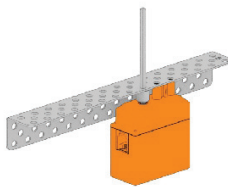
02

Lock Axle Lock



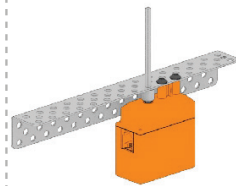
03

Insert Plate



04

Insert Bolts



**Actual metal plate may 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 Firstly take the battery and 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 Battery will be removed can keep it safe in the box.





Deep Dive Into Building Robots

Control Method 1: Avishkaar App



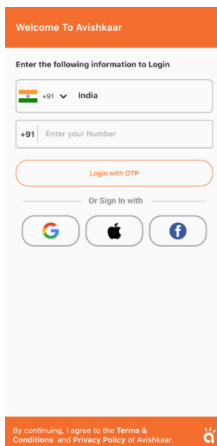
Download the Avishkaar App

Download the Avishkaar App by scanning the QR codes below:



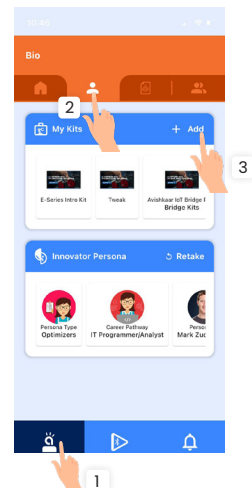
1 Create an Account

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



2 Register your Kit

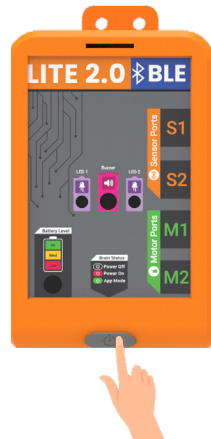
Go to the 'Profile' section in the app and click on '+ Add More' in the 'My Kits' section to register your kit. This step is important to control your robot later.



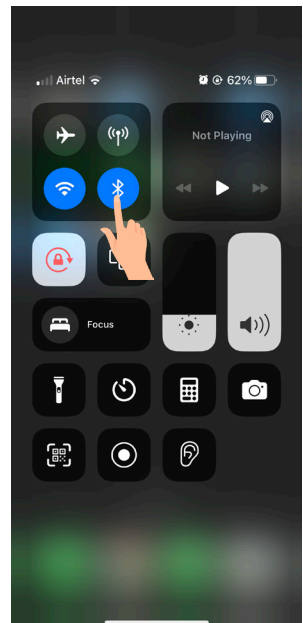
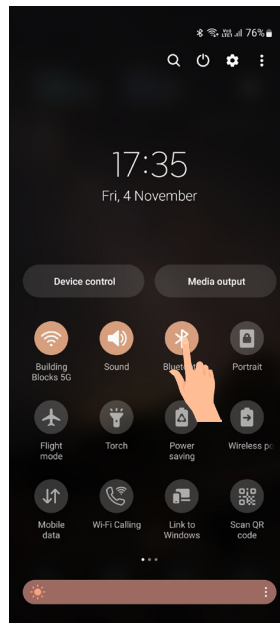
Product Registration
Sticker

3 Connecting the LITE 2.0 Brain to the App

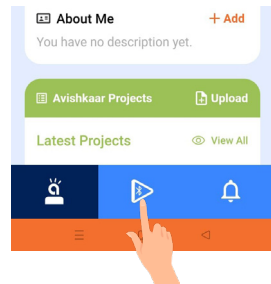
- i Turn ON the brain



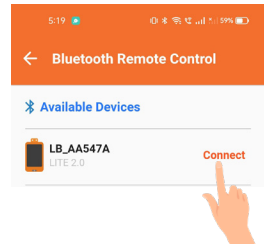
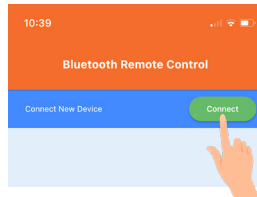
- ii Turn ON the bluetooth on your phone.



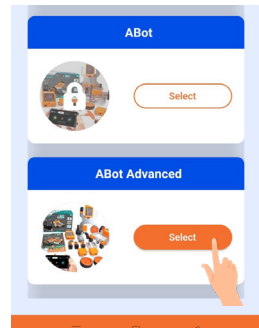
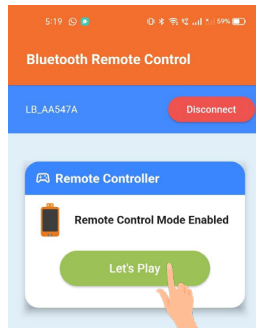
- iii Open the Avishkaar App and click on the 'Play' button inside the 'Home' section.



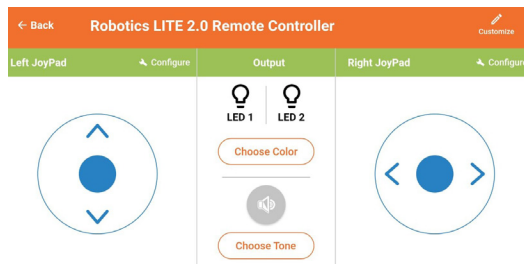
- iv Click on 'Connect'. Your app should be able to find your LITE 2.0 brain if it is turned ON. Click on 'Connect' once your app detects your LITE 2.0.



- v Click on 'Let's Play' and select 'ABot Advanced' in the kit selection menu.



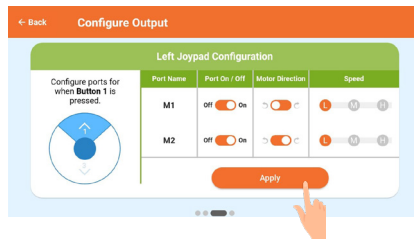
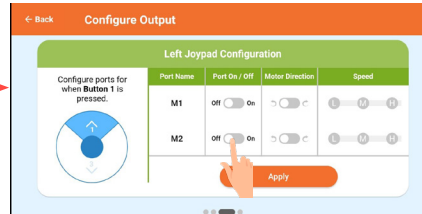
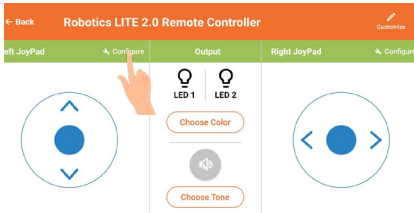
- vi The remote control screen will open up which will allow you to control the LEDs in the brain and the motors connected to it. Have fun!



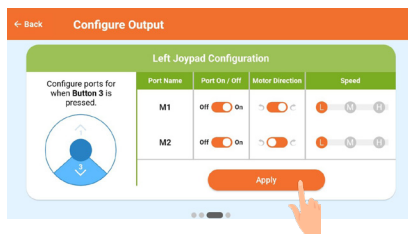
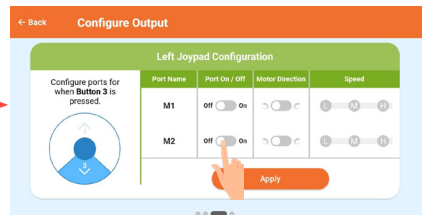
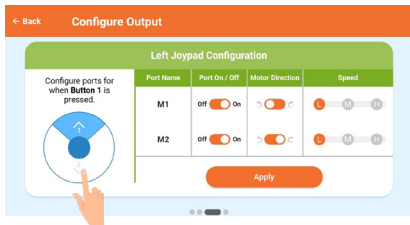
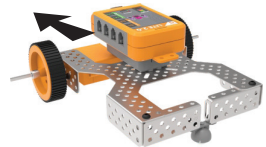
4

Race Car Configuration

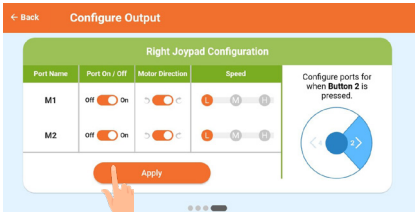
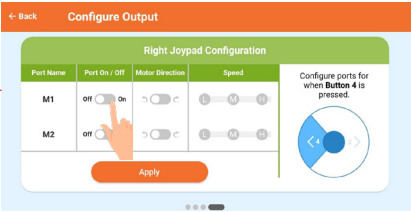
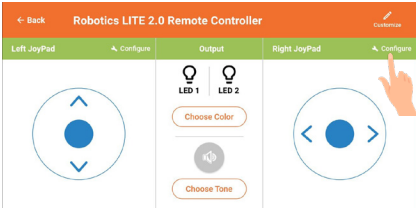
Move Forward



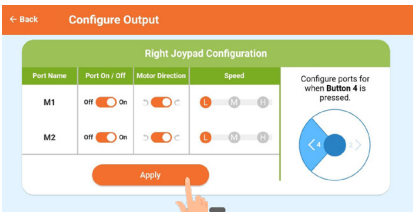
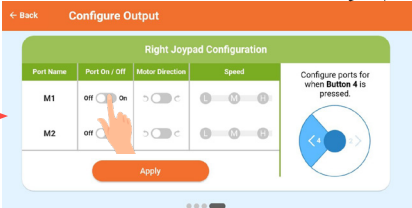
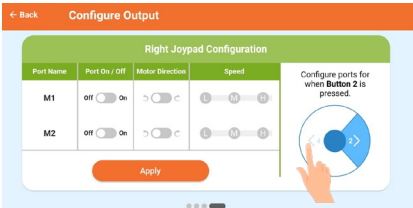
Move Backward



Move Right

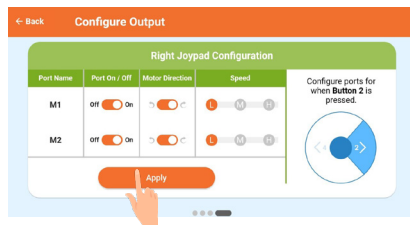
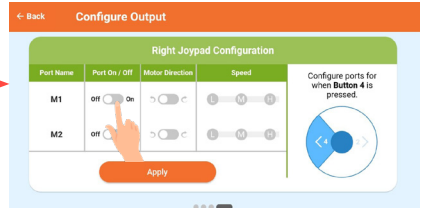
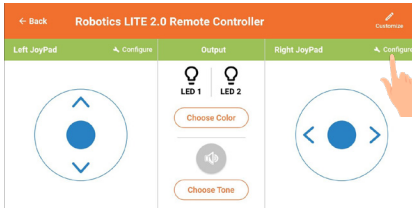
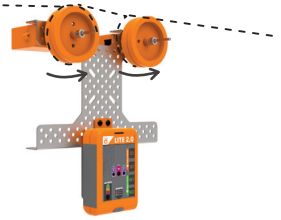


Move Left

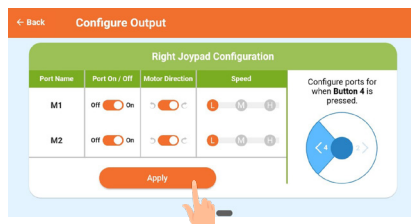
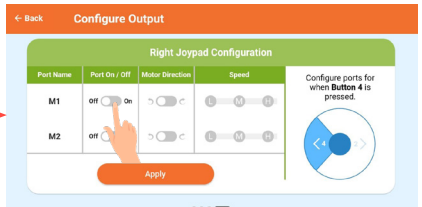
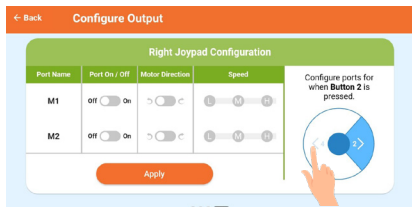
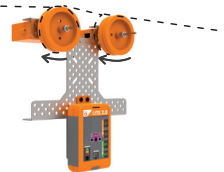


5 Rope Car Configuration

Move Right



Move Left



Project 1: RC Car



Things we need



BLELITE 2.0
Brain x 1



High Speed
Motors x 2



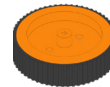
Connecting
Cables x 2



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



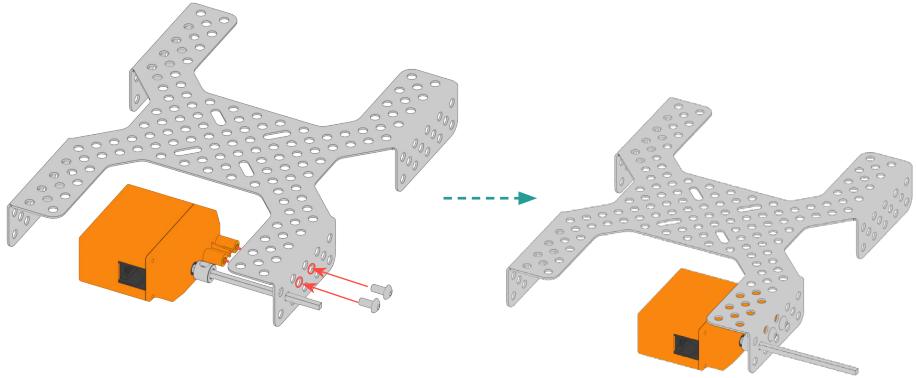
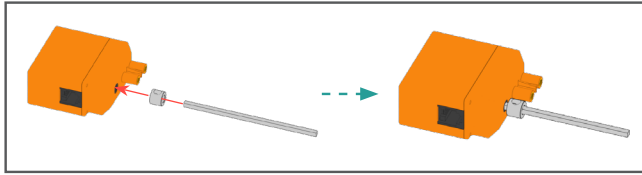
Filler x 2



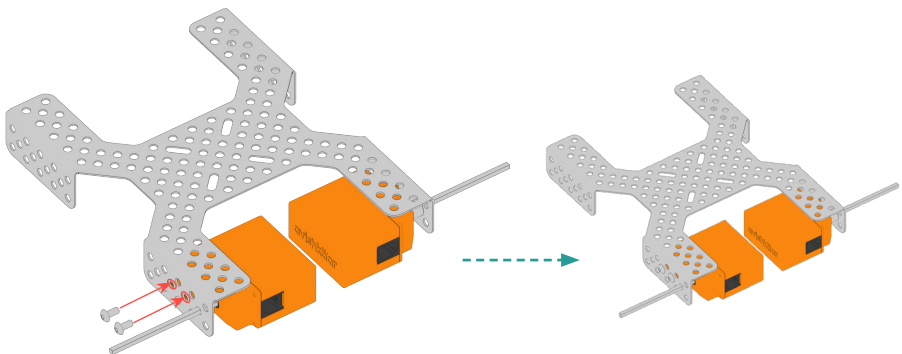
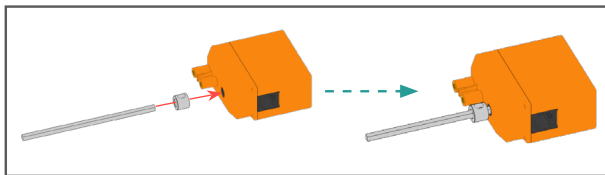
Axle Lock x 4

Let's Build!

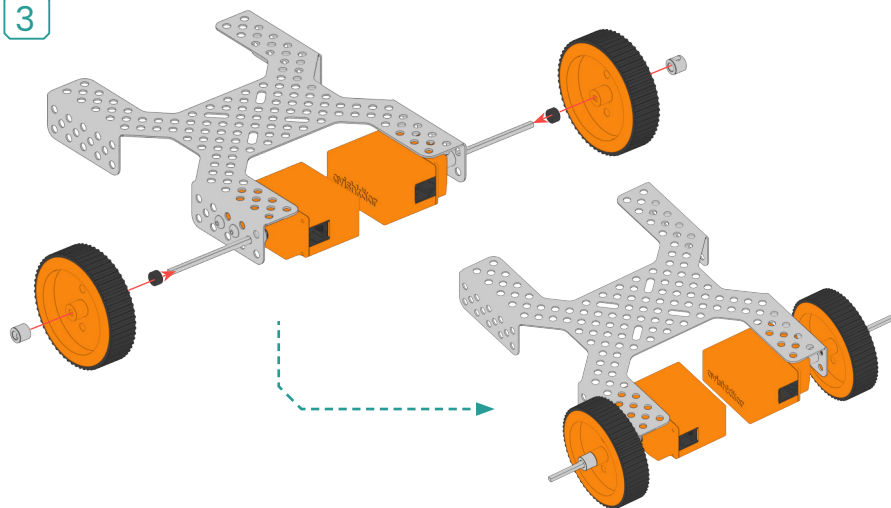
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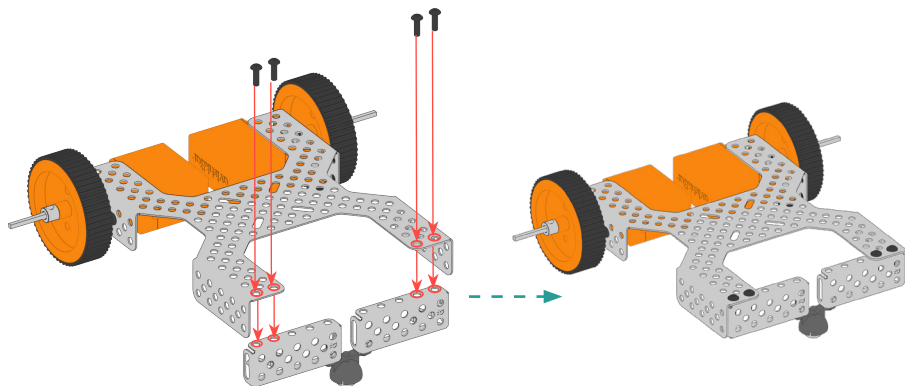
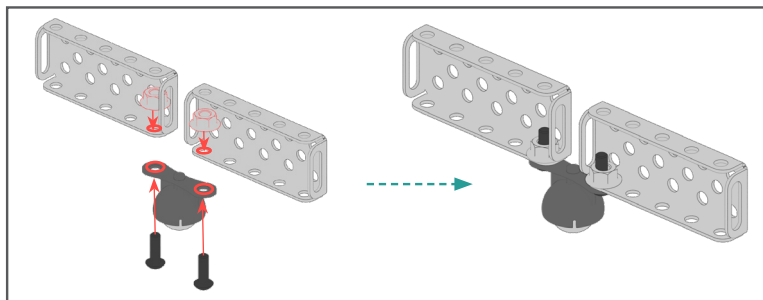
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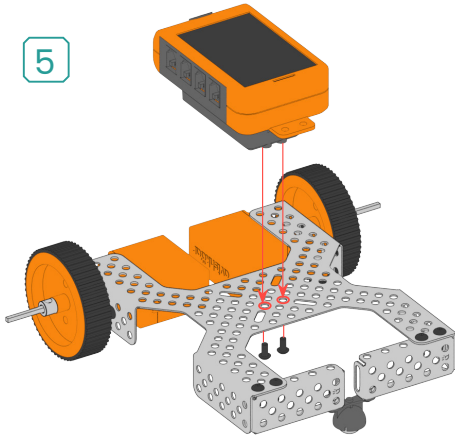
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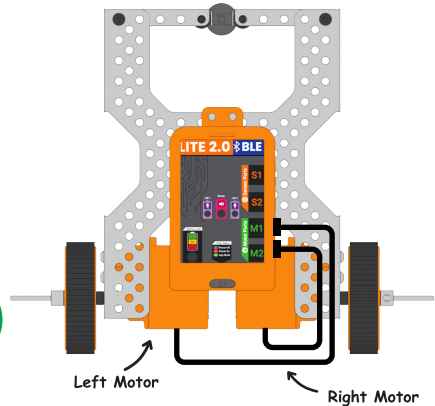
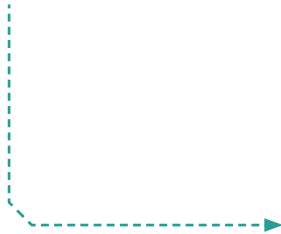
4



5



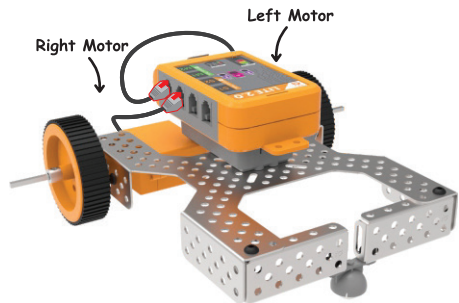
- Connect Left Motor to M1.
- Connect Right motor to M2.



Your bot is now ready!

Let's Play

Go to Pg 16 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 mobile app?

Go to Pg 16 about the detailed instructions on how to download the app and control your bot using it.

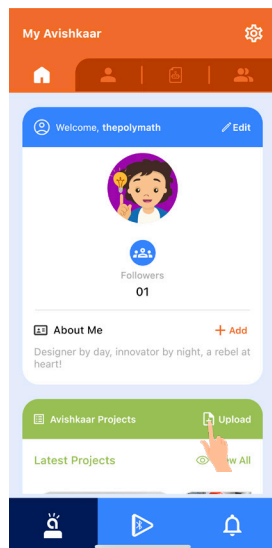
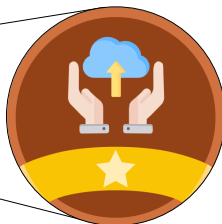
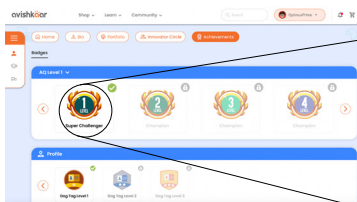


Share your Creation with the World and Win the 'Scratch the Surface' Level 1 Badge

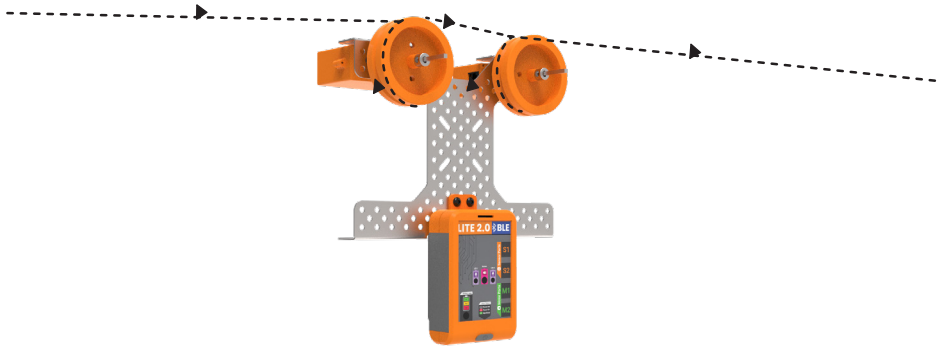
Upload photos or videos of your project using the project section of the Avishkaar App to win the 'Scratch the Surface' Level 1 Badge.

See all your collected badges in the achievement section of your profile on www.avishkaar.cc.

Explore all other badges to be collected and win them all!



Project 2 : Rope Car



Things we need



BLE LITE 2.0
Brain x 1



High Speed
Motors x 2



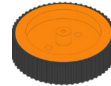
Connecting
Cables x 2



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



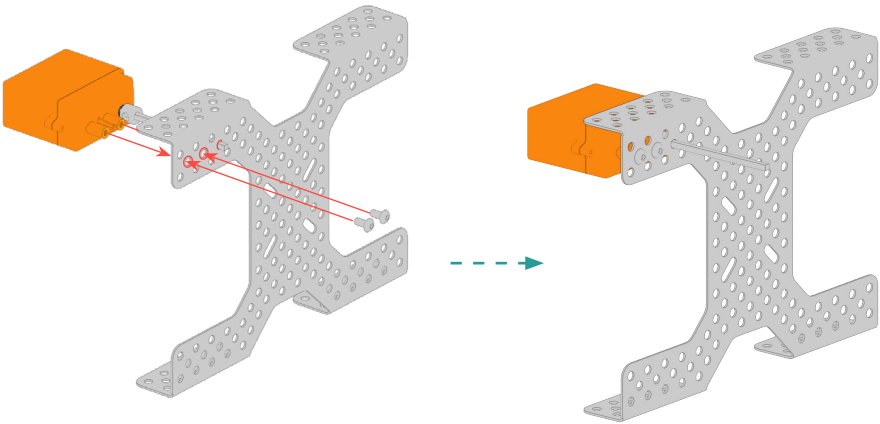
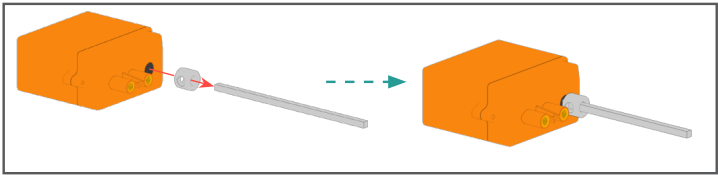
Filler x 2



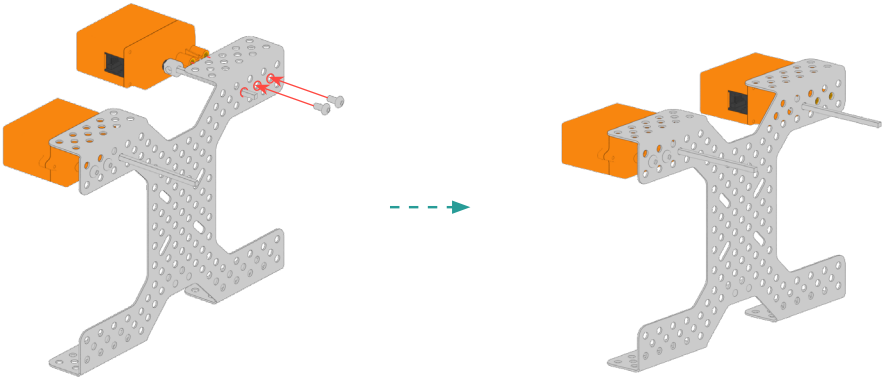
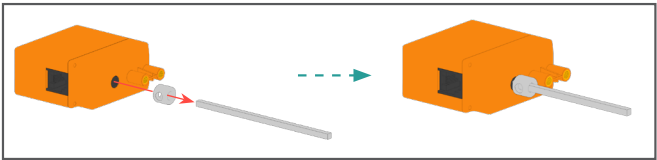
Axle Lock x 4

Let's Build!

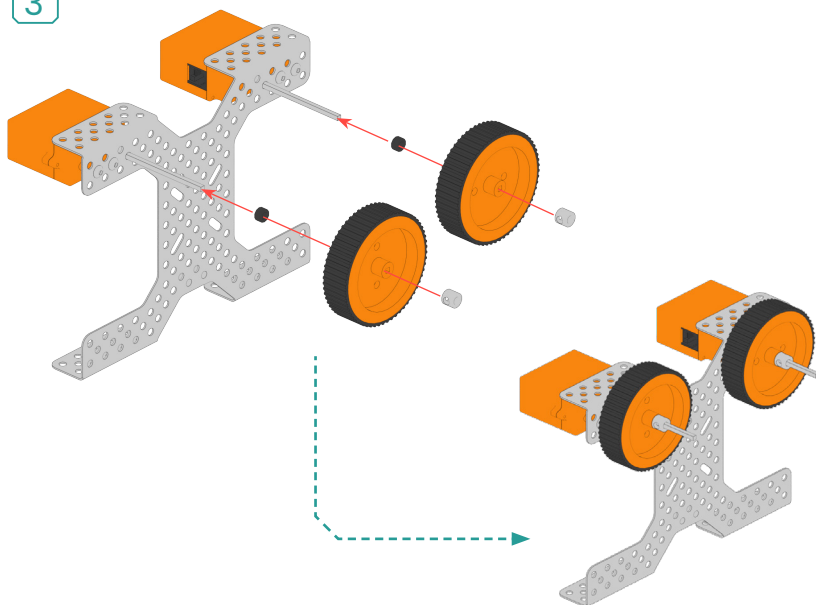
1



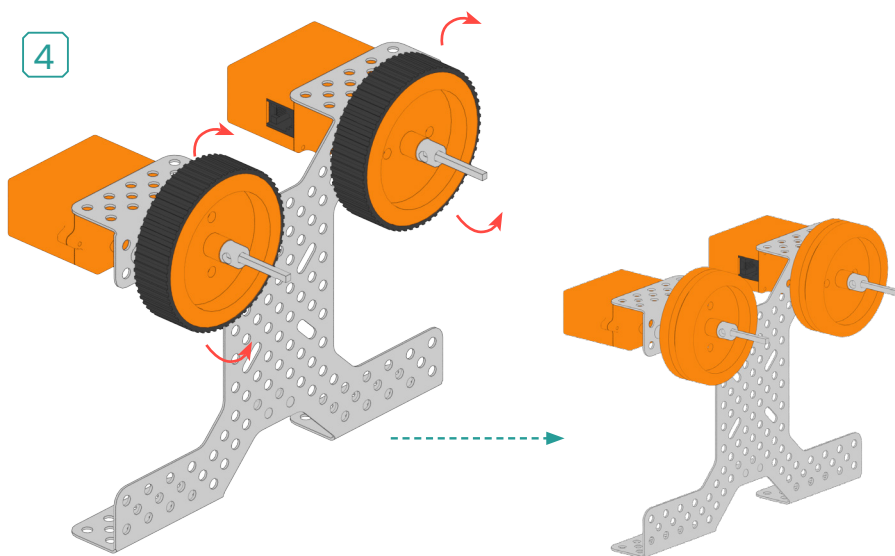
2



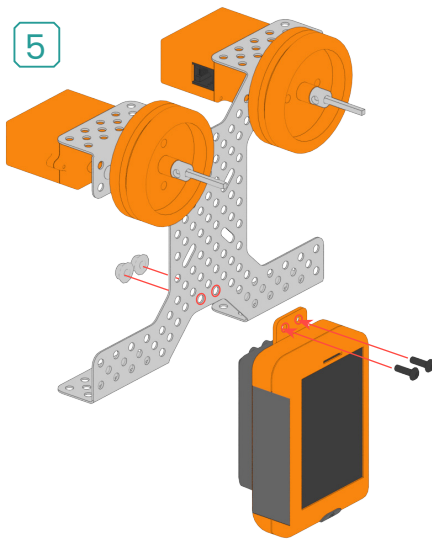
3



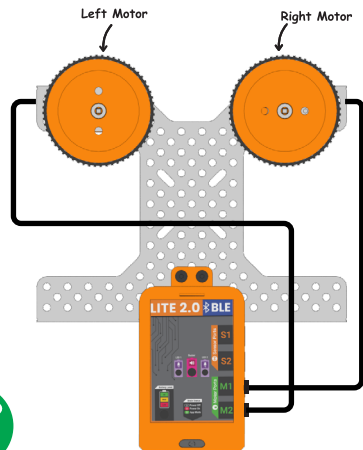
4



5



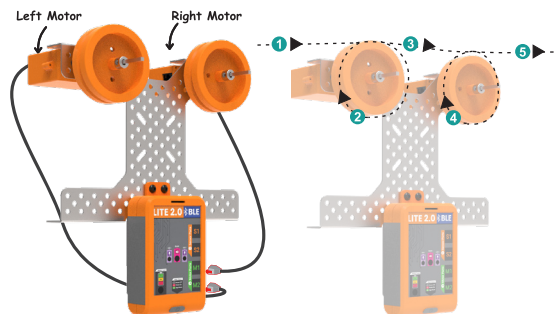
- Connect Left Motor to M2.
- Connect Right motor to M1.



Your bot is now ready!

Let's Play

Go to Pg 16 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 mobile app?

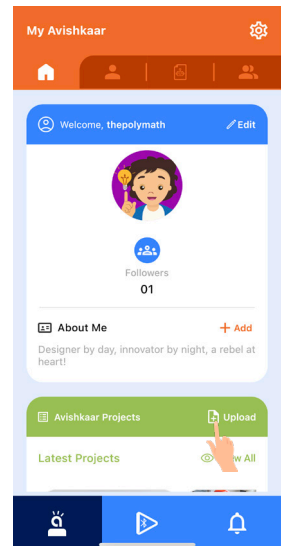
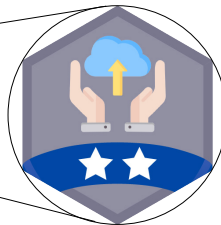
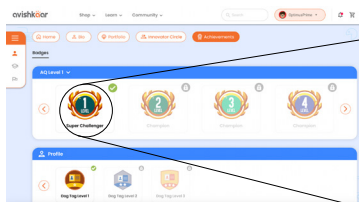
Go to Pg 16 about the detailed instructions on how to download the app and control your bot using it.



Share your Creation with the World and Win the 'Scratch the Surface' Level 2 Badge

Upload photos or videos of your project using the project section of the Avishkaar App to progress towards winning the 'Scratch the Surface' Level 2 Badge.

See all your collected badges in the achievement section of your profile on www.avishkaar.cc. Explore all other badges to be collected and win them all!



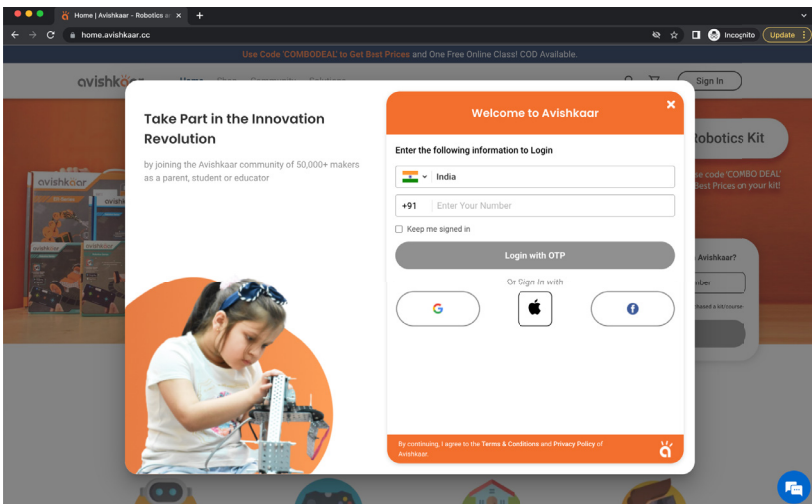
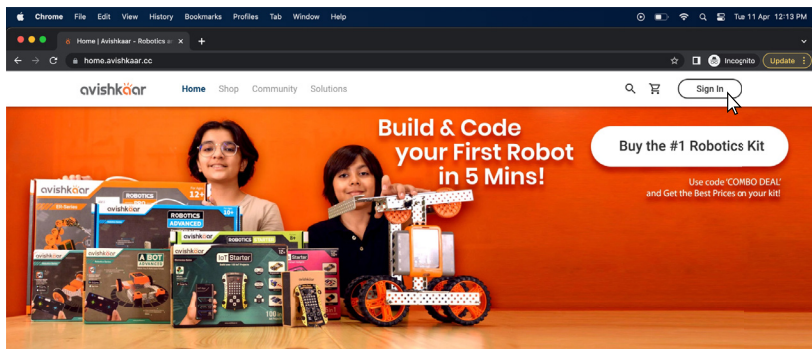
Control Method 2: AMS Setup

Using Online AMS

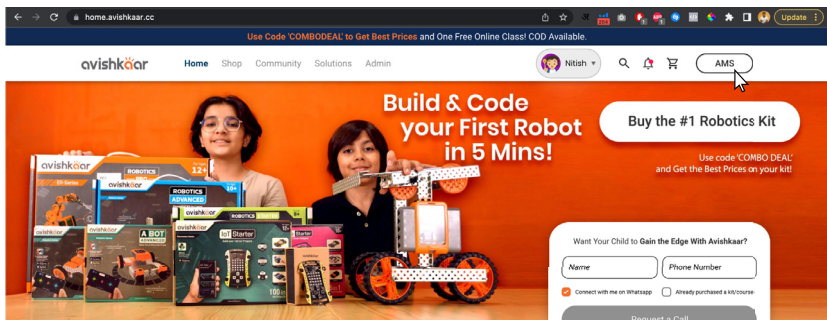
Avishkaar Maker Studio (AMS) is an integrated development environment to program **Robotics LITE 2.0 Brain** for your kit.



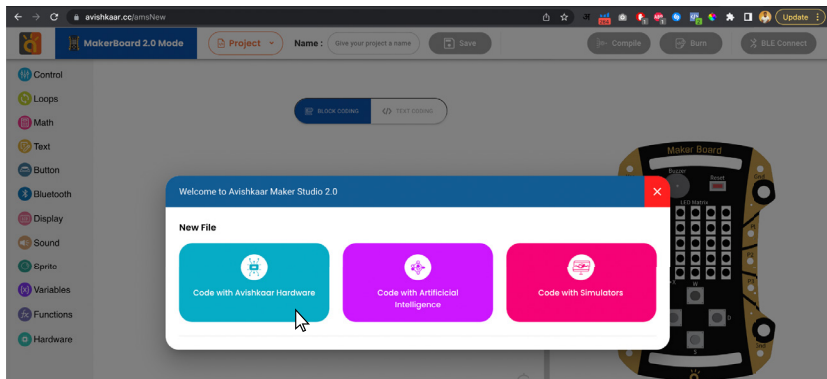
- 1 Open Avishkaar.cc and sign up/ login by clicking on the button on the top right.



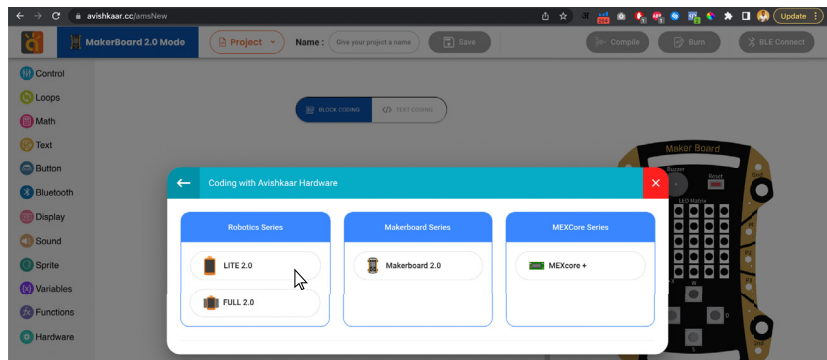
- 2 Open AMS Online by clicking on the button on the top right.



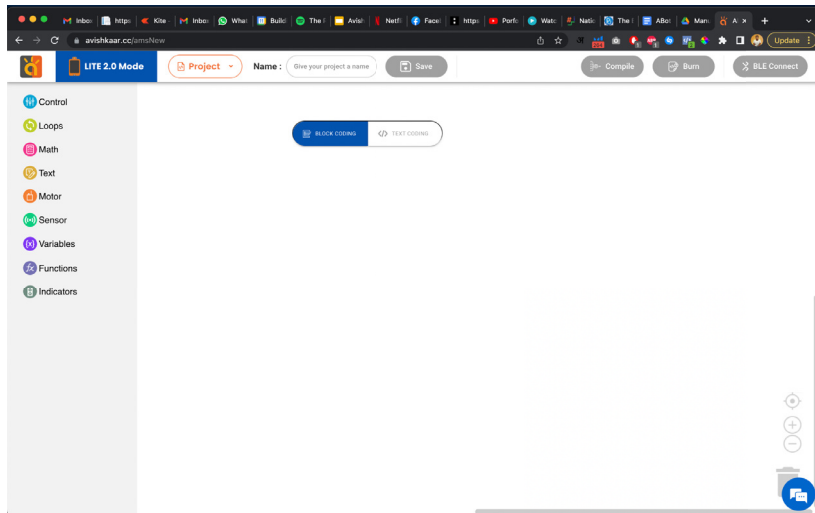
- 3 Create a Program using the 'Code with Avishkaar Hardware'.



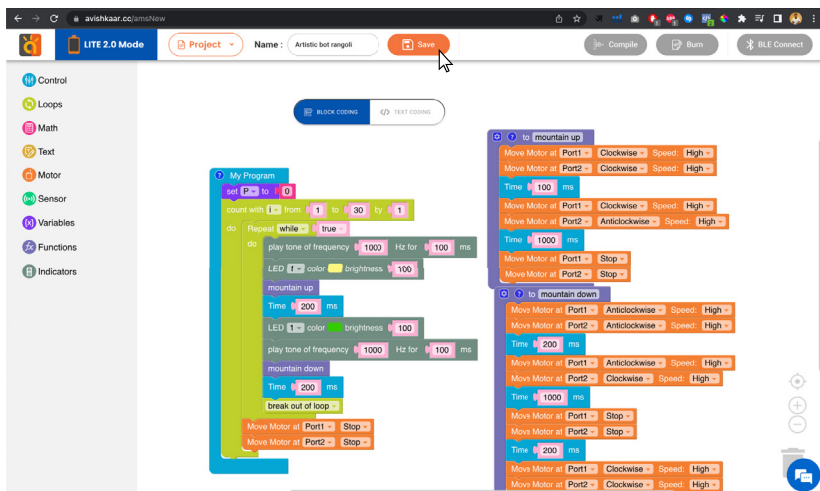
- 4 Select LITE 2.0 brain here.



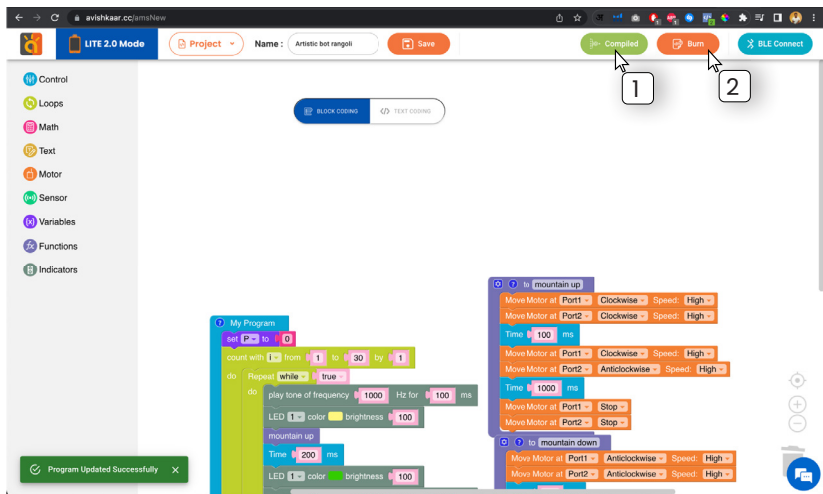
5 Write the project specific code in this space.



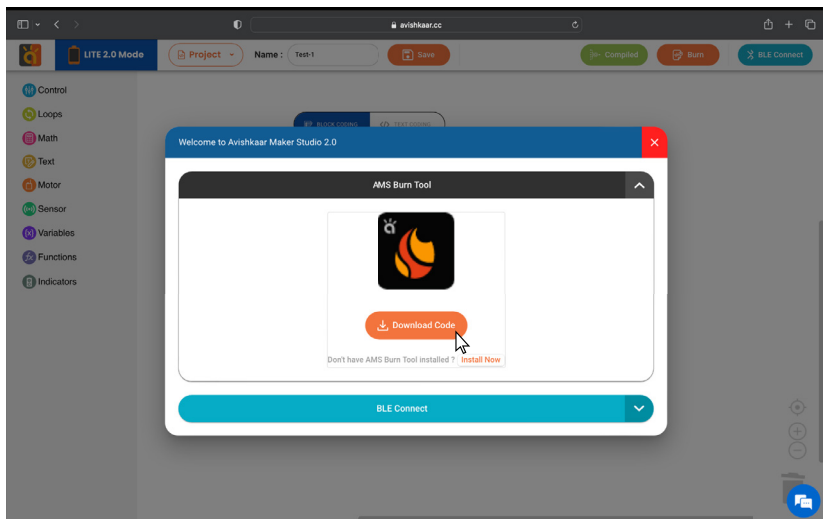
Give your code a name and click on 'Save'.



7 After saving, click on 'Compile' and then 'Burn'.



8 Download the code using the 'Download Code' button.

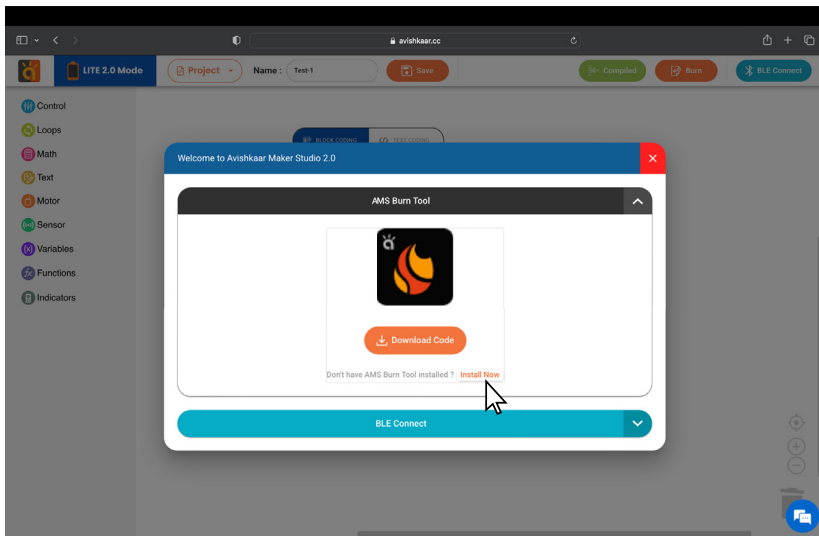


Burning the code on the brain using offline ABT with the USB cable.

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

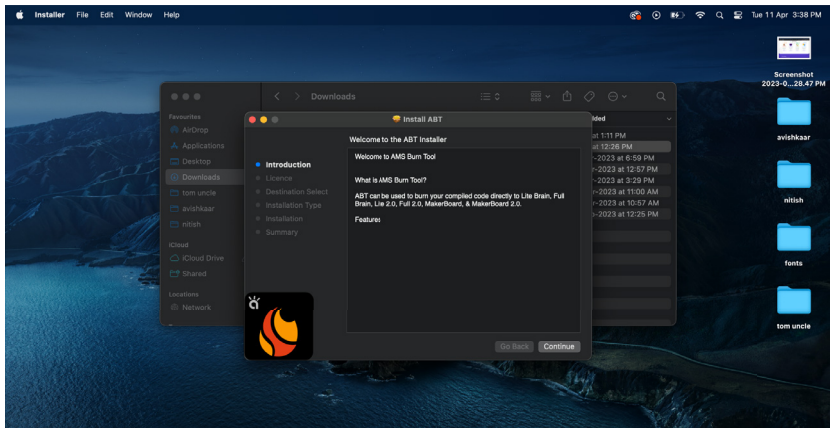


- 9 Download offline ABT using the 'Install Now' button.

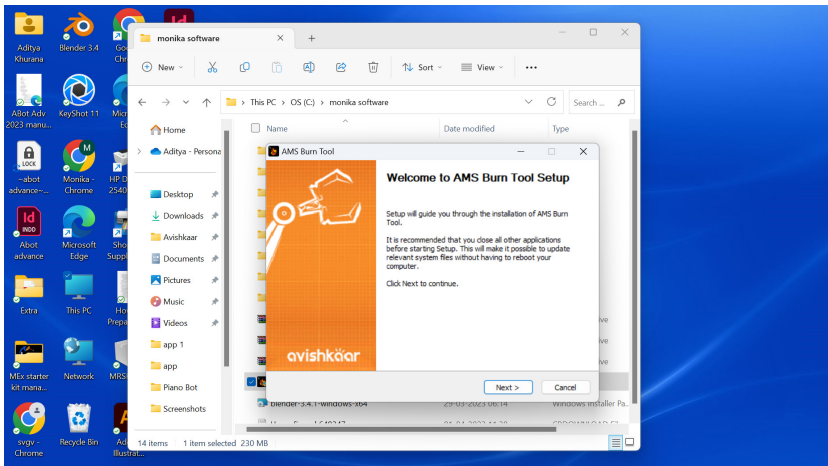


10

Open the downloaded setup file and install on your computer.



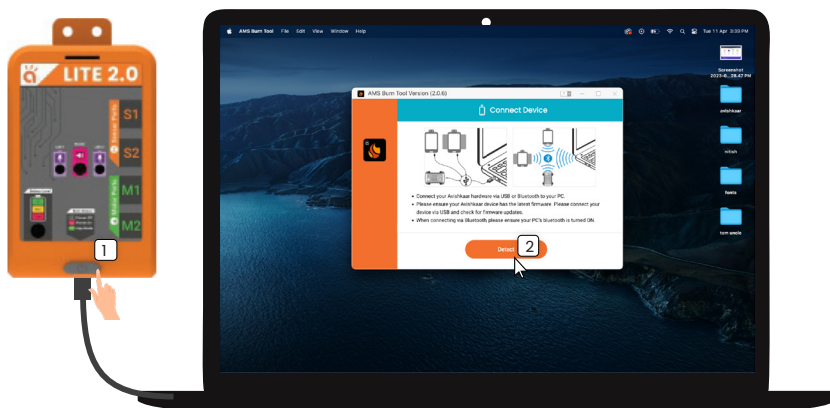
Installation on MacOS.



Installation on Windows.

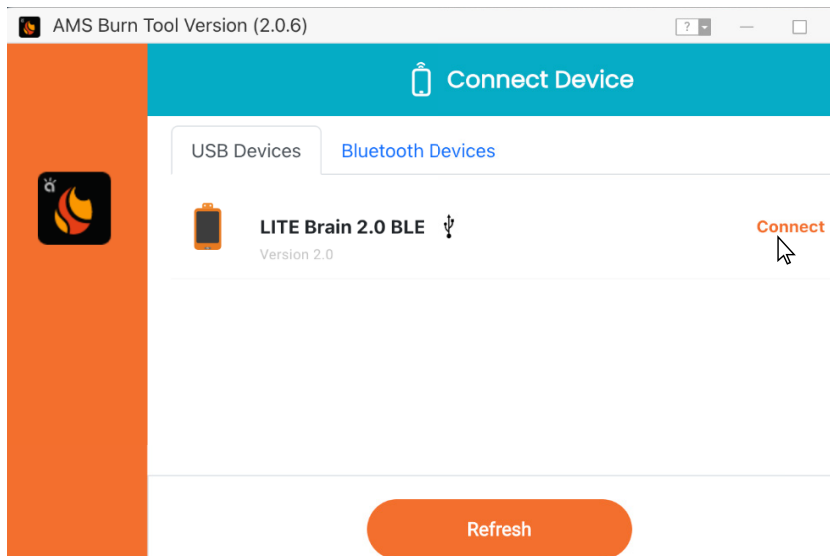
11

Connect the LITE 2.0 brain to your computer using the USB cable. Open the AMS Burn Tool (ABT) on your computer and click on the 'Detect' button.



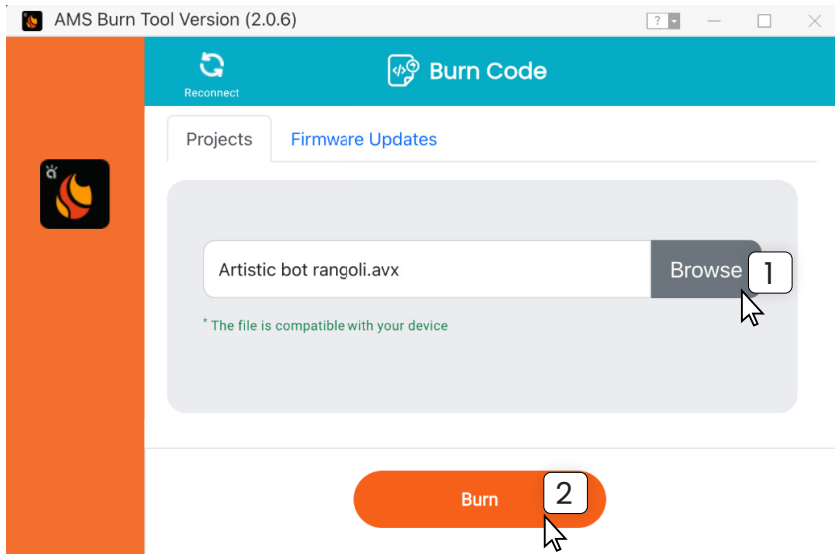
12

Click on the 'Connect' button.



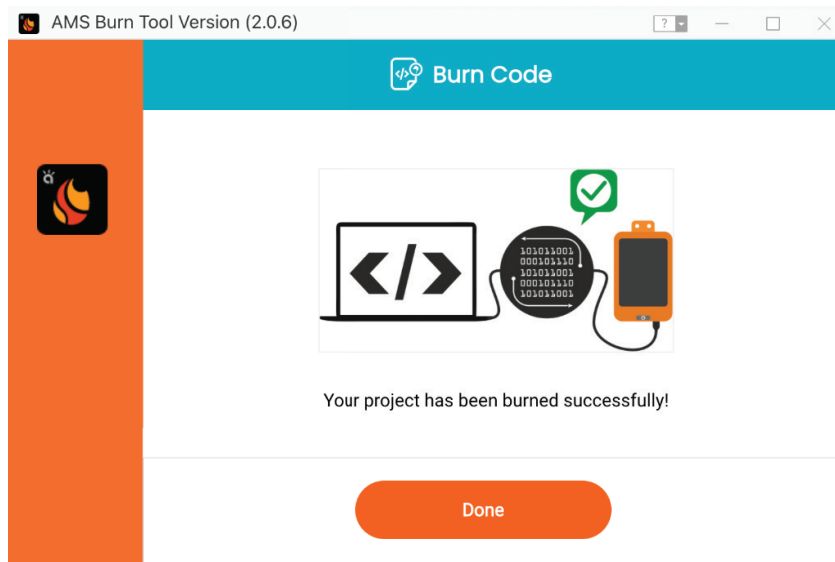
13

Once the device is connected, click on 'Browse' and select the downloaded code from online AMS that you wish to burn, and then click on 'Burn'



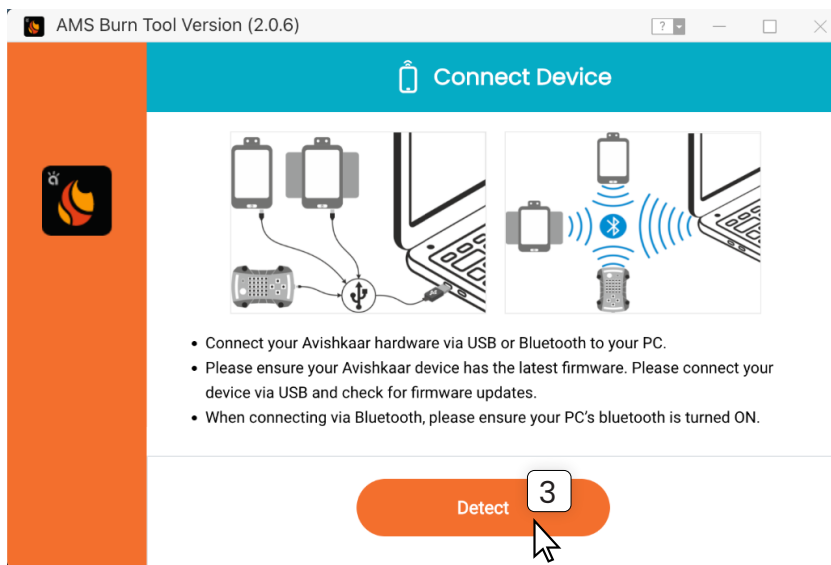
14

Once the code is burned successfully - you can unplug the brain. And that's it - your bot is ready to play around with!



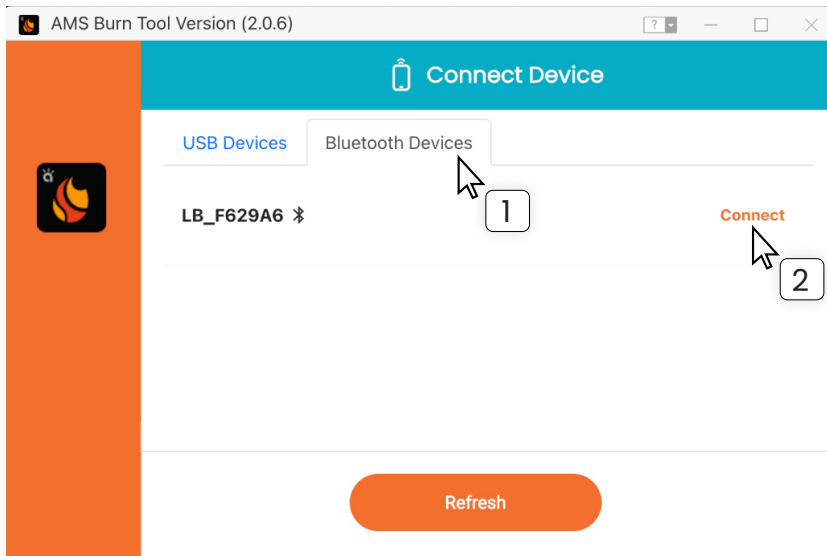
Burning the code on the brain using offline ABT over the air with BLE (blueooth)

- 15 Ensure the battery is plugged in the brain and turn ON the LITE 2.0 brain. Open the AMS Burn Tool (ABT) on your computer and click on the 'Detect' button.



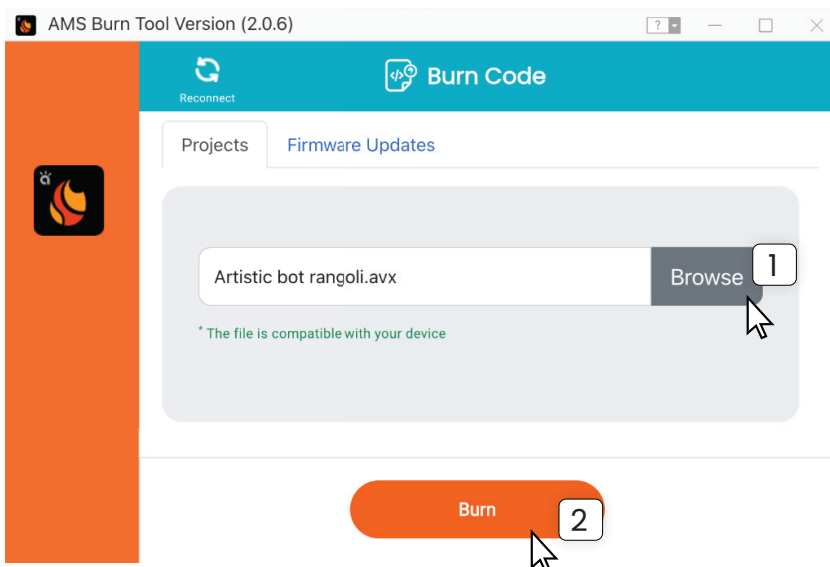
16

Navigate to the 'Bluetooth Devices' tab and click on the 'Connect' button to establish a bluetooth connection with the detected brain.



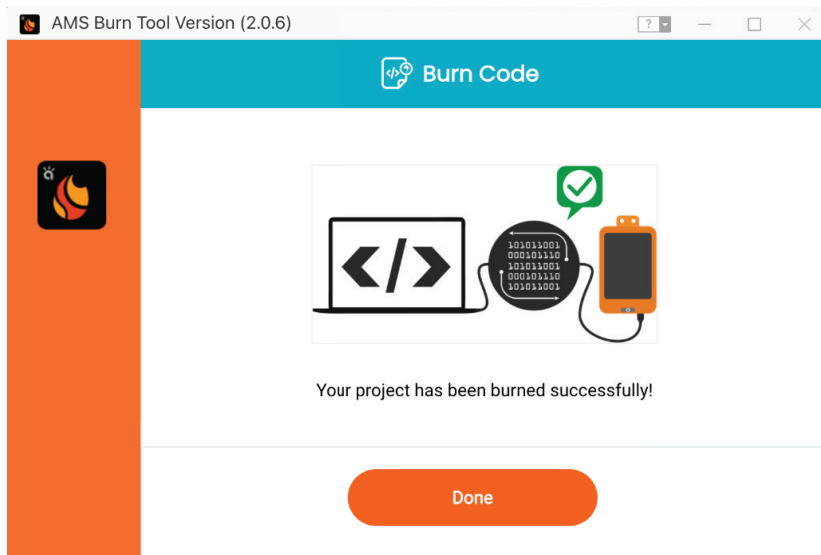
17

Once the device is connected, click on 'Browse' and select the downloaded code from online AMS that you wish to burn, and then click on 'Burn'.

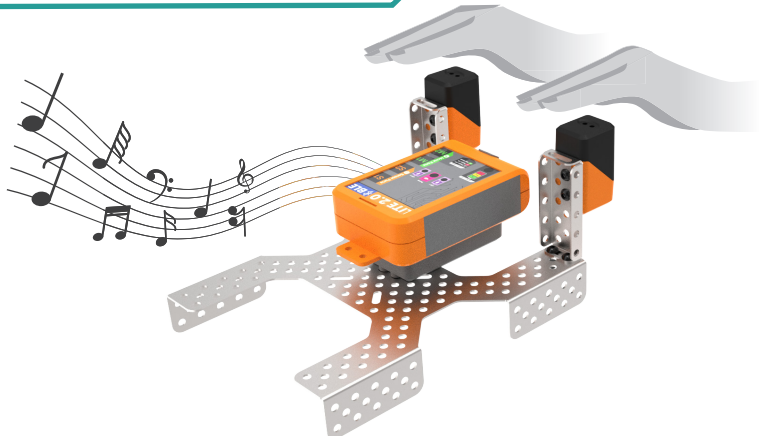


18

Once the code is burned successfully - you can unplug the brain. And that's it - your bot is ready to play around with!



Project 3: Piano Bot



Things we need



BLE LITE 2.0
Brain x 1



IR Sensors
x 2



Connecting
Cables x 2



Programming
Cables x 1



Avishkaar
Battery x 1



Avishkaar
Charger x 1



2.5" U-Beam
x 2



Chassis x 1



Allen key x 1



Spanner x 1



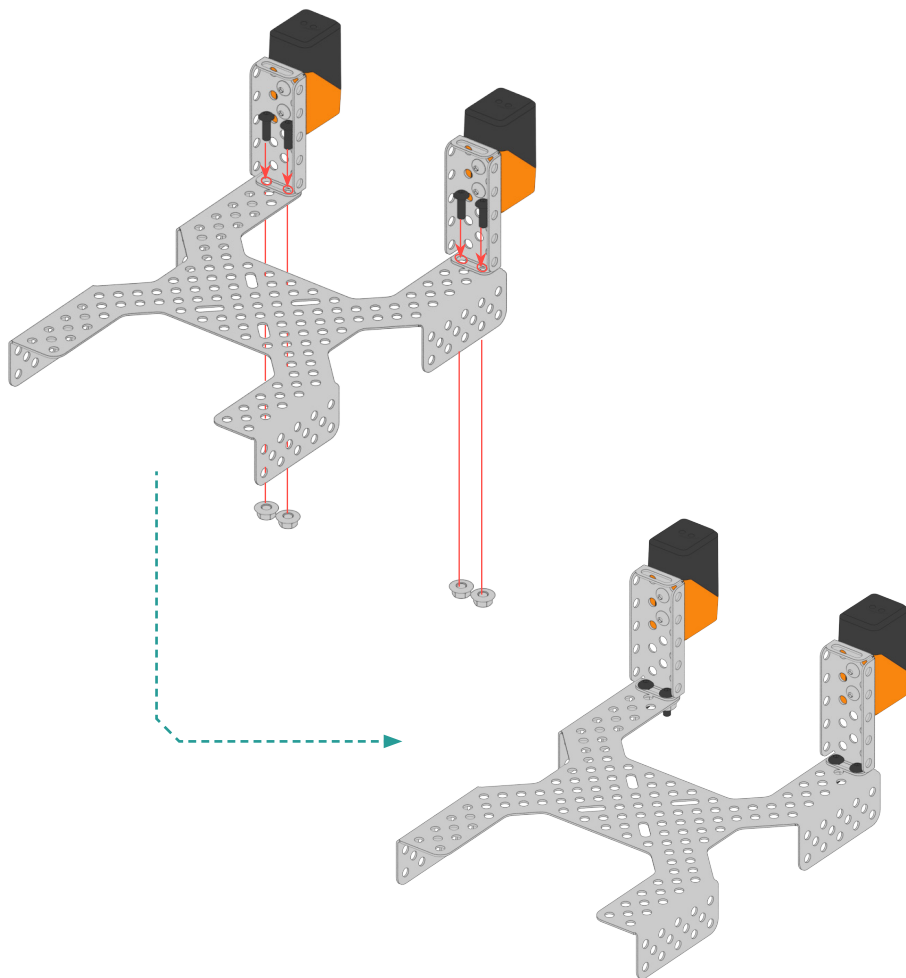
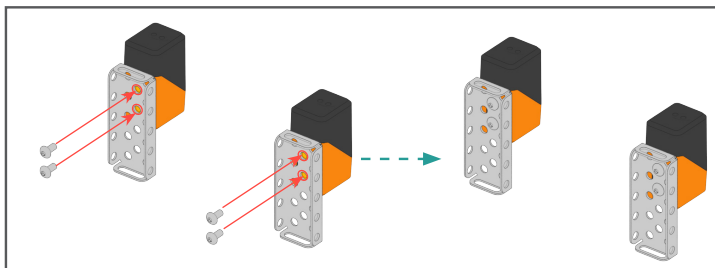
12 mm Bolts
& K-Nuts x 4

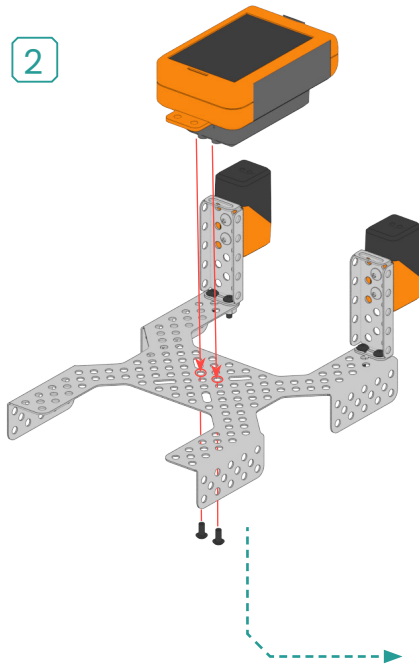


6mm
Bolts x 6

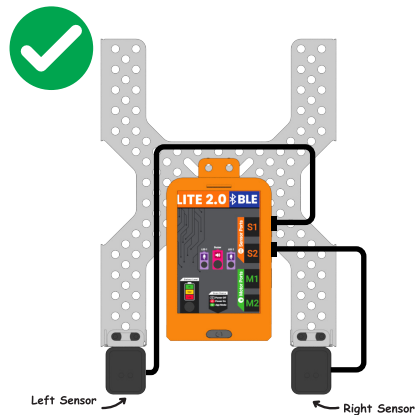
Let's Build!

1





- Connect Left Sensor to S1.
- Connect Right Sensor to S2.

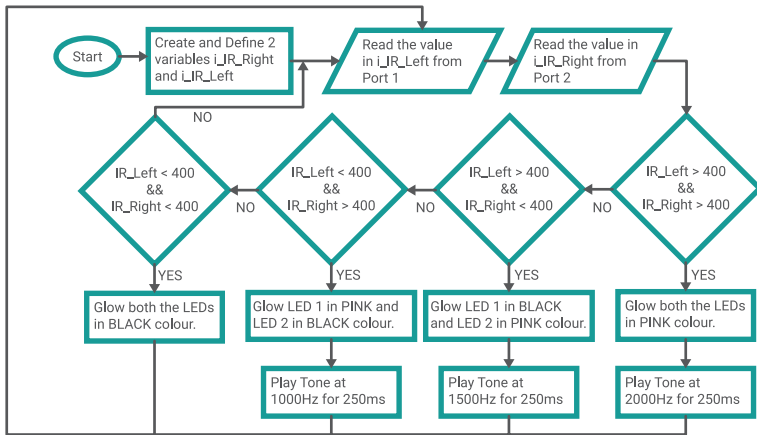


Your bot is now ready!

Understanding the Algorithm

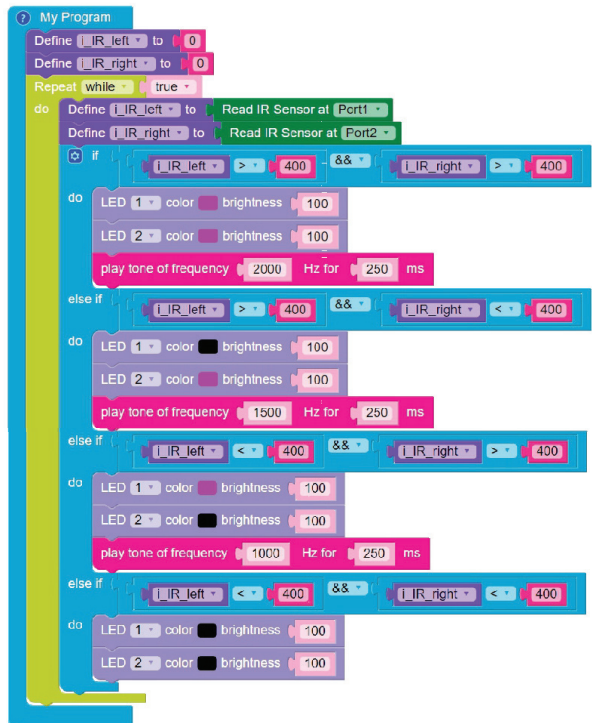
- Begin by defining the 2 variables, one for left IR sensor and one for right IR sensor.
- Read the values in them from Port 1 and Port 2 to which both the sensors are attached.
- Now, check which sensor detects a press on it by values read. if the value read is greater than 400 then that means the sensor detects and if the value is less than 400 that means nothing is detected.
- Based on the values read LEDs will glow in different colors and play beep sound. Continuous change in values and changing beep frequency gives a feel that piano is being played.

Logic Flowchart



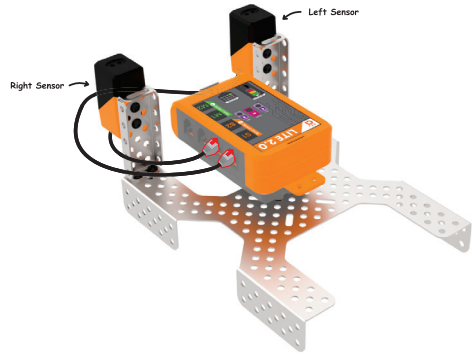
Let's Code!

Go to Pg 16 to write the code below on online AMS and use offline ABT to burn the code on the LITE 2.0 brain

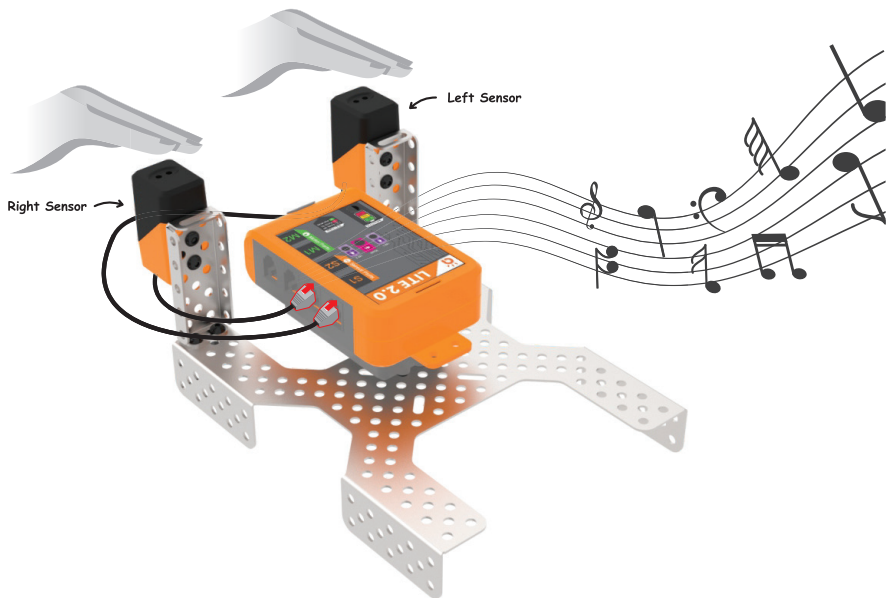


Let's Play

- Connect the Left Sensor to S1
- Connect the Right Sensor to S2
- Turn ON the Brain



How to Play



Congratulations on Completing this Project!

Excited to play with it using the avishkaar mobile app?

Go to Pg 16 about the detailed instructions on how to download the app and control your bot using it.

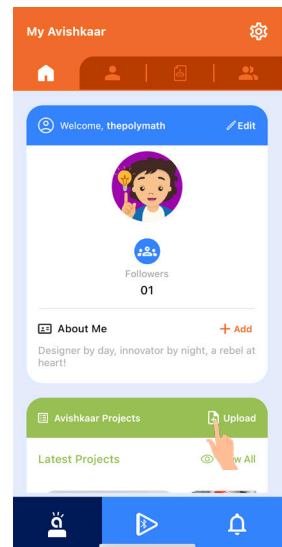
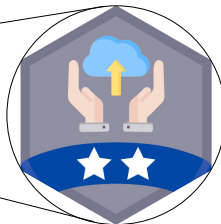
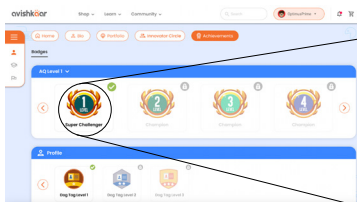


Share your Creation with the World and Win the 'Scratch the Surface' Level 2 Badge

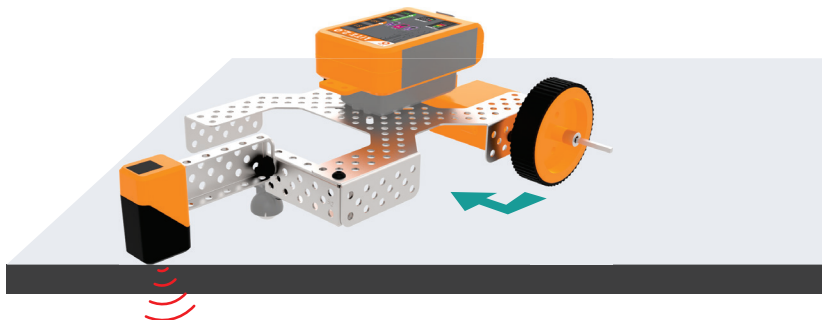
Upload photos or videos of your project using the project section of the Avishkaar App to win the 'Scratch the Surface' Level 2 Badge.

See all your collected badges in the achievement section of your profile on www.avishkaar.cc.

Explore all other badges to be collected and win them all!



Project 4: Edge Avider



Things we need



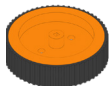
BLE LITE 2.0
Brain x 1



IR Sensors
x 1



High Speed
Motors x 2



Wheels x 2



Connecting
Cables x 3



Programming
Cables x 1



Avishkaar
Battery x 1



Avishkaar
Charger x 1



2.5" U-Beam
x 2



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 4



6mm
Bolts x 7



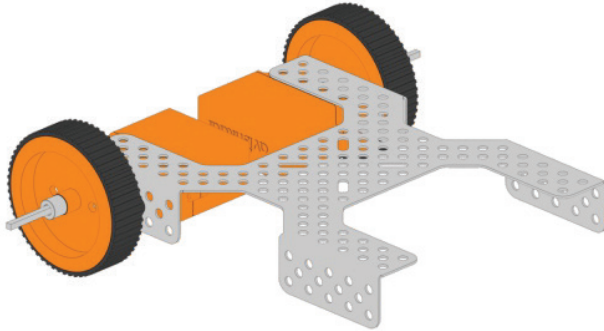
Filler x 2



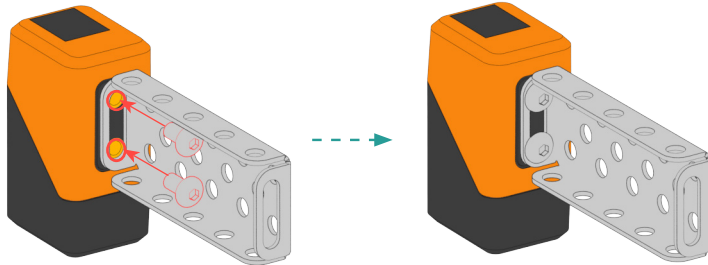
Axle Lock x 4

Let's Build!

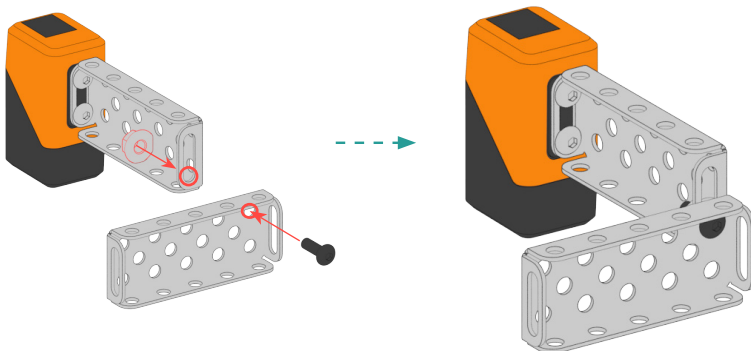
- 1 Refer to RC Car from step 1 to 3 on page no.23.your model should look like this.



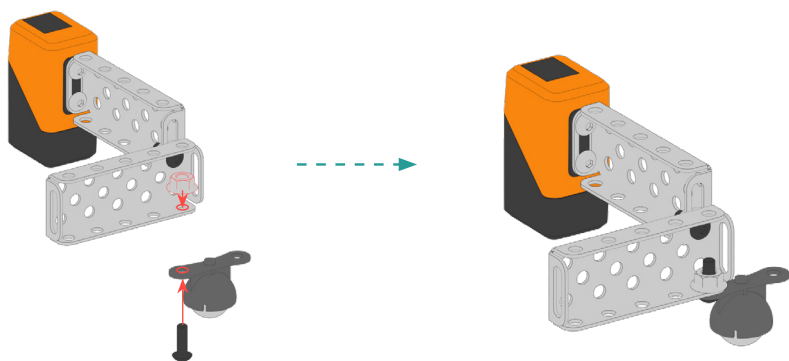
2



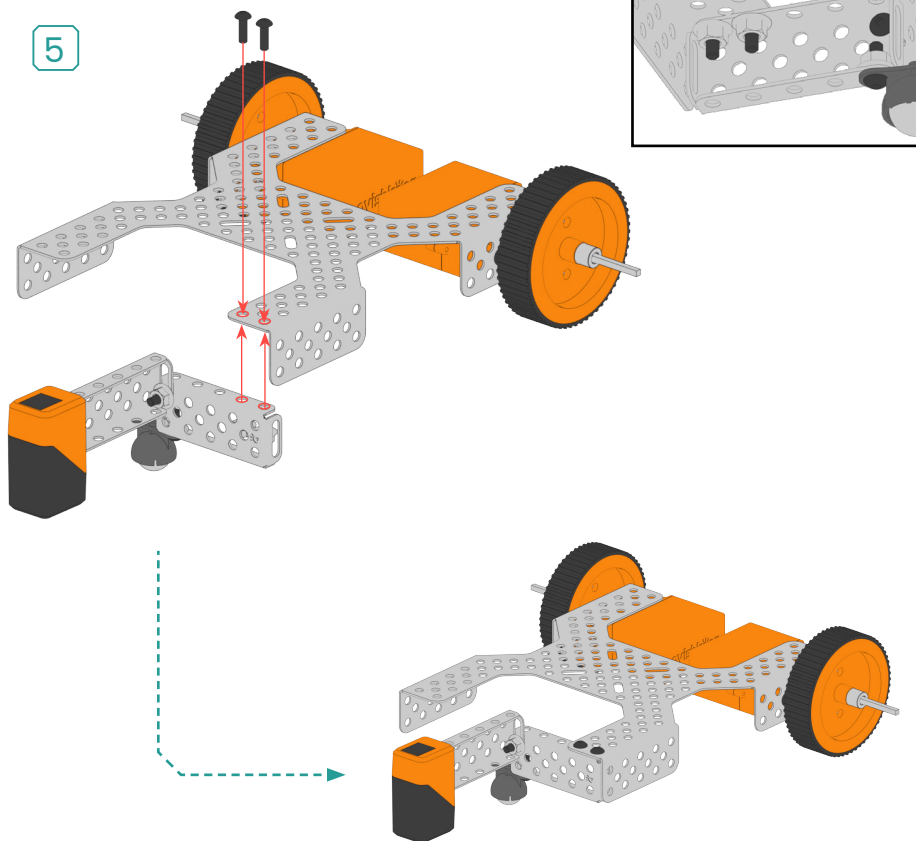
3



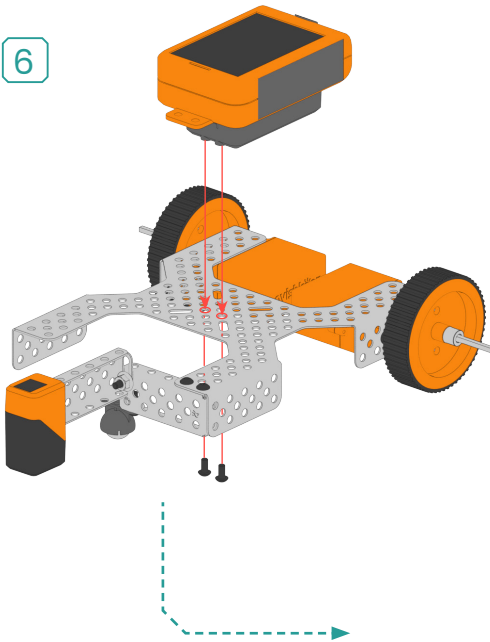
4



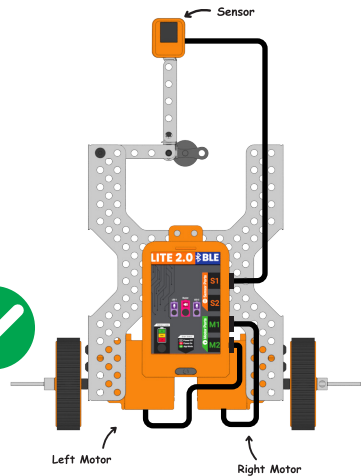
5



6



- Connect Left Motor to M2.
- Connect Right Motor to M1.
- Connect the IR Sensor to S1.

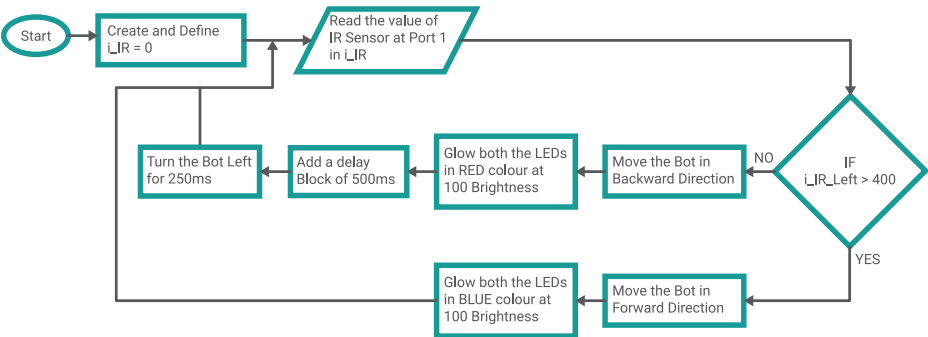


Your bot is now ready!

Understanding the Algorithm

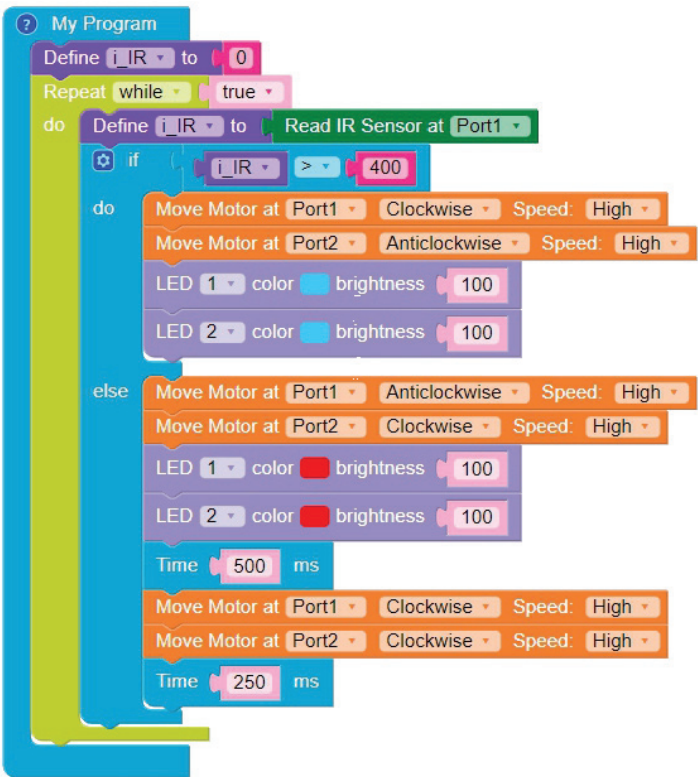
- Declare the variable for IR sensor.
- If the value read is less than or equal to 400, that means we have reached the edge of the table. Therefore
 - Make the bot move backward.
 - Glow LEDs in Red color and Turn the bot Left after a delay of 0.05 sec.
- If the value read is greater than 400, that means there is a table and we can move forward, with blue color LEDs wrong.
- This will keep repeating until the brain is switched OFF.

Logic Flowchart



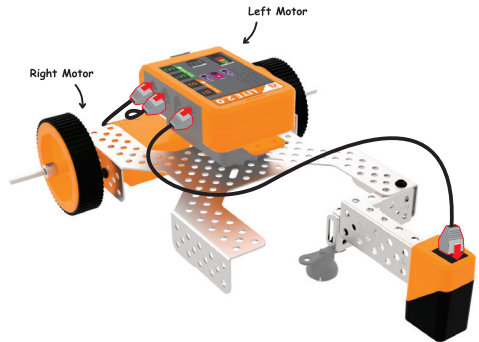
Let's Code!

Go to Pg 16 to write the code below on online AMS and use offline ABT to burn the code on the LITE 2.0 brain

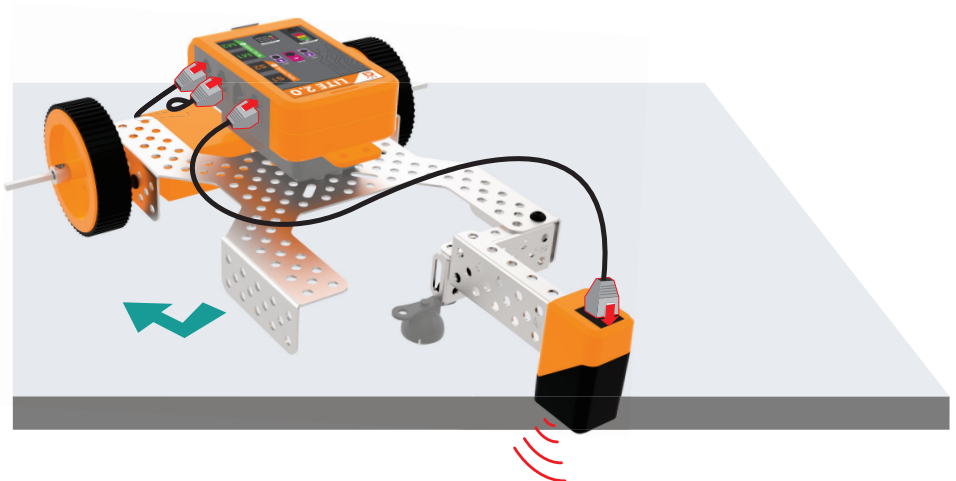


Let's Play

- Connect the Left Motor to M1
- Connect the Right Motor to M2
- Connect the IR Sensor to S1
- Turn ON the Brain



How to Play



Congratulations on Completing this Project!

Excited to play with it using the avishkaar mobile app?

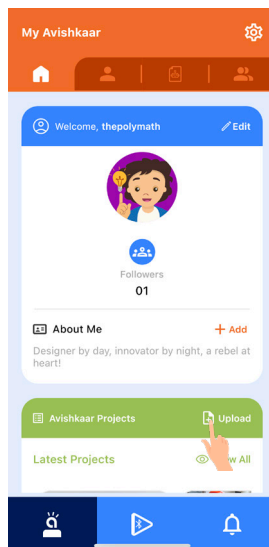
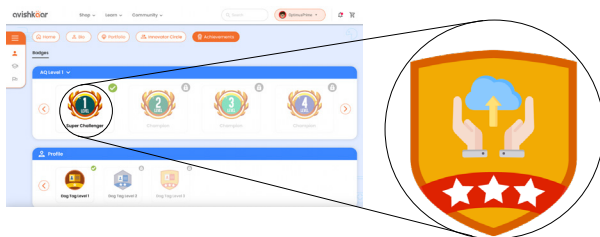
Go to Pg 16 about the detailed instructions on how to download the app and control your bot using it.



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

Upload photos or videos of your project using the project section of the Avishkaar App to progress towards winning the 'Scratch the Surface' Level 3 Badge

See all your collected badges in the achievement section of your profile on www.avishkaar.cc. Explore all other badges to be collected and win them all!



Project 5: Touch Dancer



Things we need



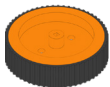
BLE LITE 2.0
Brain x 1



Touch
Sensors x 1



High Speed
Motors x 2



Wheels x 2



Connecting
Cables x 2



Programming
Cables x 1



Avishkaar
Battery x 1



Avishkaar
Charger x 1



2.5" U-Beam
x 2



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 4



6mm
Bolts x 6



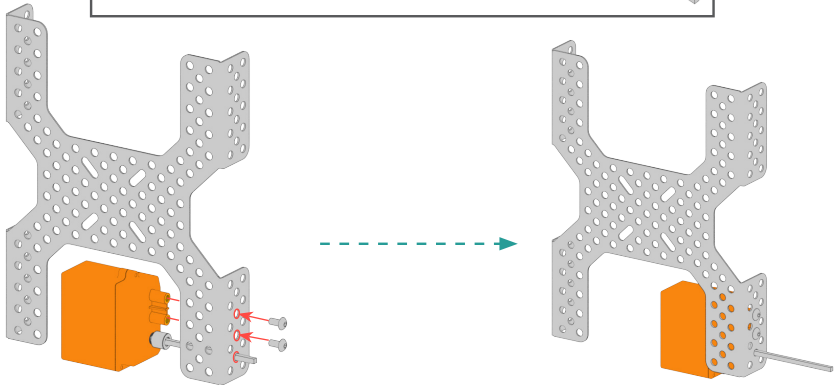
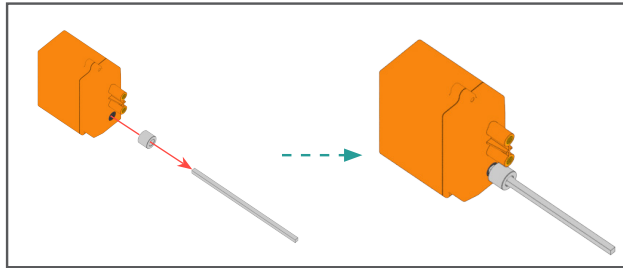
Filler x 10



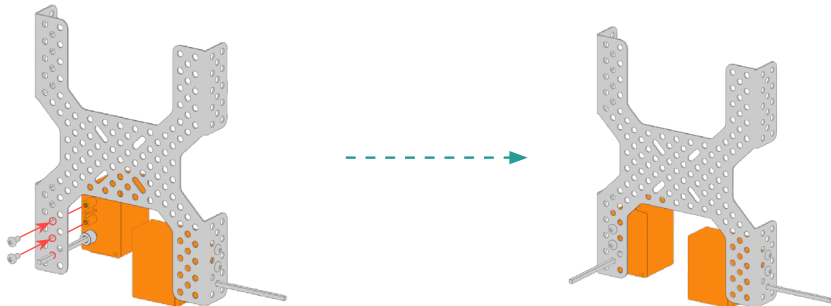
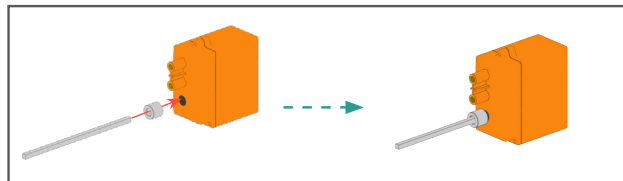
Axle Lock x 4

Let's Build!

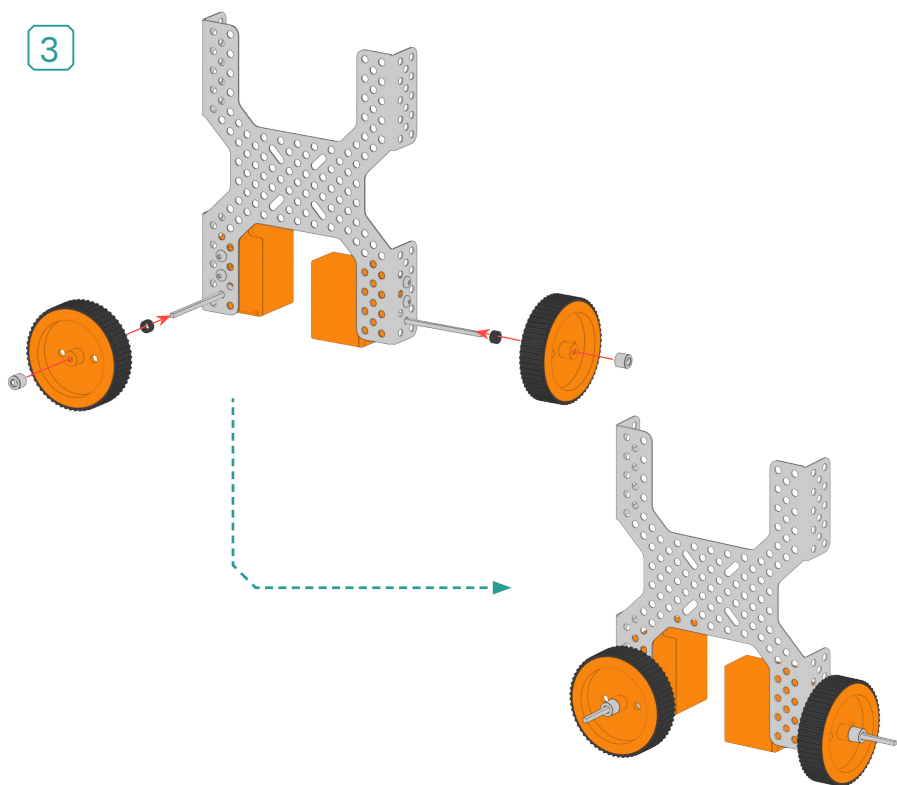
1



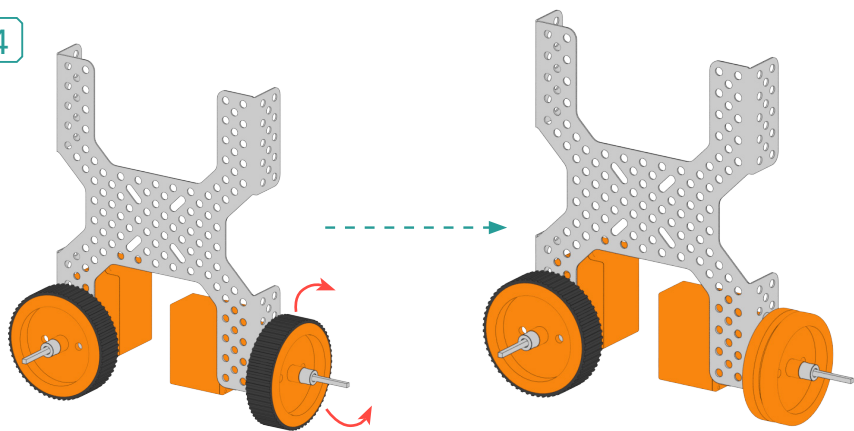
2



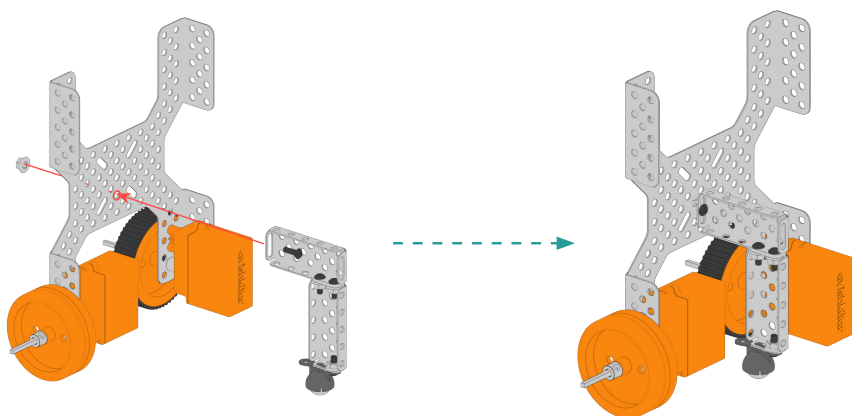
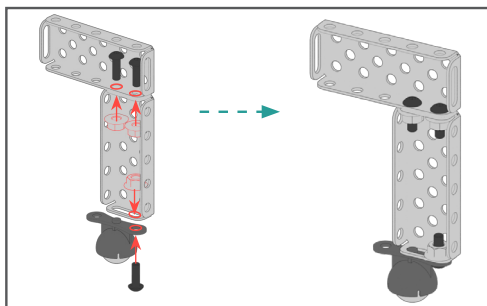
3



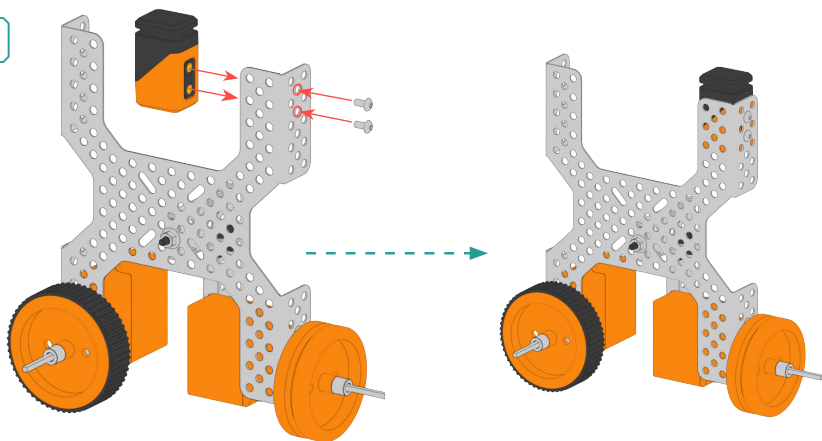
4



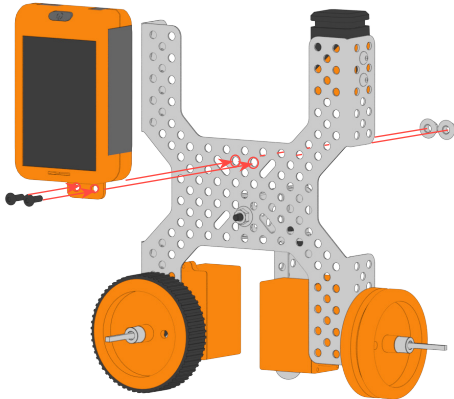
5



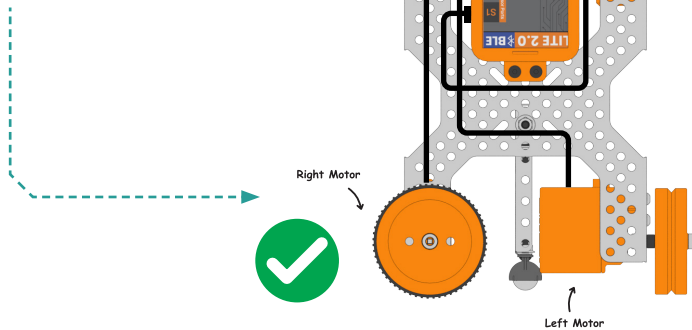
6



7



- Connect Left Motor to M2.
- Connect Right Motor to M1.
- Connect the Touch Sensor to S1.

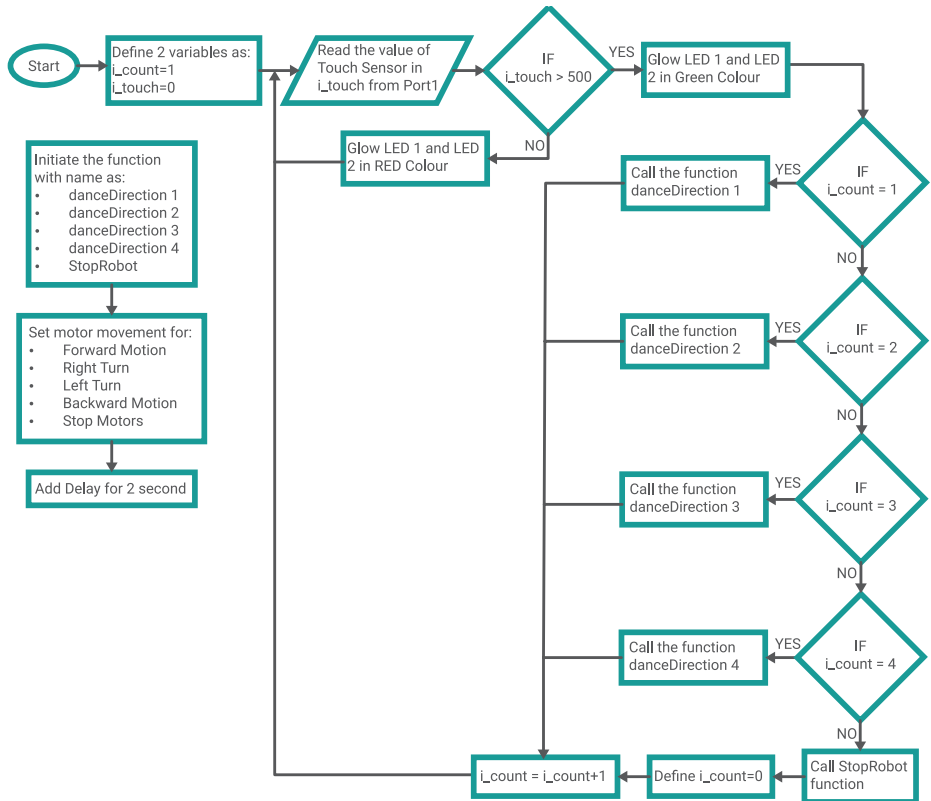


Your bot is now ready!

Understanding the Algorithm

- Define two variables, one for touch sensor and another for count.
- Now, if the sensor's value read is greater than 500 then glow LEDs in green and begin the count by 1 to 4.
- Now, check for the count variable and if the value is Less than equal to 4 can a function be defined as a dance movement.
- On the other side, define all the dance movement functions for the forward, Backward, Left, Right and Stop.

Logic Flowchart



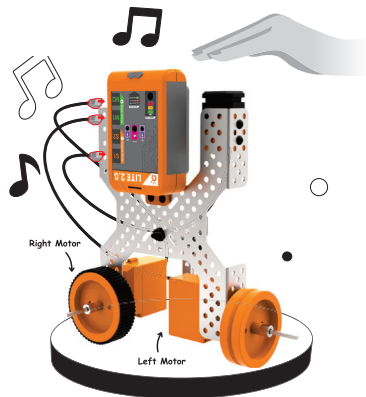
Let's Code!

Go to Pg 16 to write the code below on online AMS and use offline ABT to burn the code on the LITE 2.0 brain



Let's Play

- Connect the Left Motor to M2
- Connect the Right Motor to M1
- Connect the Touch Sensor to S1
- Turn ON the Brain



Congratulations on Completing this Project!

Excited to play with it using the avishkaar mobile app?

Go to Pg 16 about the detailed instructions on how to download the app and control your bot using it.

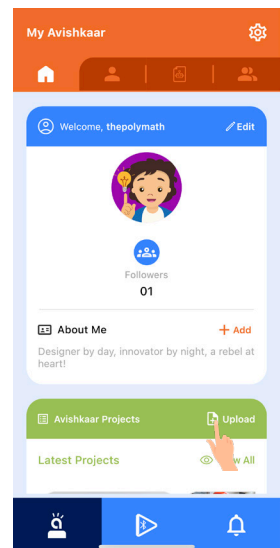
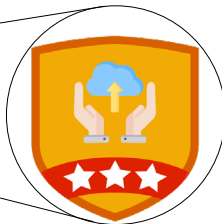
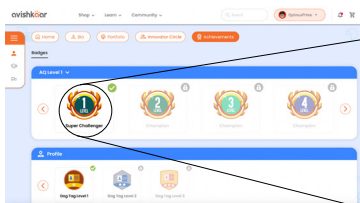


Share your Creation with the World and Win the 'Scratch the Surface' Level 3 Badge

Upload photos or videos of your project using the project section of the Avishkaar App to progress towards winning the 'Scratch the Surface' Level 3 Badge

See all your collected badges in the achievement section of your profile on www.avishkaar.cc.

Explore all other badges to be collected and win them all!



Project 6: Line Follower



Things we need



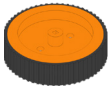
BLE LITE 2.0
Brain x 1



IR Sensors
x 2



High Speed
Motors x 2



Wheels x 2



Connecting
Cables x 4



Programming
Cables x 1



Avishkaar
Battery x 1



Avishkaar
Charger x 1



2.5" U-Beam
x 2



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 4



6mm
Bolts x 8



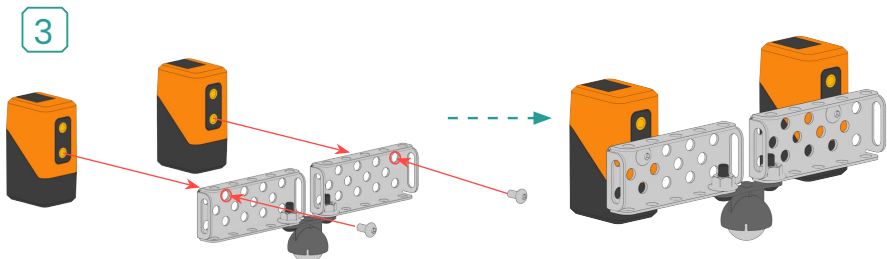
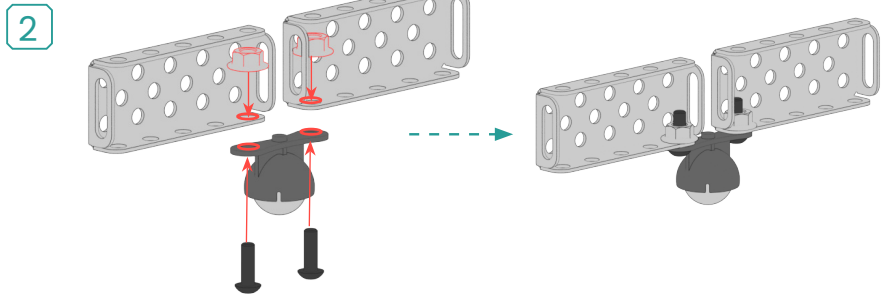
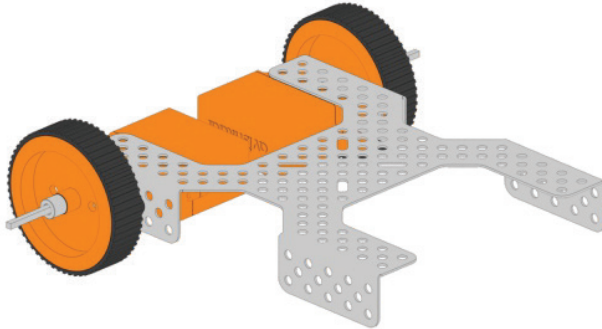
Filler x 2



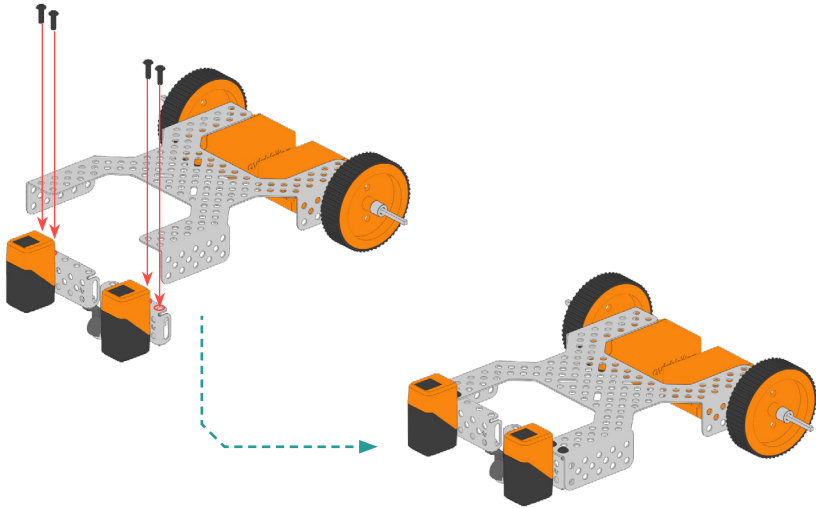
Axle Lock x 4

Let's Build!

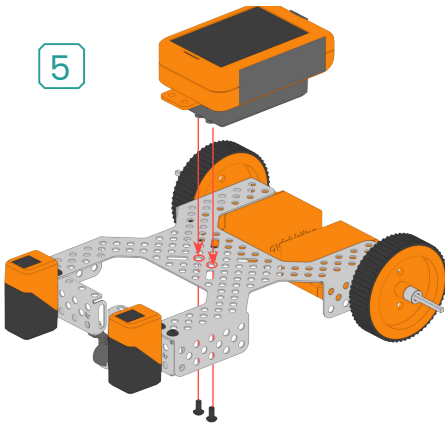
- 1 Refer to RC Car from step 1 to 3 on page no.23.your model should look like this.



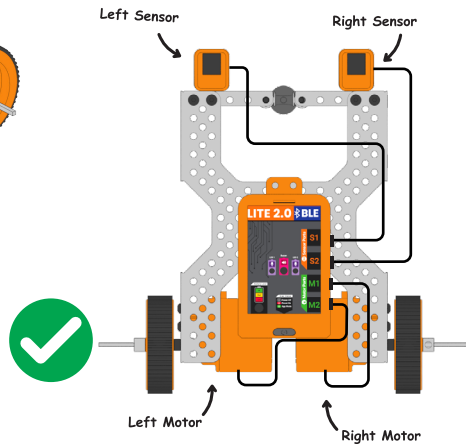
4



5



- Connect Left Motor to M2.
- Connect Right Motor to M1.
- Connect the Left IR Sensor to S1.
- Connect the Right IR Sensor to S2.

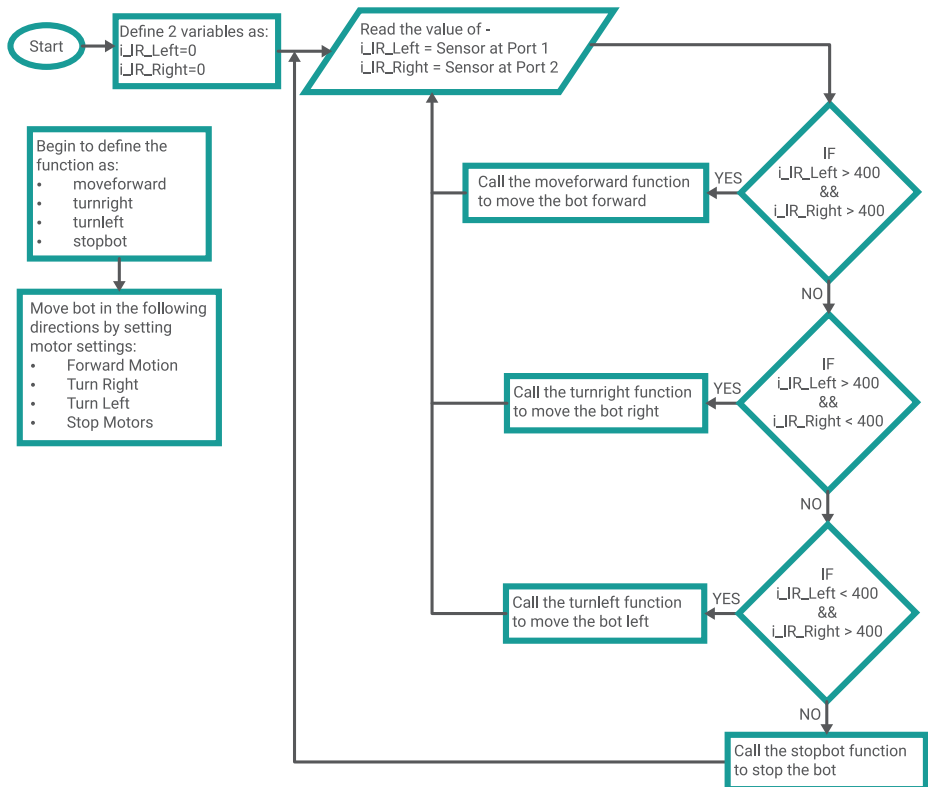


Your bot is now ready!

Understanding the Algorithm

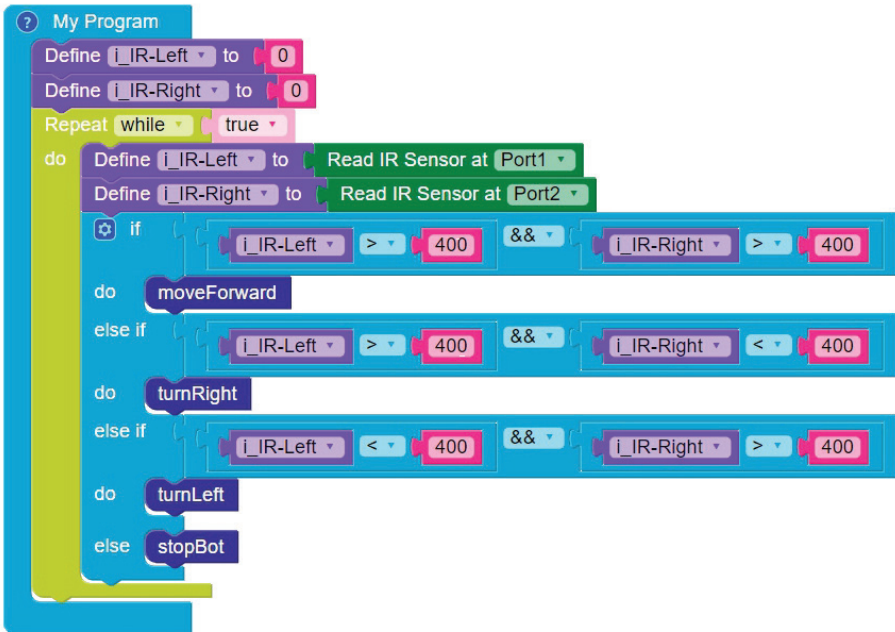
- Create and Define 2 variables for a Left Sensor and the Right Sensor.
- Check for the conditions and call the functions based on the values.
- Both Variables are greater than 400, that means there is a white colour at the bottom and therefore keep moving forward.
- Left is greater than 400 and Right is less than 400, therefore there is no white colour detected on the right sensor therefore turn right.
- Left is Less than 400 and Right is greater than 400, therefore there is no white colour detected on the left sensor therefore turn left.
- Lastly, in any other condition stop the bot.

Logic Flowchart



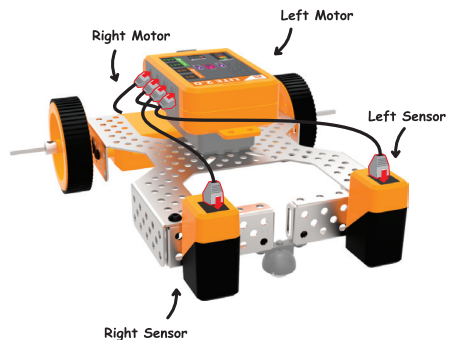
Let's Code!

Go to Pg 16 to write the code below on online AMS and use offline ABT to burn the code on the LITE 2.0 brain



Let's Play

- Connect the Left Motor to M2
- Connect the Right Motor to M1
- Connect the IR Sensor to S1
- Connect the IR Sensor to S2
- Turn ON the Brain



Congratulations on Completing this Project!

Excited to play with it using the avishkaar mobile app?

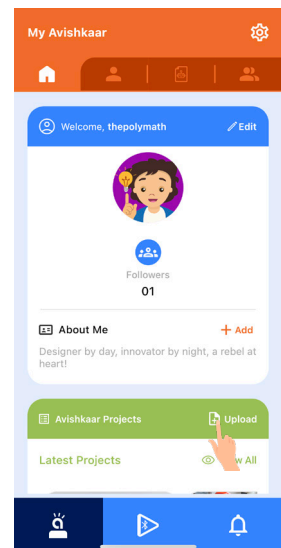
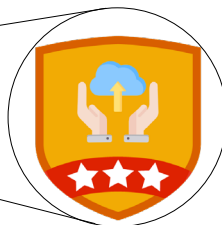
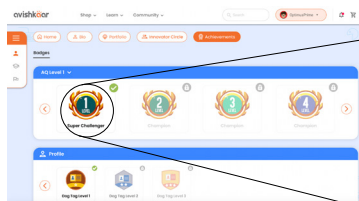
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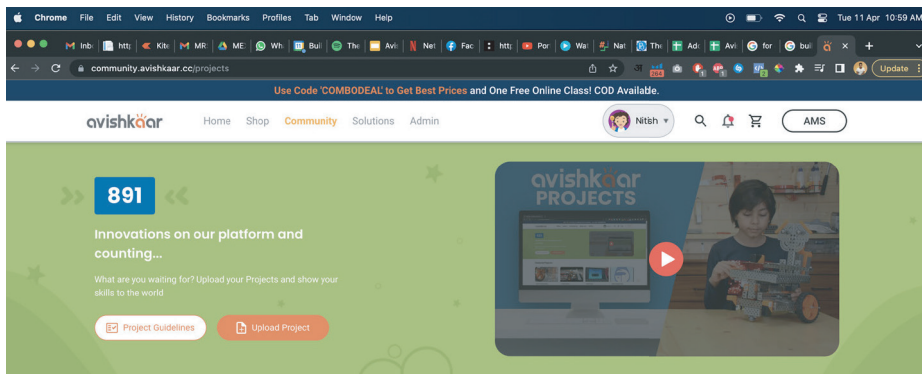
See all your collected badges in the achievement section of your profile on www.avishkaar.cc. Explore all other badges to be collected and win them all!



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 the projects page on avishkaar.cc website or the app - the best designs will get a chance to be showcased in the 'Featured Projects' section of the website and win the '30 Seconds of Fame' badge!



Avishkaar Makeathon 2022 Projects



SMART WIFI CAR

THIS IS A SMART WIFI CAR. THIS WORKS ON WIFI AND FOR THAT WE...



MR BOW No haste Zero Waste

This application is helpful in deciding what to do with your leftover food.



Robotic Hand

Robotic Hand using Arduino Uno, Servo and Bluetooth Module



Netra

Stage specific early detecting of Diabetes through fundus images of...



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.

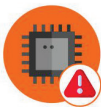


Check your structure is stable or not.

Facing an issue?



Software
Issues



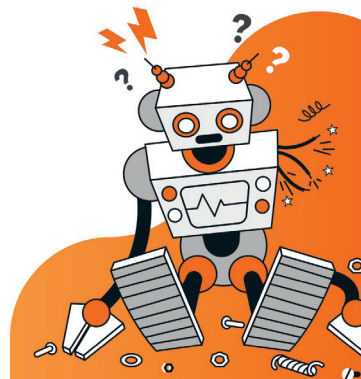
Hardware
Issues



Usability
Issues

Contact support by scanning the QR Code.

- support@avishkaar.cc
- +91-8506931515



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