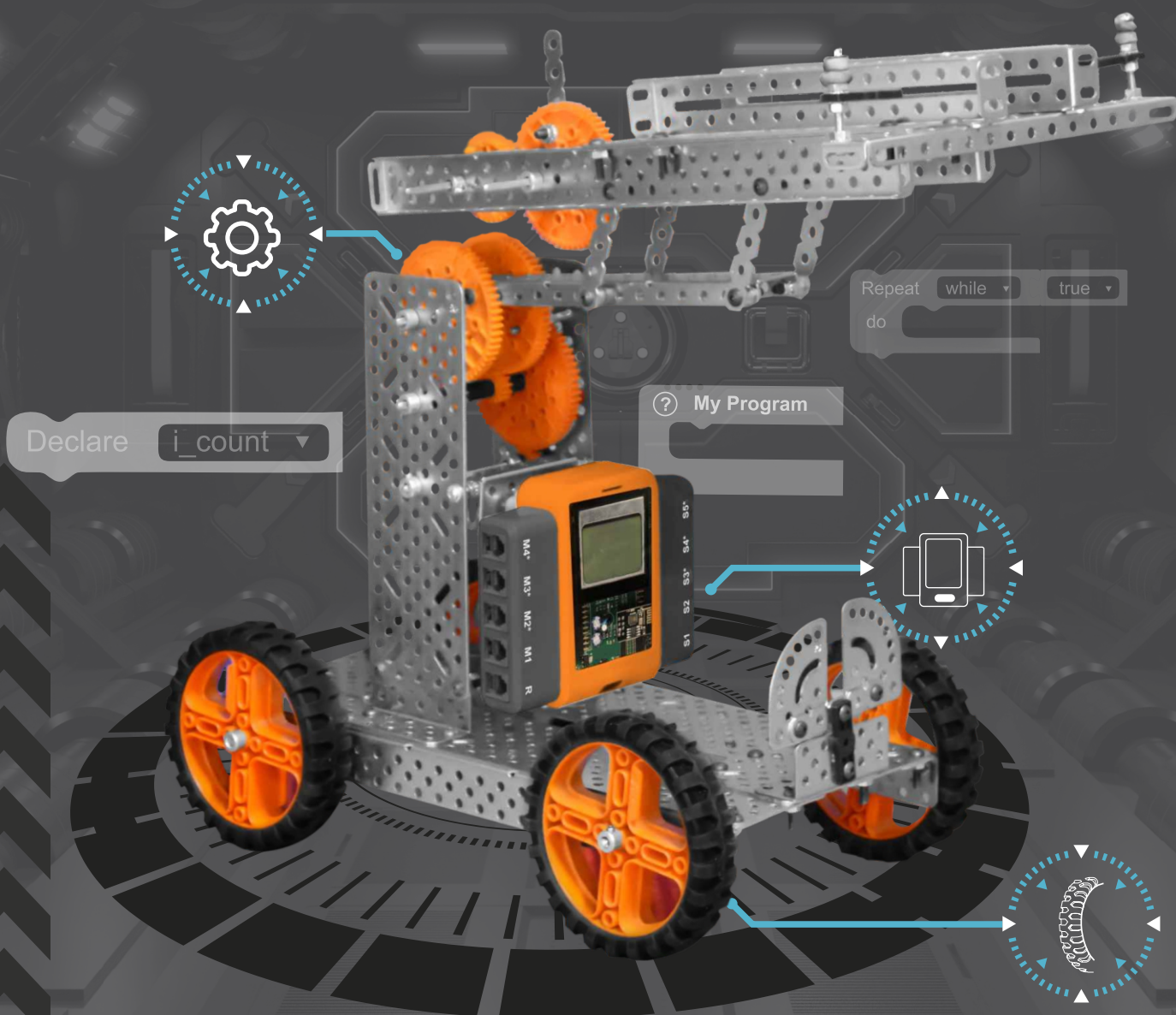
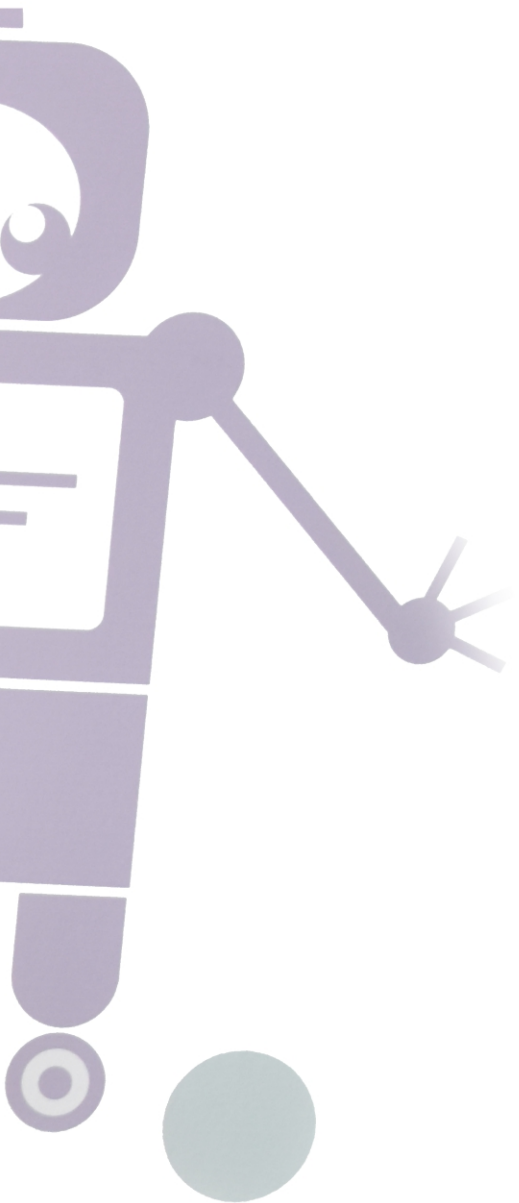




“I never dream
about success.
I work for it.”



Sneak Peak

Make The Most Of Your Kit 01

Armour Check?

Your programmable robotics system 03

Deep Dive Into Robotics

Turtle Robot 07

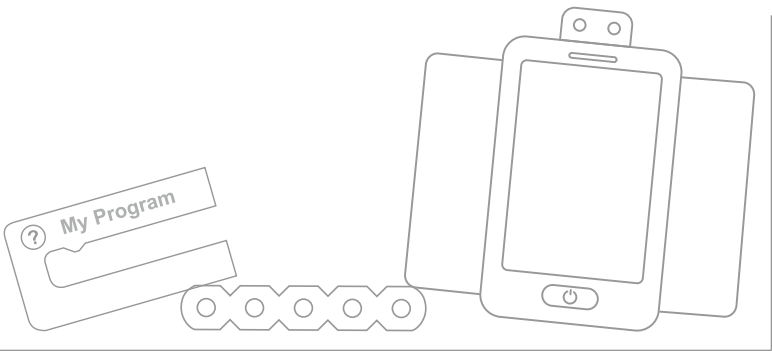
Robo-oto 12

Soccer Bot 20

Ball Shooter 26

Register Your Kit 34

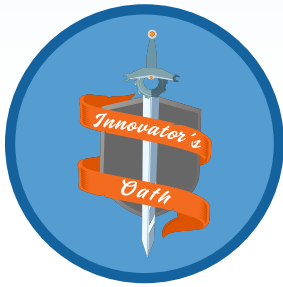
Join Let’s Avishkaar 35



Make The Most Of Your Kit

Innovate

Take The Innovator's Oath



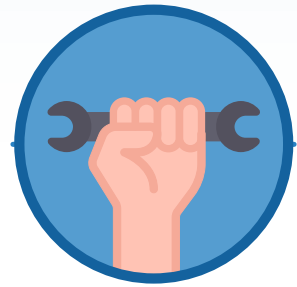
Take the oath written inside your kit and share a photo in **Let's Avishkaar Community**.
(fb@LetsAvishkaar)

Familiarize With Your Kit



Use "**Armour Check**" section to check all the parts of your kits.

Build Your Bot



Follow detailed instructions in this manual to build exciting robots.

Share

Win

Register Your Kit



Scan the QR code, register your kit and get access to additional project tutorial videos.

Join Let's Avishkaar



Join Let's Avishkaar to share your innovative projects, attend free webinars and know about the latest updates in the tech world.

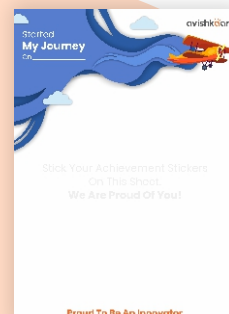
Participate in Innovator of the Month



Participate in the next Innovator of the Month challenge and **get a chance to win grand prizes.**

Celebrate Your Achievements

Use the 'My Achievements' sheet and the stickers provided to track your innovator journey. Paste the relevant sticker on the achievement sheet.



Armour Check

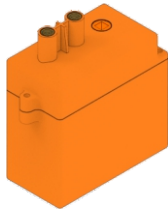
All(s)heroes need their super-weapons. Let's familiarize you with yours.

Programmable Brain & Remote

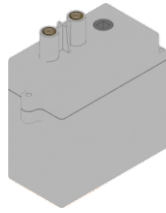
Avishkaar Full Brain is a control panel that allows you to control motors and sensors in the kit and connect a remote controller too.



Full Brain x 1



High Speed
Motor x 2



High Torque
Motor x 1



Battery x 1



Remote
Controller x 1

Plastic & Metal parts

A complete metal and plastic design system allows you to make from easy to complex mechanical bot designs.



Big Wheels x 4



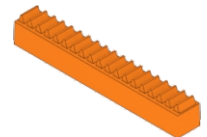
Big Spur
Gear x 2



Medium Spur
Gear x 2



Small Spur
Gear x 2



Rack Gear x 2



Caster Wheel x 1



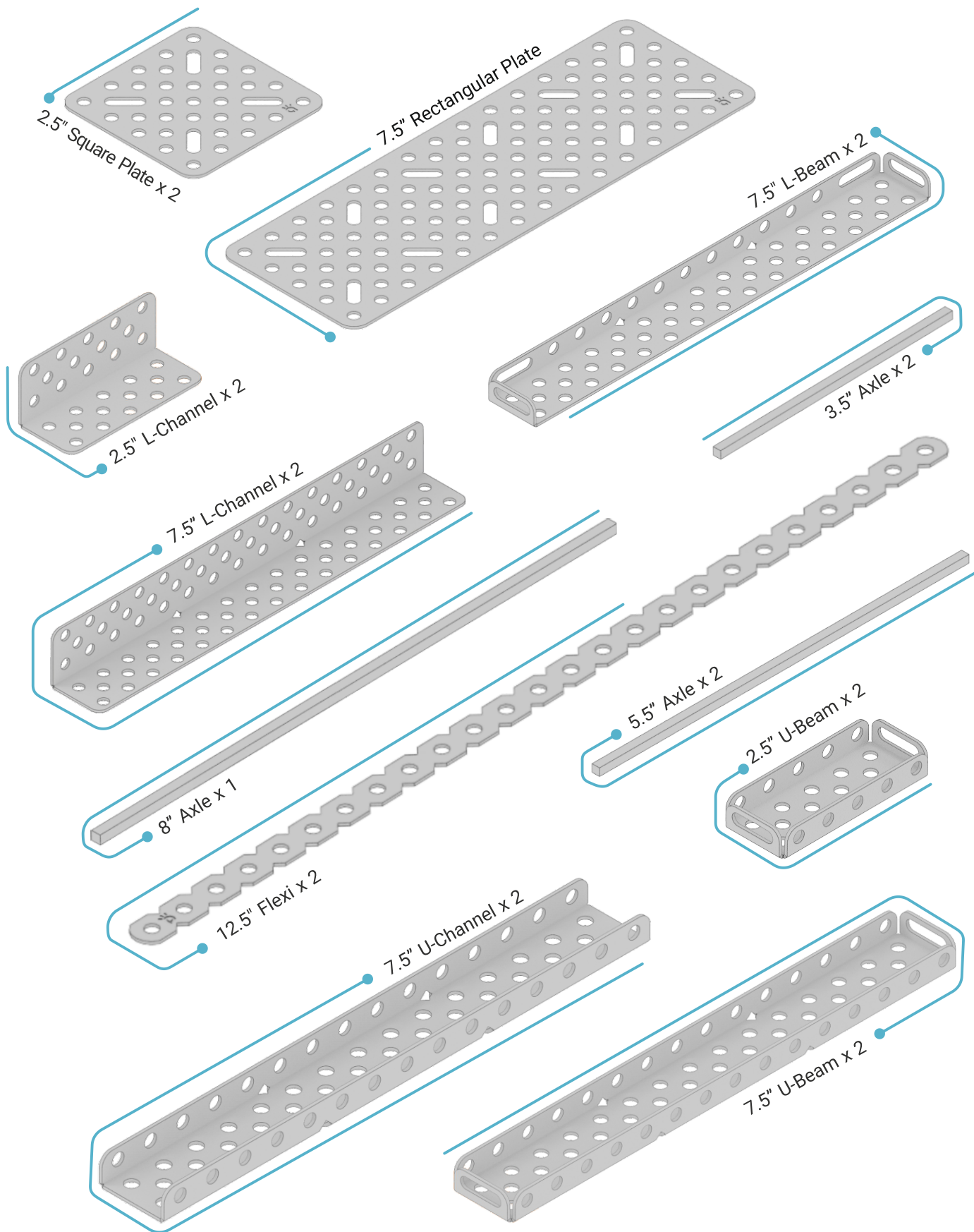
Allen Key x 1



Plastic Hook x 1



Spanner x 1



Nuts & Bolts (Advanced)

ER-Series Bolts and K-Nuts with a strong metal and easy-to-use design for strong joints of your grand robots.



K-Nuts



40mm, 8mm & 6mm Bolts



Axle Lock



3-Hole Connector



Filler

Cables

Set of RJ-11 Cables to connect the motors, sensors and the remote controller to the Brain of the robot and a USB Cable to burn programs on the brain of your robot.



Long Cable



Cables



USB Cable



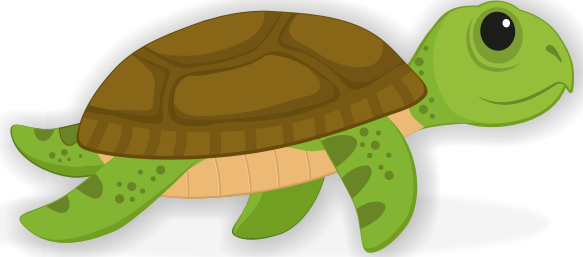
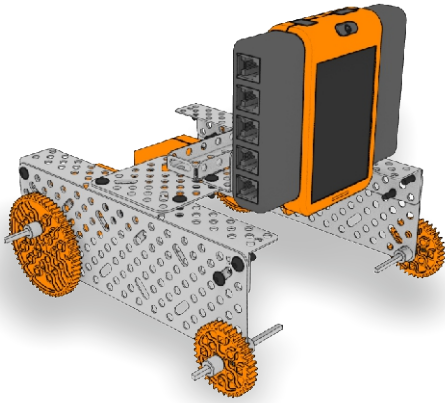
Congrats!

Give yourself the 'Familiarize with your Kit' sticker on your Achievement Sheet.



DEEP DIVE INTO ROBOTICS

Turtle Robot



Turtles walk slowly in a wobbly style. It is fun to make our own turtle robot toy and for which we need to understand off center motion. Off center means something which is away from the center or the axis. In this the object motion is around the other axis which is not centered in the robot design.

What are we gonna do?

Our task is to make a turtle robot that imitates the motion of a turtle i.e. slow forward motion using the four legs in an off-centered cam mechanism.

What will you learn?



Mechanical
Design



Lift and Wedge



Gear System

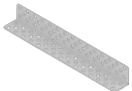


Simple Machines



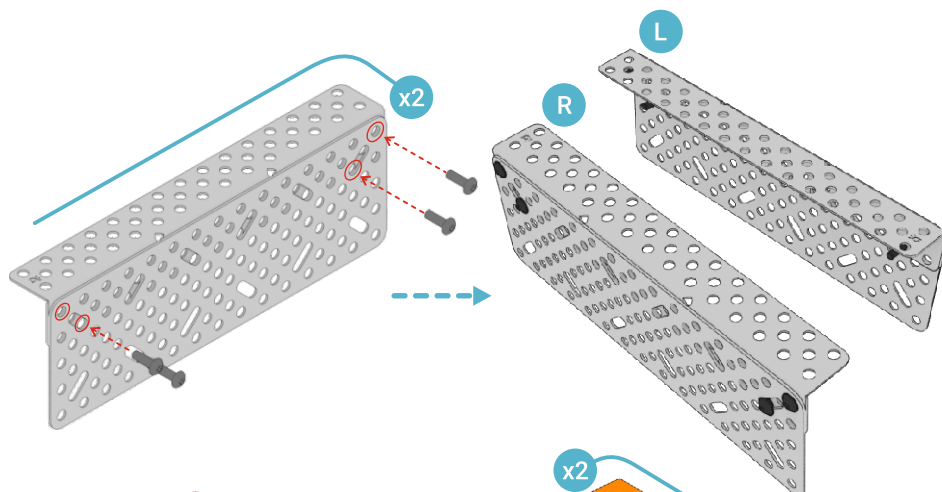
Load-Bearing

Things we need

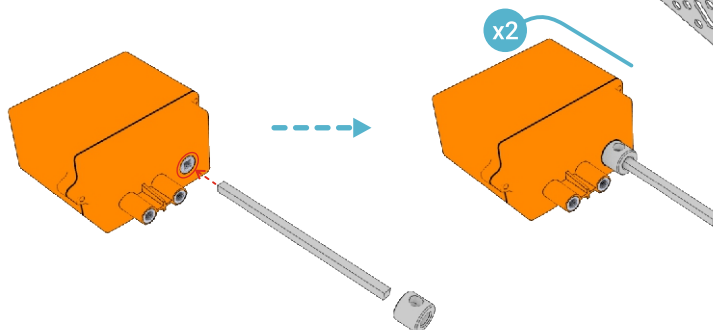
 Full Brain x 1	 Battery x 1	 High Speed Motor x 2	 Medium Spur Gear x 2
 Large Spur Gear x 2	 Nuts and Bolts	 Cables x 2	 2.5" U-Beam x 1
 3.5" Axle x 2	 2.5" Square Plate x 2	 2.5" L-Channel x 1	 7.5" Rectangular Plate x 2
 7.5" L-Channel x 2	 5.5" Axle x 2		

Let's Build

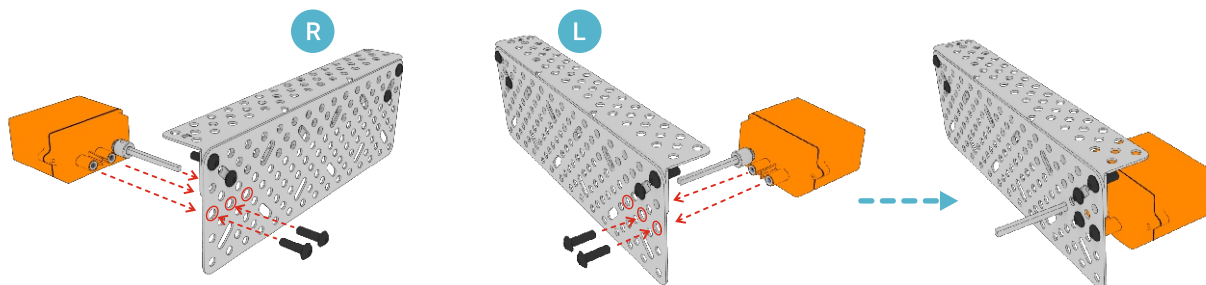
- 1 Attach one 7.5" L-Channel and join it on a 7.5" Rectangular Plate as shown in figure & make two such parts.



- 2 Insert the 5.5" Axle in one High Speed Motor. Tighten with an Axle Lock at the correct level on the Shaft.

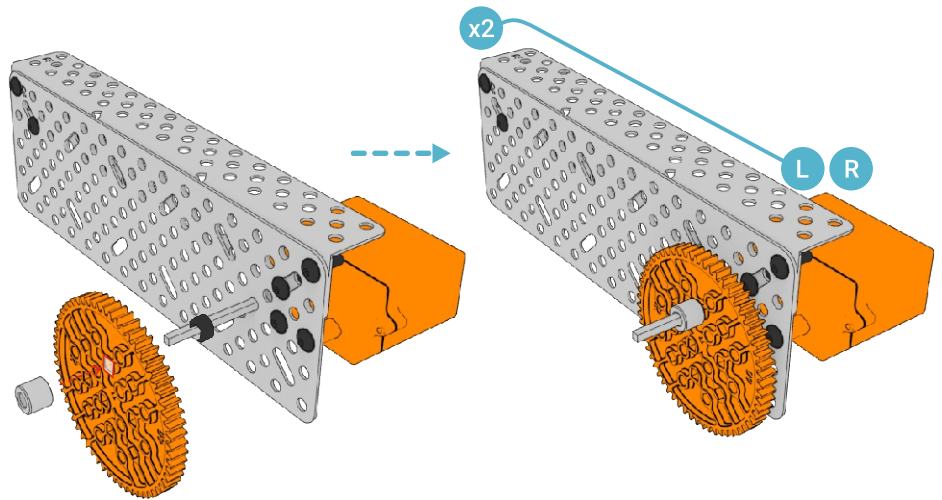


- 3 Insert the motor at the marked holes in both the assemblies you made before using 6mm Bolts.



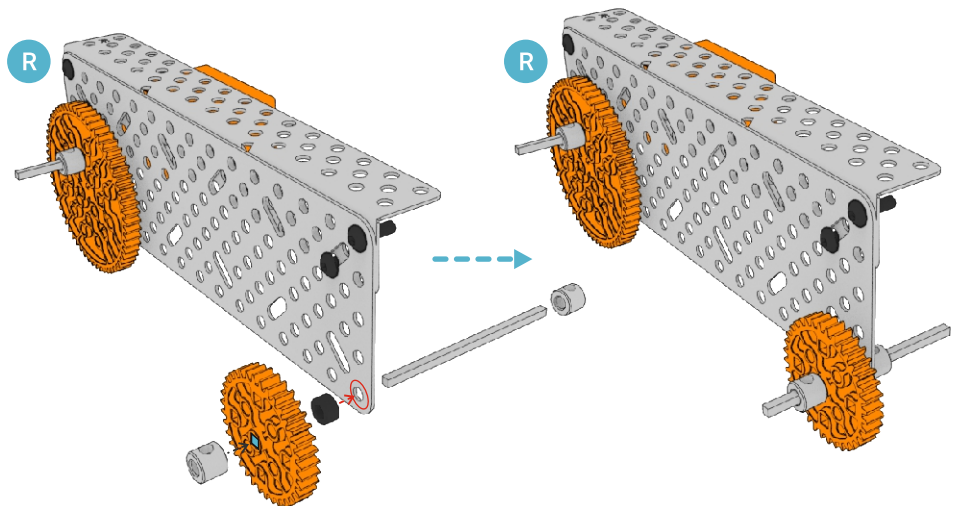
4

Insert a Big Spur Gear with a Filler in the Axle through the marked hole, and tighten with an Axle Lock. Do this for both the assemblies.



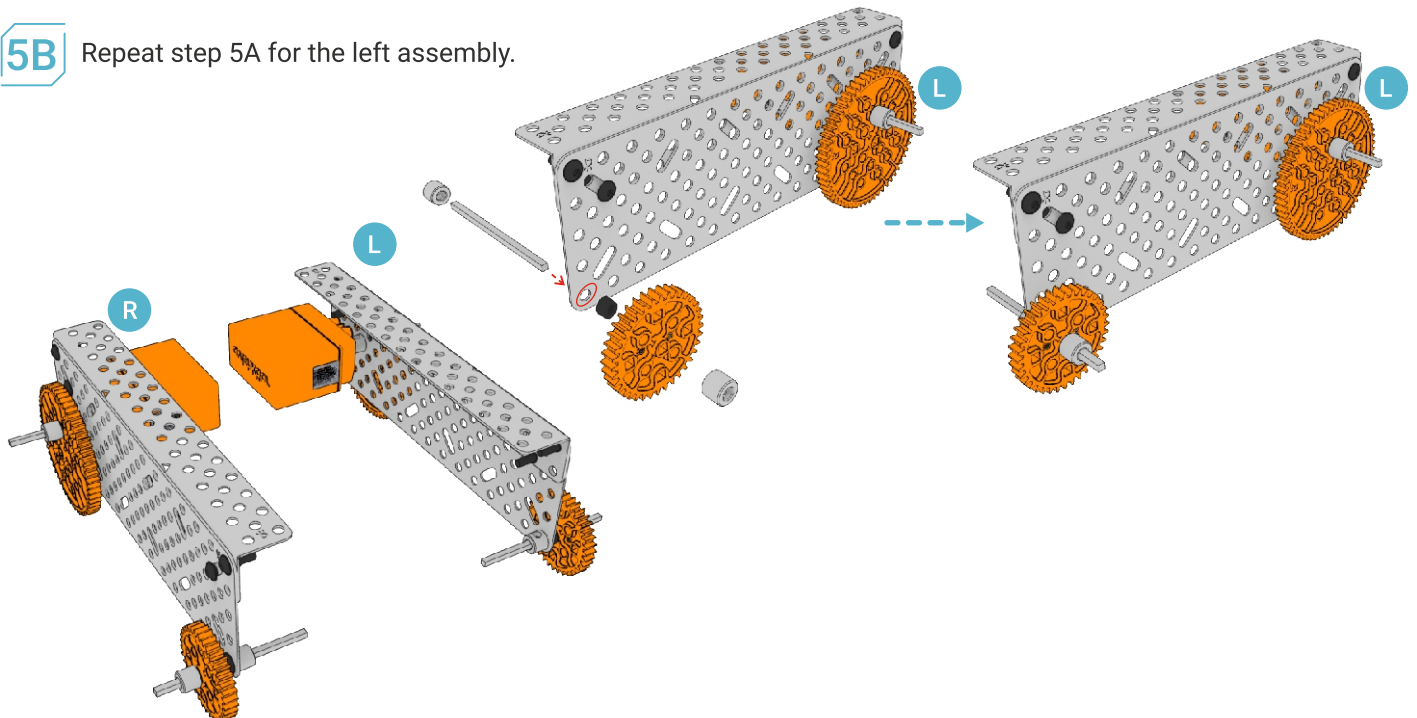
5A

Insert a Small Spur Gear in front of the assemblies at the marked hole, using 3.5" Axle, Filler and Axle Locks.

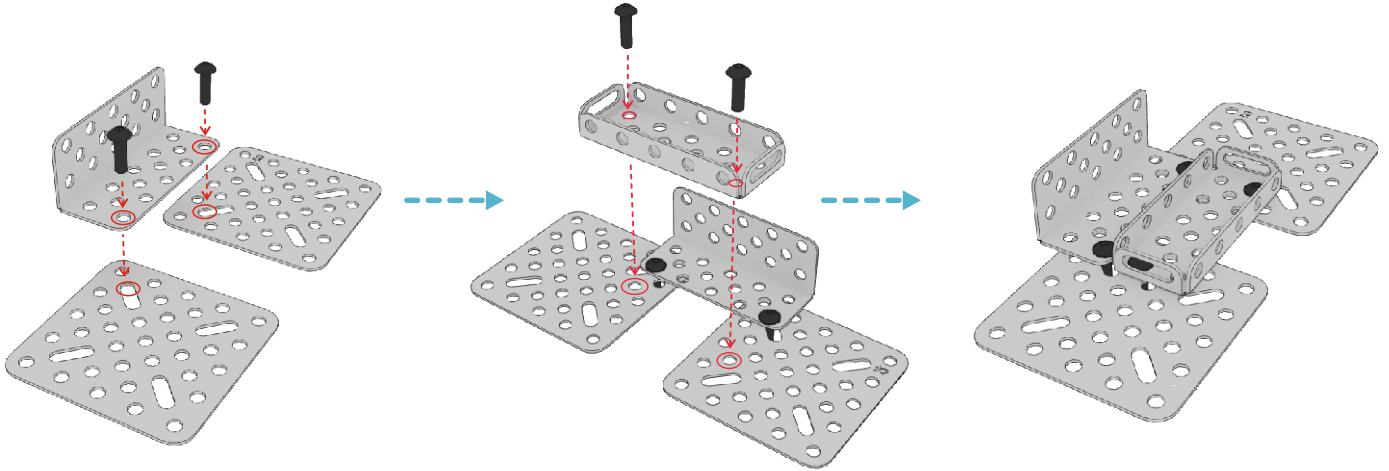


5B

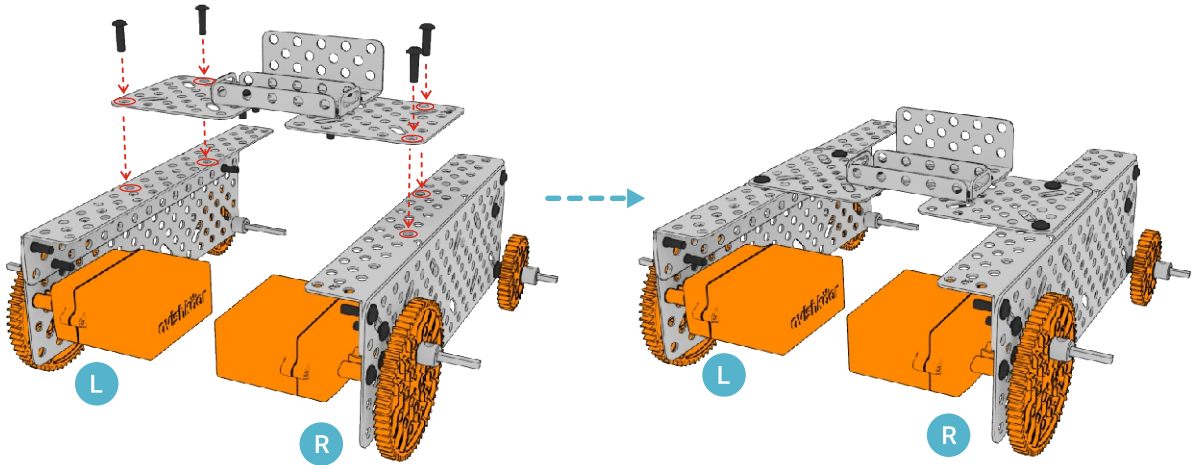
Repeat step 5A for the left assembly.



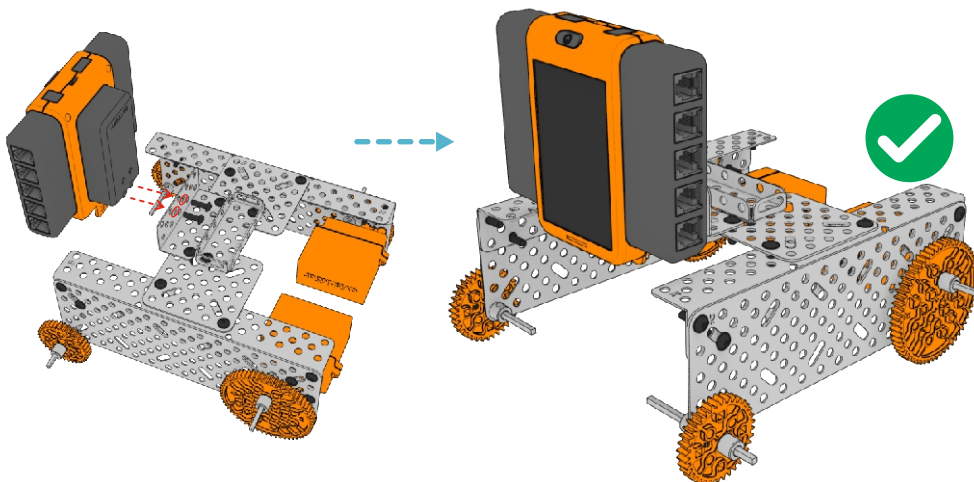
6 Join two 2.5" Square Plates using a 2.5" L-Channel, as shown in the figure.



7 Connect both the previously made assemblies from step 5 using the connector assembly you made above in Step 6.



8 Complete your bot by attaching the Full Brain at the specified holes.

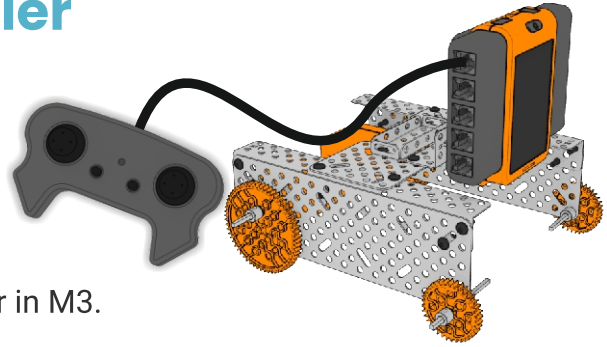


Congrats!

Give yourself the 'First Project
Badge' sticker on your
Achievement Sheet.

How to play – With Controller

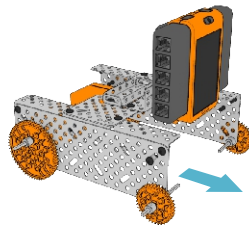
You can use the remote controller to control your robot.
Follow the instructions below to know various ways you can use it.



- Connect the Left Motor in M4 and Right Motor in M3.
- Connect Remote Cable in Port Labeled as R.
- Switch on the Brain and keep your Turtle Bot in open space and use your Remote's Right and Left panel Joystick for movement of the robot.



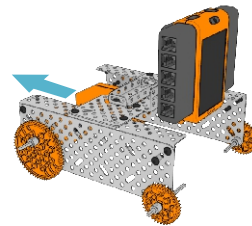
Right Joystick



When we push the right joystick forward, the bot moves forward.

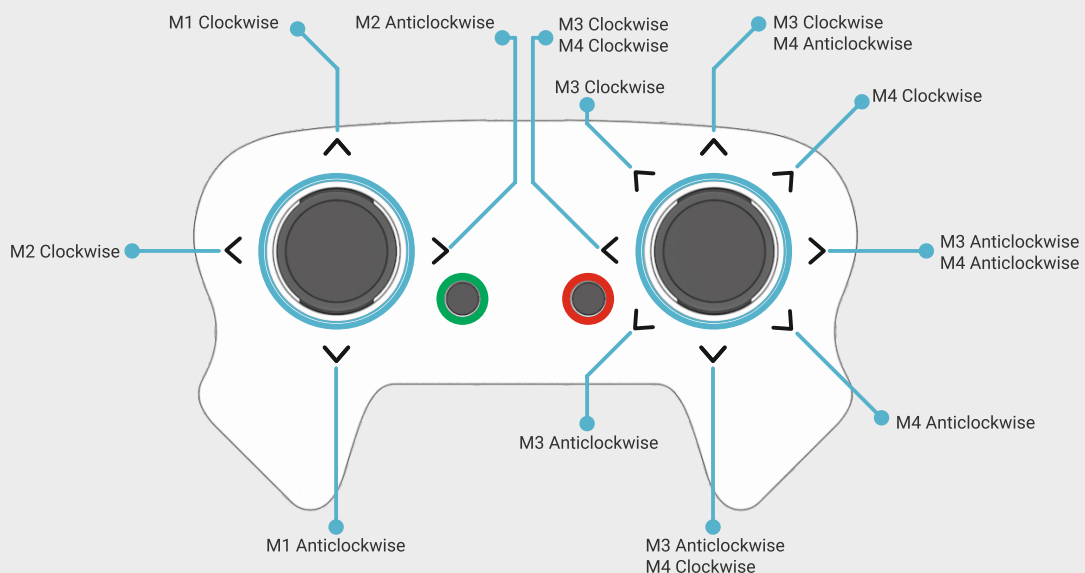


Right Joystick

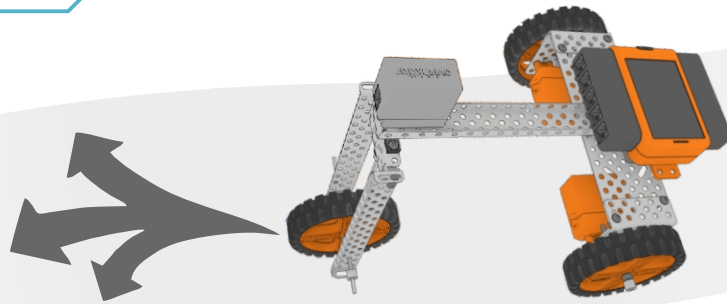


When we push the right joystick backward, the bot moves backward.

Here's a detailed mapping of the joysticks in the Remote Controller to the various Motor Ports in the Full Brain.



Robo-oto



Imagine your vehicle is going straight and you want it to turn towards right. How will you achieve this? If you think about bicycles or cars, we have a steering mechanism which helps turning the vehicle in any direction. Let's learn how to build this mechanism and how to make vehicle robots.

What is our task?

We will make a Robo-oto, which is a three wheel structure with looks similar to a three-wheeler automotive. We can tilt and lean based on motor movement so that turning is dependent on the front wheel.

What will you learn?



Mechanical
Design



Tilt and Lean



Steering
Mechanism



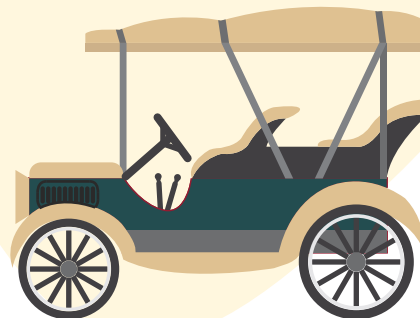
Friction



Stability

Did You Know?

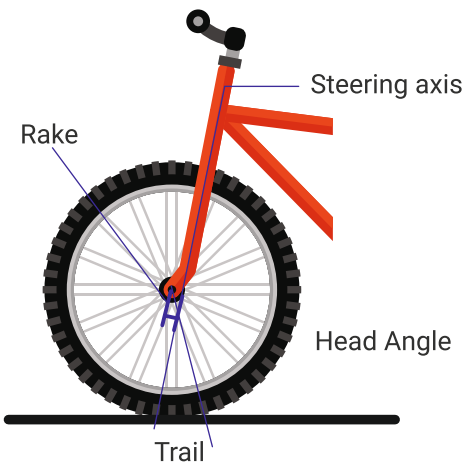
First steering wheel was invented in Cleveland, Ohio. Many three-wheelers which exist in the form of motorcycle-based machines are often called trikes.



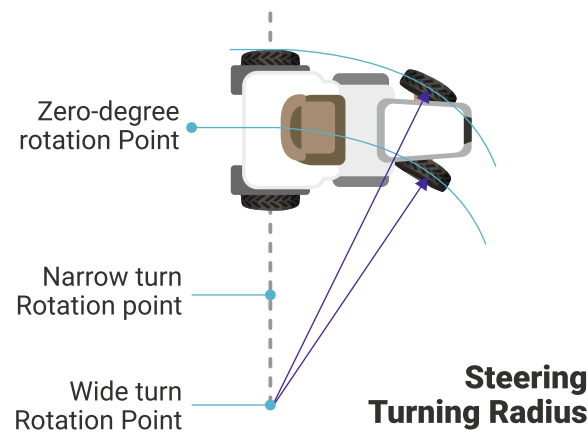
What will you need?

 Full Brain x 1	 Battery x 1	 High Speed Motor x 2	 High Torque Motor x 1
 Nuts and Bolts	 Cables x 3	 Three Hole Connector x 2	 7.5" Rectangular Plate x1
 3.5" Axle x 2	 2.5" Square Plate x 2	 2.5" L-Channel x 2	 7.5" U-Channel x 1
 5.5" Axle x 2	 7.5" L-Beam x 2	 2.5" U-Beam x 1	 Wheels x 3

Two Wheel structure

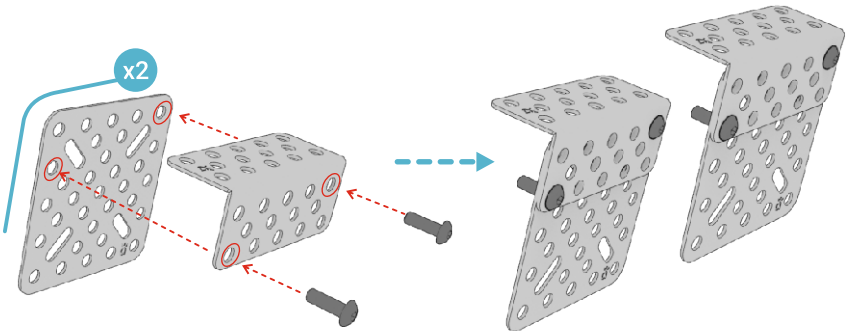


Four Wheel structure

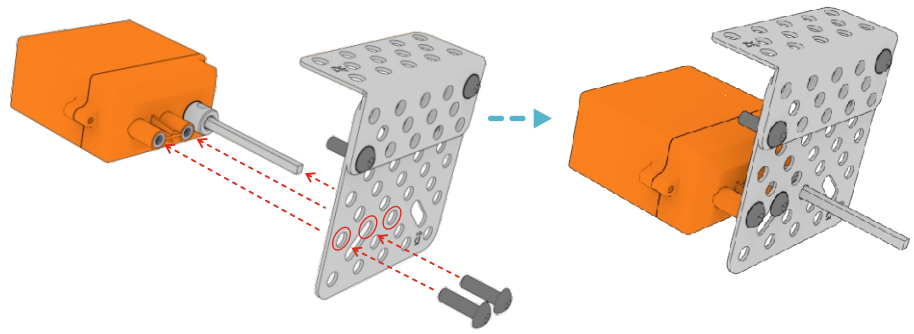


Let's Build

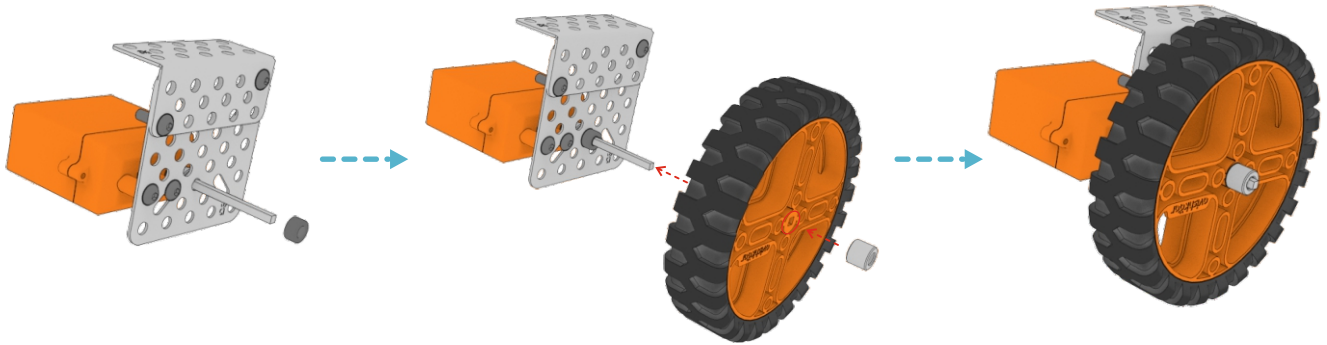
- 1 Attach one 2.5" Square Plate with one 2.5" L-Channel as shown in figure & make two such assemblies.



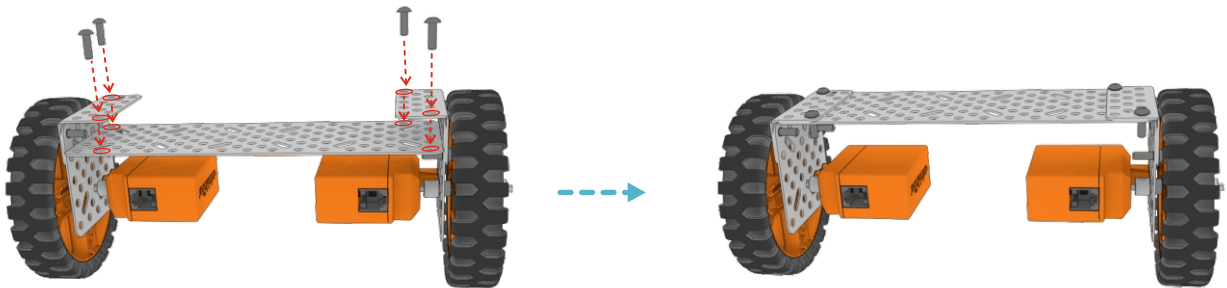
- 2 Connect a 3.5" Axle to a High Speed Motor using an Axle Lock and connect the Motor to both the assemblies using 6mm Screws.



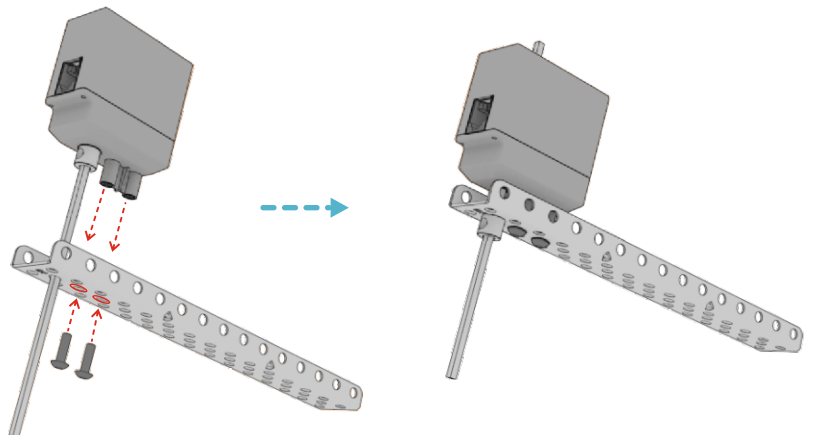
- 3 Put a Filler on the Axle and attach a Big Wheel on top of it using an Axle Lock. Do this for both the assemblies.



- 4 Connect both the assemblies using a 7.5" Rectangular Plate.

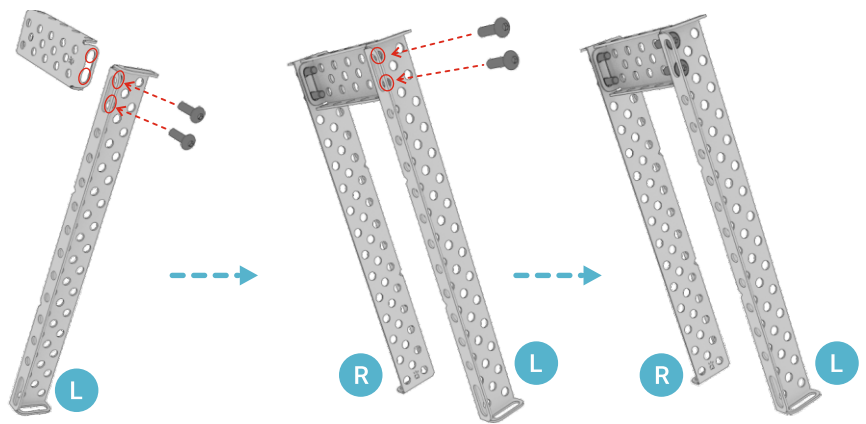


- 5 Attach 5.5" Axle on a High Torque Motor using an Axle Lock. Connect the Motor to a 7.5" U-Beam using Screws.



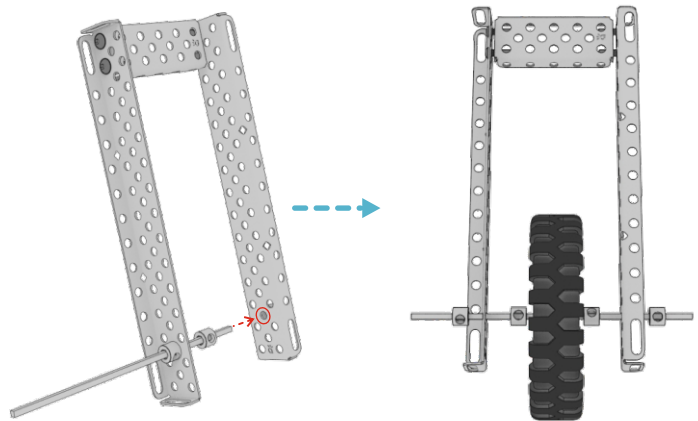
6

Connect two 7.5" L-Beam using a 2.5" U-Beam as shown in the figure.



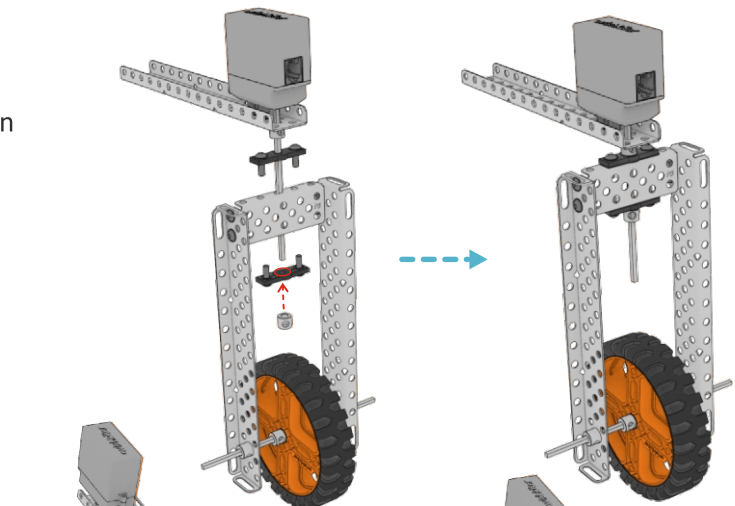
7

Connect a wheel to this assembly using a 5.5" Axle. You will have to use four Axle Locks to keep the wheel in place as shown.



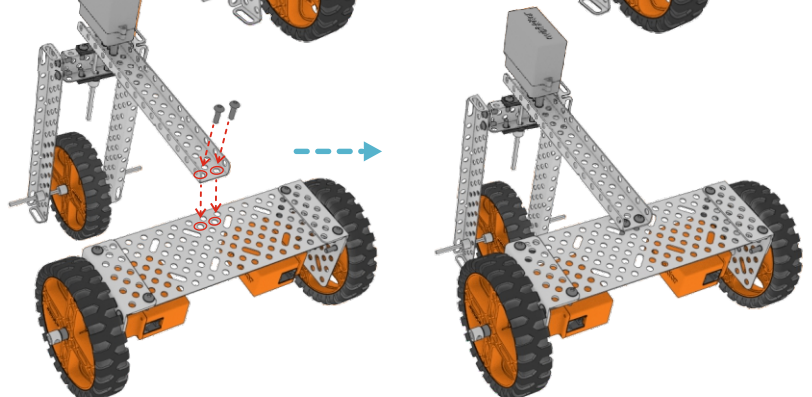
8

Connect both the assemblies using two 3-Hole Connectors and Screws as shown in the figure.

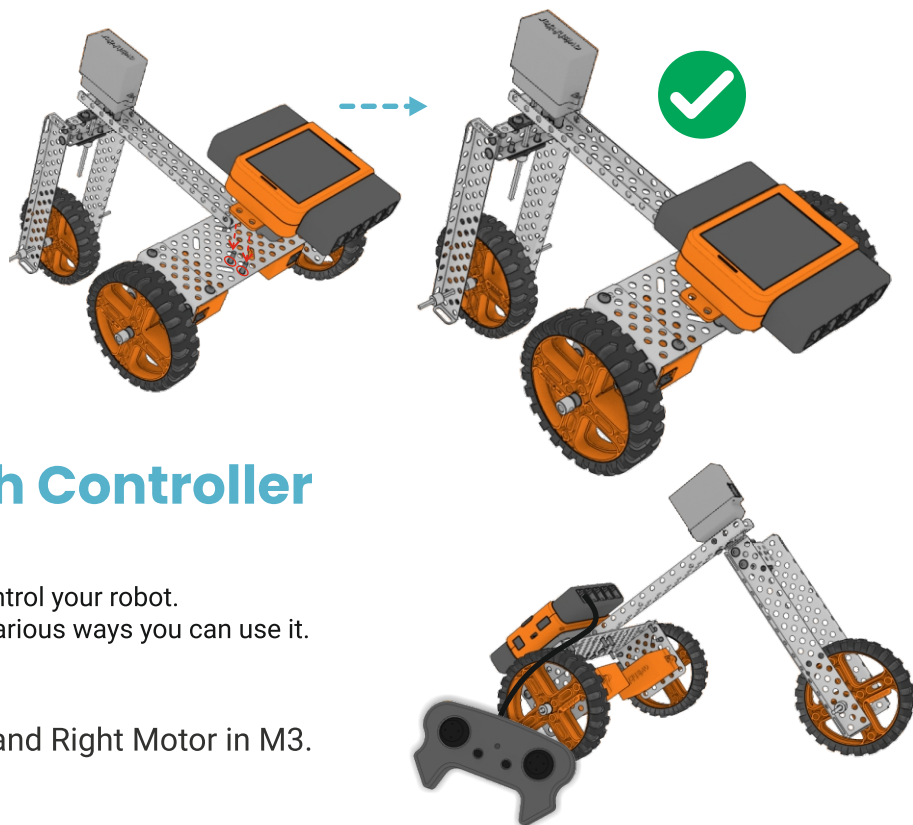


9

Connect the front assembly to the rear assembly as shown in the figure.



10 Connect the Full Brain to the bot.



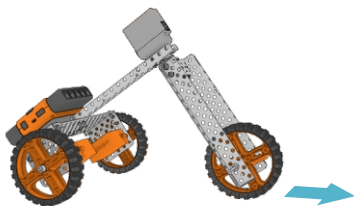
How to play – With Controller

You can use the remote controller to control your robot.
Follow the instructions below to know various ways you can use it.

- Connect the Left motor in M4 and Right Motor in M3.
- Connect the front motor in M1.
- Connect Remote Cable in Port Labeled as R.
- Switch on the brain and keep your Robo-oto in open space and use your Remote's Right and Left panel Joystick for movement of the robot.



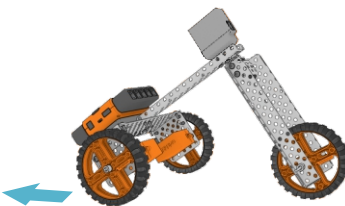
Right Joystick



When we push the right joystick forward, the bot moves forward.



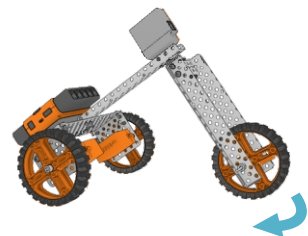
Right Joystick



When we push the right joystick backward, the bot moves backward.



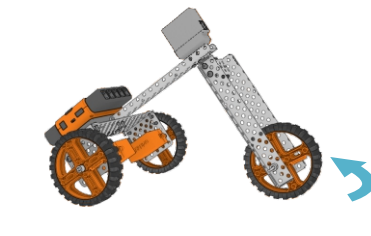
Left Joystick



When we push the left joystick backward, the steering moves left.



Left Joystick



When we push the left joystick forward, the steering moves right.

How to play – With Avishkaar Remote Controller (ARC)



The Powerful **Avishkaar Remote Controller (ARC)** allows for wireless control of robots built with certain Avishkaar FULL Brain. Connecting wirelessly children can maneuver their robots' actions in a variety of fun ways.

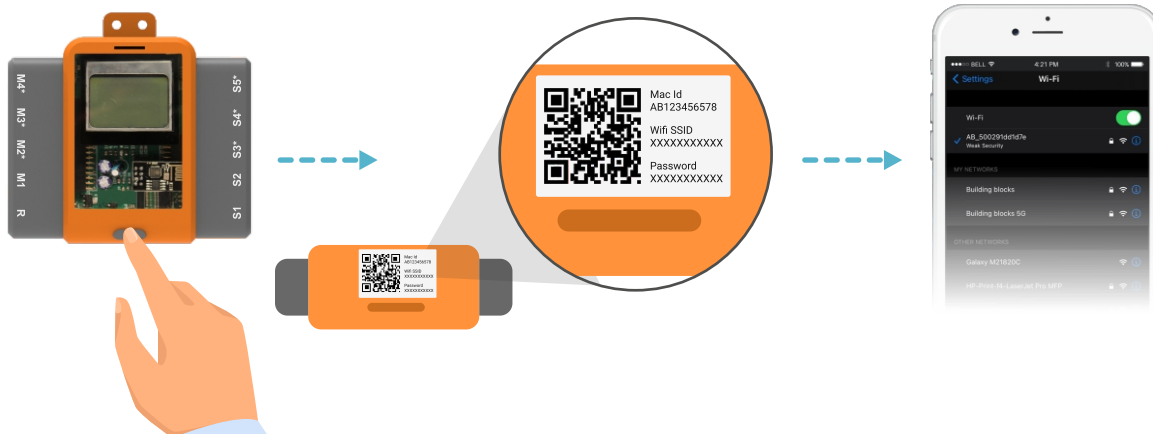
Let's Start

- 1 Begin by installing the ARC app on your phones using the QR codes alongside.

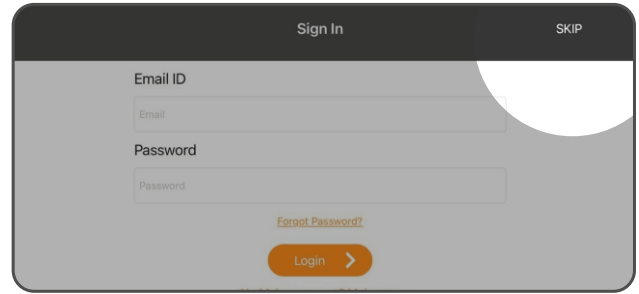
Available on



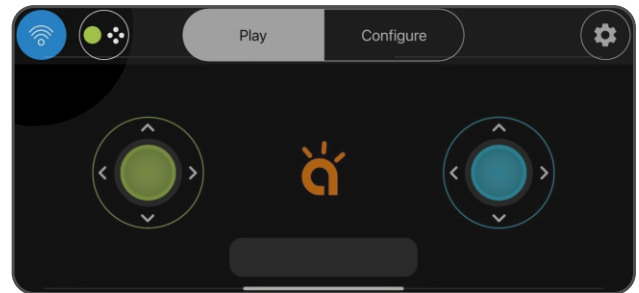
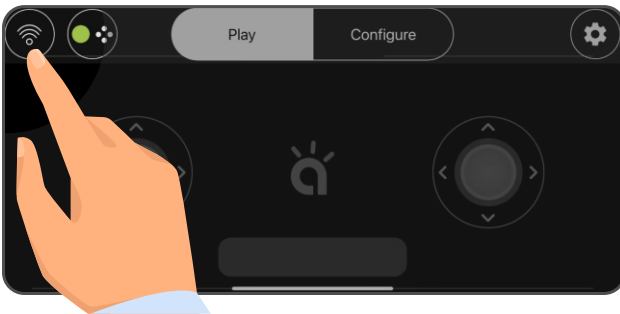
- 2 Turn ON the Brain (press once, it will take 2-3 seconds to turn ON) and connect to the Full Brain's WiFi module by going to the WiFi Settings in your phone. You can find the mac address and the password for the Brain's WiFi on the sticker on top of the brain.



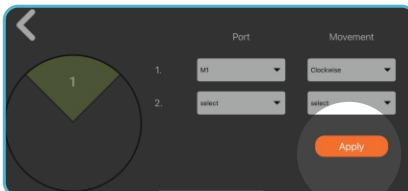
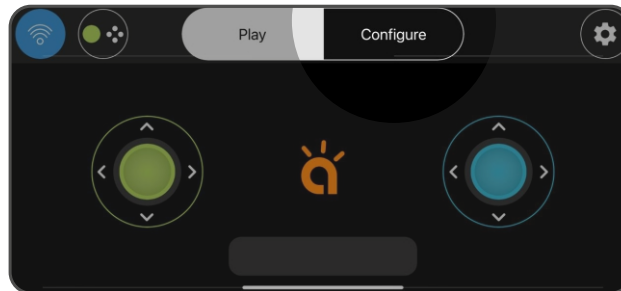
- 3 Open the app. You can skip the sign-in/login page.



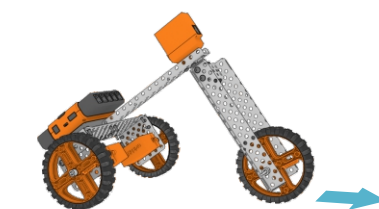
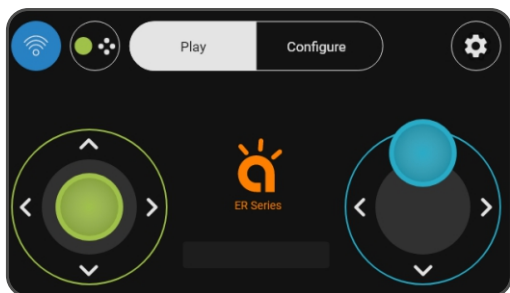
- 4 Click on the WiFi button on top-left. If it turns blue, it means the app has successfully connected to the brain.



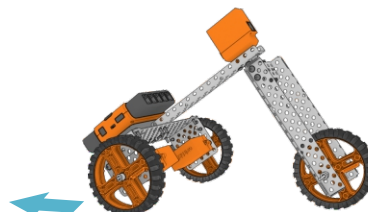
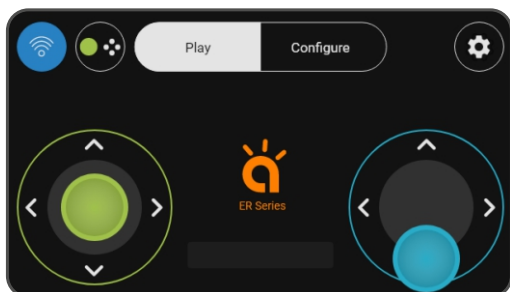
- 5 Click on 'Configure'. Then set the left joystick's forward direction to M1 clockwise and left joystick's backward direction to M1 anti-clockwise.



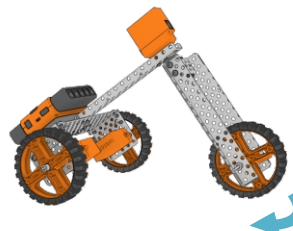
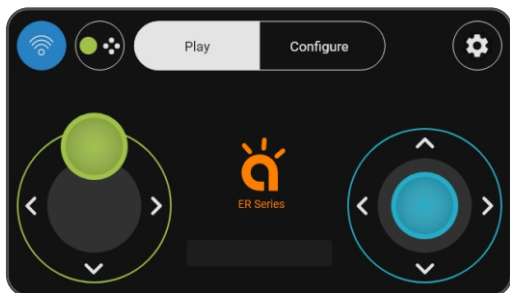
Let's Play With Ball Shooter



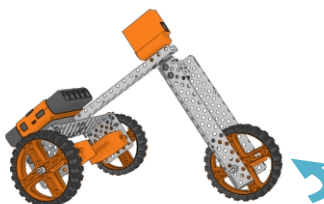
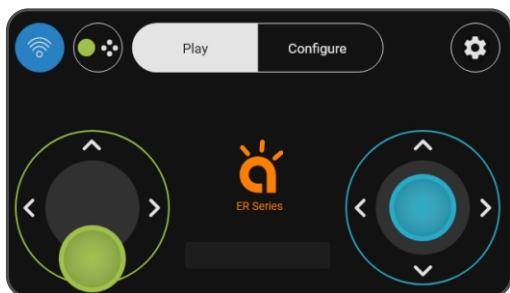
When we push the right joystick forward, the bot moves forward.



When we push the right joystick backward, the bot moves backward.



When we push the left joystick forward, the steering turns right.



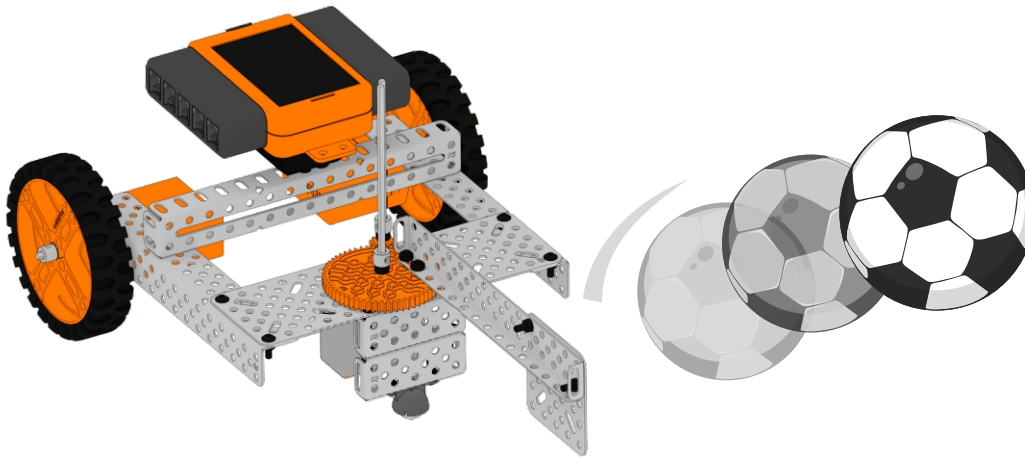
When we push the left joystick backward, the steering turns left.



Congrats!

You are one bot away from getting your 'Three Project Badge'.

Soccer Robot



Robotics finds its applications in lots of areas. It is definitely used in industries, in healthcare and in households, but it also finds use for sports and recreations.

What is our task?

Our aim is to make a soccer bot with a wheel and caster so it can move around, and with a slapper arm so it can hit the ball in different directions.

What will you learn?



Mechanical
Design



Axle Support



Momentum



Friction



Inertia



Gear System

Interesting Fact

Do you know RoboCup or FIRA tournaments played each year which are tournaments of soccer played by robots and Robo cup has been organized every year since 1996.



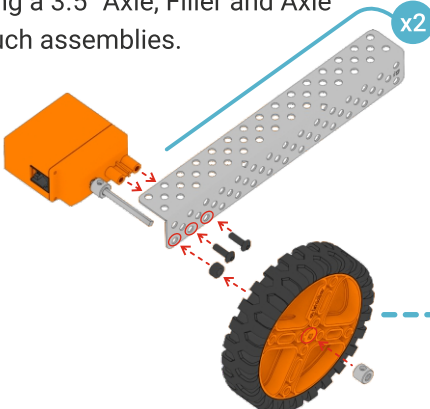
What will you need?

 Full Brain x 1	 Battery x 1	 Caster Wheel x 1	 Wheels x 2
 Nuts and Bolts	 Cables x 3	 2.5" Square Plate x 2	 7.5" Rectangular Plate x 2
 3.5" Axle x 2	 5.5" Axle x 2	 2.5" U-Beam x 2	 7.5" L-Beam x 1
 7.5" Slider x 1	 L-Channel x 2	 Small Spur Gear x 1	 Big Spur Gear x 1
 High Speed Motor x 2	 High Torque Motor x 1		

Let's Build

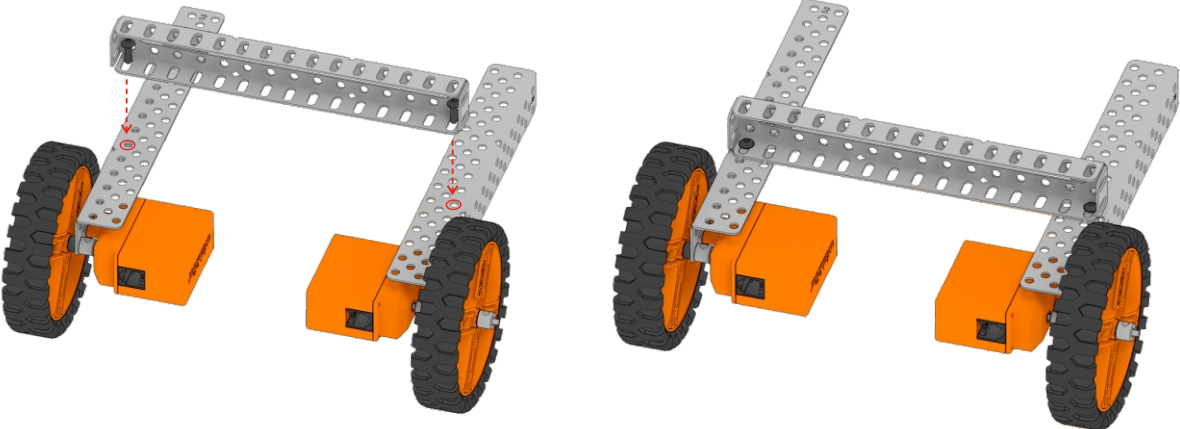
1

Connect a High Speed Motor to a 7.5" L-Channel and Big Wheel using a 3.5" Axle, Filler and Axle Lock. Make two such assemblies.

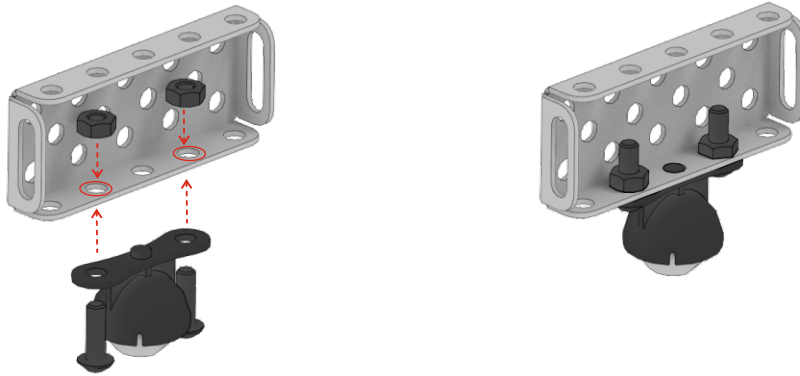


2

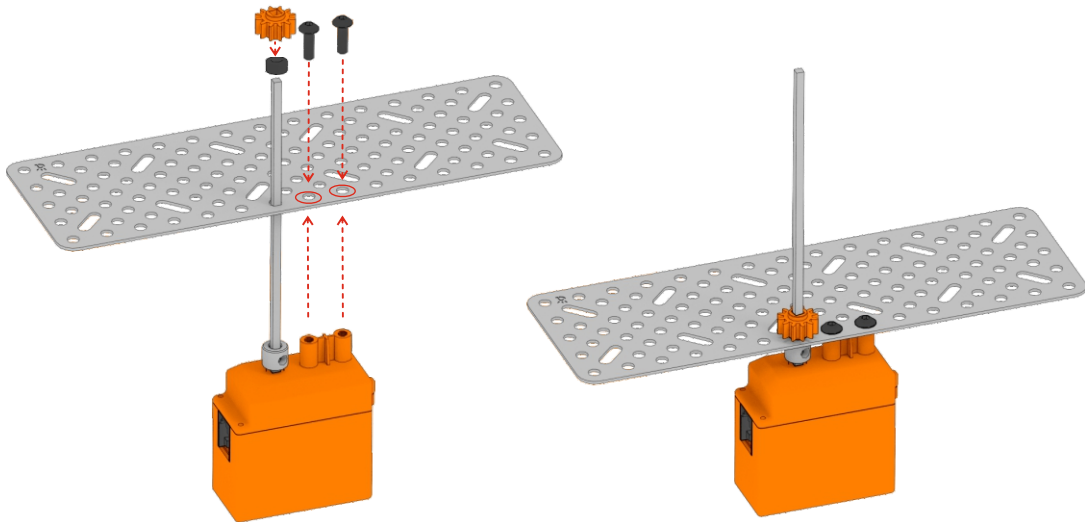
Connect both the assemblies using a 7.5" Slider as shown.



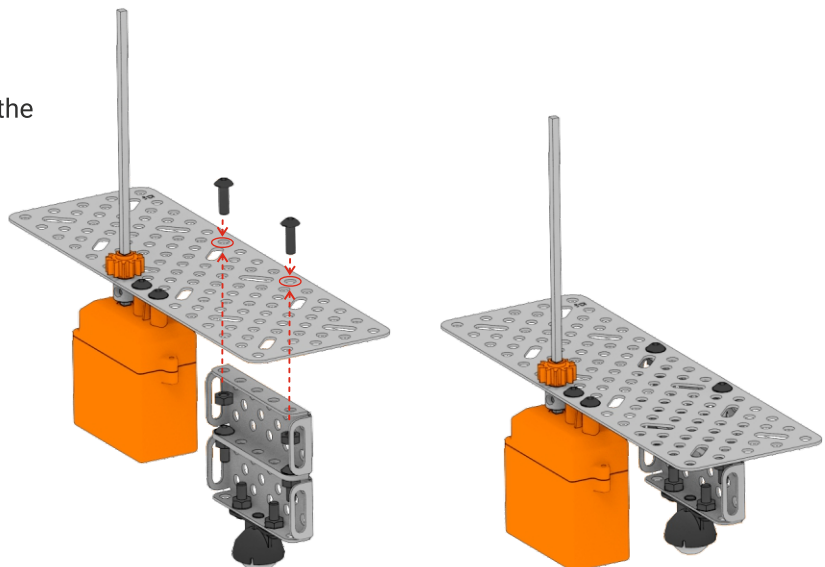
- 3 Connect two 2.5" U-Beam and a Caster Wheel together as shown.



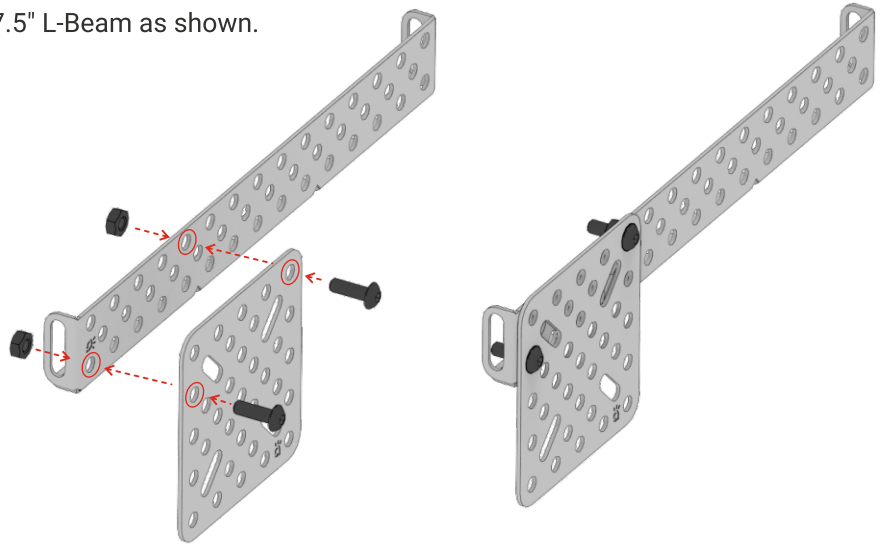
- 4 Connect a High Torque Motor to a 7.5" Rectangular Plate and a Small Spur Gear using a 5.5" Axle, Filler and Axle Lock.



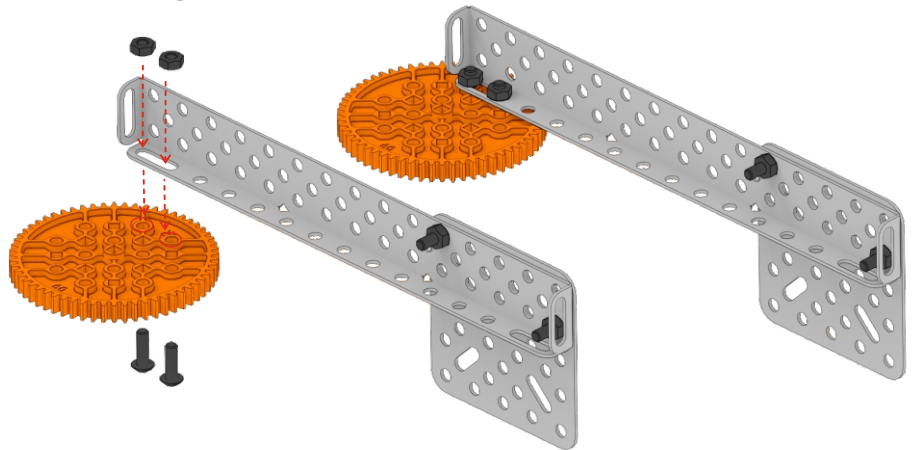
- 5 Connect the Caster assembly to the Slapper assembly as shown.



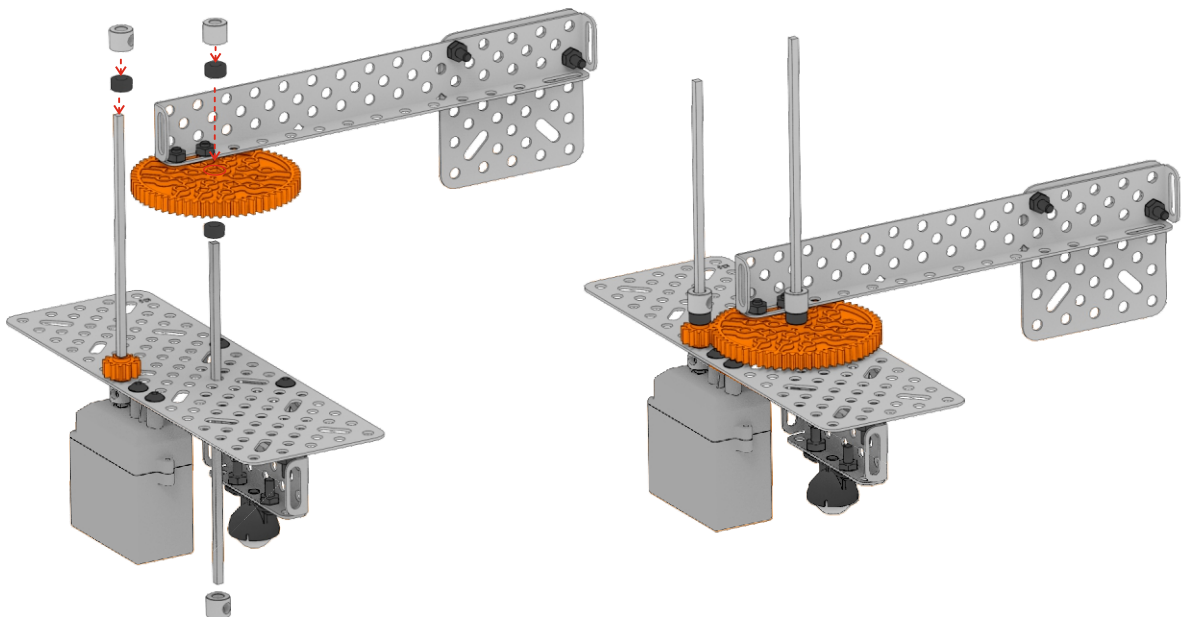
6 Connect a 2.5" Square Plate to a 7.5" L-Beam as shown.



7 Connect the above to a Big Spur Gear as shown.

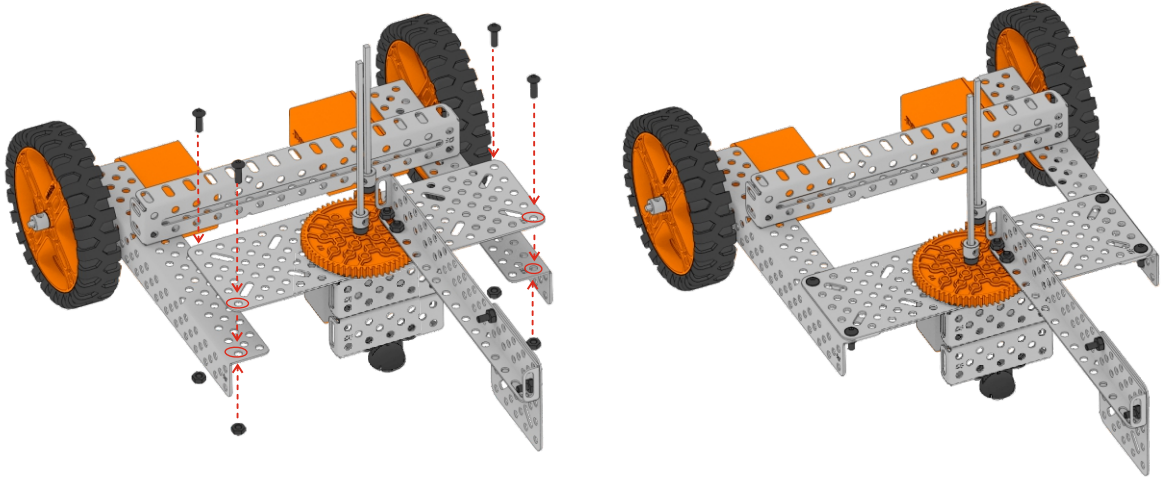


8 Connect the slapper to this assembly in the marked hole using a 5.5" Axle, Fillers and Axle Locks.



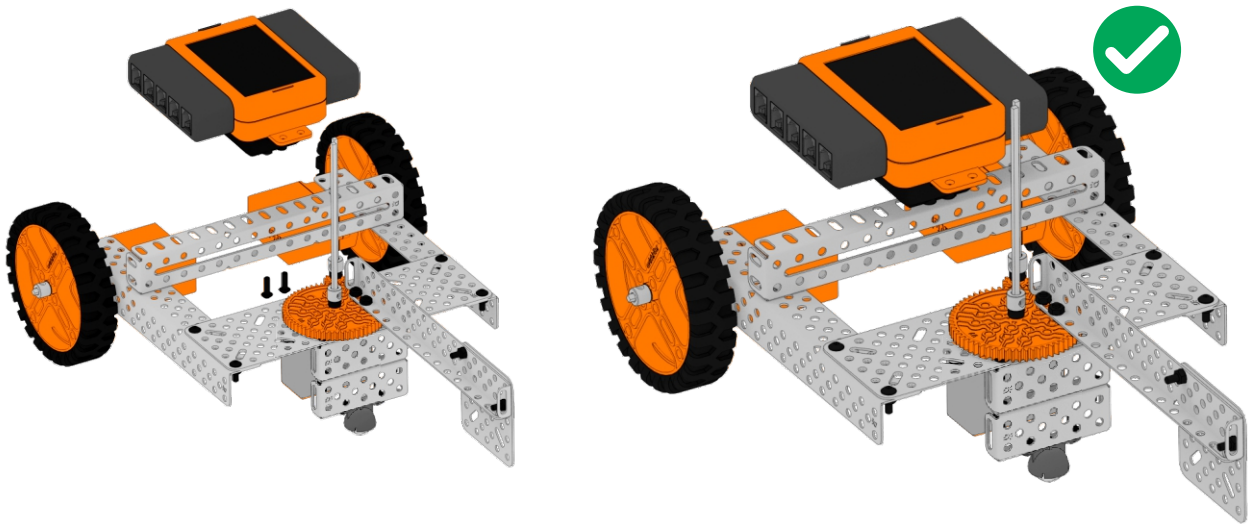
9

Connect both the assemblies as shown.



10

Connect the brain to the bot and complete your model.

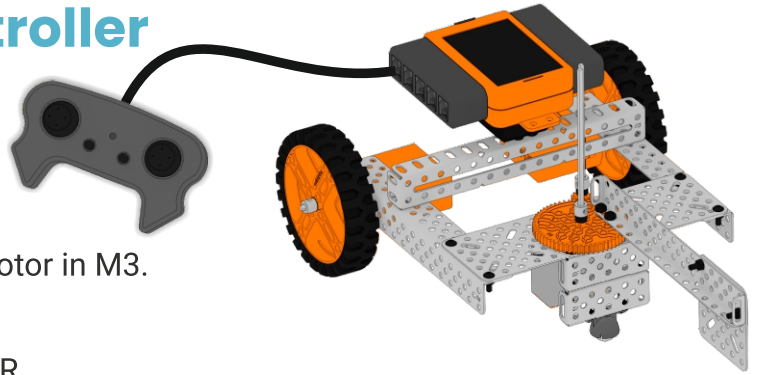


Congrats!

Give yourself the 'Third Project Badge' sticker on your Achievement Sheet.

How to play – With Controller

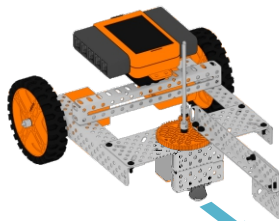
You can use the remote controller to control your robot. Follow the instructions below to know various ways you can use it.



- Connect the Left motor in M4 and Right Motor in M3.
- Connect the front motor in M2.
- Connect Remote Cable in Port Labeled as R.
- Switch on the brain and keep your Soccer Bot in open space and use your Remote's Right and Left panel Joystick for movement of the robot.



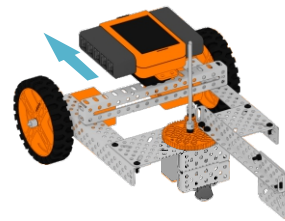
Right Joystick



When we push right joysticks forward, the bot moves forward.



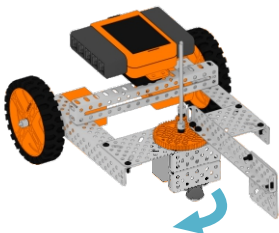
Right Joystick



When we push right joysticks backward, the bot moves backward.



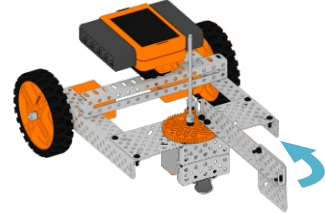
Right Joystick



When we push the right joystick right, the bot moves right.



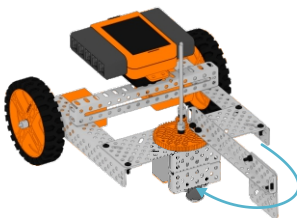
Right Joystick



When we push the right joystick left, the bot moves left.



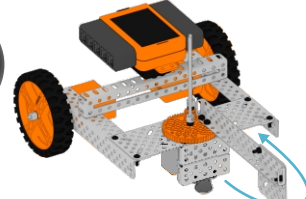
Left Joystick



The slapper turns anti clock-wise.

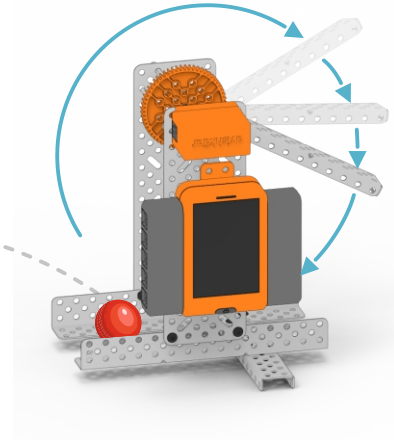


Left Joystick



The slapper turns clock-wise.

Ball Shooter



We all love cricket! In cricket, a bowler throws the ball towards the batsman who then hits the ball at a particular angle using force and momentum to score runs. Making a ball shooter can become our play companion when we cannot find any human.

What are we gonna do?

We will make a ball shooter with a motorized arm and cam powered mechanism to hit a ball giving it a projectile motion.

What will you learn?



Mechanical Design



Force



Gear System



Trajectory



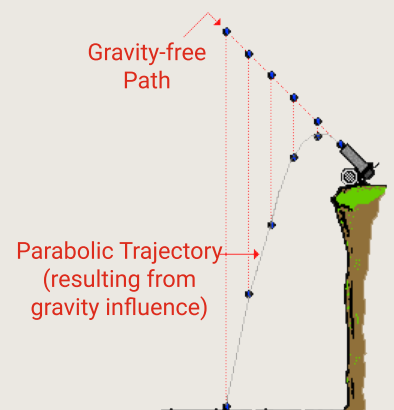
Simple Machine



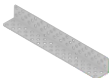
Momentum and Inertia

Interesting Fact

Did you know if there was no gravity acting on the shot ball then it will follow a linear path?

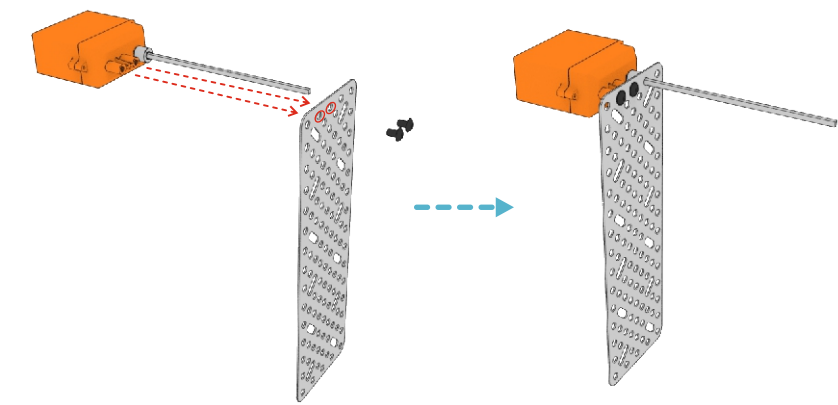


Things we need

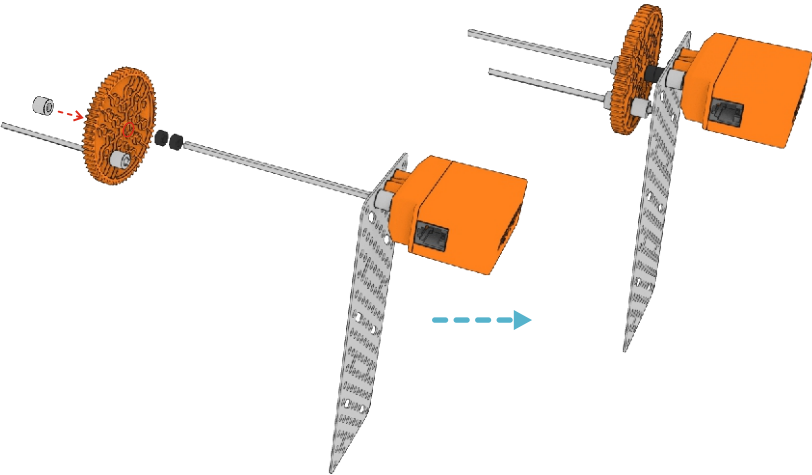
 Full Brain x 1	 Battery x 1	 High Speed Motor x 1	 Large Spur Gear x 1
 Nuts and Bolts	 Cable x 1	 8" Axle x 1	 7.5" U-Channel x 1
 7.5" L-Channel x 2	 3.5" Axle x 1	 7.5" Rectanglar Plate x 2	 7.5" U-Beam x 1

Let's Build

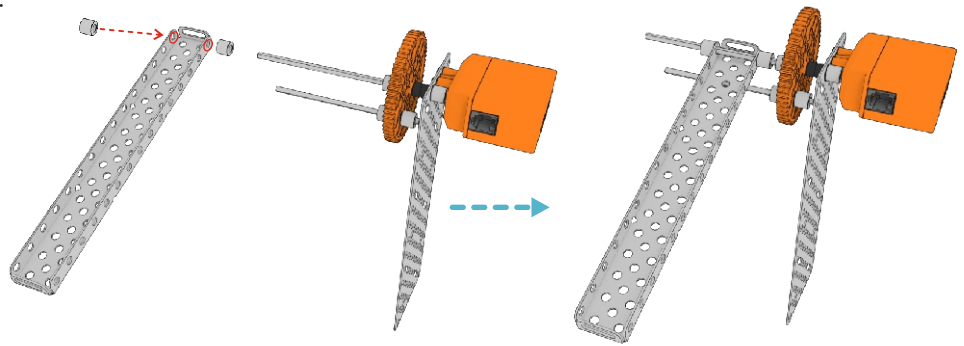
1 Attach a motor in a 7.5" Rectangular Plate using a 8" Axle, Axle Locks and 6mm Bolts.



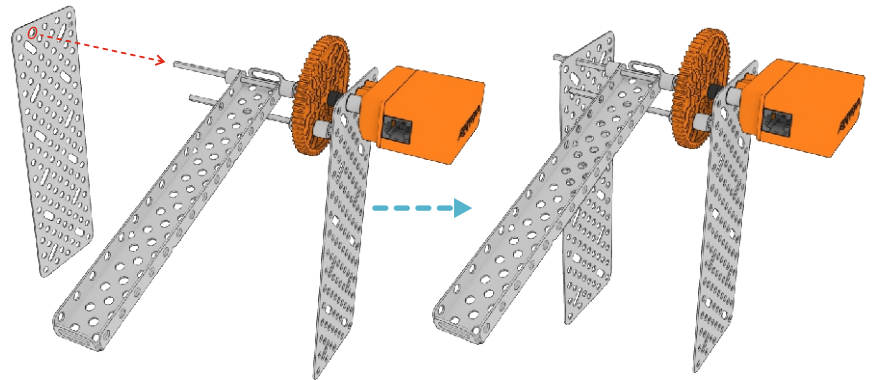
2 Connect a Big Spur Gear to the High Speed Motor and the 5.5" Axle with Fillers and Axle Lock and connect another 3.5" Axle to the Gear in the specified hole using two Axle Locks.



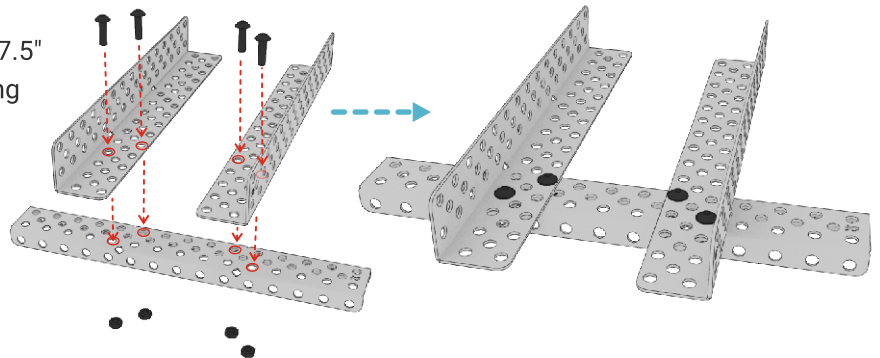
- 3** Connect 7.5" U-Beam to the Big Spur Gear using two Axle Locks.



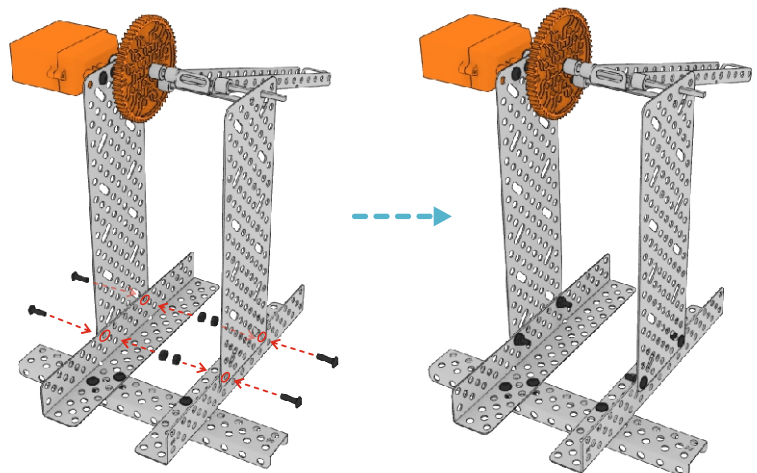
- 4** Connect a 7.5" Rectangular Plate to the central 5.5" Axle using an Axle Lock at the specified hole.



- 5** Connect two 7.5" L-Channels to one 7.5" U-Channel at the specified holes using nuts and bolts.

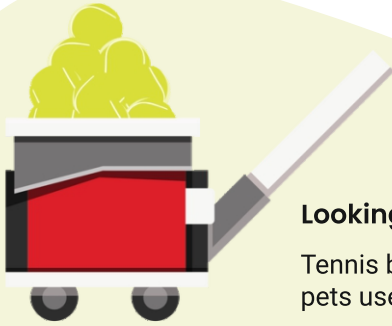
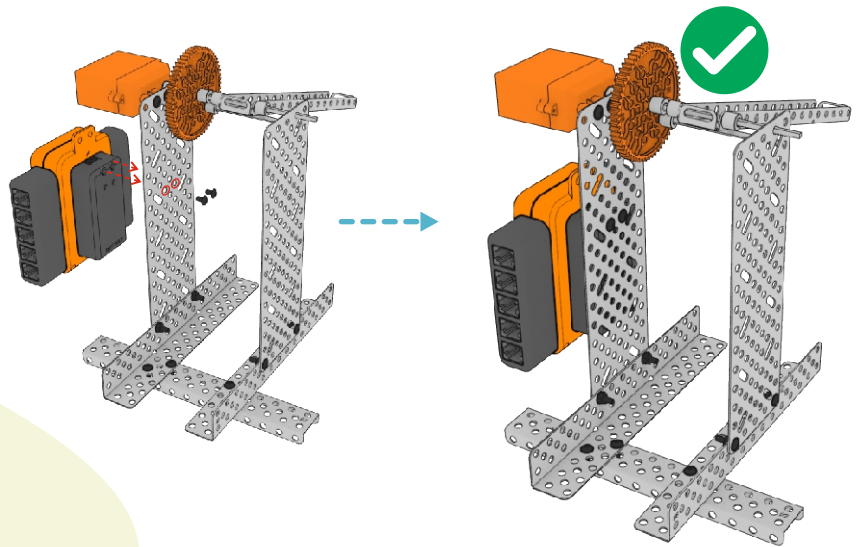


- 6** Connect both the assemblies together at the specified holes using Nuts & Bolts.



7

Connect the Full Brain to the specified holes and complete your bot.



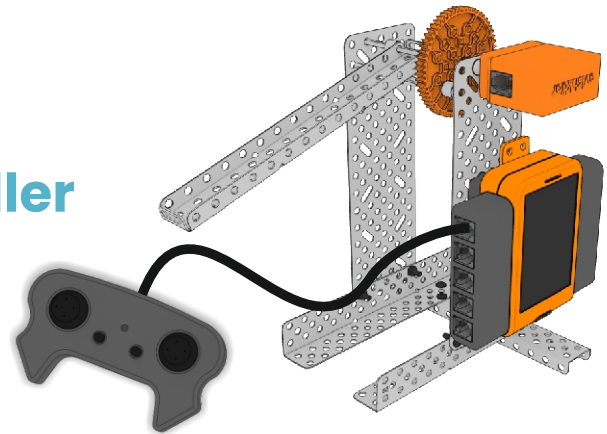
Looking Around You

Tennis ball launcher for pets uses the same mechanism

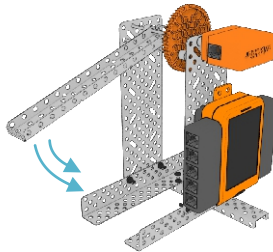
How to play – With Controller

You can use the remote controller to control your robot. Follow the instructions below to know various ways you can use it.

- Connect the motor in M2.
- Connect Remote Cable in Port Labeled as R.
- Switch on the brain and keep your Ball Shooter in open space and use your Remote's Left panel Joystick for movement of the robot.



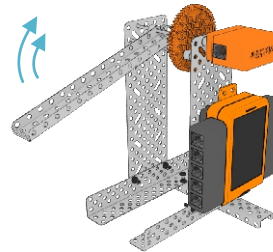
Left Joystick



When we push the left joystick towards left, the arm moves in clockwise direction.



Left Joystick



When we push the left joystick towards right, the arm moves in anti-clockwise direction.

How to play – With AMS

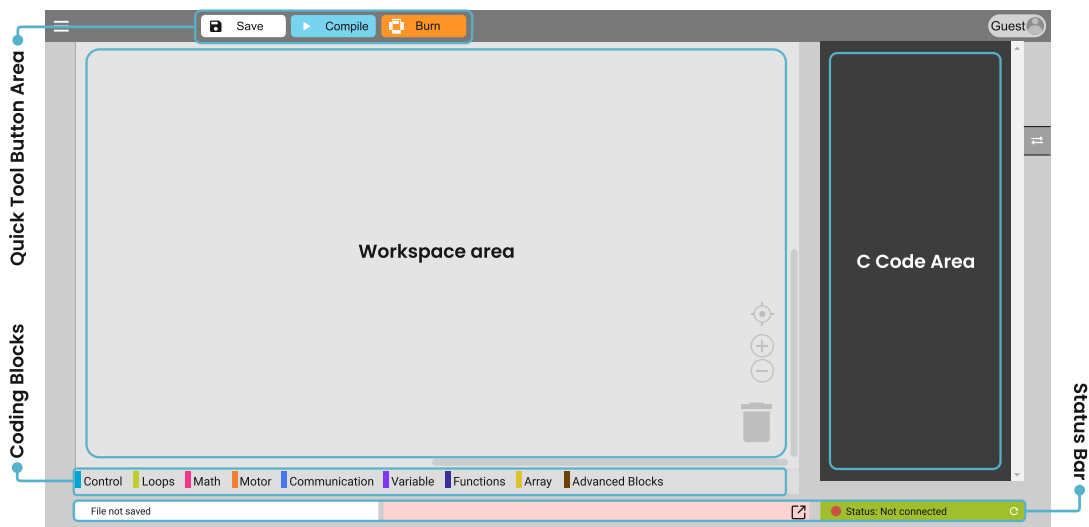
To program your robot you will need to use the software, **Avishkaar Make Studio**. Let's learn how to use it.



Avishkaar Maker Studio (AMS) is a block-based visual programming software to program all of Avishkaar's products. This nifty software allows children to code using a simple drag-n-drop interface, making programming a lot of fun.

Download AMS from www.avishkaar.cc/software/maker-studio

Understanding AMS Interface



- **Workspace Area**

This is the area where coding blocks will be dragged to develop any logic.

- **Coding Blocks**

This section is where all the blocks according to their use will be selected.

- **Status Bar**

This section will show the status of program, whether it is saved, compiled or burnt and the status of brain, Connected or Not-connected.

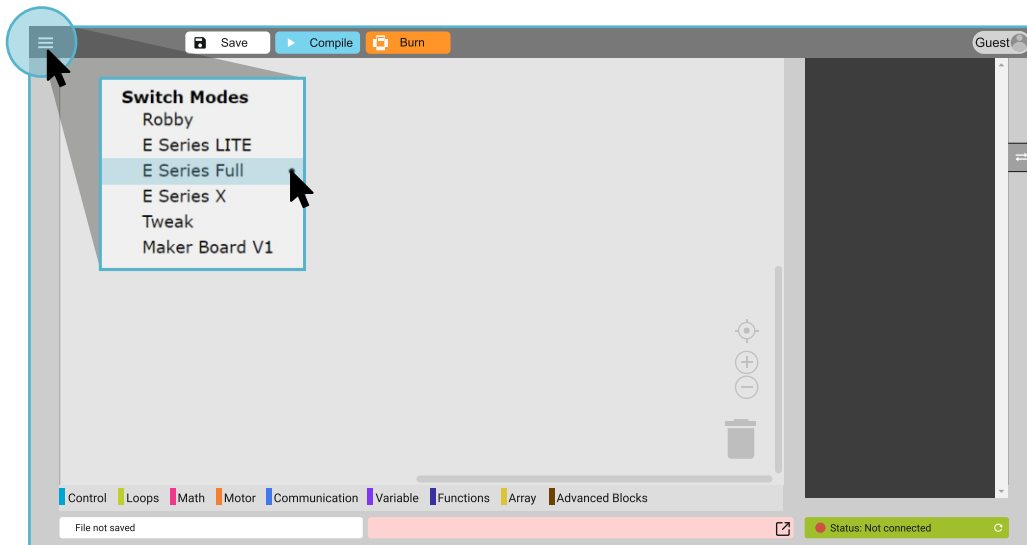
- **C-Code Area**

This section shows the program in C-Code Language, equivalent to the one made on workspace area using blocks.

Go ahead and develop any code of your choice in AMS following the examples shown in the sample projects ahead.

Set Mode

Open the App and switch mode to E-Series FULL.

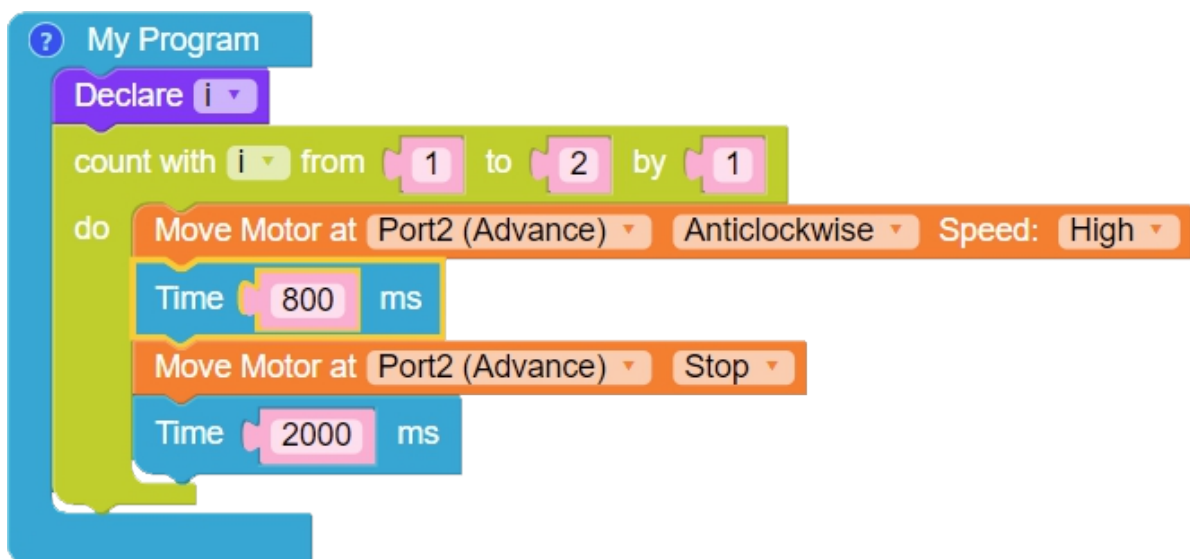


Write Code

Our problem statement here is that the ball shooter should do shooting action continuously. The players can throw the ball at it and the shooter will shoot it away.

Understanding the code

The code simply rotates the motor continuously so perform the shooting action. You can do a limited number of shoots by using a count with block too.



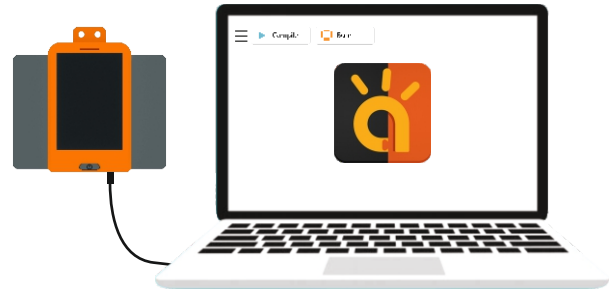
Burn Program on the Brain

01



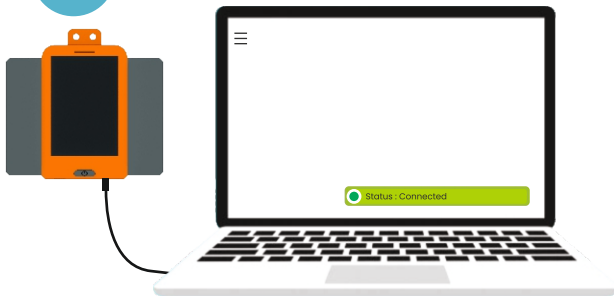
Click on SAVE.

02



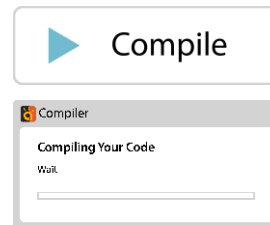
Connect the Full Brain to your laptop.

03



If the brain connected successfully then the STATUS will turn green show Connected.

04



Click on COMPILE.

05



Click on BURN.

How to play?

Cables Connection

1. Connect motor at M2.
2. Press the power button on the brain and see your robot work automatically.

Congrats!

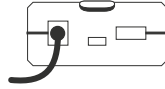
You are one step away from your 5 badge sticker. Register your kit using the steps on page 2 to access more project tutorial and complete all your badges.



Troubleshooting



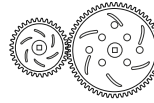
Check if you have connected the ports as mentioned in the chapter.



Check whether the wire is connected properly or not.



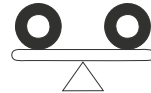
Check if the battery is connected properly to the brain or not.



Check if gears are meshed properly or not.



Check if the axle shaft is properly connected.



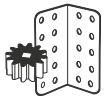
Check your structure is stable or not.



Check if the sensor is working properly or not by using LCD Display.



Check if your sensor is connected at proper height or not.



Check if any of the gear is not stuck with any plate.

In case the suggestions don't work,
do reach out to us:



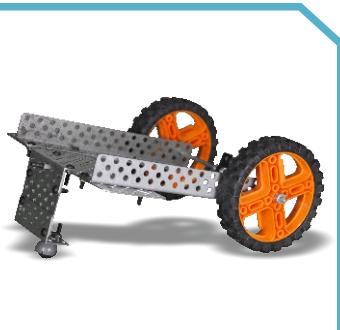
+91- 8506931515



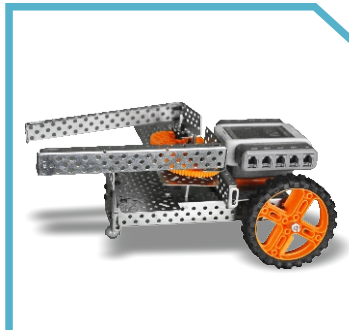
support@avishkaar.cc

Register Your Kit for More Possibilities

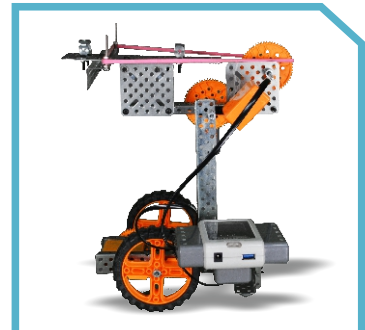
Scan the QR code to register your kit and get access to an online which is updated with expert tutorial videos each month.



Pull Toy



Gripper Robot



Archery Bot

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Isn't Innovating Fun?

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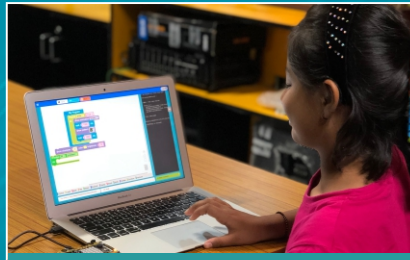


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Asia's Largest Robotics & Innovation Challenge!



Asia's Biggest Robotics
Competition



The Inventor's
Plaything Challenge



Tweak League: Jump
Start To Robotics



Biggest STEAM
Competition of India



1000+ | **15000+**
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