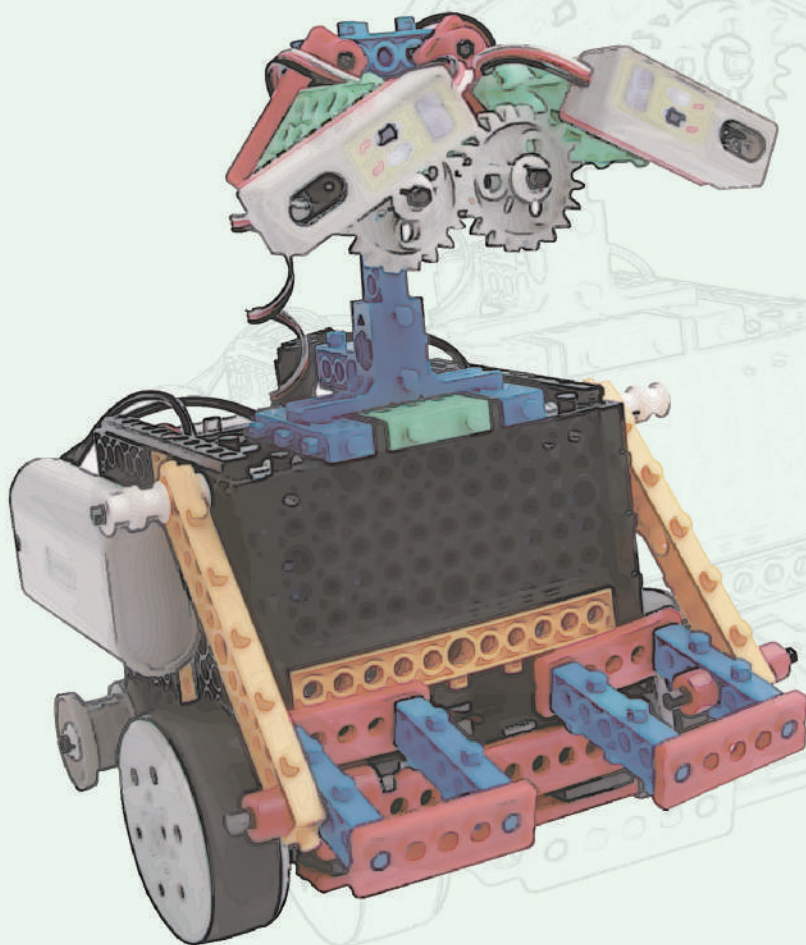


HUNA

Science Class



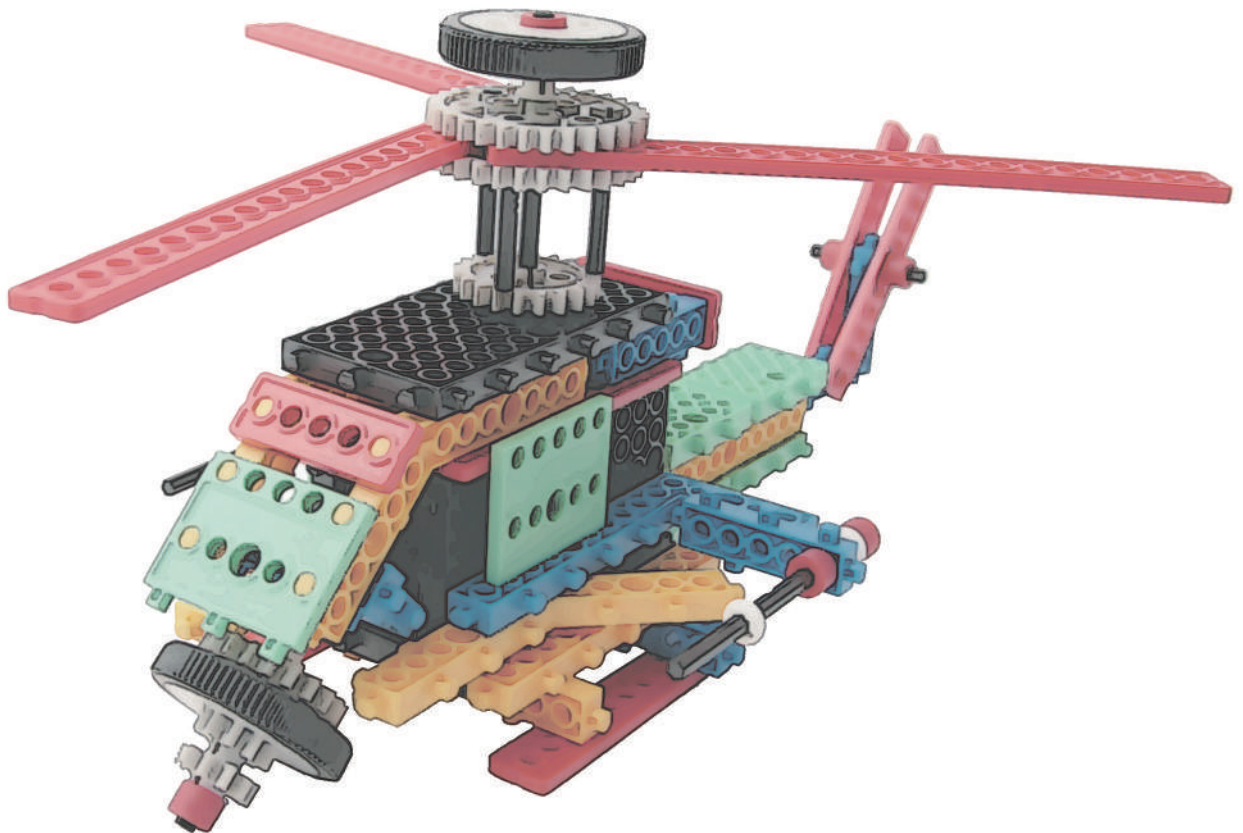
Beginning Course

Learn basic robot building skills, using a variety of block shapes, control boards and motors.

- Inspector Gadget's Arm
- Apache Helicopter
- Air-Sing-Sing
- Power Spin
- Battle Bumper Car
- Thomas Train
- Huna-E
- Scorpion Robot
- Penguin Show
- Soccer Robot

HUNAscience Class

Beginning Course



HUNAROBO SCIENCE CLASS BEGINNING COURSE

CONTENTS



List of the parts 5

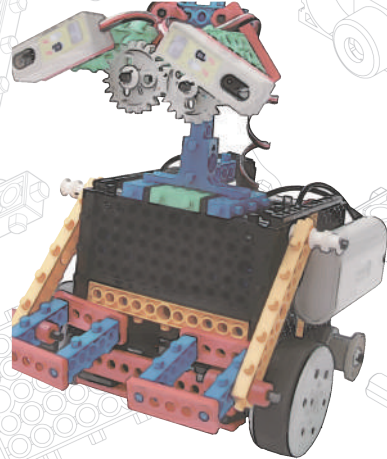
Let's learn how to assemble each part and its function! 7

What we are going to learn? (Robot Story)

• What is the robot?	13
• Kind of robots	18
• Principles of a lever	20
• The use of weights and pulleys	24
• The magic box of a robot - Mainboard	32
• How to use the electronic parts?	33
• Brain of the robot - MCU	42
• Robot Development	43
• History of Robots	52
• Control of the robot - Remote Control	53
• The principle of a Remote Control	60
• I like the color black - Linetracer	61
• Adjusting the sensor position	71
• Making the eyes of a robot - IR Sensor 1	72
• What is an IR Sensor?	73
• What is the Avoider?	74
• Avoiding objects	84

HUNAROBO SCIENCE CLASS BEGINNING COURSE

CONTENTS



• Power - Robot movement	85
• Making the eyes of a robot - IR Sensor 2	86
• Let's know about light	96
• Muscle of the robot - Motor	97
• Servo Motor	106
• Shaft and Gear	107
• Soccer game	114

Let's Make it!

• Turtle	14
• Scorpion	16
• Inspector Gadget's Arm	21
• Apache Helicopter	25
• Air-Sing-Sing	36
• Power Spin	44
• Battle Bumper Car	54
• Thomas Train	62
• Huna-E	76
• Scorpion Bot	88
• Penguin Show	98
• Soccer Bot 1	108

HUNAROBO 1 Education Program

Educational Development Program

- The whole programs focus on the development of scientific, robotic and other technological skills.
- Development of basic scientific knowledge and creative thinking skills to solve complex problems and program development to raise problem solution-orientated abilities and to create novel solutions.

Training Features

- Challenges and promotes problem-solving skills and improve concentration.
- Improve leadership and communication skills through small group activities.
- Education linked to kindergarten and elementary school science curriculum
- Under the guidance of a teacher, the goal will be achieved through self-assembly to promote a good learning environment.

HUNAROBO 1(Beginning Course)

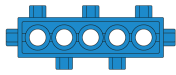
In this Beginning Course for Hunarobo 1, we will learn the program below:

No	Robot Story	Let's Make it
Course No. 1	What is a robot?	Let's know each part's function, name and learn assembling!
	Story of lever and pulley	Making objects using a variety of blocks
	Mainboard- Magic box	Making a robot using all modes of the mainboard
	History & Development of robots	Making a game robot using all modes of the mainboard
Course No.2	Robot composition (recognition) - Remote Control	Making a battle robot and play games with friends
	Linetracer	Making a Linetracer that can follow a line
	Robot composition (eyes) - IR Sensor 1	Making your own robot using an IR Sensor
	What is Avoider?	Making a robot that can avoid objects
Course No.3	Power of a robot- Electricity	Making your own robot and understand the principle of electricity
	Robot composition (eyes) - IR sensor 2	Making a robot that can follow an object
	Robot composition (muscle) - Motor	Making a robot using a motor
	Shaft wheel and Gear	Making a soccer robot using a remote control and play games with your friends

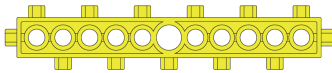
List of the parts

Block

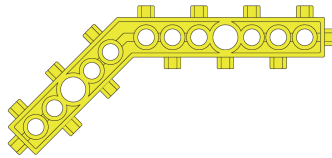
** The form and color of some parts may be different when compared to actual parts due to continues improvement of production quality.*



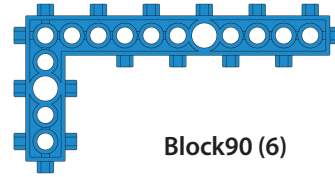
Block15 (10)



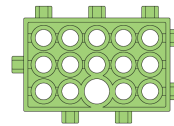
Block111 (6)



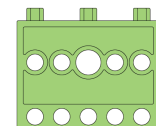
Block135 (6)



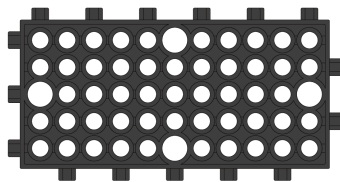
Block90 (6)



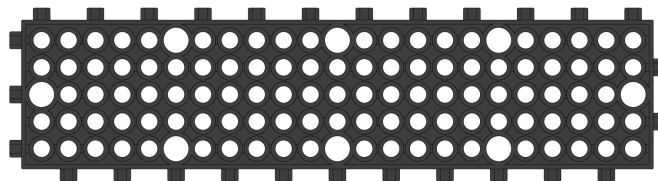
Block35 (6)



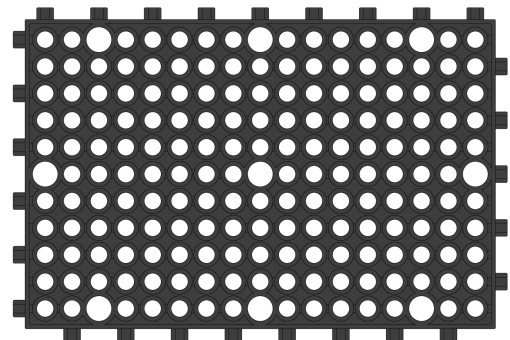
Motor Mount (4)



Block511 (6)

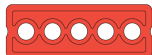


Block523 (2)



Block1117 (2)

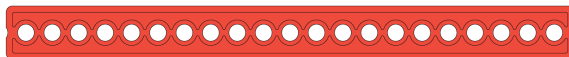
Frame / Adapter



Frame5 (10)



Frame11 (10)



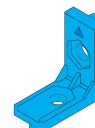
Frame21 (4)



Adapter1 (10)

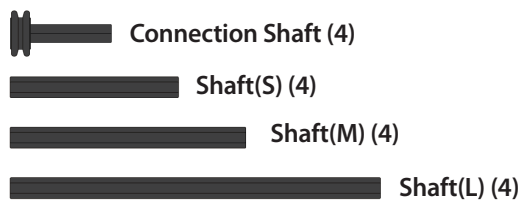


Adapter2 (10)

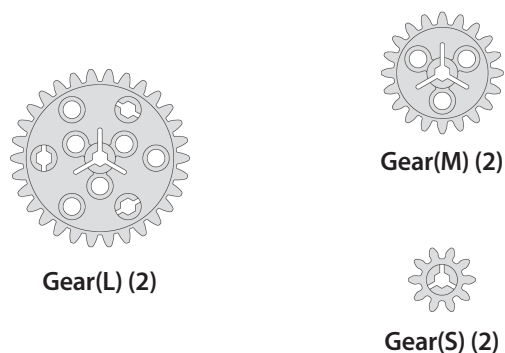
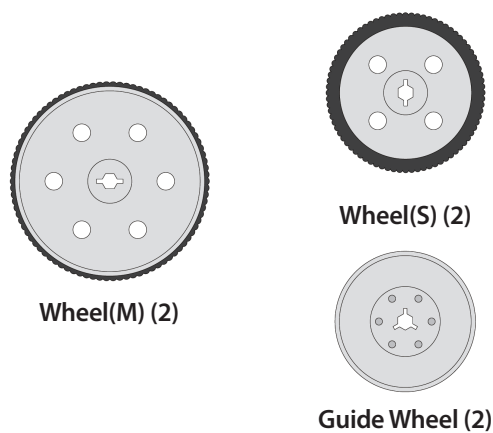


L Adapter (8)

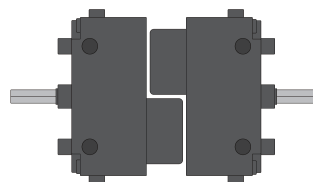
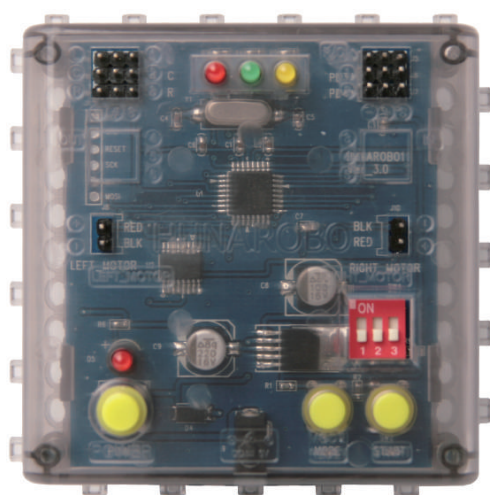
Shaft / Bush



Wheel/ Gear



Electronic Part



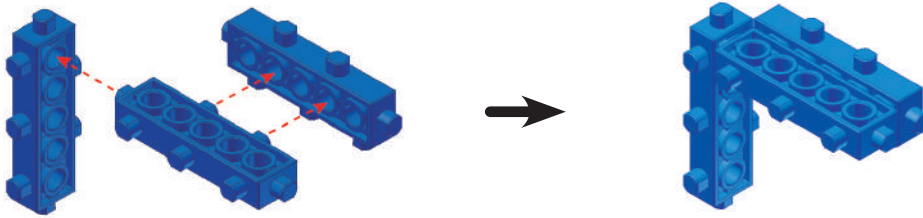
Let's learn how to assemble each part and its function!

Assemble blocks

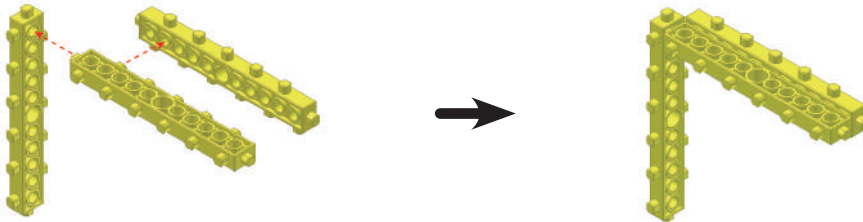
The blocks can be assembled in any fashion as long as the parts line up.

(The middle hole can be used to assemble the DC motor.)

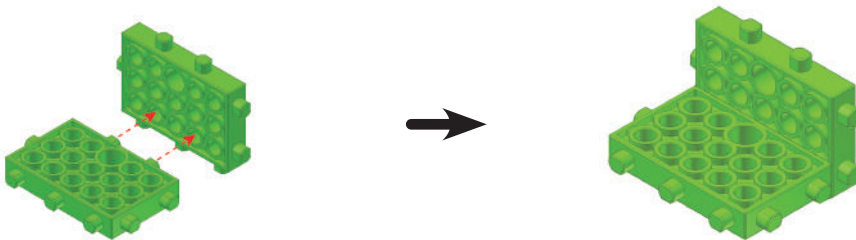
- 1) Block15 means that it has 5holes in a row and the left column side has 3 protruding parts, the other side has 2 protruding parts.



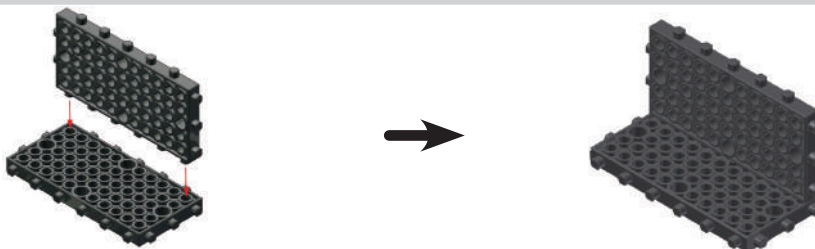
- 2) Block111 means that it has 11holes in a row and the left column side has 6 protruding parts, the other side has 5 protruding parts.



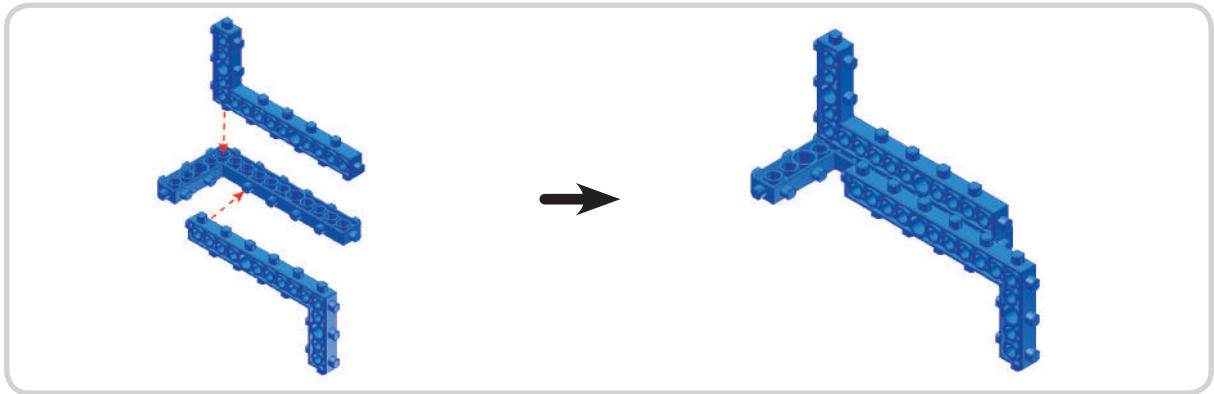
- 3) Block35 means that it has 5holes in three rows(total 15holes),also the block35 has one side with 3 protruding parts, 2sides with 2 protruding parts and 1side with 1 protruding part.



- 4) Block511 means that it has 11holes in five rows(total 55holes), one side has 6 protruding parts, the other side has 5 protruding parts and the other 2side have 3 and 2 protruding parts respectively.



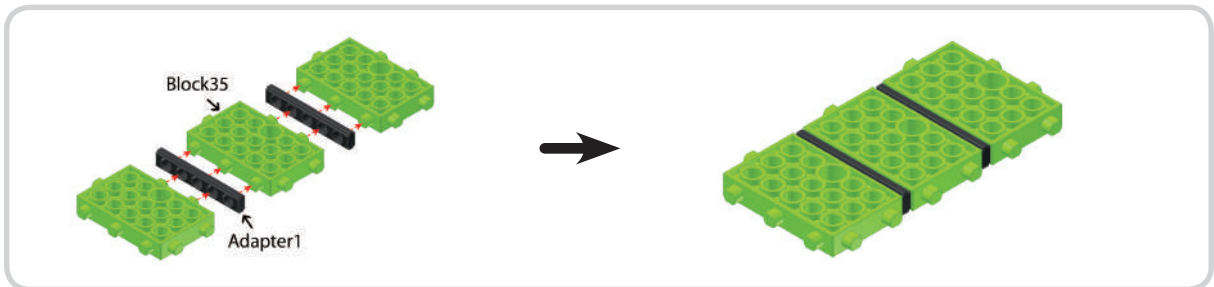
5) Block90 means angle is 90 degrees.



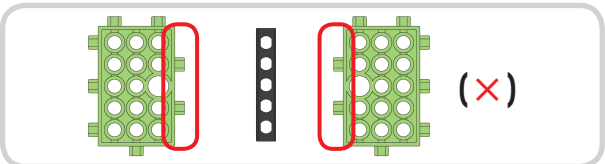
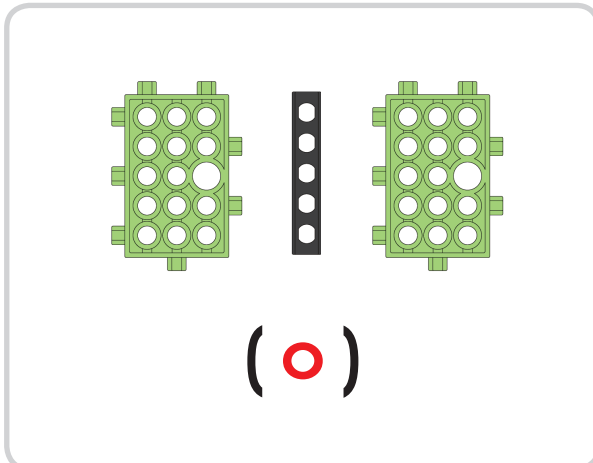
6) Block135 has an angle of 135 degrees.



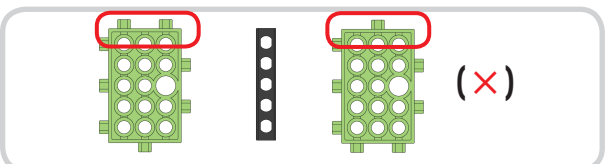
Assemble using an adapter



Ensure you use the proper side of the adapter.



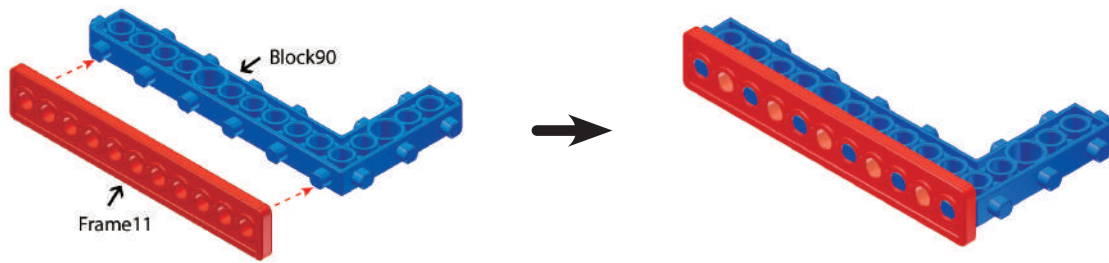
If both sides are odd or even, the adapter will not work.



If the upper and lower parts are different, the adapter will not work.

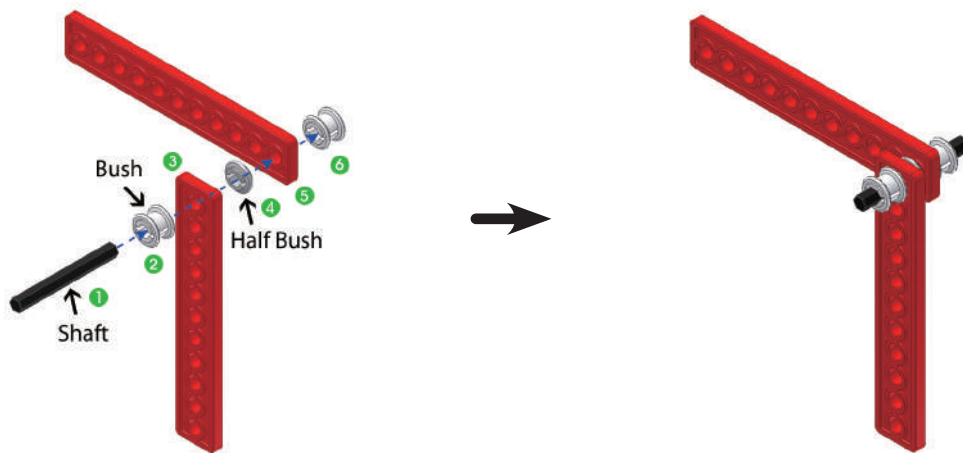
Assemble block and frame

If you assemble the frame it protruding parts get inserted into every other hole.



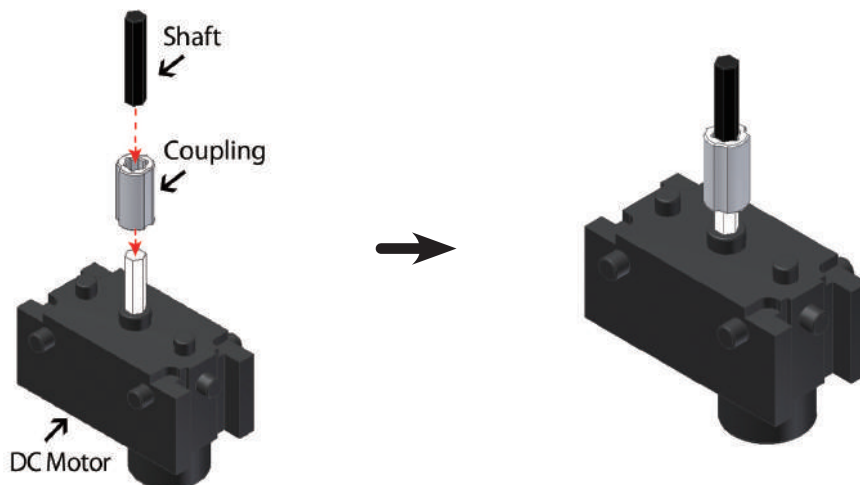
Assemble shaft and bush

Try to assemble in order.



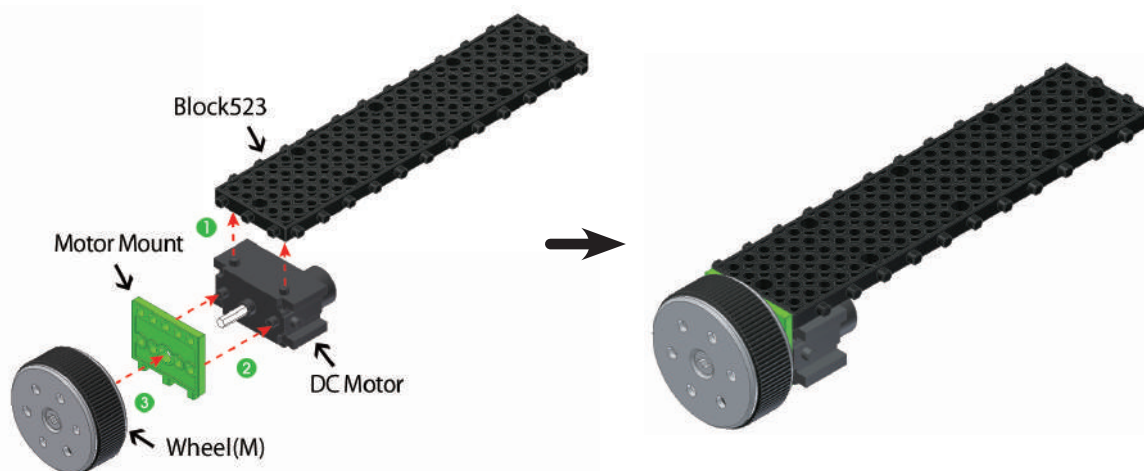
Assemble DC motor and coupling

The coupling is used to join the shaft to the motor and can be used to make the shaft longer.



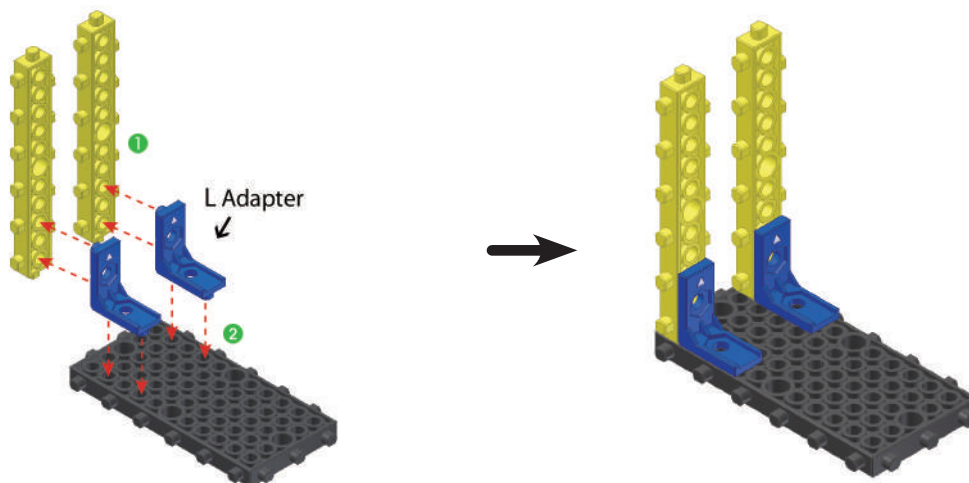
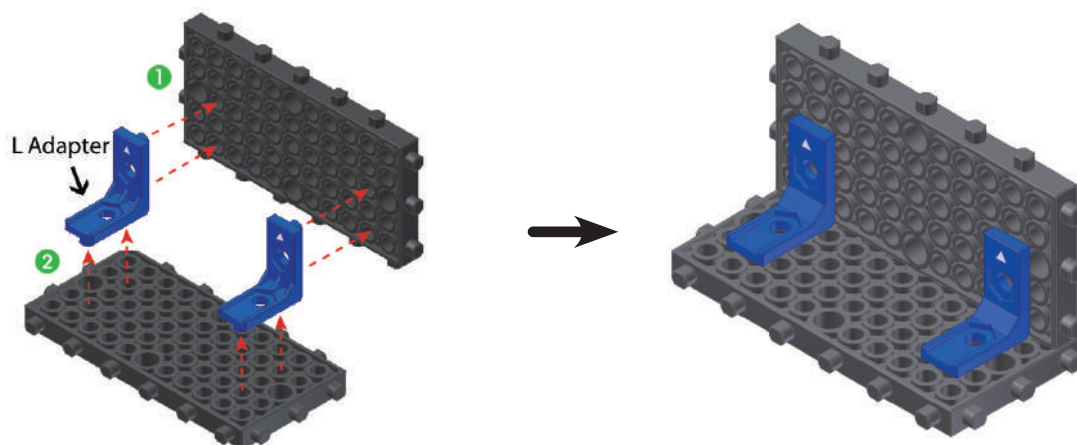
Assemble DC motor and wheel

Follow the order.

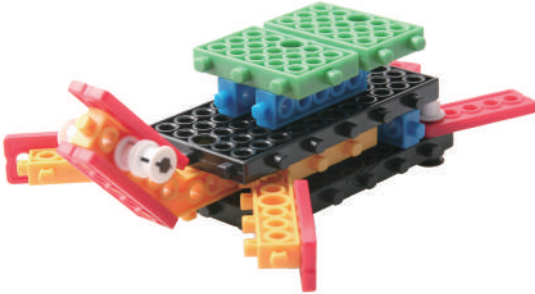


Assemble L adapter and block

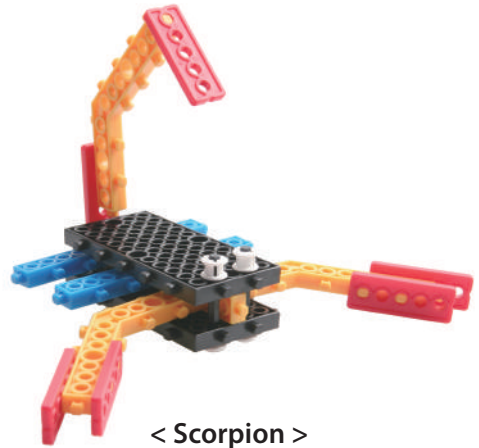
Follow the order.



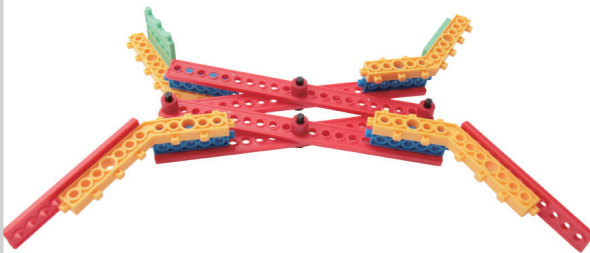
What robots are we going to assemble? ➡



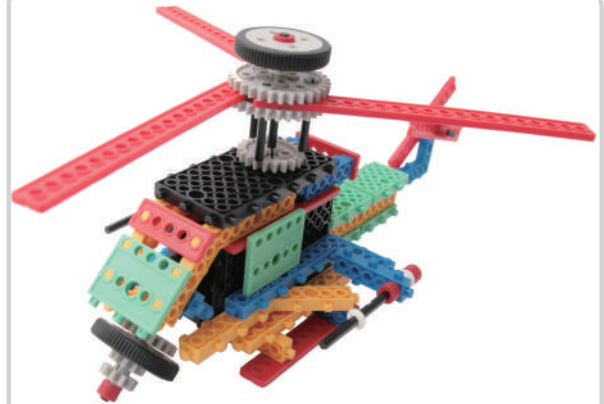
< Turtle >



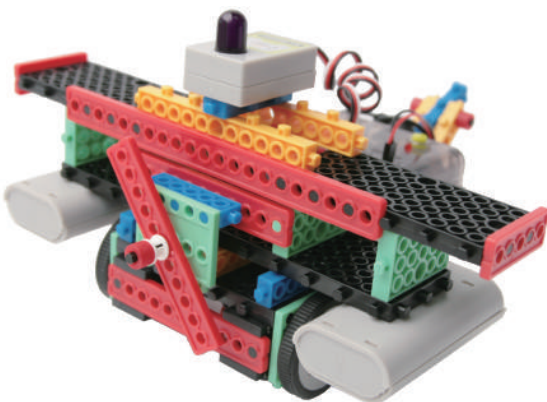
< Scorpion >



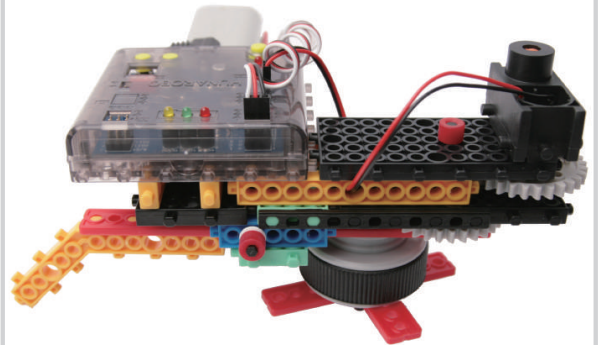
< Inspector Gadget's arm >



< Apache Helicopter >

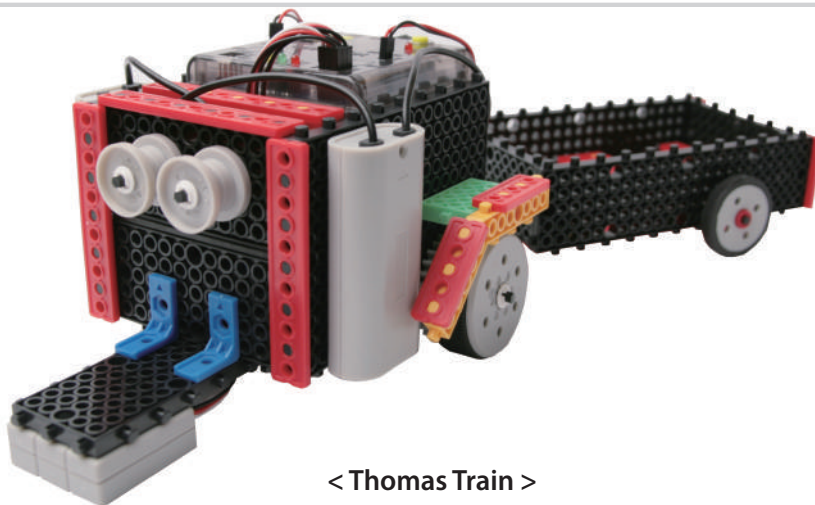


< Air-sing-sing >

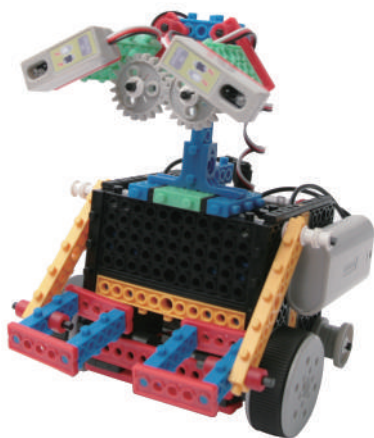


< Power Spin >

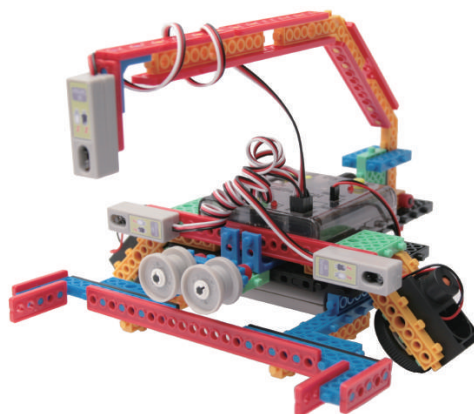
What robots are we going to assemble?



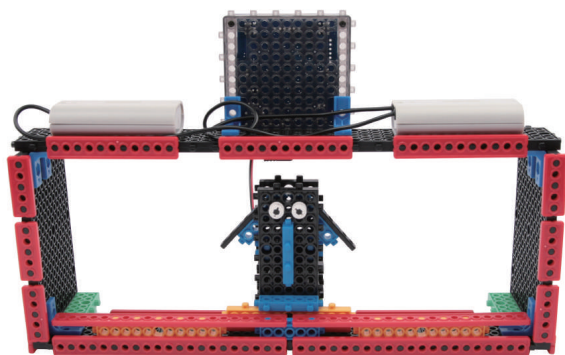
< Thomas Train >



< Huna-E >



< Scorpion Bot >



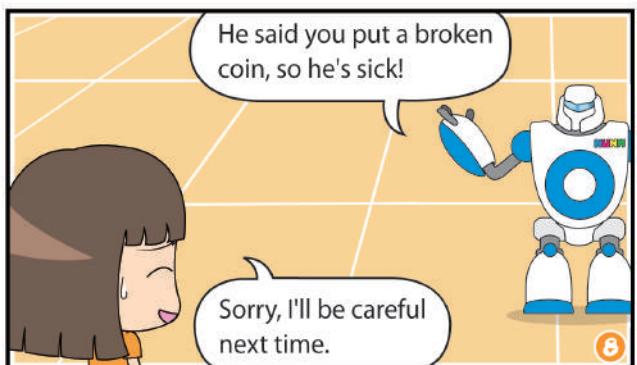
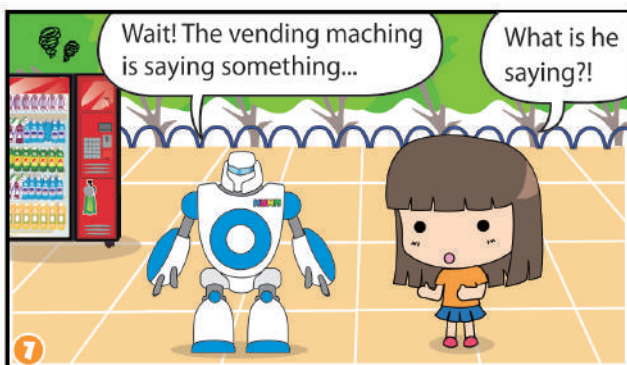
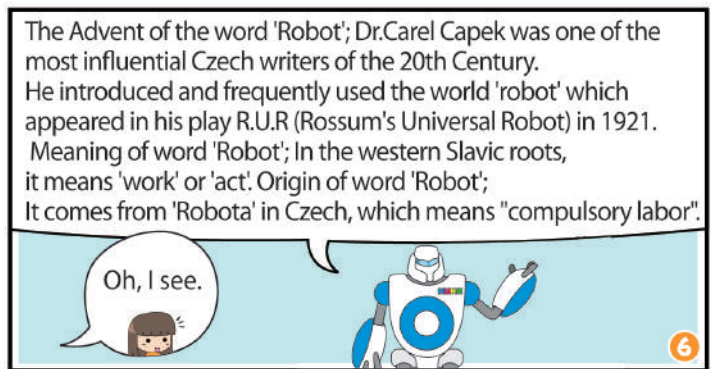
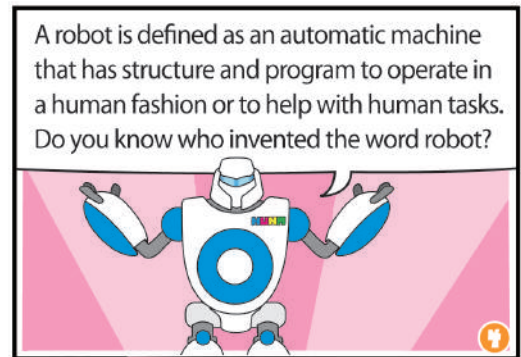
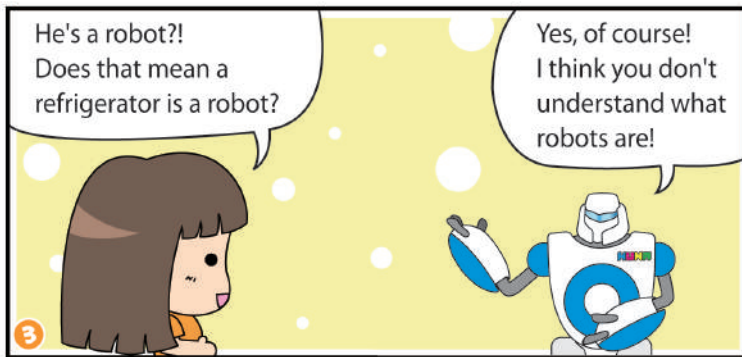
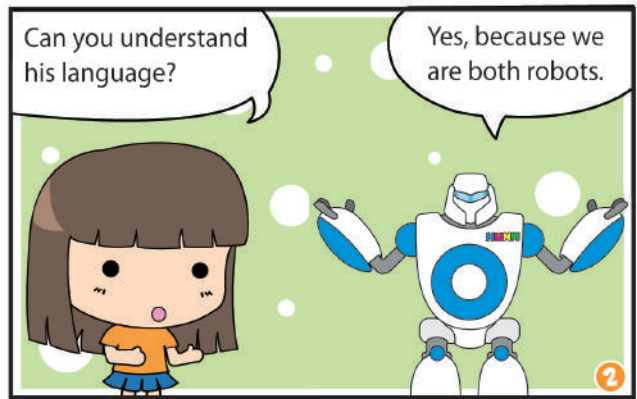
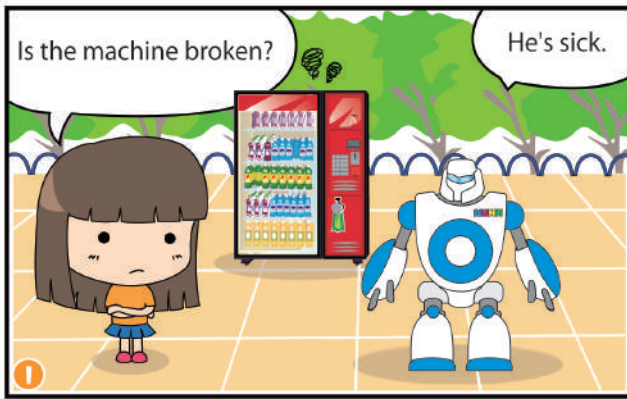
< Penguin Show >



< Soccer Bot 1 >



What is a Robot ?

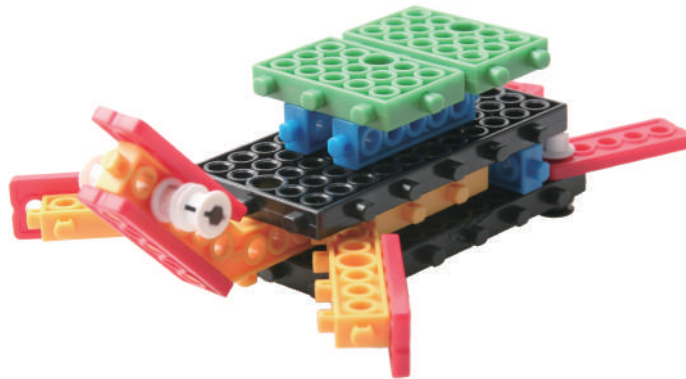




Let's
Make it 1

Learning basic assembly

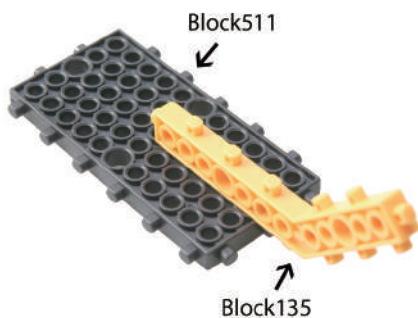
Turtle



Prepare parts for assembly

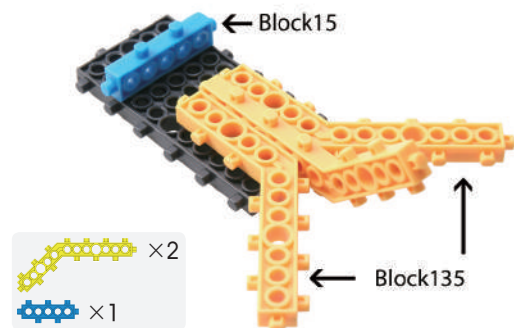
Block15	×3
Block35	×2
Block511	×2
Block135	×3
Frame5	×6
Shaft	×1
Connection Shaft	×2
Bush	×6

1



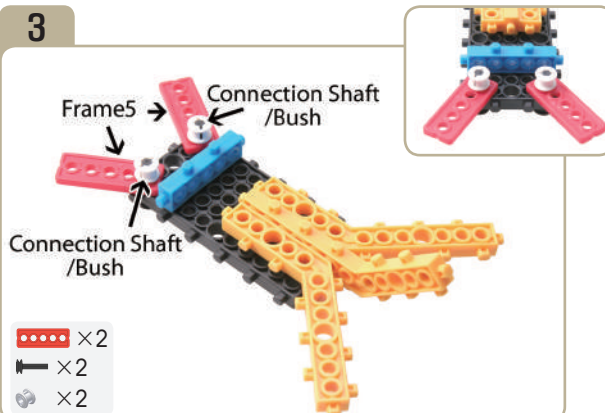
Attach a 「block135」 to 「block511」.

2



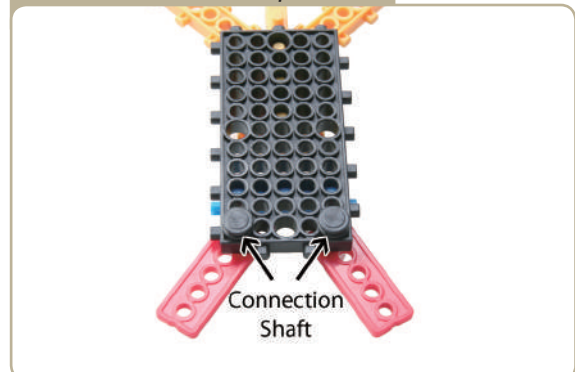
Connect two 「block135」s and a 「block15」 to model(pic)#1.

3

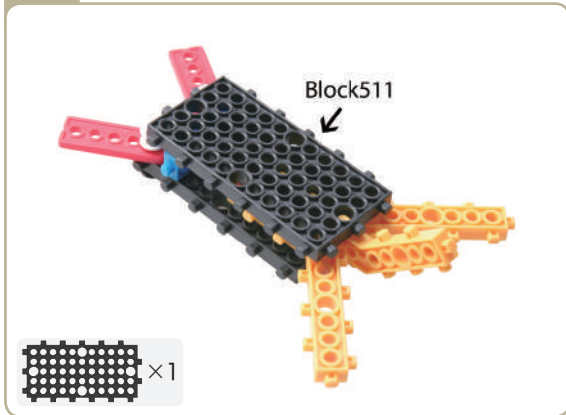


Connect two 「frame5」s to model(pic)#2 with connection shafts and bushes.

4 (Bottom of model(pic)#3)

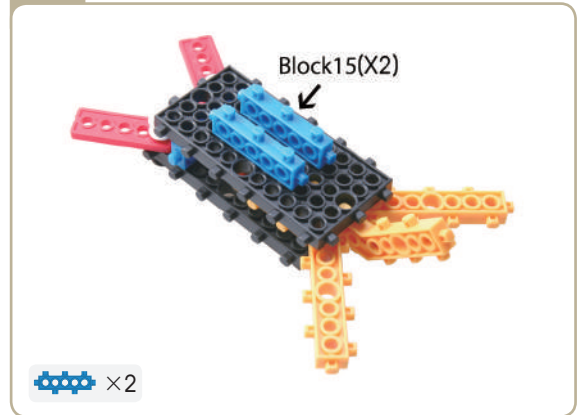


5



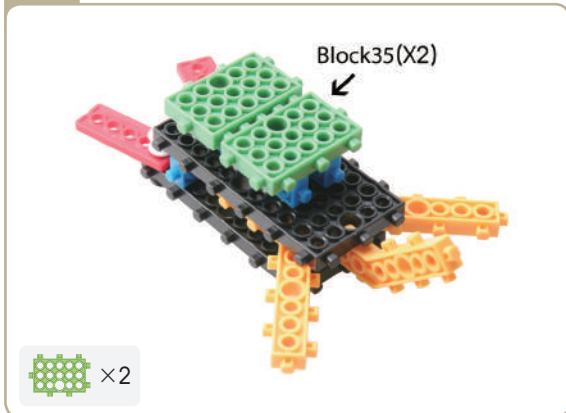
Attach a 「block511」 to model(pic)#3.

6



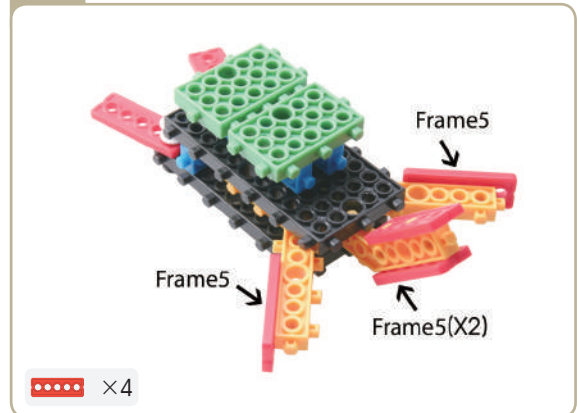
Attach two 「block15」s to model(pic)#5.

7



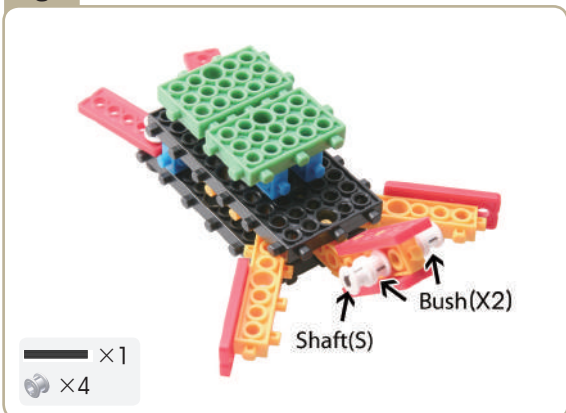
Attach two 「block35」s to model(pic)#6.

8



Attach four 「frame5」s to model(pic)#7.

9



Connect a short shaft and each side two bushes to model(pic)#8.

Completed





Let's
Make it 2

Learning Basic Assembly

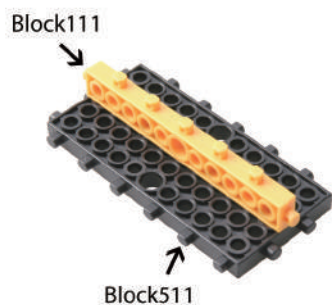
Scorpion



Prepare parts for assembly

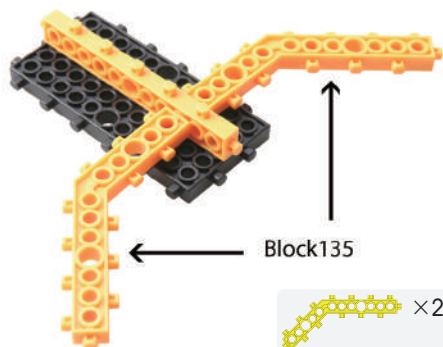
Block15	×4
Block111	×1
Block511	×2
Block135	×3
Frame5	×6
Shaft	×2
Bush	×2
Half Bush	×2

1



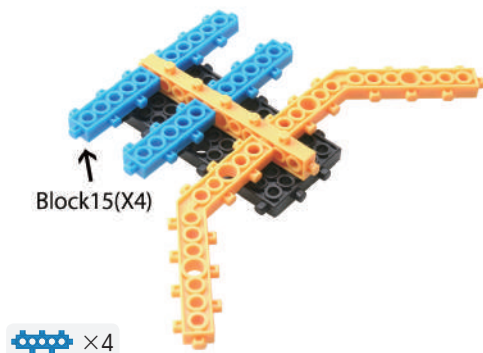
Connect a 「block111」 and a 「block511」.

2



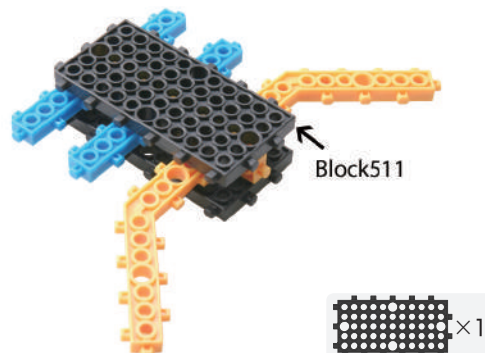
Connect two 「block135」s to model(pic)#1.

3



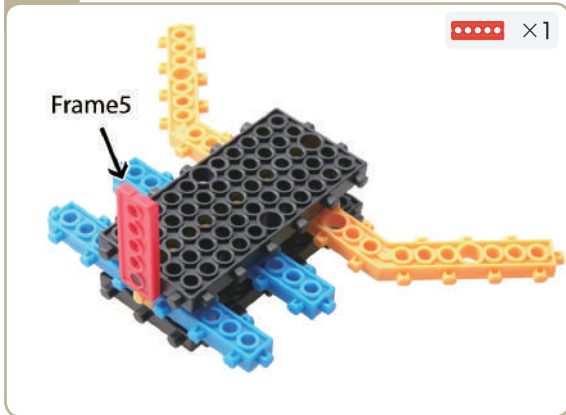
Connect four 「block15」s to model(pic)#2.

4



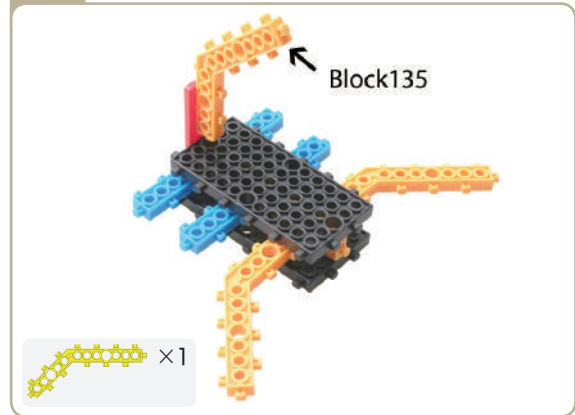
Attach a 「block511」 to model(pic)#3.

5



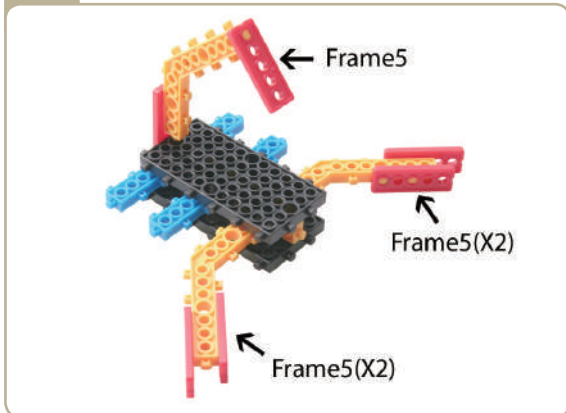
Connect a 「frame5」 to the back of model(pic)#4.

6



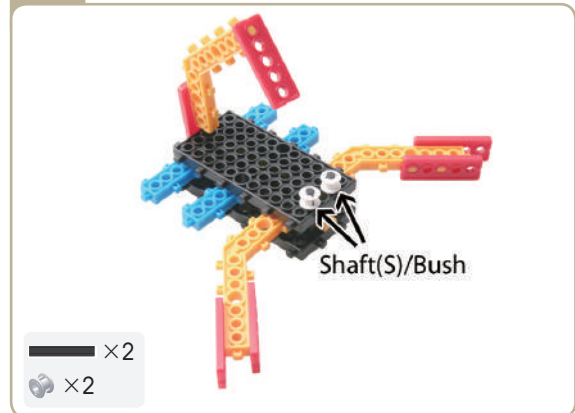
Connect a 「block135」 to 「frame5」 of model(pic)#5.

7



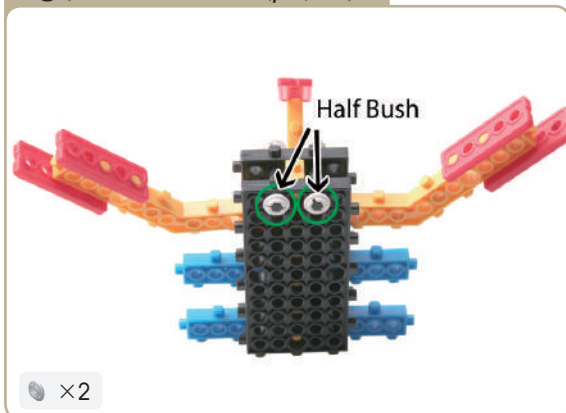
Attach five 「frame5」s to model(pic)#6.

8



Make the eyes to model(pic)#7 with two short shafts and bushes.

9 (Bottom of model(pic)#8)



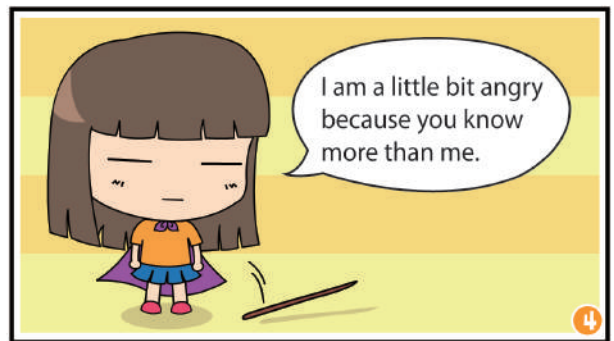
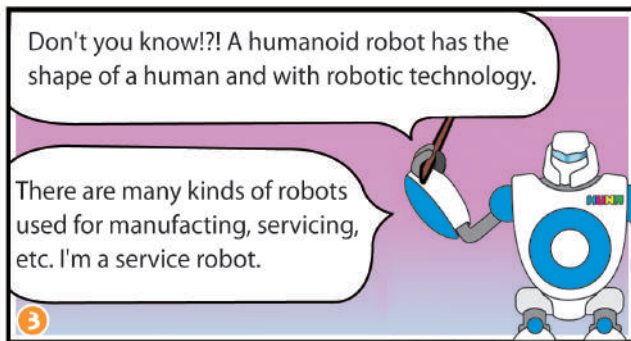
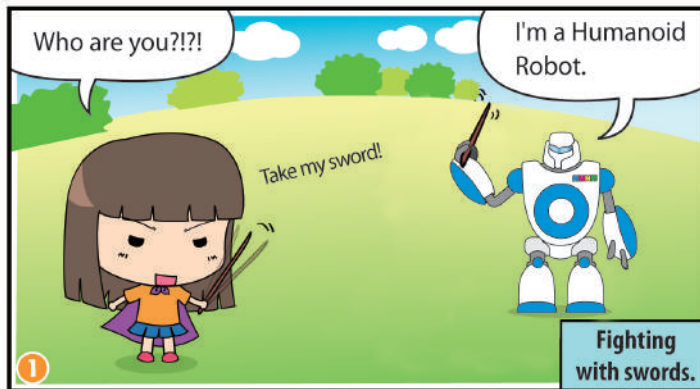
Connect half bushes to short shaft at the bottom of model(pic)#8.

Completed





Kind of robots



1) Manufacturing Industry



Motorbike manufacturing



Electronics Manufacturing



Car manufacturing

2) Servicing Robots



Cleaning Robot



Security Robot



Humanoid Robot



Look around your house and list how many robots you can find!

Spiral notebook lines for writing.



Making your own robot

♣ Try to make the robots in the pictures below and talk about their shapes.



1

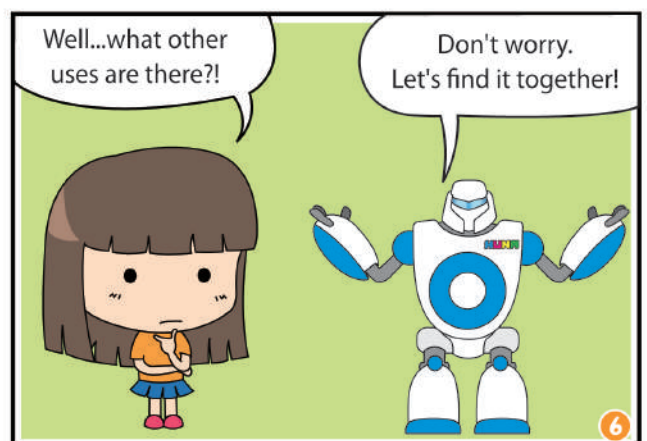
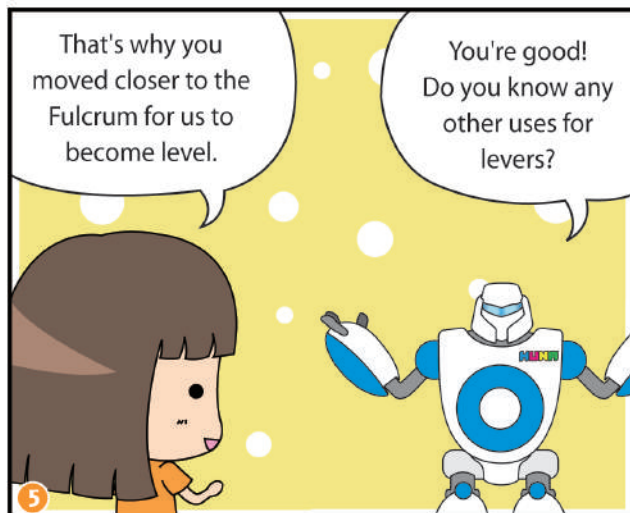
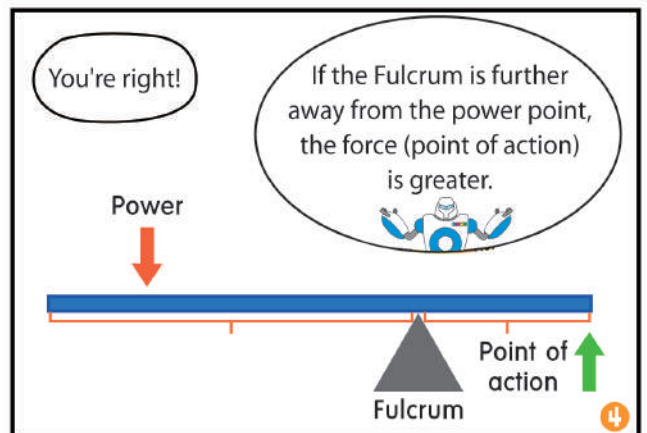
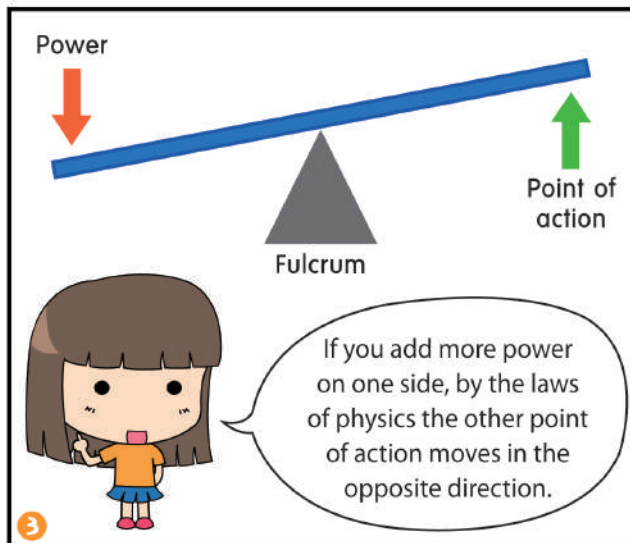
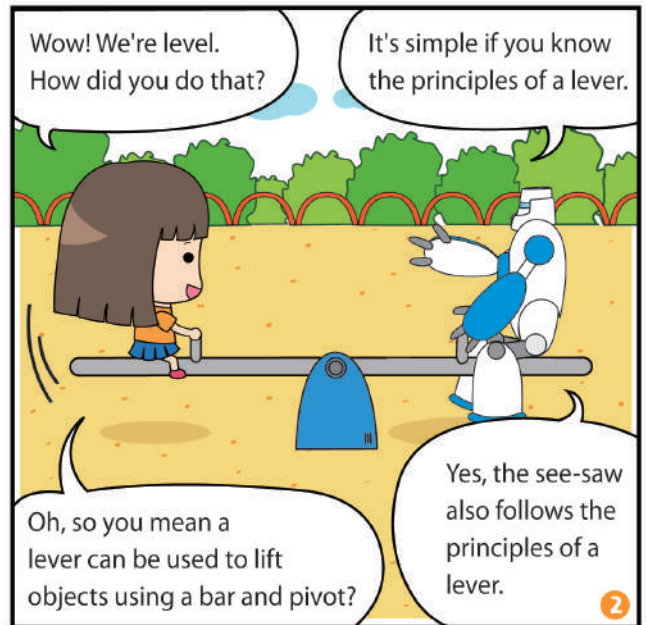
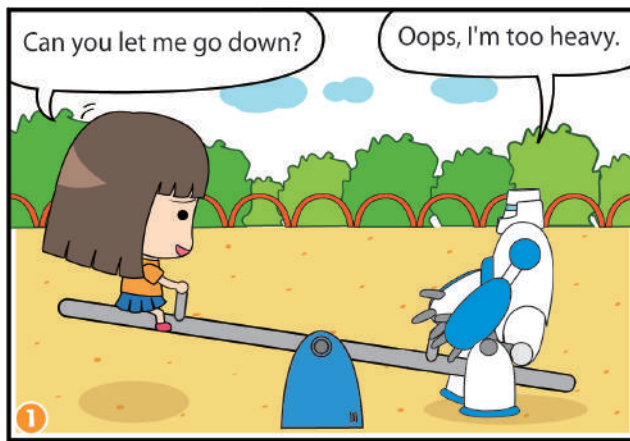
2

3

4



Principles of a lever



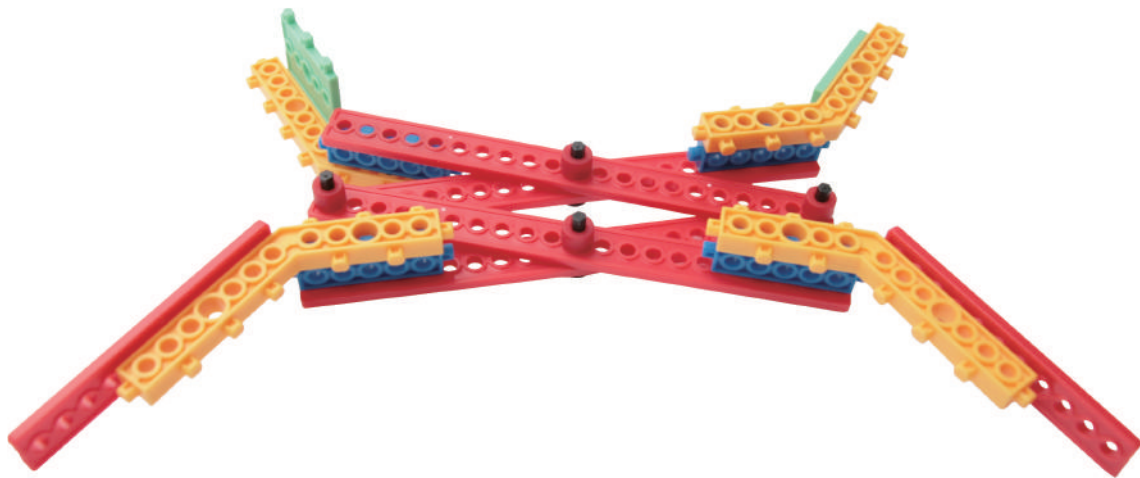
Let's Make it 3 *Make the object below using the principles of levers*



Inspector Gadget's Arm



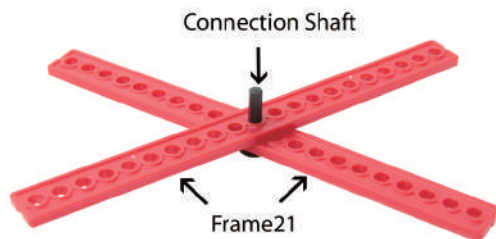
It is a freely moving robotic arm based on the cartoon 'Inspector Gadget' and has been adapted for many practical purposes in our lives these days. The three pictures above give some of the practical uses for this technology.



Prepare parts for assembly

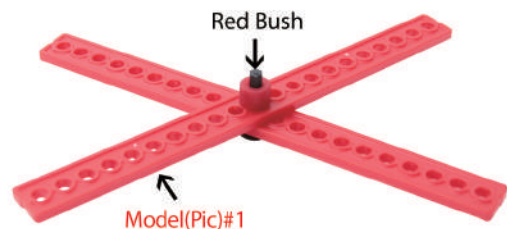
Block15	×4
Block135	×4
Motor Mount	×2
Frame11	×2
Frame21	×4
Connection Shaft	×4
Red Bush	×4

1



— ×1
 ×2

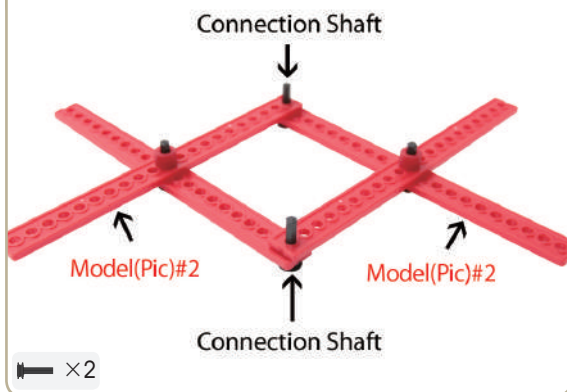
2



 ×1

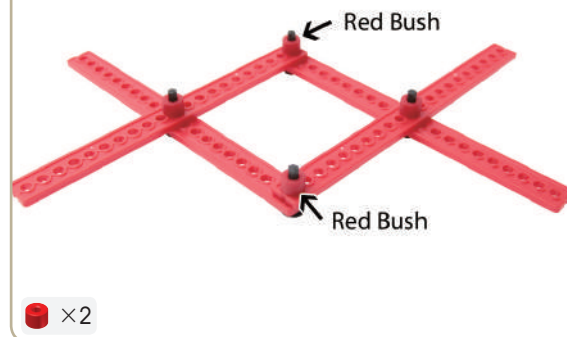
Fix connection shaft with a red bush.
 (Assemble two identical models.)

3



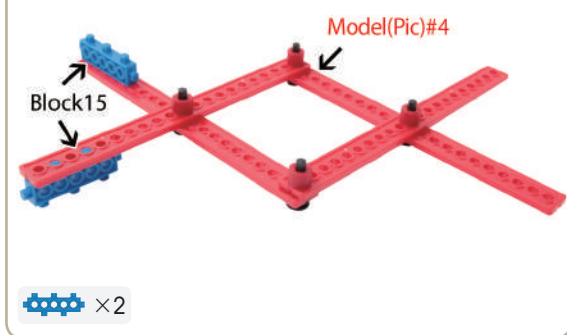
Join two of model(pic)#2 with two connection shafts.

4



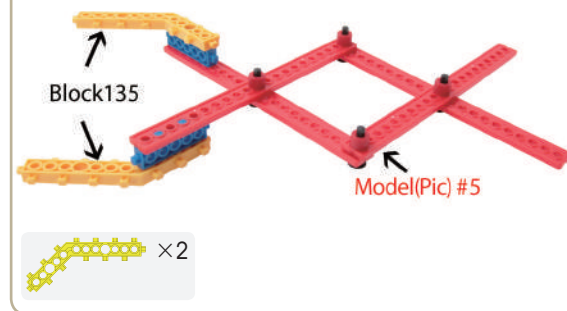
Connect the red bush to each connection shaft of model(pic)#3.

5



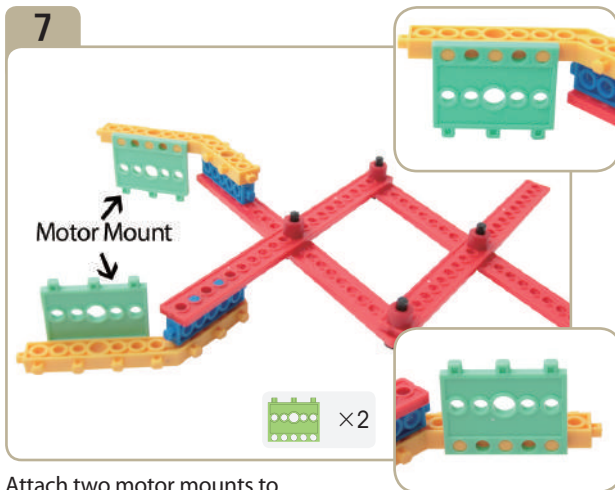
Attach two 'block15's to model(pic)#4.

6



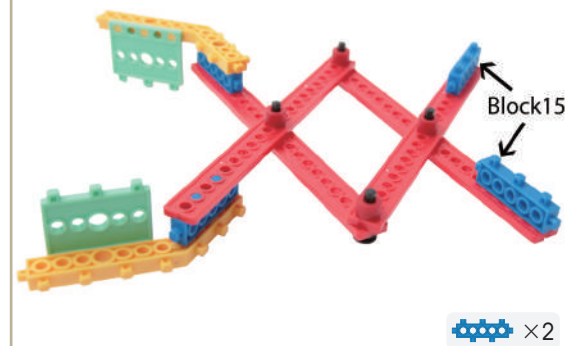
Attach two 'block135's to model(pic)#5.

7



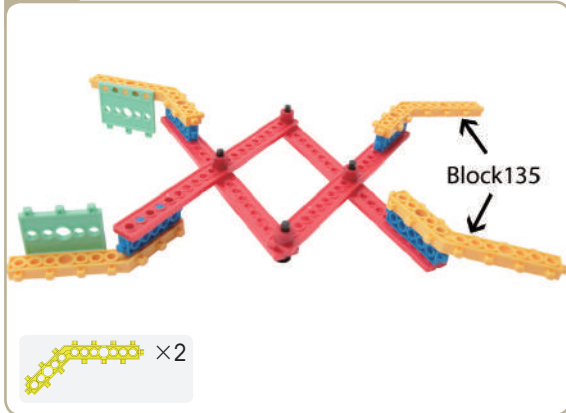
Attach two motor mounts to 'block135' of model(pic)#6.

8



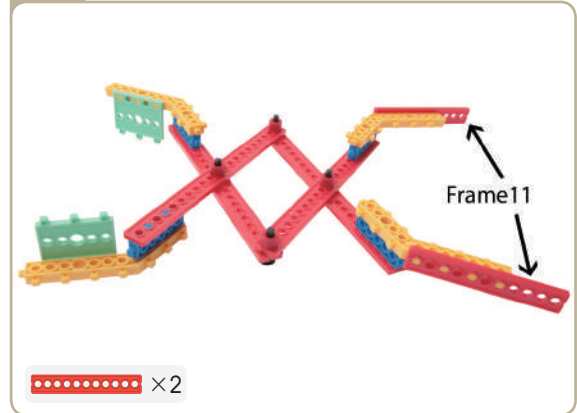
Attach two 'block15's to model(pic)#7.

9



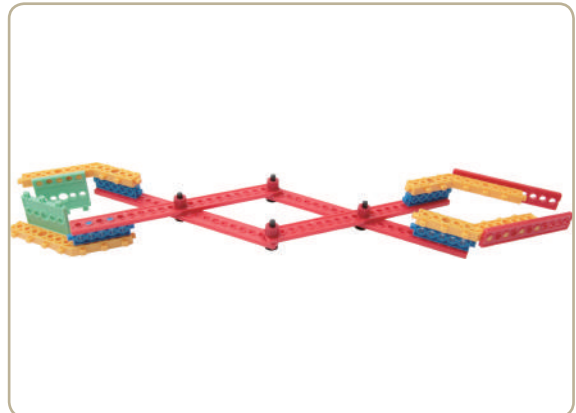
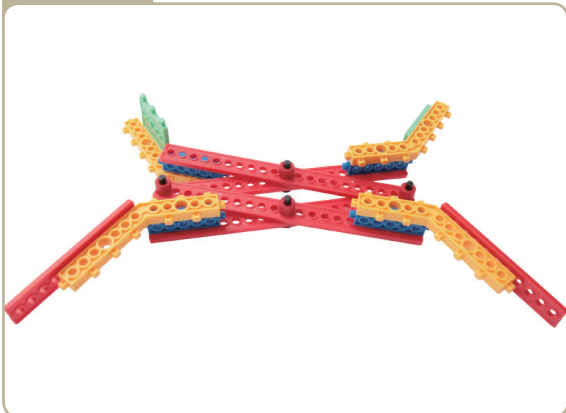
Attach two 「block135」s to model(pic)# 8.

10



Attach two 「frame11」s to model(pic)# 9.

Completed



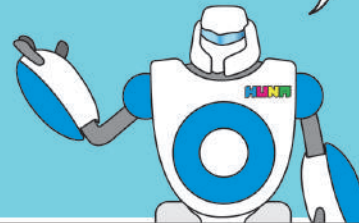


The use of weights and pulleys

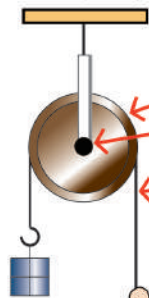
What are the uses of weights and pulleys?



A pulley is made by wheel, shaft and rope.
There are two kinds of pulleys,
do you want to try to lift objects using both?!



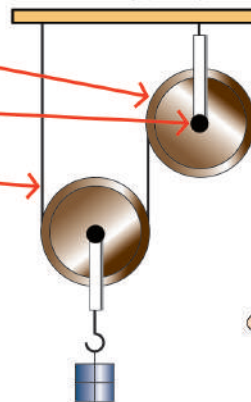
Fixed pulley



The object isn't that
light but the fixed pulley
makes it easier to move.



Moving pulley



Wow! This object is
really easy,
but why does the object
move so little?



Why?! ??



What is the difference between fixed and moving pulleys?



Blank lined area for writing notes.



Using a variety of blocks to make objects



Apache Helicopter

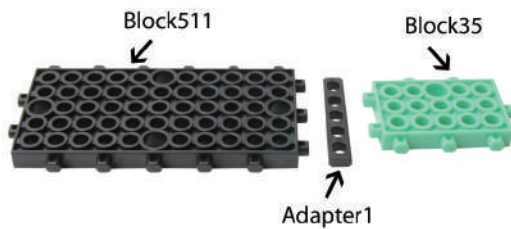
The Apache Helicopter is part of the U.S Army. It is lethal in attacking tanks and other enemy targets. It also has enough firepower to bring down enemy helicopters and is very functional at night.



Prepare parts for assembly

Block15	×8	Gear(L)	×2
Block111	×6	Gear(M)	×2
Block35	×4	Gear(S)	×2
Block511	×4	Shaft(L)	×4
Block90	×3	Shaft(M)	×3
Block135	×4	Shaft(S)	×1
Motor Mount	×3	Bush	×5
Frame5	×2	Half Bush	×2
Frame11	×6	Red Bush	×10
Frame21	×3	Adapter1	×1
Wheel(S)	×2	Adapter2	×2

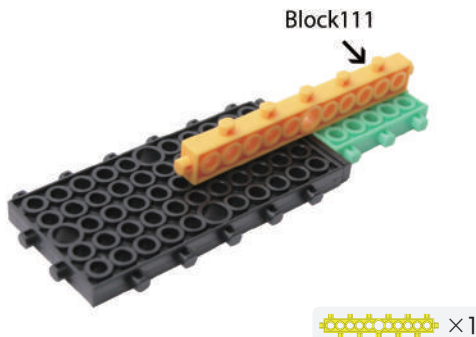
1



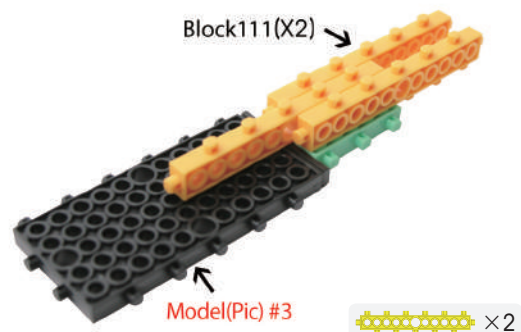
2



3



4



Connect two 「block111」s to model(pic)# 3.

Red Bush(X2)

Frame11

Shaft(S)

Model(Pic) #6

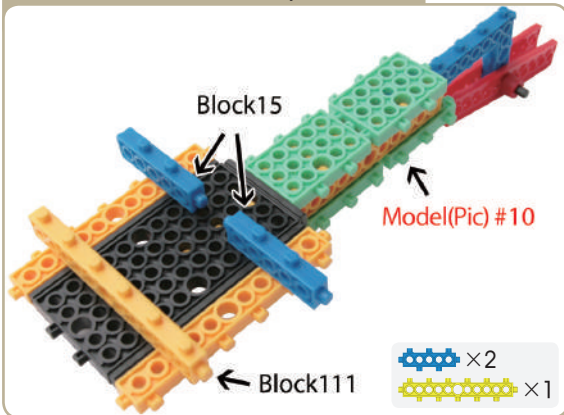
Legend:

- Red square: $\times 2$
- Black line: $\times 1$
- Red dotted line: $\times 2$

[illegible]

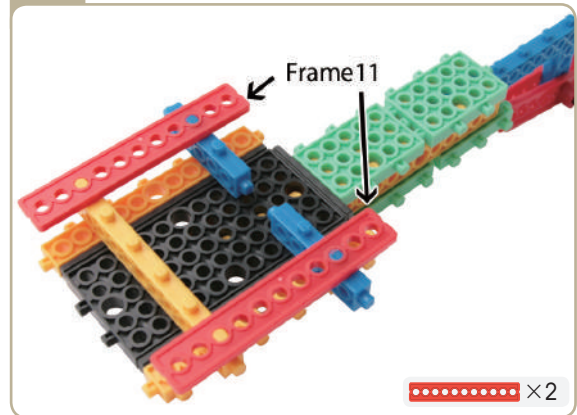
A LEGO Technic model of a rocket ship. The base is a black 1x12 plate. Two orange 1x12 Technic beams are attached to the sides of the base. In the center, an orange 1x2 Technic beam is attached to the base. On top of this orange beam is a green 1x12 Technic beam. At the top of the green beam is a red 1x2 Technic beam with a red propeller-like structure on top.

11 (Bottom of model(pic)#10)

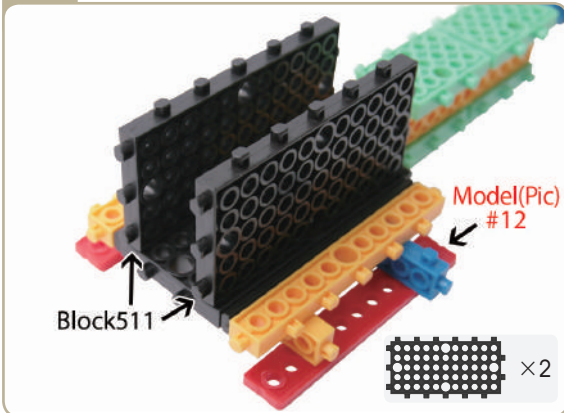


Turn model(pic)#10 upside down, attach two 「block15」s and a 「block111」.

12

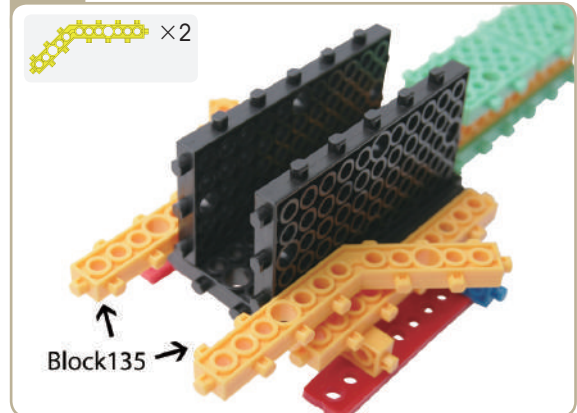


13

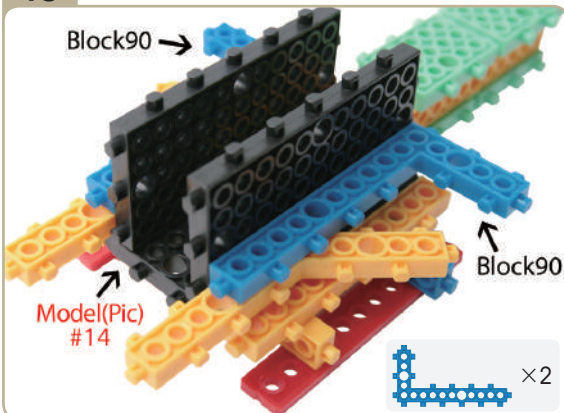


Turn model(pic)#12 upside down, then attach two 「block511」s.

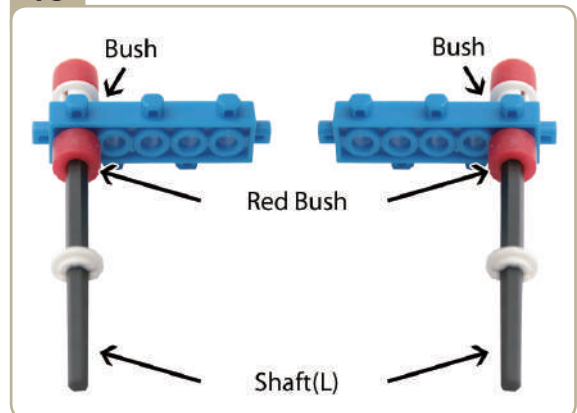
14



15

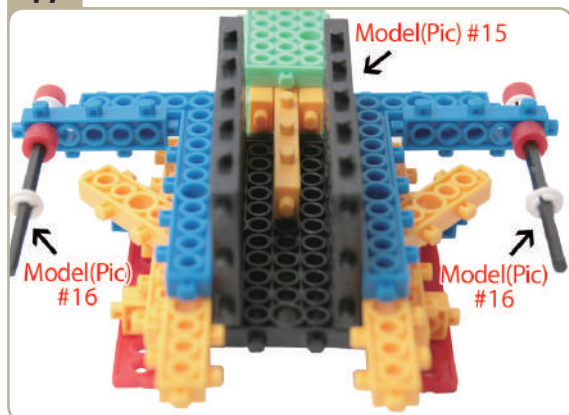


16



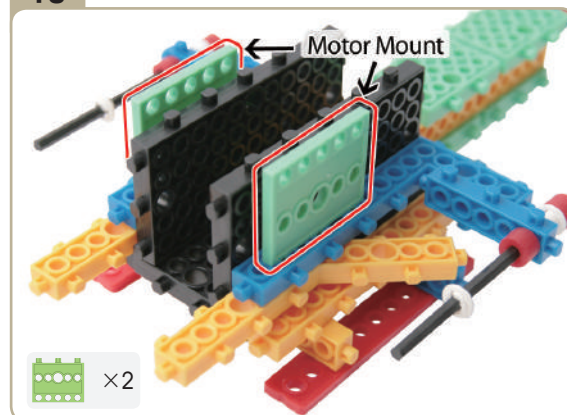
Give attention on 「block15」's directions.
(Assemble two identical models.)

17

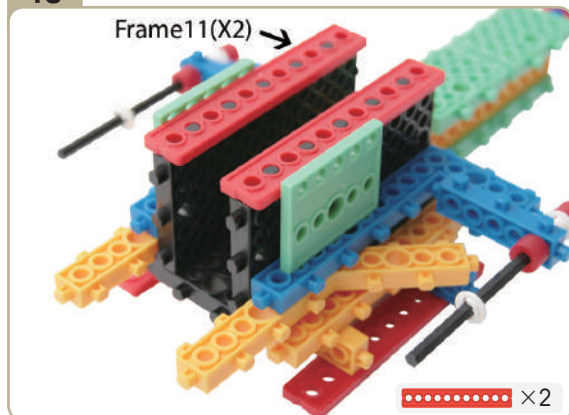


Combine model(pic)#15 with model(pic)#16.

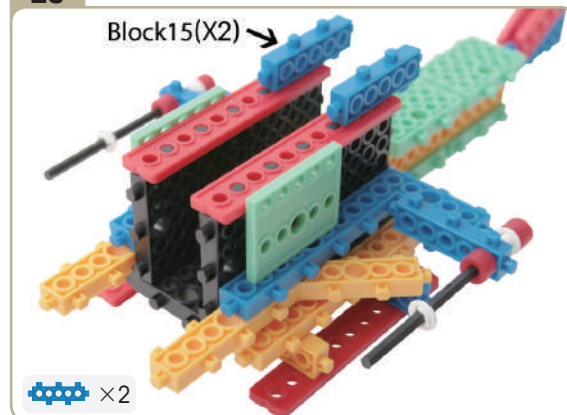
18



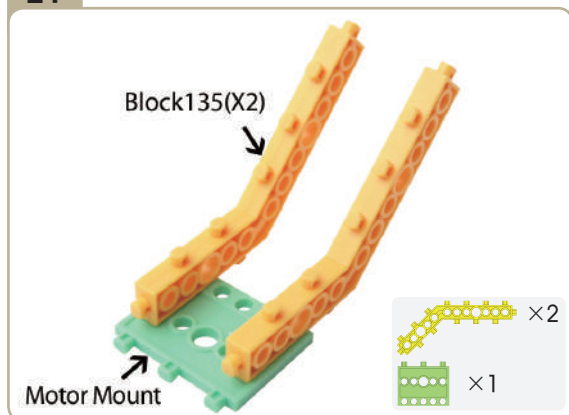
19



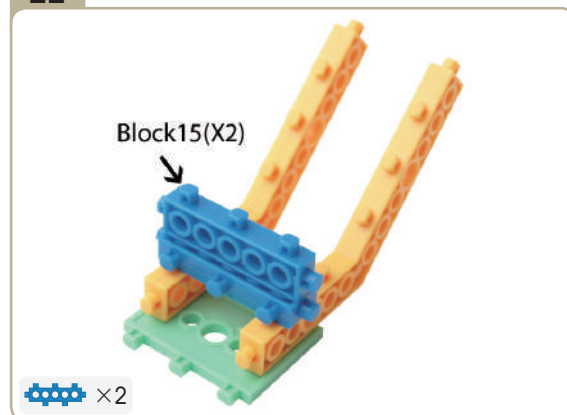
20



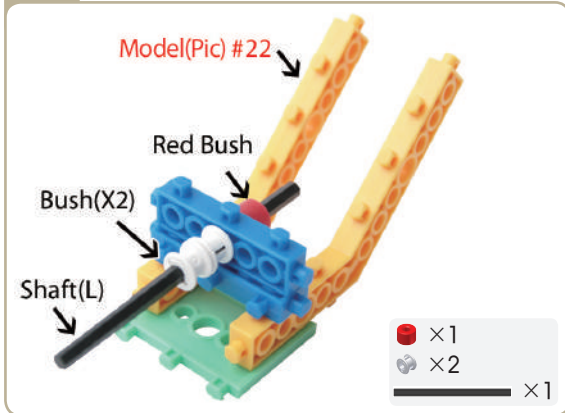
21



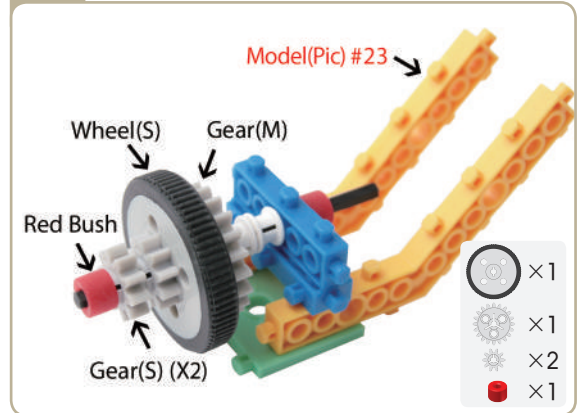
22



23

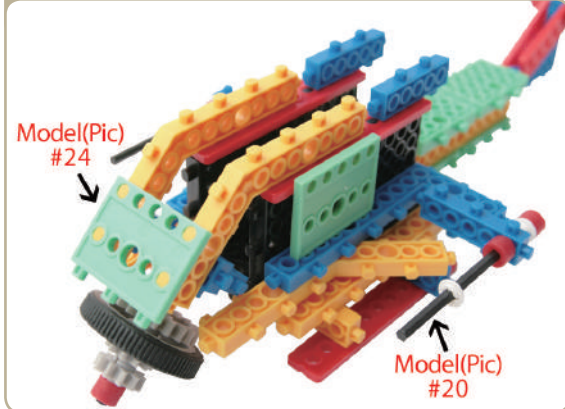


24



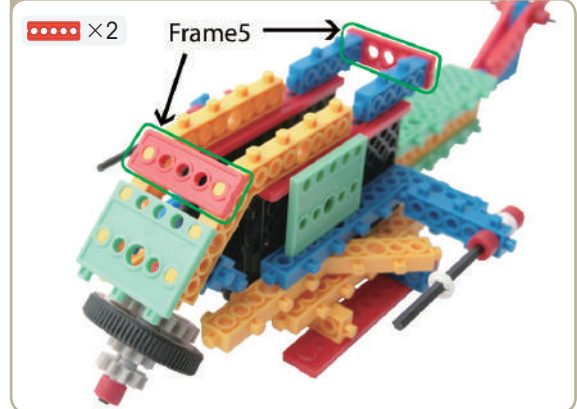
Connect parts in the following order; A medium gear → A small wheel → Two small gears → A red bush.

25

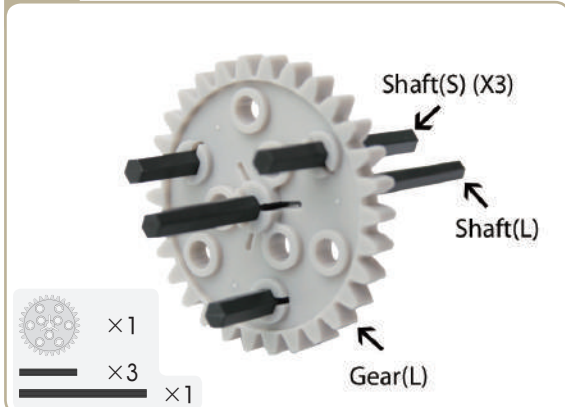


Turn model(pic)#24 upside down, then attach it to model(pic)#20.

26

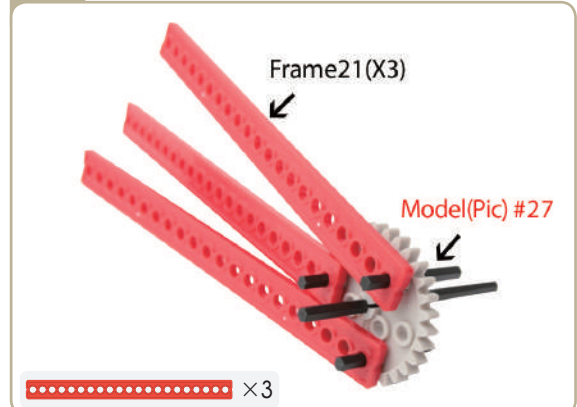


27



Connect a long shaft and three short shafts to large gear.

28

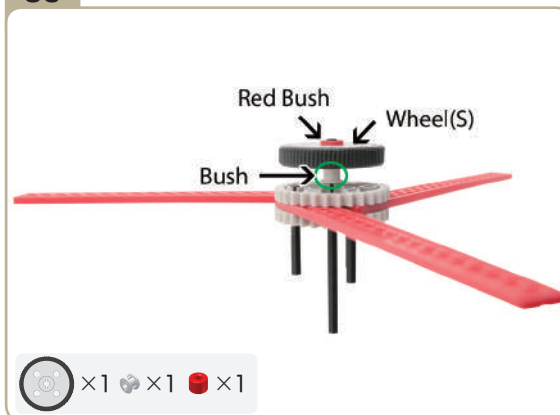


29



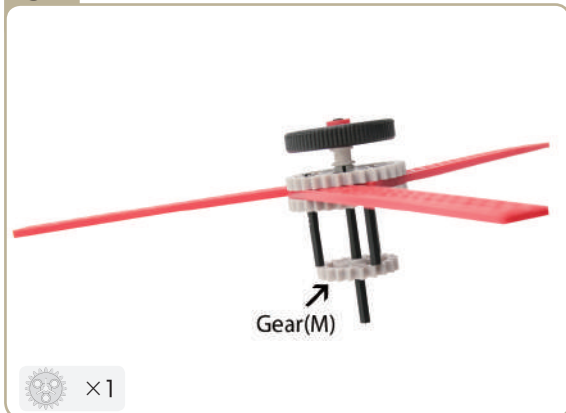
Cover model(pic)#28 by a large gear.

30

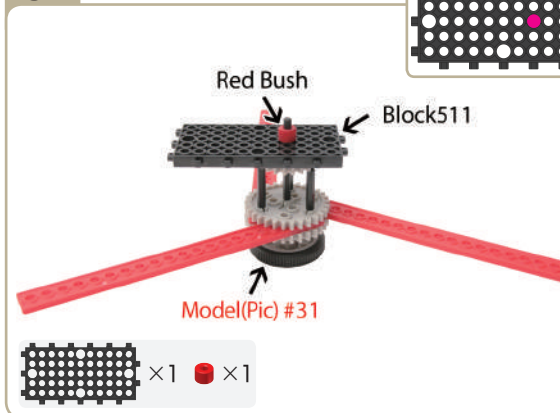


Connect parts in the following order; A bush → A small wheel → A red bush.

31

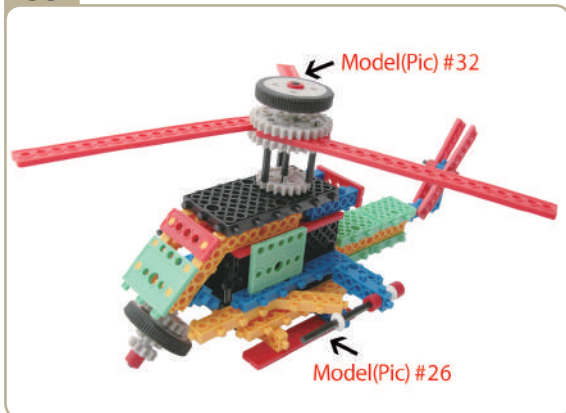


32



Turn model(pic)#31 upside down, then attach a 「block511」 and a red bush to it.

33



Combine model(pic)#32 with model(pic)#26.

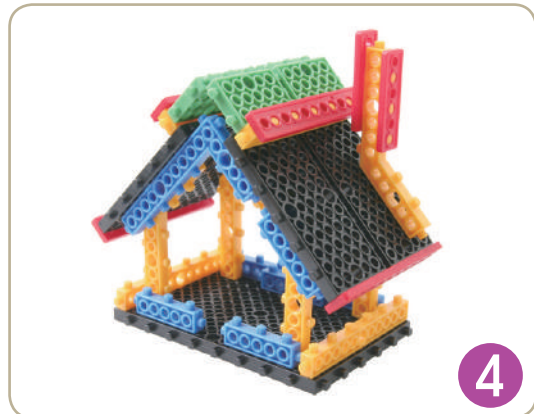
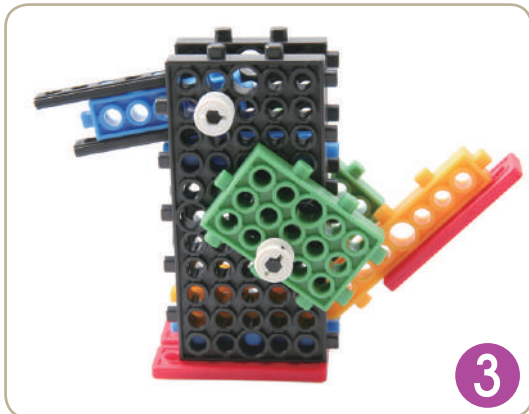
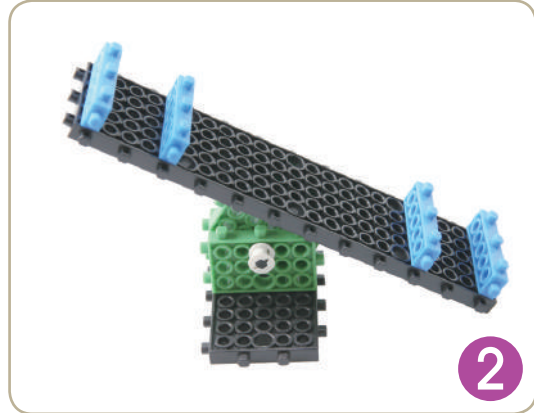
Completed





Making your own robot

♣ Use the blocks to make the images below.



1

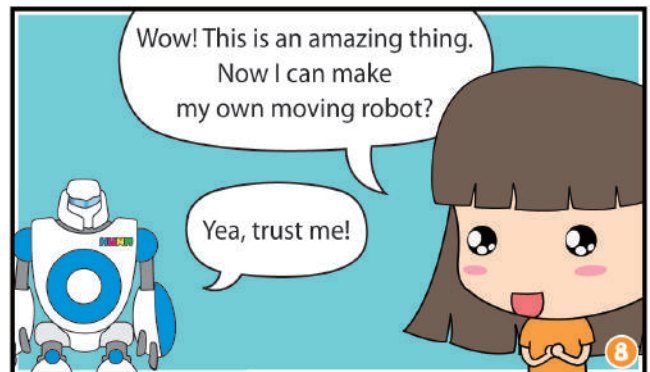
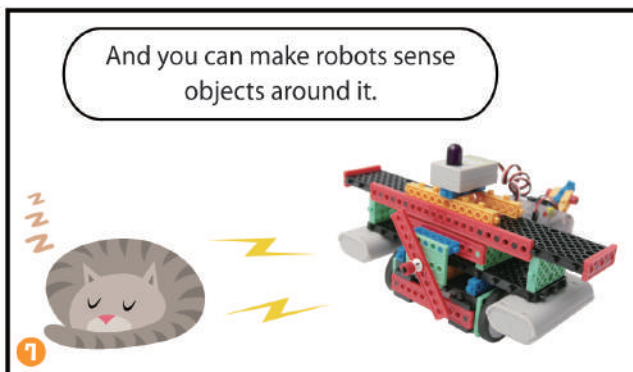
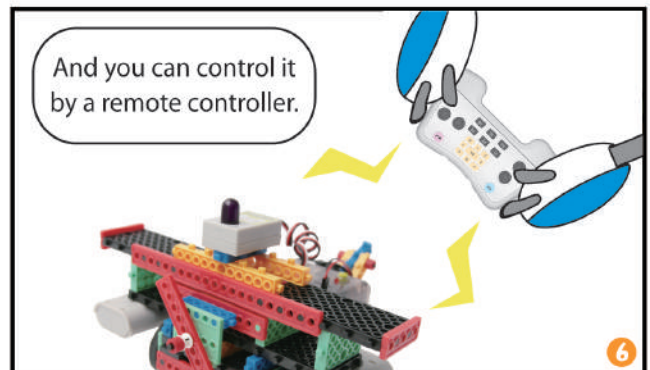
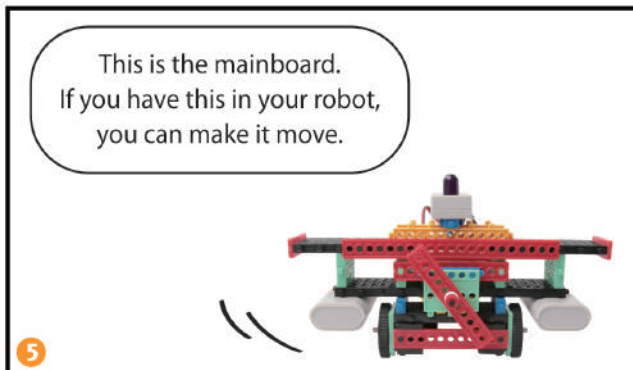
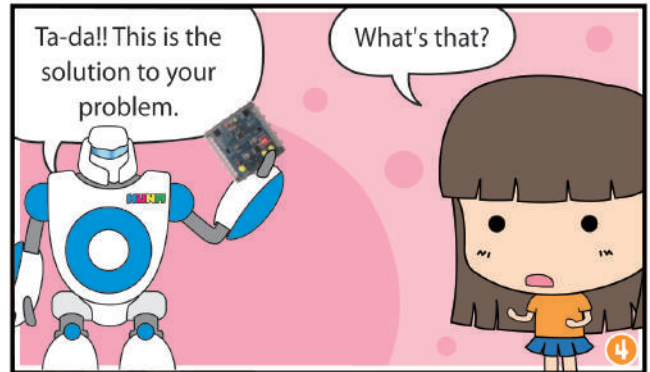
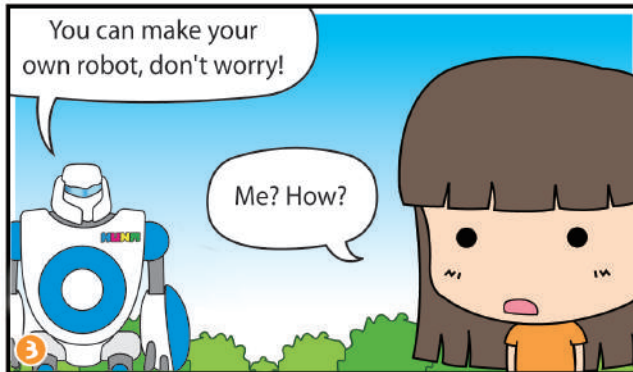
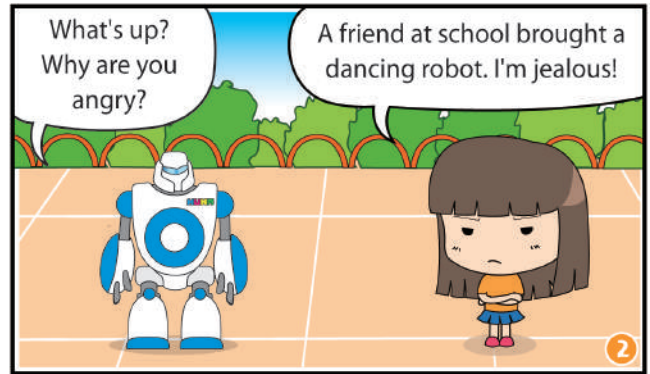
2

3

4

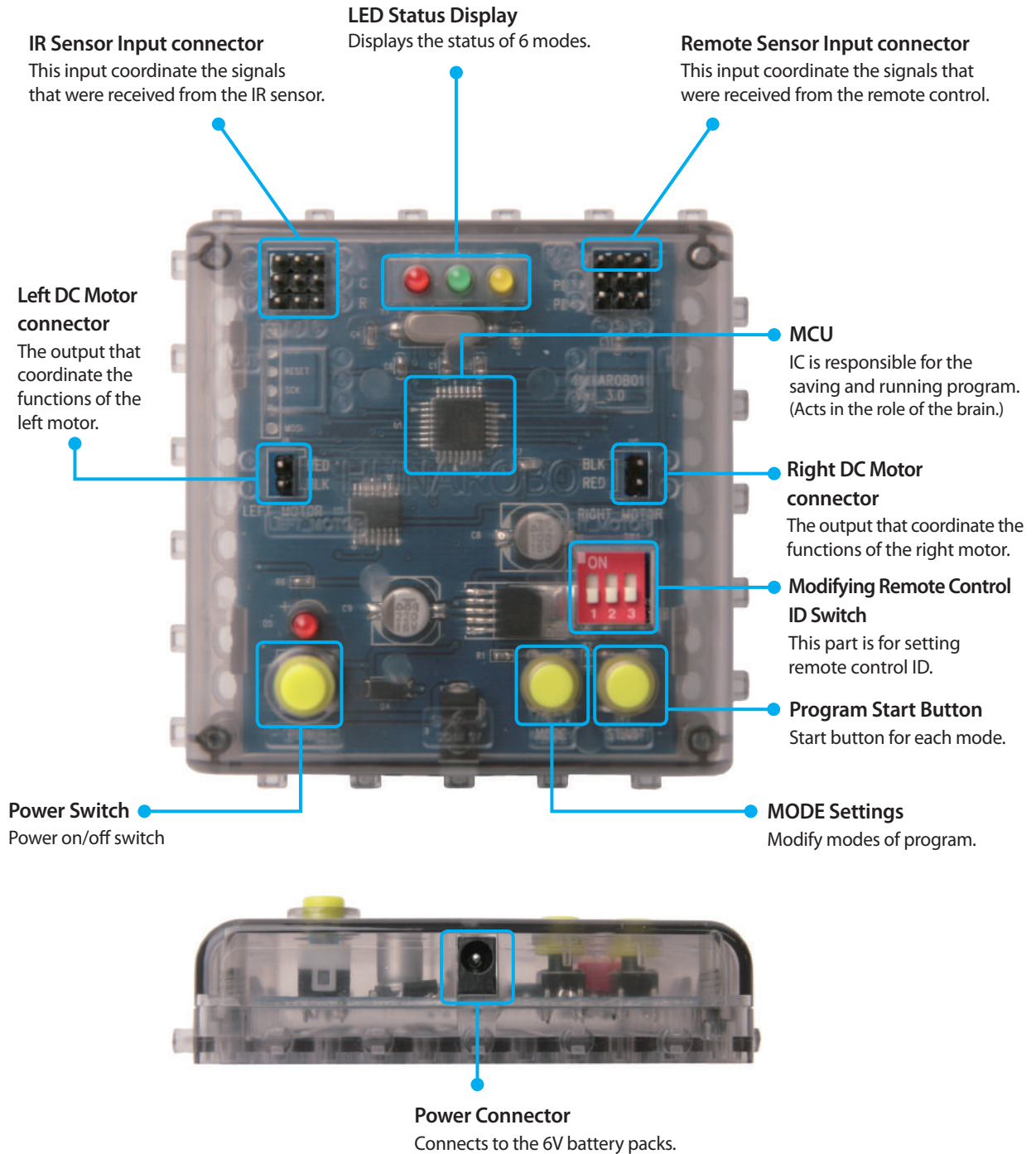


The magic box of a robot - the mainboard



How to use the electronic parts?

Assembling the mainboard and the function of each part



Mode Settings

1. Press mode button and the LED will flicker.
2. After selecting your mode, press start button and the robot will move.



Remote Control



ON/OFF



Linetracer



Avoider



Stalker



Free Move

RC Receiver (Remote Control Receiver Board)

* Insert the black line into the marked triangle on the circuit board.



Remote Control receive part

This sensor receives the IR signal from the remote control into the input signal.

IR Sensor



"Send" light

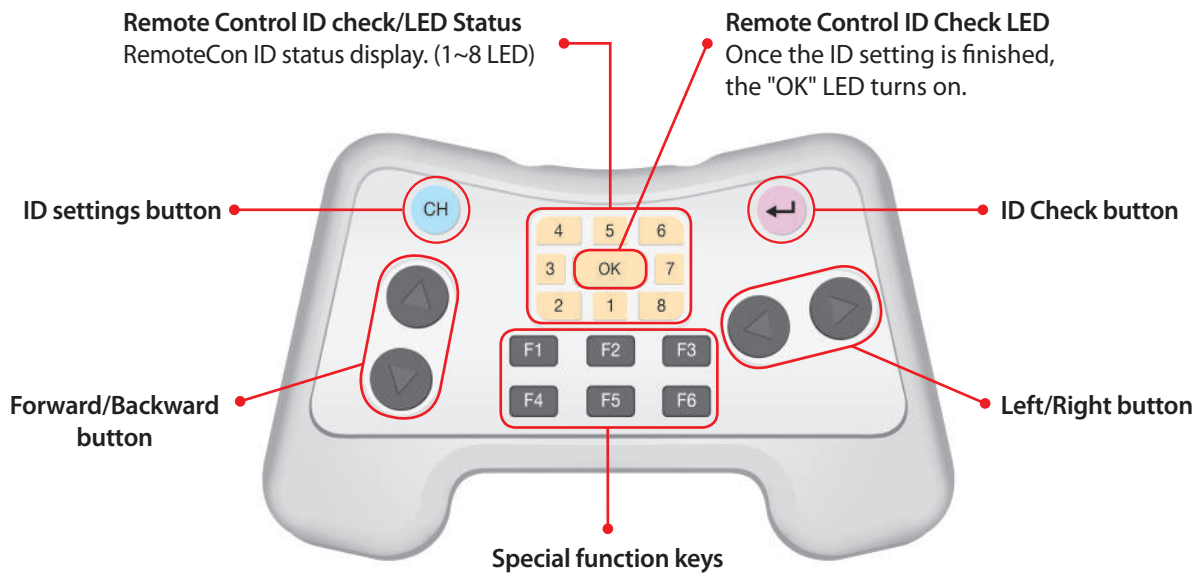
An infrared signal is sent to the object.

If there is a reflection, the information is sent to the 'receive' light part.

"Receive" light

This receives the signal from the above part and converts that signal into the input signal.

Remote Control configuration



Setting remote control ID

1. Turn on the robot.
2. Select #1 mode of robot. (Red LED turns on)
3. Press **CH** button while holding **↩** button.

The **A** panel ID LED turns on and shows you what mode you chose.

4. Press **CH** button while holding **↩** button and choose your ID. (Number 1~8)
5. After selecting ID, if you release **↩** Button and press **CH** button, ID will be selected.
6. The LED on the mainboard will blink 3 times and it will turn off automatically.

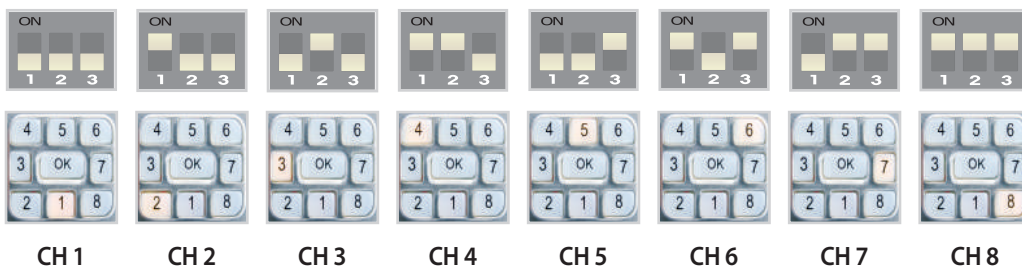
That means the ID Selection is finished.

7. If you press **↩** button, you can see your selected ID.

***If there is a problem, repeat steps 1-7 carefully.**

How to set up communication ID

- * The maximum number of channels can be set as shown below without interference.
Use the picture to assign the channels to the communication ID.





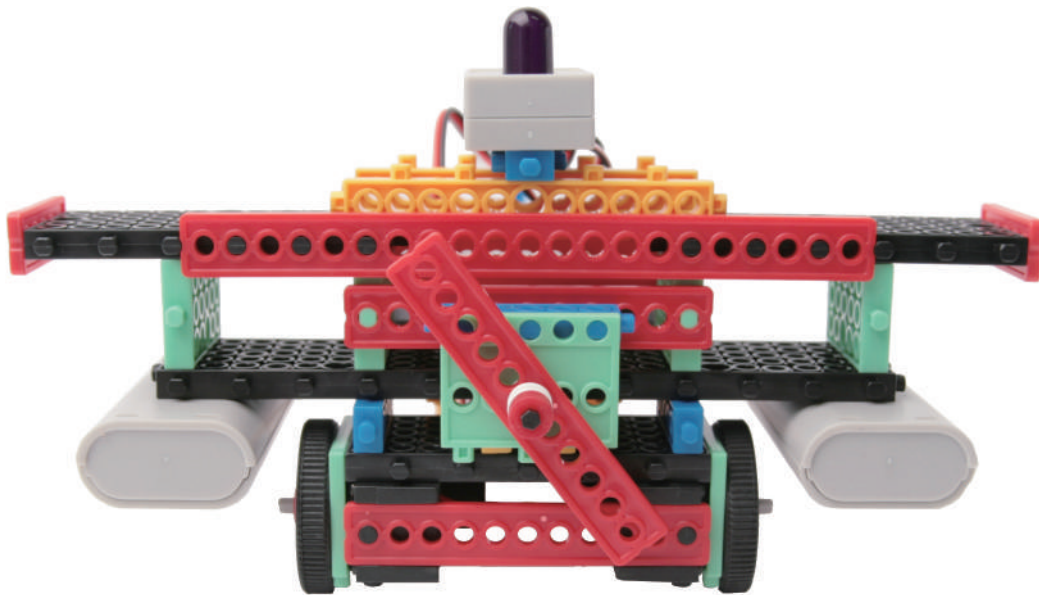
Let's
Make it 5

Making a robot using all kinds of mainboard modes






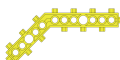
















Air-Sing-Sing

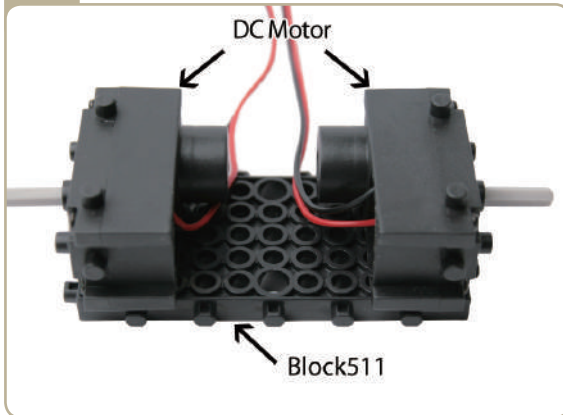
This model is one of the winners of Hunarobo's design challenge. This model is designed to resemble the appearance of an airplane. we call them 'biplane' because they have a sets of wing.



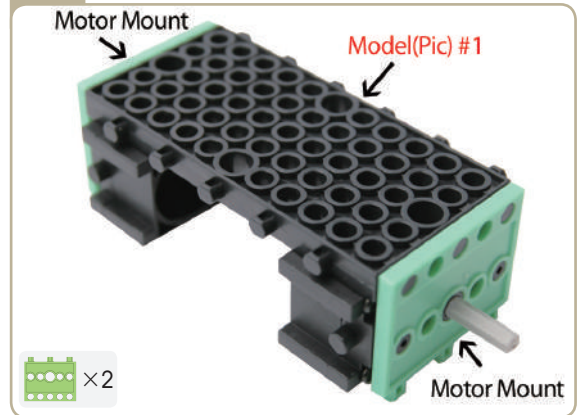
Prepare parts for assembly

	Block523	×1		Frame21	×1	
	Block511	×3		Frame11	×6	
	Block135	×4		Frame5	×2	
	Block111	×4		Connection Shaft	×1	
	Block15	×5		Shaft(S)	×1	
	Block35	×4		Half Bush	×1	
	Motor Mount	×3		Bush	×3	
	Wheel(S)	×2		DC Motor	×2	
				Battery Case	×1	

1

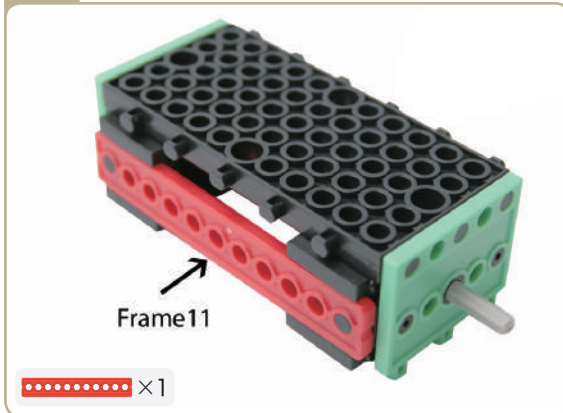


2

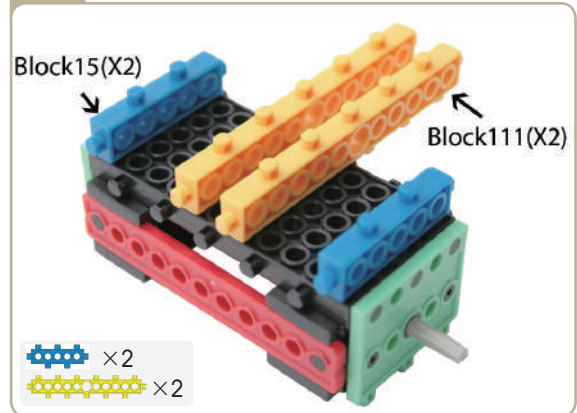


Turn model(pic)#1 upside down, then insert motor mounts to the shaft of DC motor.

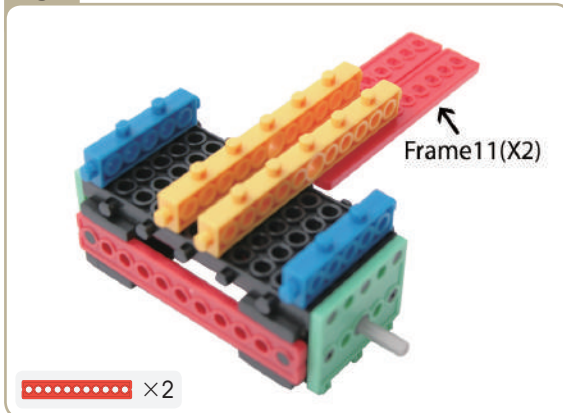
3



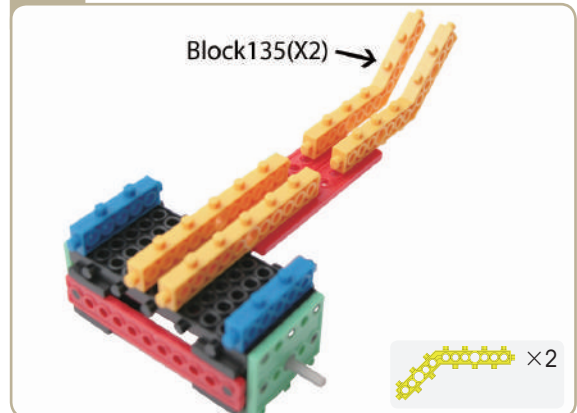
4



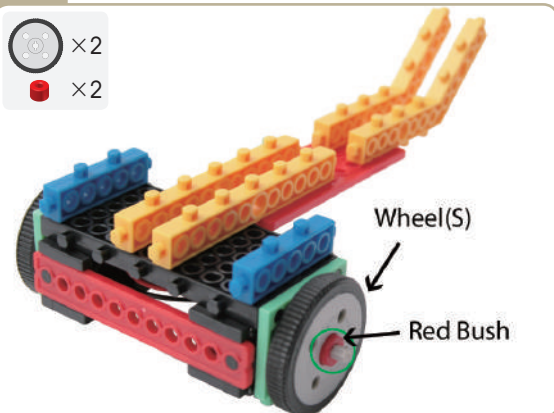
5



6

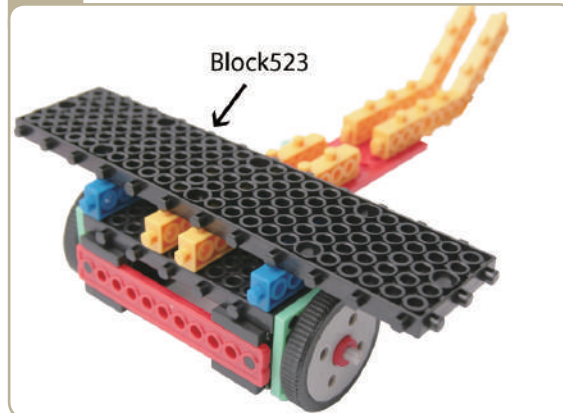


7

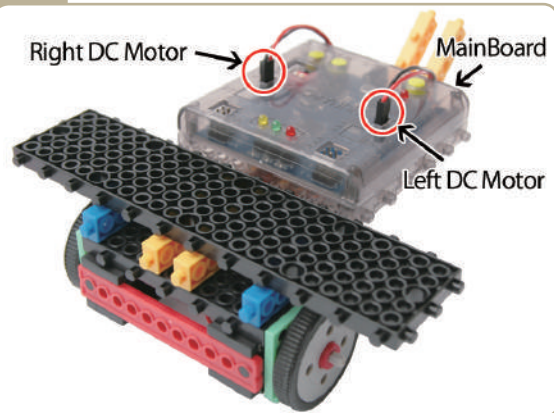


Insert two small wheels to the shaft of DC motor with two red bushes.

8

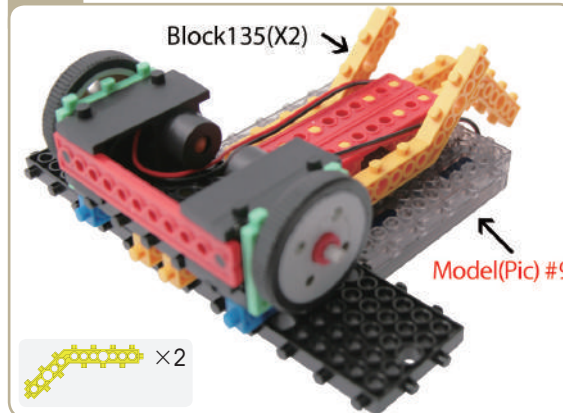


9



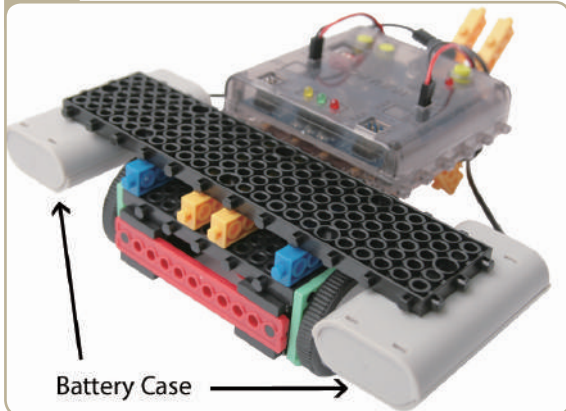
Connect mainboard to model(pic)#8.

10



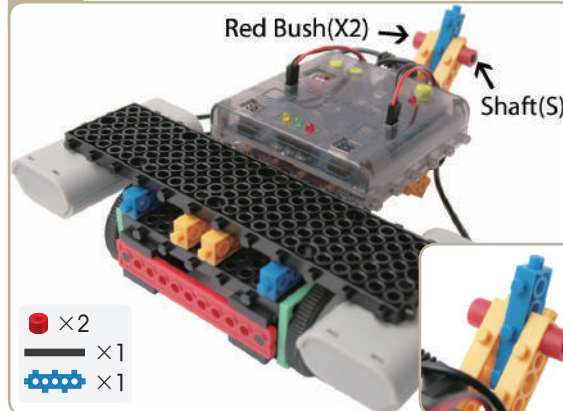
Turn model(pic)#9 upside down, then attach two 'block135's to the bottom of mainboard.

11

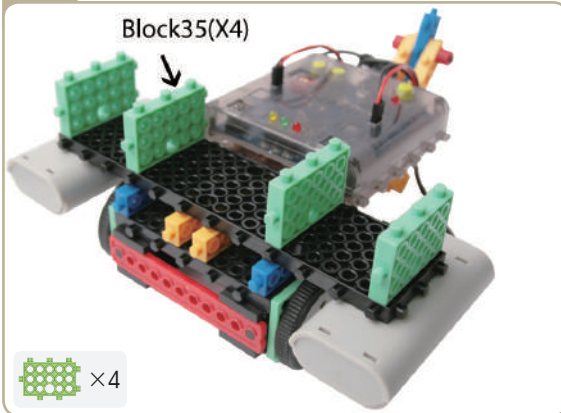


Turn model(pic)#10 upside down, then connect battery cases.

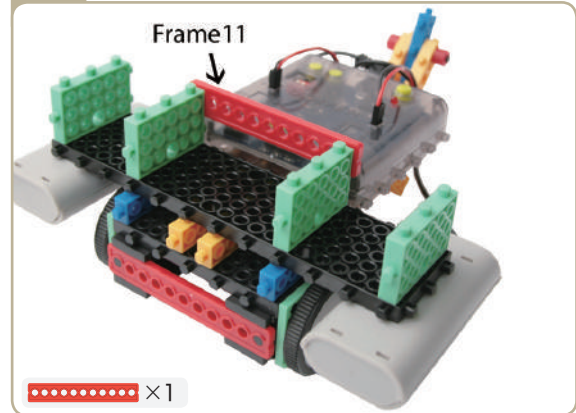
12



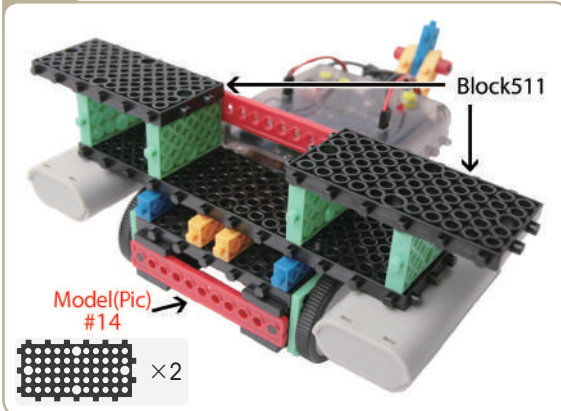
13



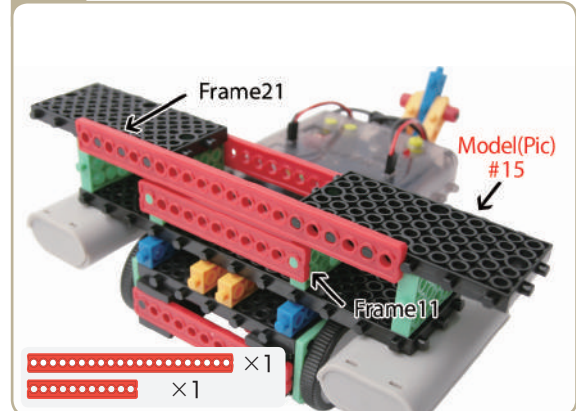
14



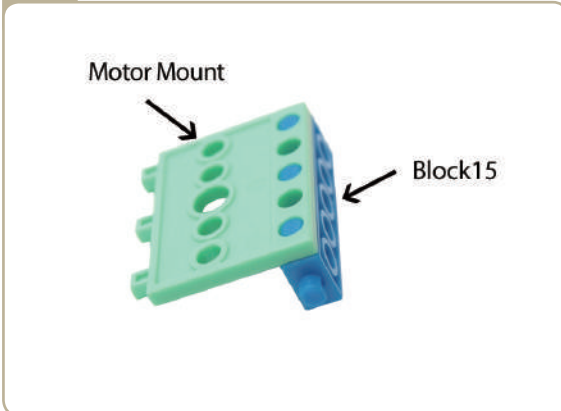
15



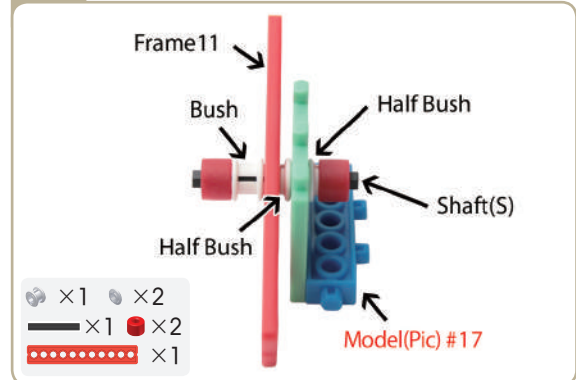
16



17

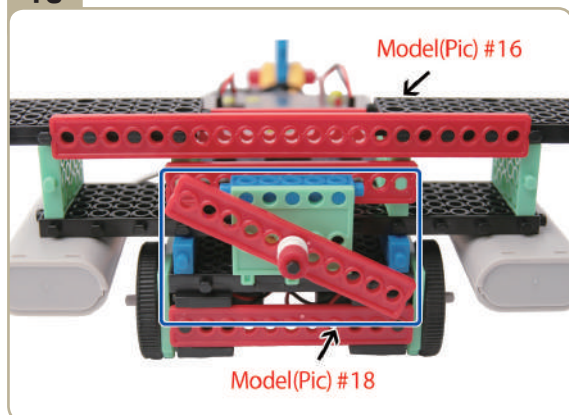


18



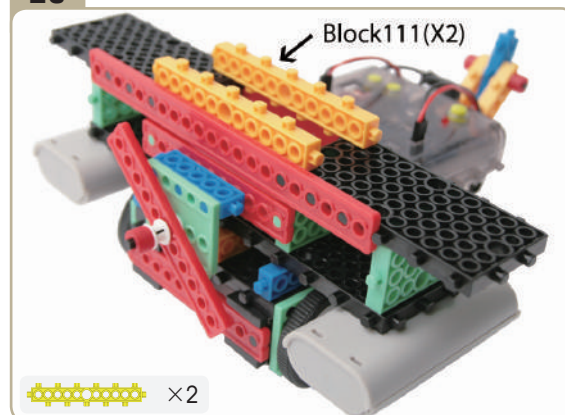
Connect parts in the following order; A short shaft → A red bush → A half bush → A half bush → A Frame11 → A bush → A red bush.

19

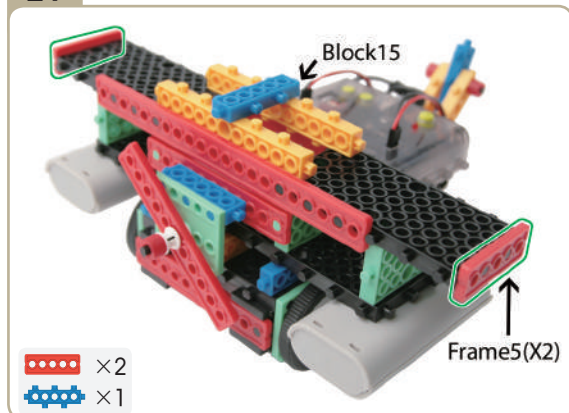


Combine model(pic)#16 with model(pic)# 18.

20

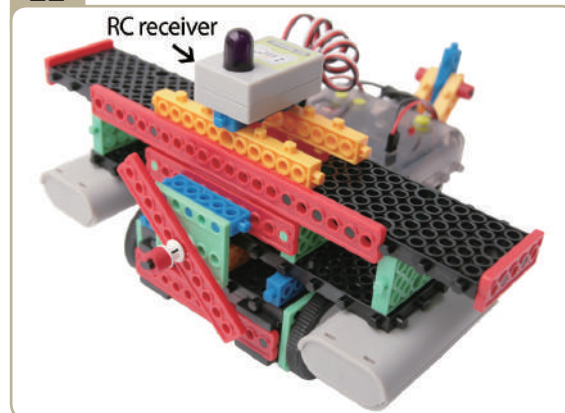


21



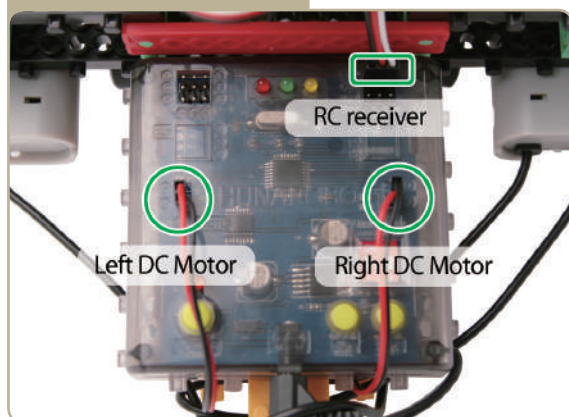
Attach two 「frame5」s and a 「block15」 to model(pic)#20.

22

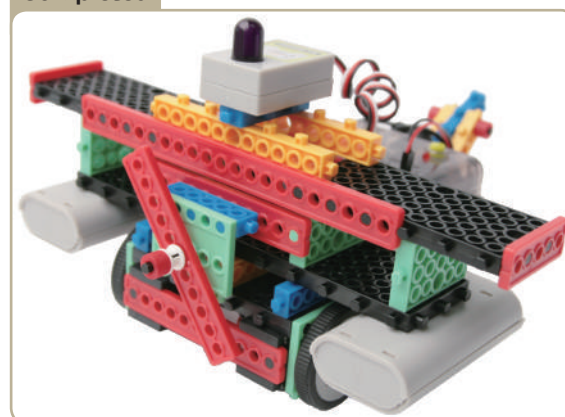


Connect RC receiver(Remote Control receiver board) to model(pic)#21.

Connect the mainboard



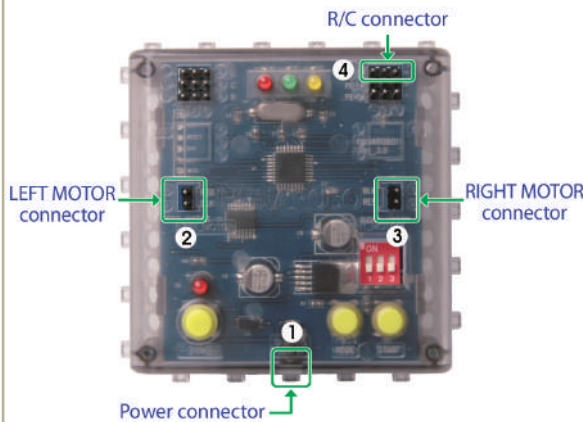
Completed





How to operate the Air-Sing-Sing

Connecting the mainboard



Connect in this order.

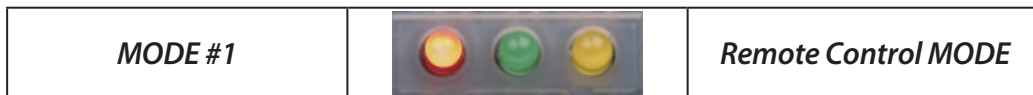
1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.
3. Connect Right DC motor to RIGHT MOTOR connector.
4. Connect RC receiver board to R/C connector.

⊕ ⊖ The DC motor red wire must be connected to positive ⊕, the black wire to the negative ⊖.

⊕ ⊖ Insert the black wire of 3P electric wire into the negative ⊖.

Setting mode

1. Ensure battery case / DC Motor Connector are connected.
2. Turn on the power.
3. Press MODE button so that the red LED is lit up.

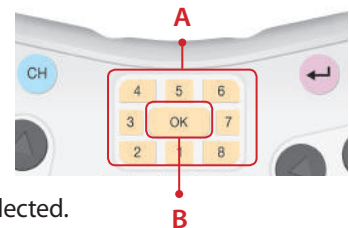


4. Select Remotecon ID. (See below.)
5. Press START button and try to move the robot.

Remote Control ID Setup

1. Turn on the robot.
2. Select #1 mode of robot. (Red LED turns on)
3. Press CH button while holding ↵ button.
The A panel ID LED turns on and shows you what mode you chose.
4. Press CH button while holding ↵ button and choose your ID. (Number 1~8)
5. After selecting ID, if you release ↵ Button and press CH button, ID will be selected.
6. The LED on the mainboard will blink 3 times and it will turn off automatically.
That means the ID Selection is finished.
7. If you press ↵ button, you can see your selected ID.

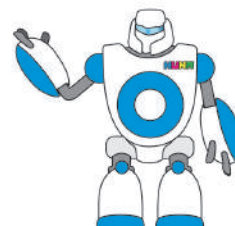
***If there is a problem, repeat steps 1-7 carefully.**



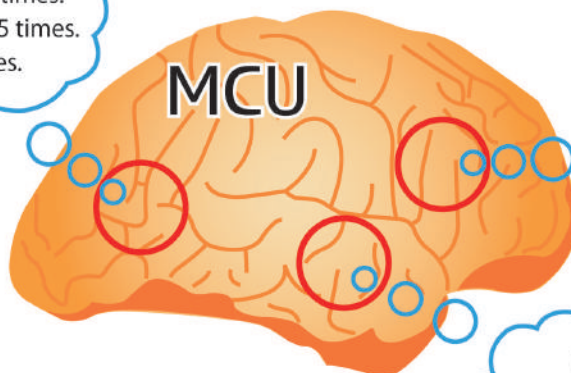


Brain of the robot - MCU

The MCU (Micro Controller Unit) is what makes the robot move. The MCU saves and runs programs to make the robot move in the desired way.



Mode #1:
Both wheels move forward 5 times.
Both wheels move backwards 5 times.
Right wheel moves 5 times.



Mode #2:
Right wheel moves independently.

Mode #3:
Left wheel moves independently

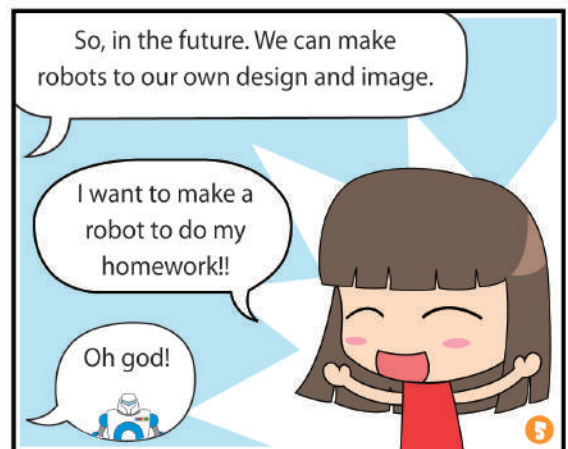
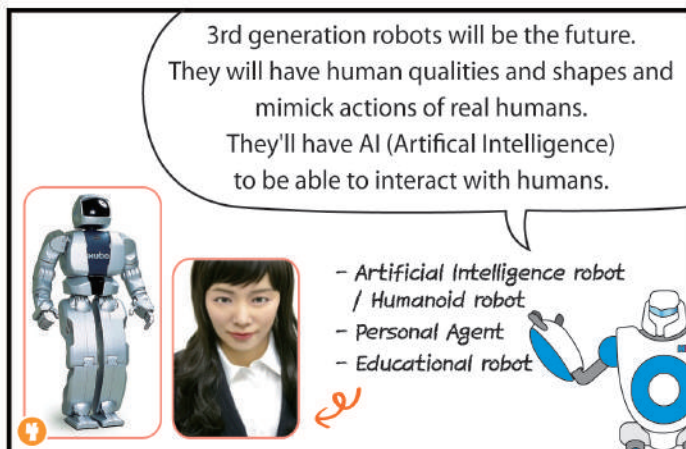
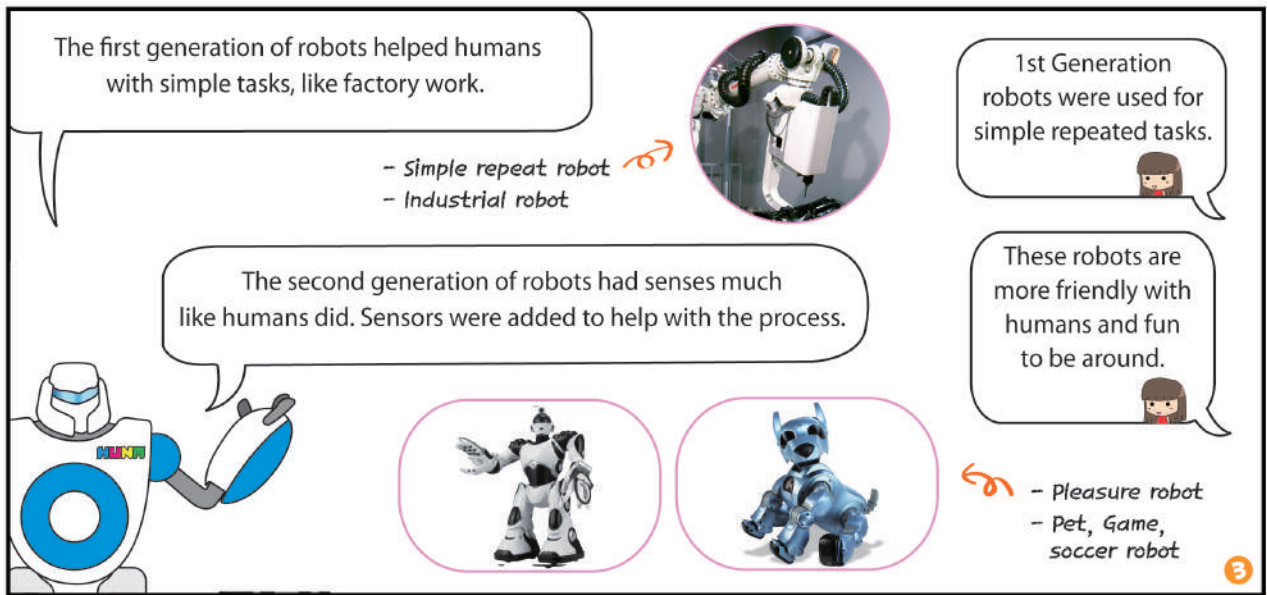
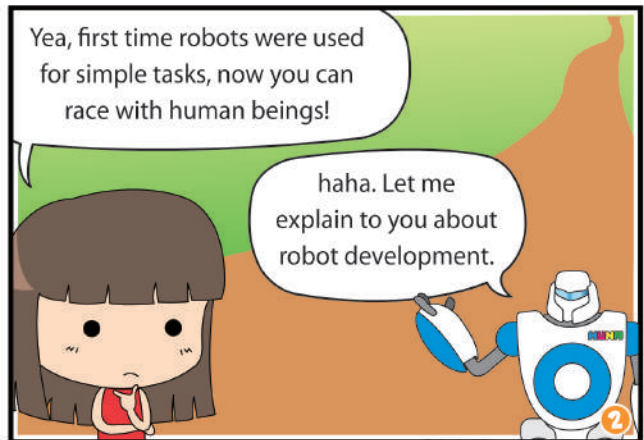
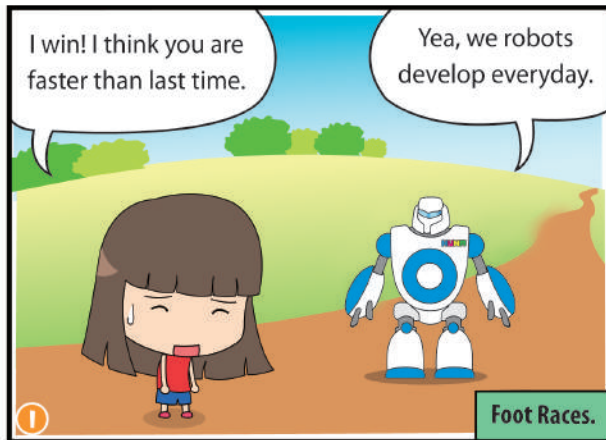


Make your own robot using a mainboard.

Spiral notebook page with horizontal lines for writing.



Robot Development



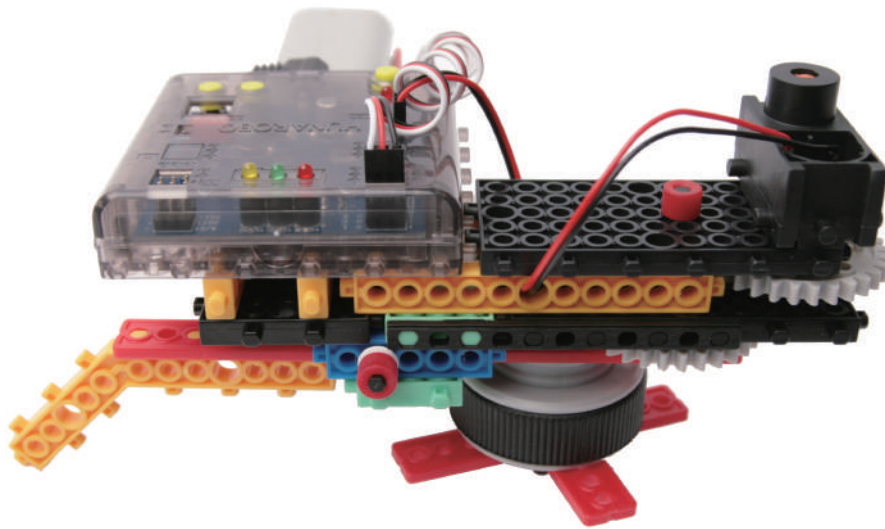
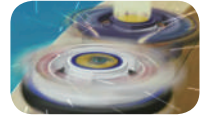


Making a game robot using all kinds of mainboard modes

























Power Spin

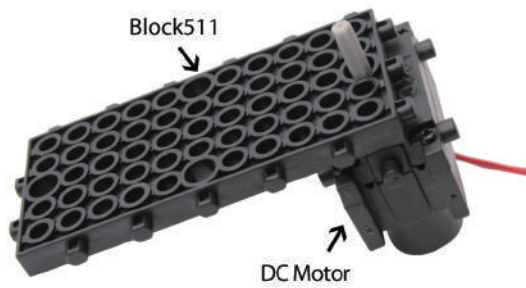
1 DC motor and 1 IR sensor can be used to make your own spinner.



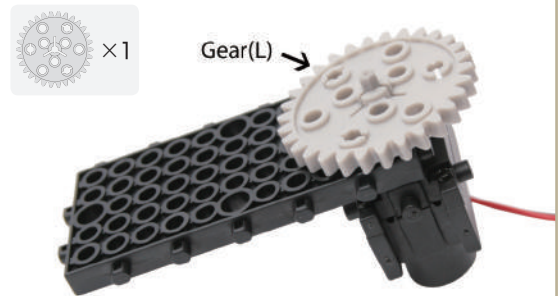
Prepare parts for assembly

	Block523	x1		Frame21	x3	
	Block511	x2		Frame11	x2	
	Block135	x1		Adapter1	x1	
	Block111	x4		Adapter2	x2	
	Block15	x2		Shaft(S)	x2	
	Block35	x3		Shaft(L)	x1	
	Wheel(S)	x1		Red Bush	x4	
	Wheel(M)	x1		Half Bush	x4	
				Gear(L)	x2	
				Gear(S)	x2	
				DC Motor	x1	

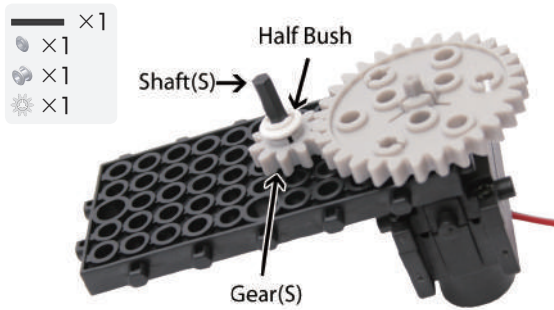
1



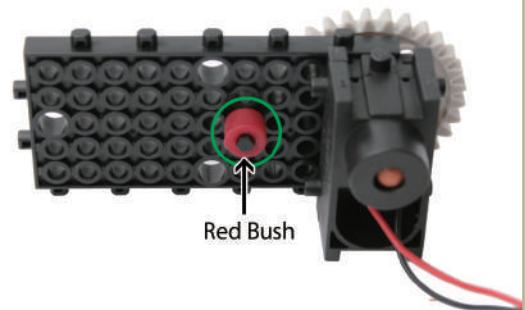
2



3

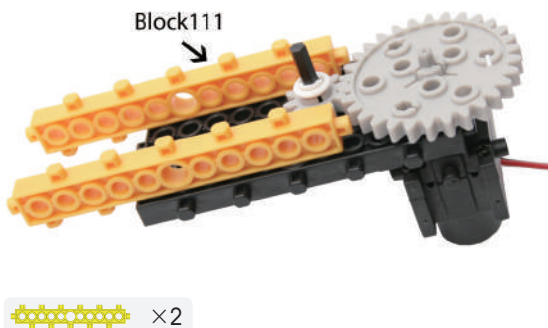


4 (Bottom of model(pic)#3)

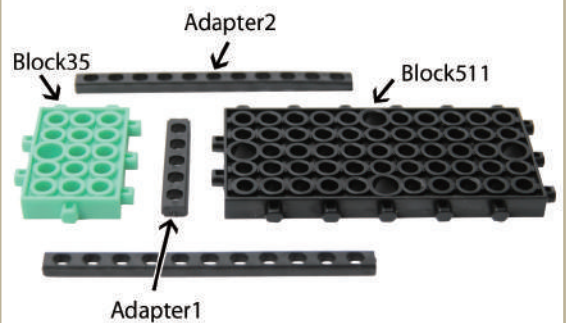


* The back side fastens with a red bush.

5



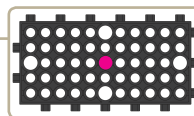
6



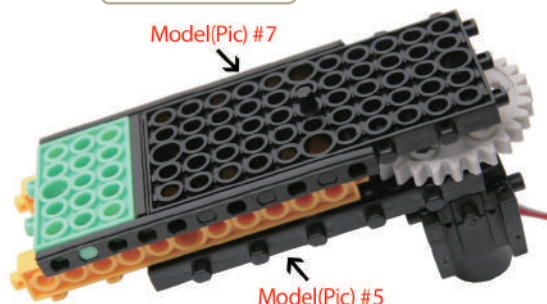
7



8



Model(Pic) #7



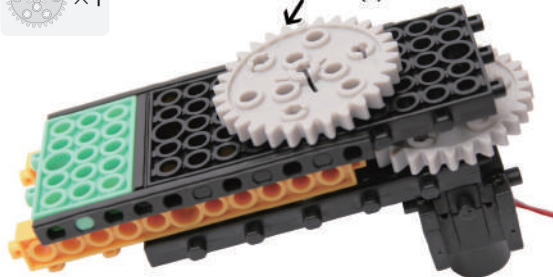
Model(Pic) #5

Combine model(pic)#5 with model(pic)# 7.

9

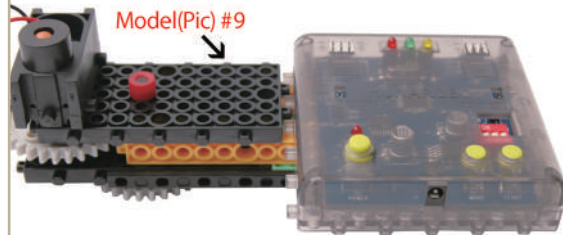


Gear(L)



10

Model(Pic) #9

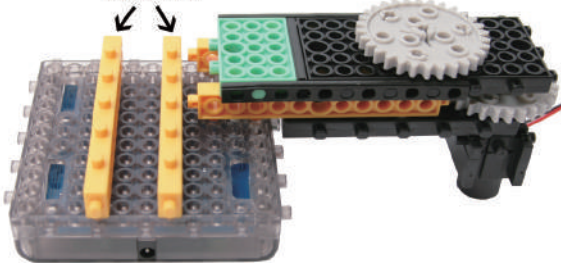


MainBoard

Turn model(pic)#9 upside down and then connect mainboard.

11

Block111

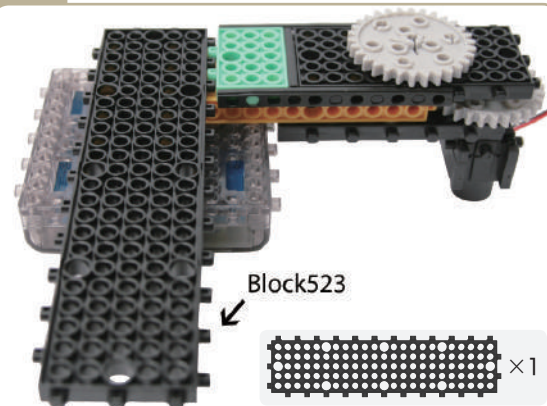


Block111 x2

Turn model(pic)#10 upside down, then attach two 'block111's to the bottom of mainboard.

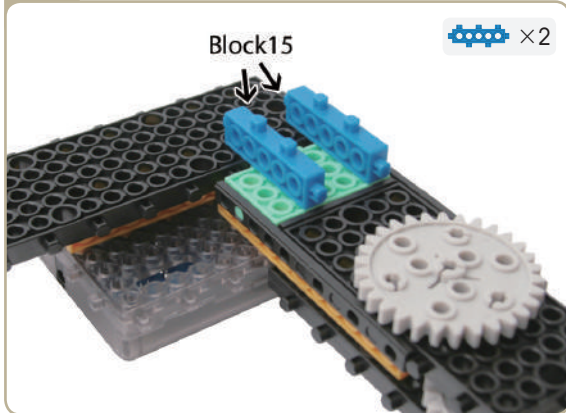
12

Block523

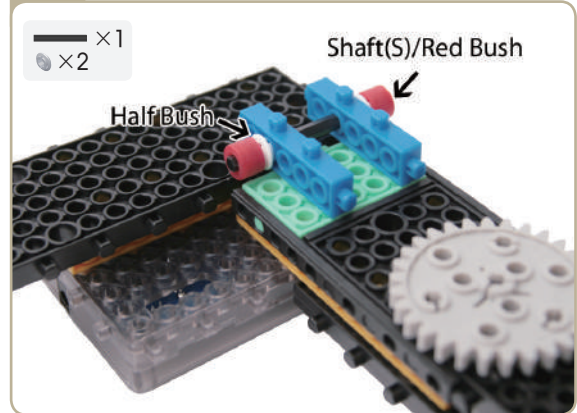


Block523 x1

13

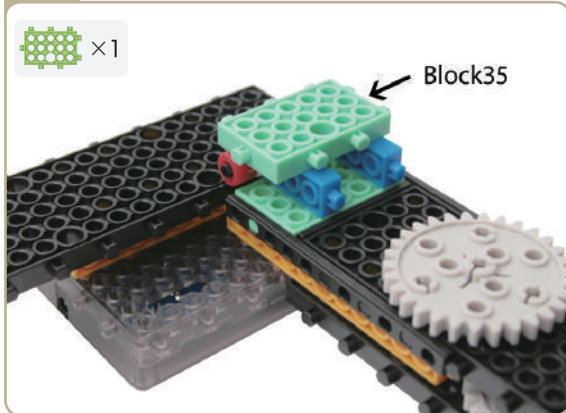


14

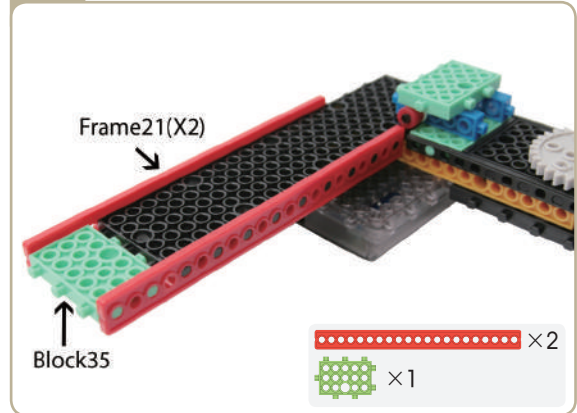


Insert a short shaft between 「block15」s with two half bushes and two red bushes .

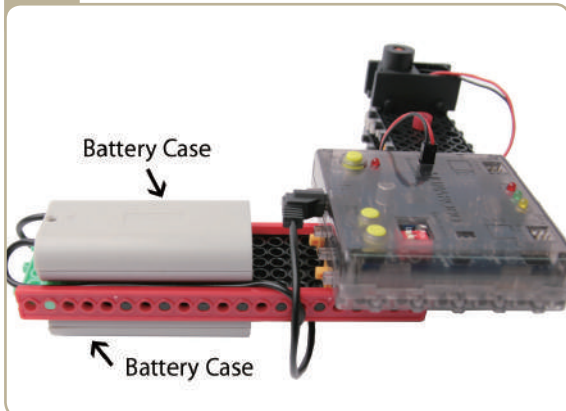
15



16

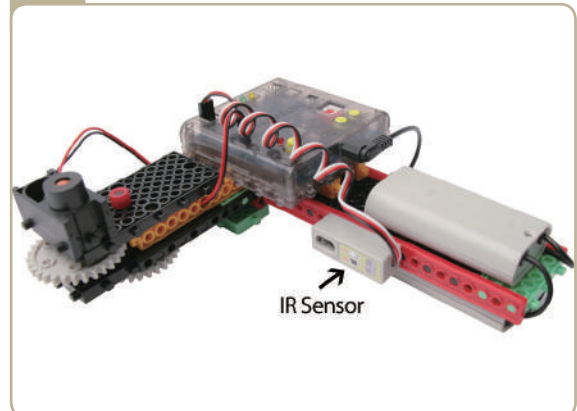


17



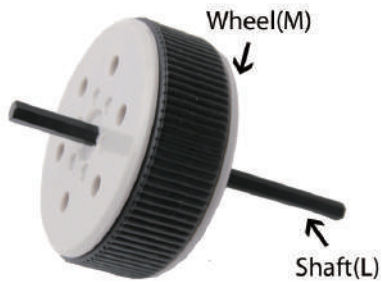
Connect battery cases to model(pic)#16.

18

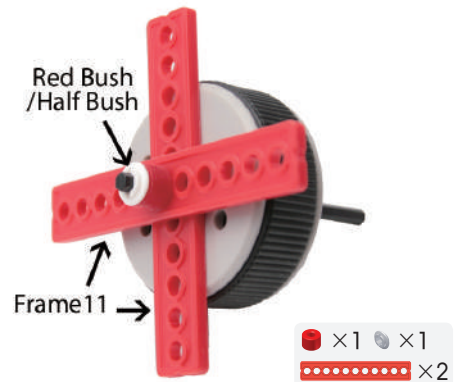


Connect a infrared sensor to model(pic)#17.

19

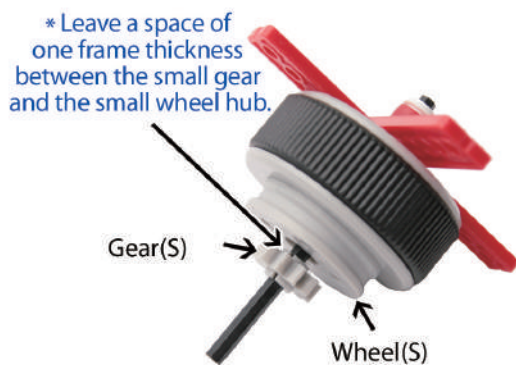


20



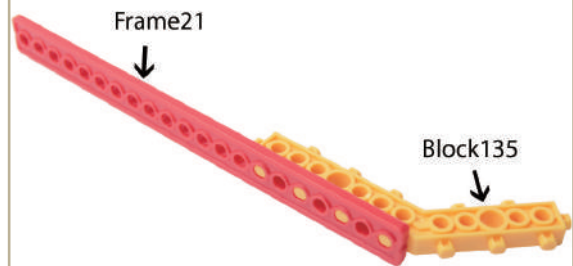
Insert two 「Frame11」s to the long shaft of model(pic)#19 with a red bush and a half bush in order.

21

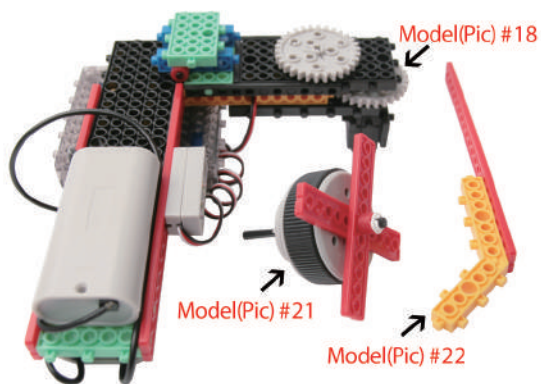


Insert a small gear and a small wheel hub to long shaft.

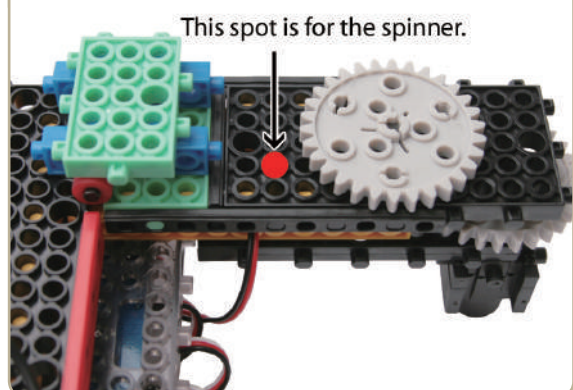
22



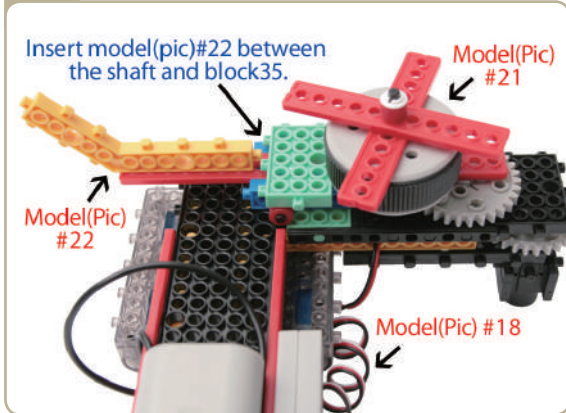
23



24

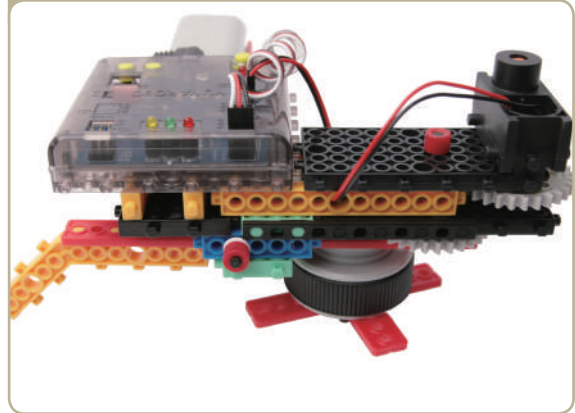


25



Combine model(pic)#18 with model(pic)# 21 and then connect model(pic)#22.

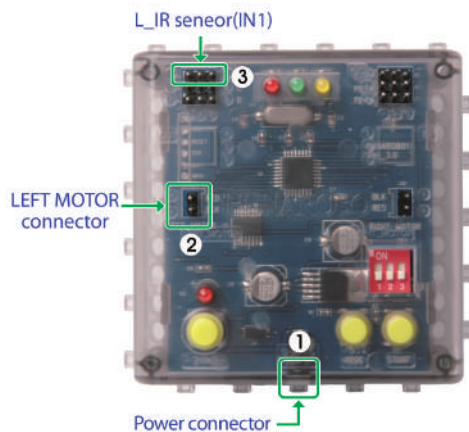
Completed





How to operate the Power Spin

Connecting the mainboard



Connect in this order.

1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.
3. Connect IR sensor to IN1 of INPUT connector.



The DC motor red wire must be connected to positive \oplus , the black wire to the negative \ominus .



Insert the black wire of 3P electric wire into the negative \ominus .

Setting mode

1. Ensure the battery case and DC Motor are connected well.
2. Turn on the power.
3. Press the MODE button and select as shown below. The green LED will turn on.

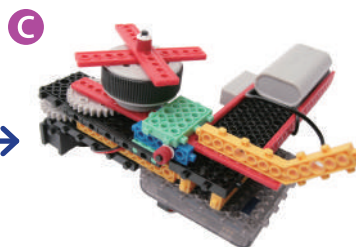
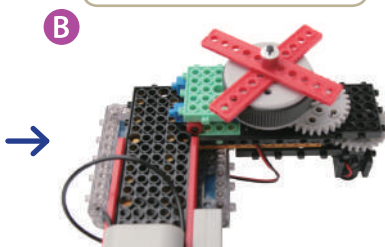
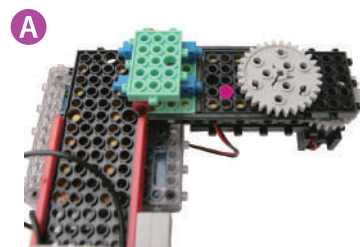
MODE #2



ON/OFF MODE

4. Press START button.

How to make it move

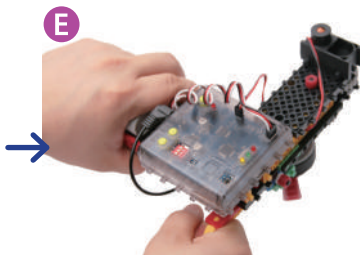


A Put the spinner on the red dot.

Connect safety handle.



When you touch the IR sensor, the spinner will turn on.

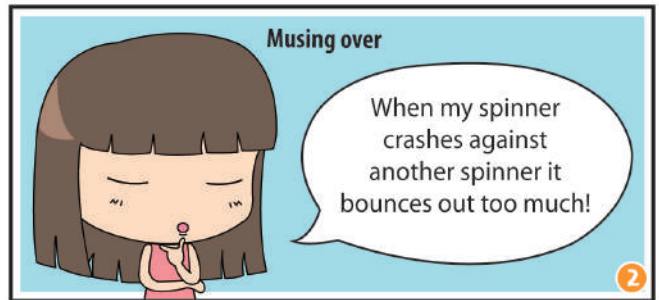
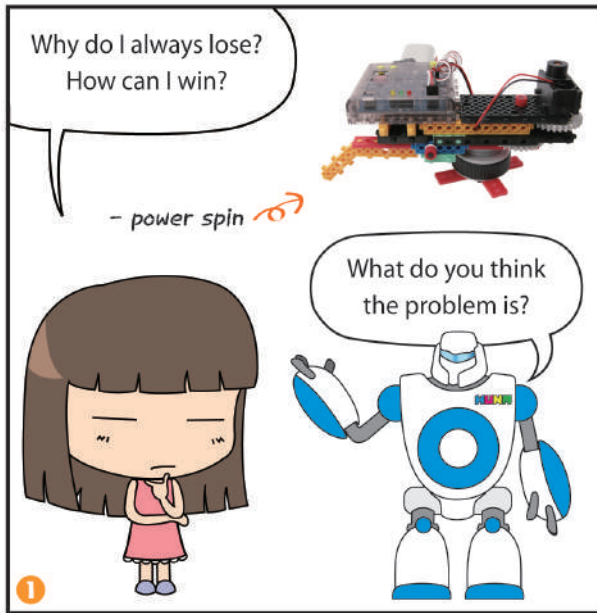


Pull the safety handle to release the spinner.





Make your own spinner



Make your own spinner for battle with your friends!

A large, light blue rectangular area with a spiral binding on the left side, intended for writing or drawing.



Let's look around history of robots.

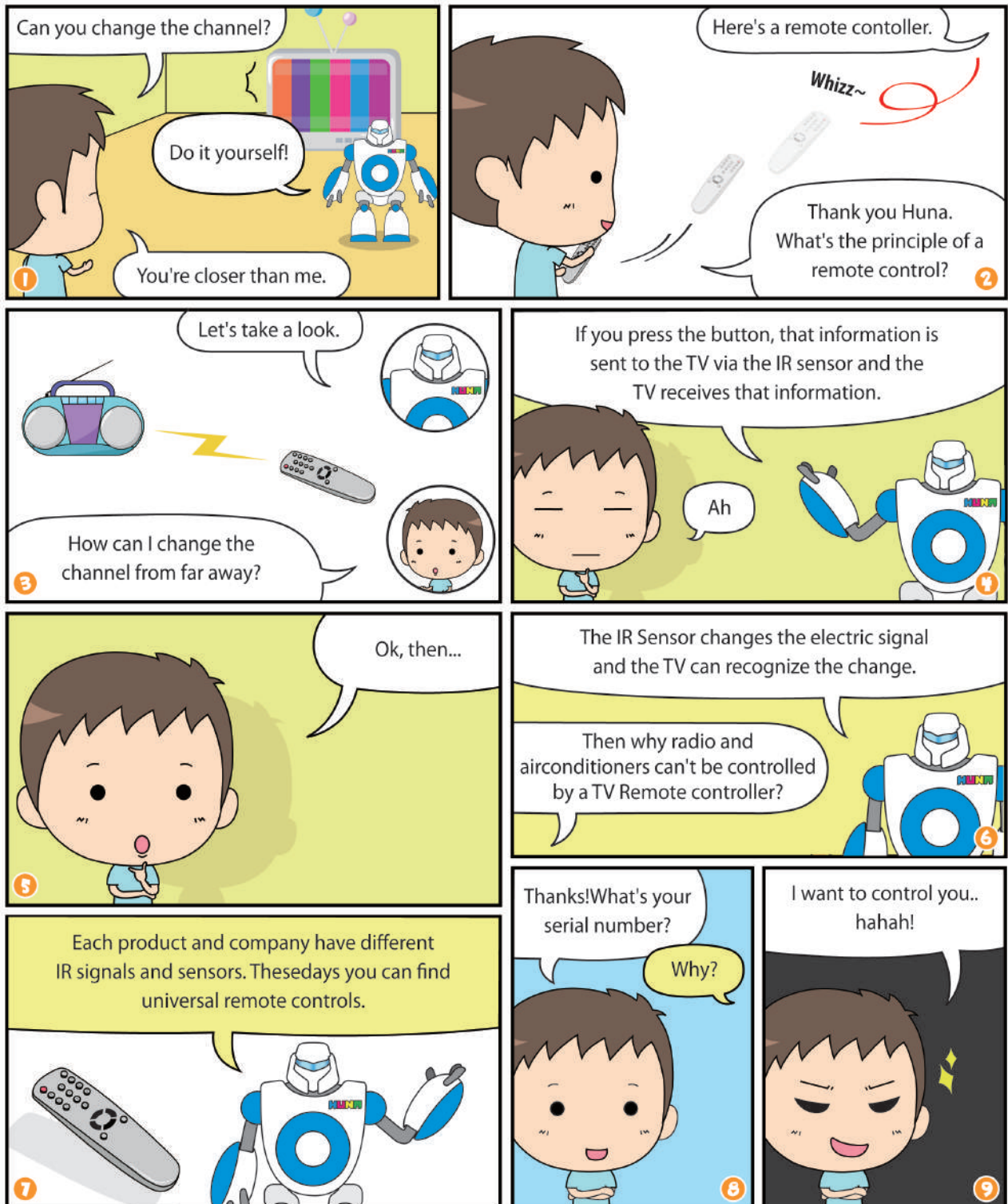
	Past	Recent Past	Present	Furture
Culture	-They talked about it in literature. The oldest robot is a Giant Bronze Talus in Greek Mythology.	-In 1949, the author Jack Williams wrote in his book, "Humanoid" about the creation of a robot-human character.	-In 2003, WowWee Company made a humanoid robot toy. 1 year later ZMP made "Nuvo", a remote controlled robot.	
Technology	-In 18th century France, Jacques de Vaucanson made an artificial duck capable of flapping its wings, quacking, eating and digesting food.	-In 1927, American, R.J. Wensley made 'Telebox', and in England, Richard made Eric the robot.	-NASA made a remote controlled robot Robonaut and Anthony Gallo Company developed Mars Probe, which was a flying robot.	-MicroRobot, Service Robot, Farming Industry Robot, Space Robot, and Automatic (non-manned) Transportation and Entertainment robot will be forecsted for practical usage.



**In the future, what robot will be produced?
Imagine your own robot and try to make it.**



Control of the robot - Remote Control



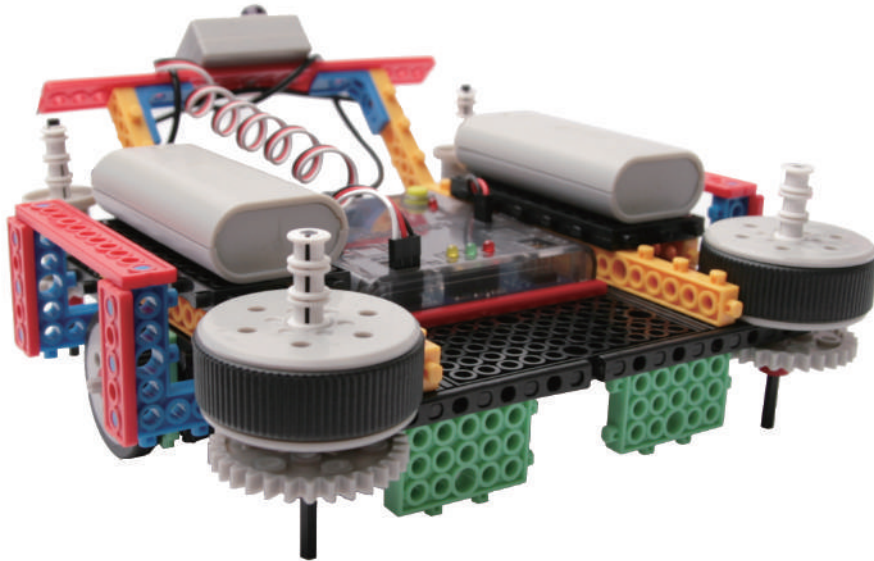


Using a variety of blocks to make objects



Battle Bumper Car

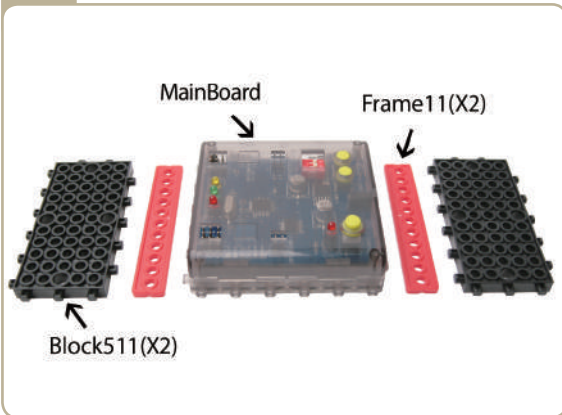
A battle robot that uses a remote controller to bump into other cars.



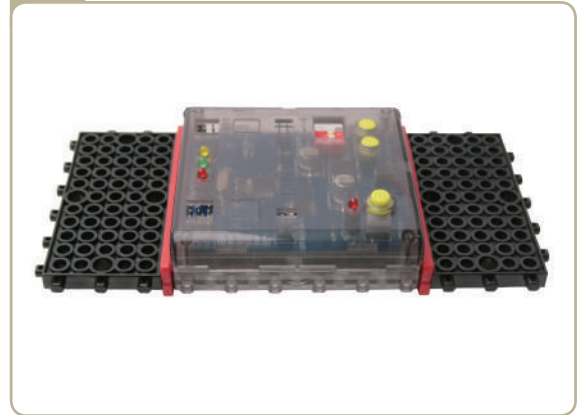
Prepare parts for assembly

	Block523	x2		Frame21	x3	
	Block511	x4		Frame11	x4	
	Block90	x4		Frame5	x4	
	Block135	x2		Adapter2	x8	
	Block111	x4		L Adapter	x2	
	Block35	x4		Shaft(L)	x4	
	Motor Mount	x2		Bush	x12	
	Guide wheel	x2		Red Bush	x6	
	Wheel(S)	x2		Gear(L)	x2	
	Wheel(M)	x2		Gear(M)	x2	
				DC Motor	x2	

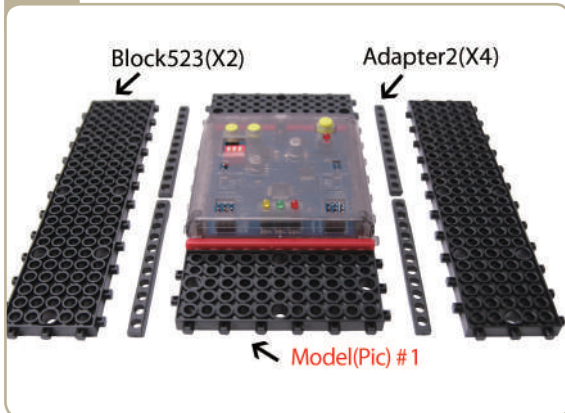
1



2



3



4



Connect two 「block523」s and four 「adapter2」s to model(pic)#2.

5

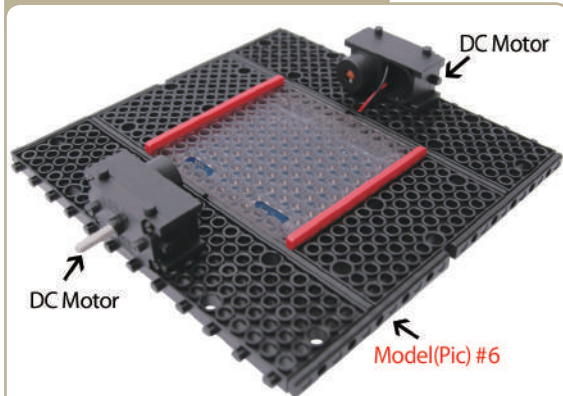


6



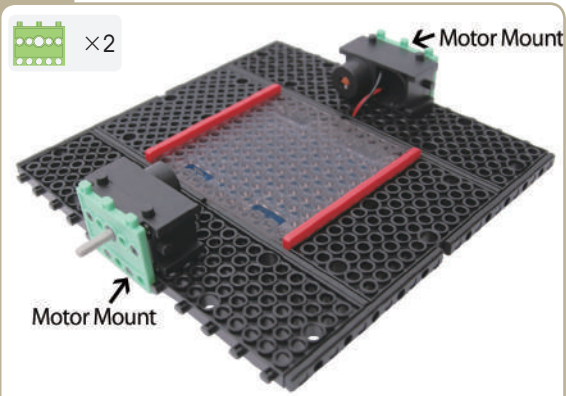
Attach four 「adapter2」s to model(pic)#4.

7 (Bottom of model(Pic)#6)

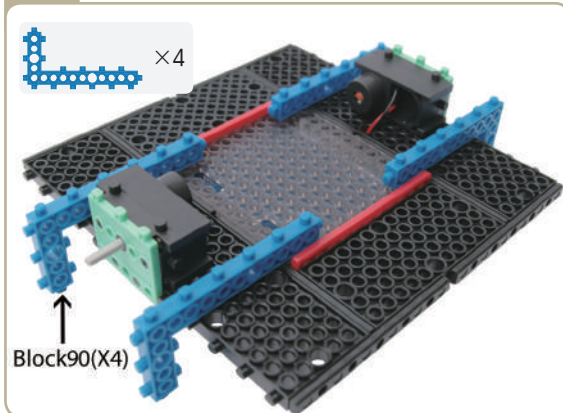


Turn model(pic)#6 upside down, then connect DC motors.

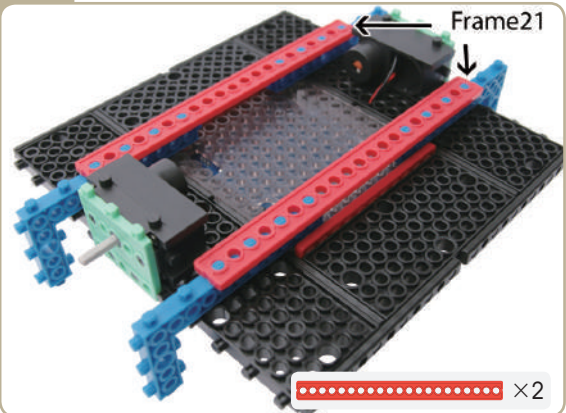
8



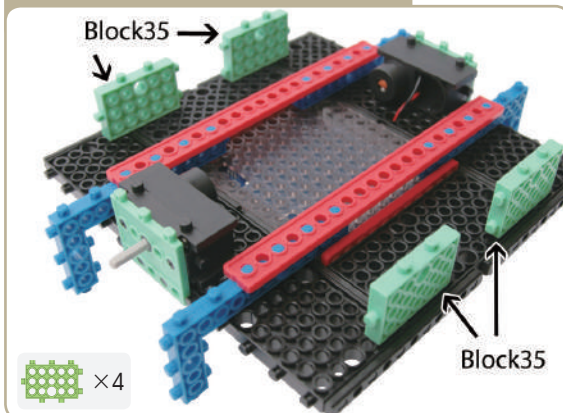
9



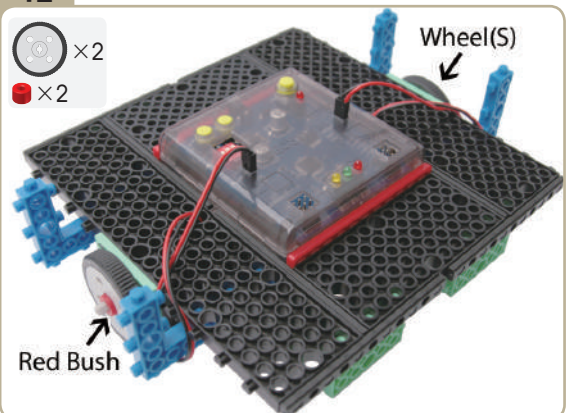
10



11 (Bottom of model(Pic)#10)

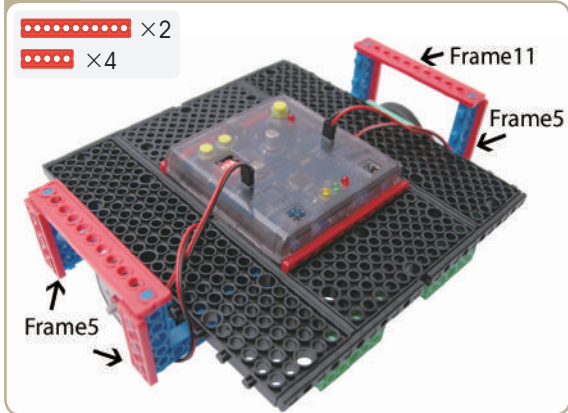


12



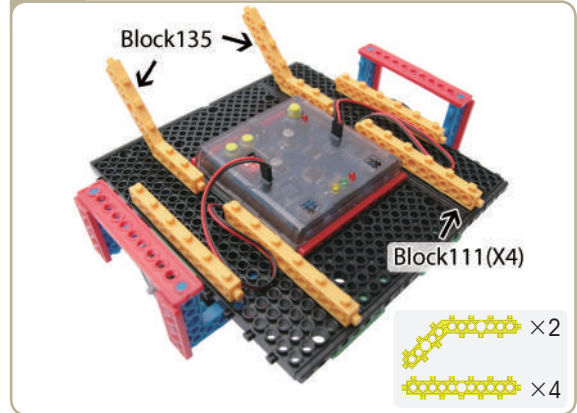
Turn model(pic)#11 upside down, then insert small wheels and red bushes to the shaft of DC motor.

13

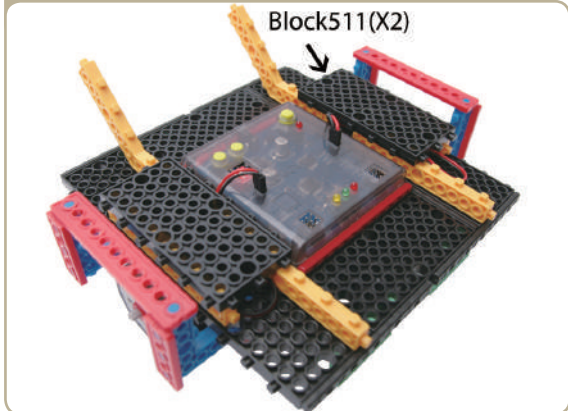


Attach four 「frame5」s and two 「frame11」s.

14

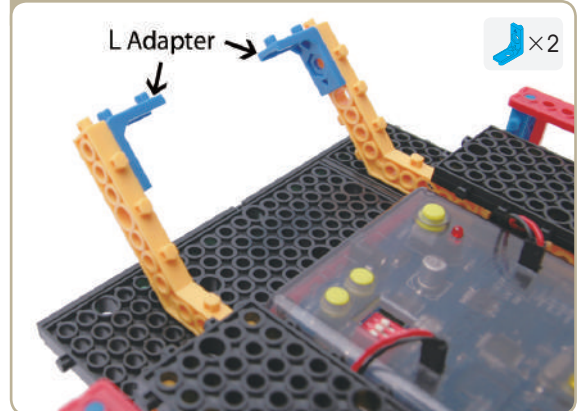


15



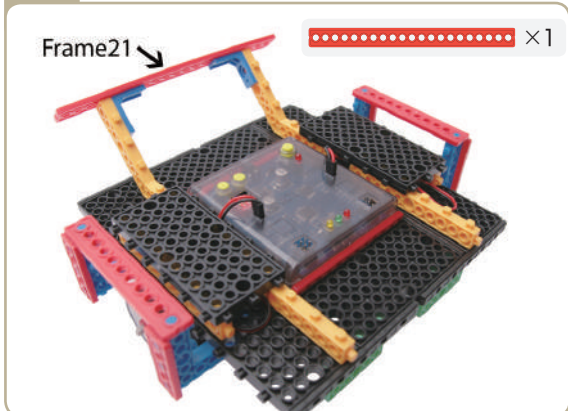
16

* Attach facing up

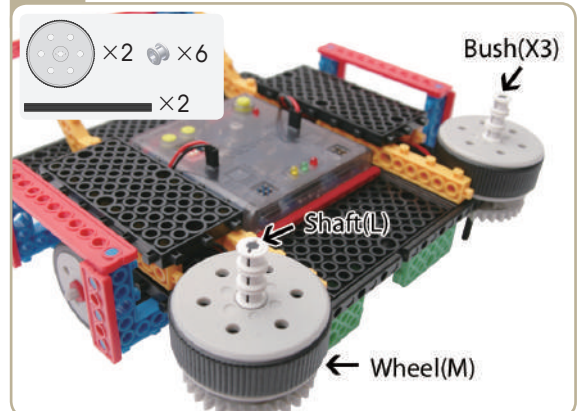


Attach two 'L' adapters to 「block135」.
(Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

17

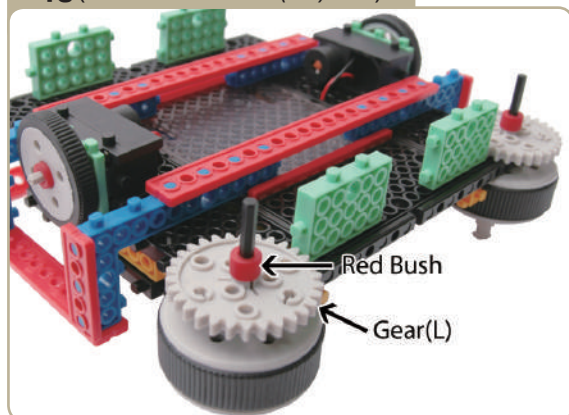


18



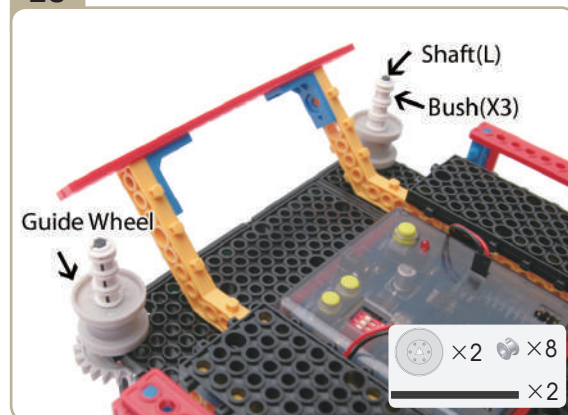
Connect the parts in the following order; tow long shafts
→ tow medium wheels → Three bushes.

19 (Bottom of model(Pic)#18)



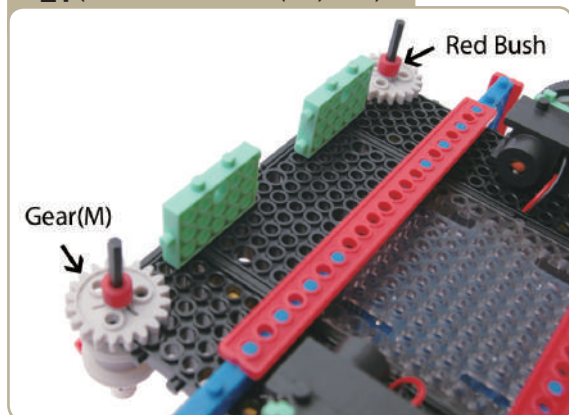
Turn model(pic)#18 upside down, the insert large gears and red bushes to long shaft .

20



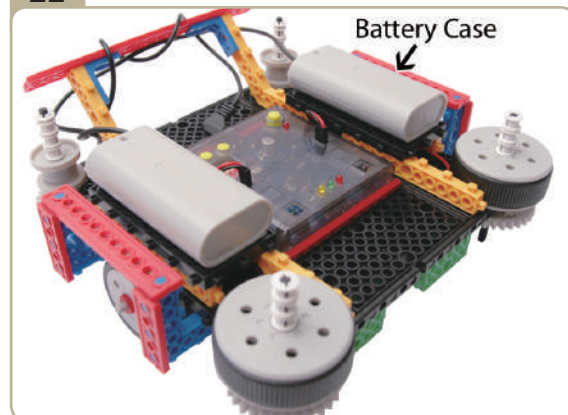
Connect the parts in the following order; Long shafts → Guide wheels → Three bushes.

21 (Bottom of model(Pic)#20)



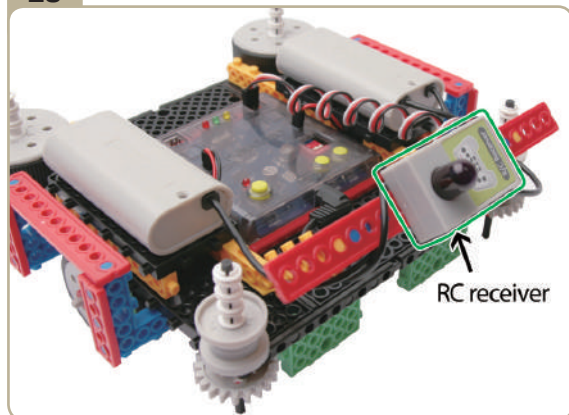
Turn model(pic)#20 upside down, then insert medium gears and red bushes to long shaft .

22



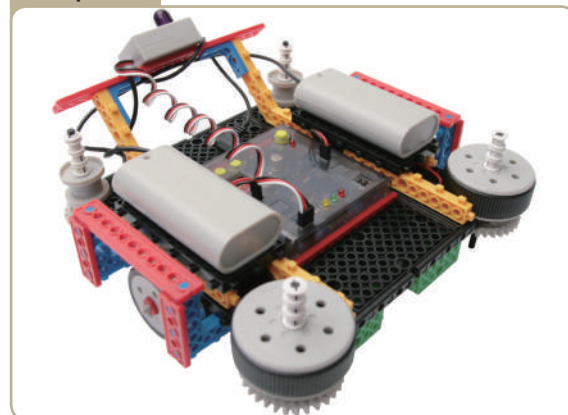
Turn model(pic)#21 upside down, then connect battery cases.

23



Connect RC receiver to the back of model(pic)#22.

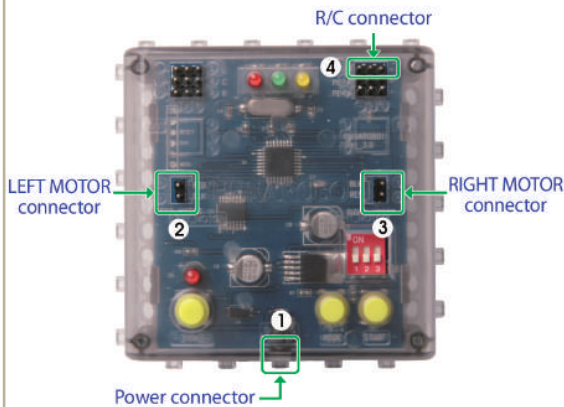
Completed





How to operate the Battle Bumper Car

Connecting the mainboard



Connect in this order.

1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.
3. Connect Right DC motor to RIGHT MOTOR connector.
4. Connect Remote control receiver board to R/C connector.



The DC motor red wire must be connected to positive \oplus , the black wire to the negative \ominus .



Insert the black wire of 3P electric wire into the negative \ominus .

Setting mode

1. Ensure battery case / DC Motor Connector are connected.
2. Turn on the power.
3. Press MODE button so that the red LED is lit up.



4. Select Remotecon ID. (See below.)
5. Press START button and try to move the robot.

Remote Control ID Setup

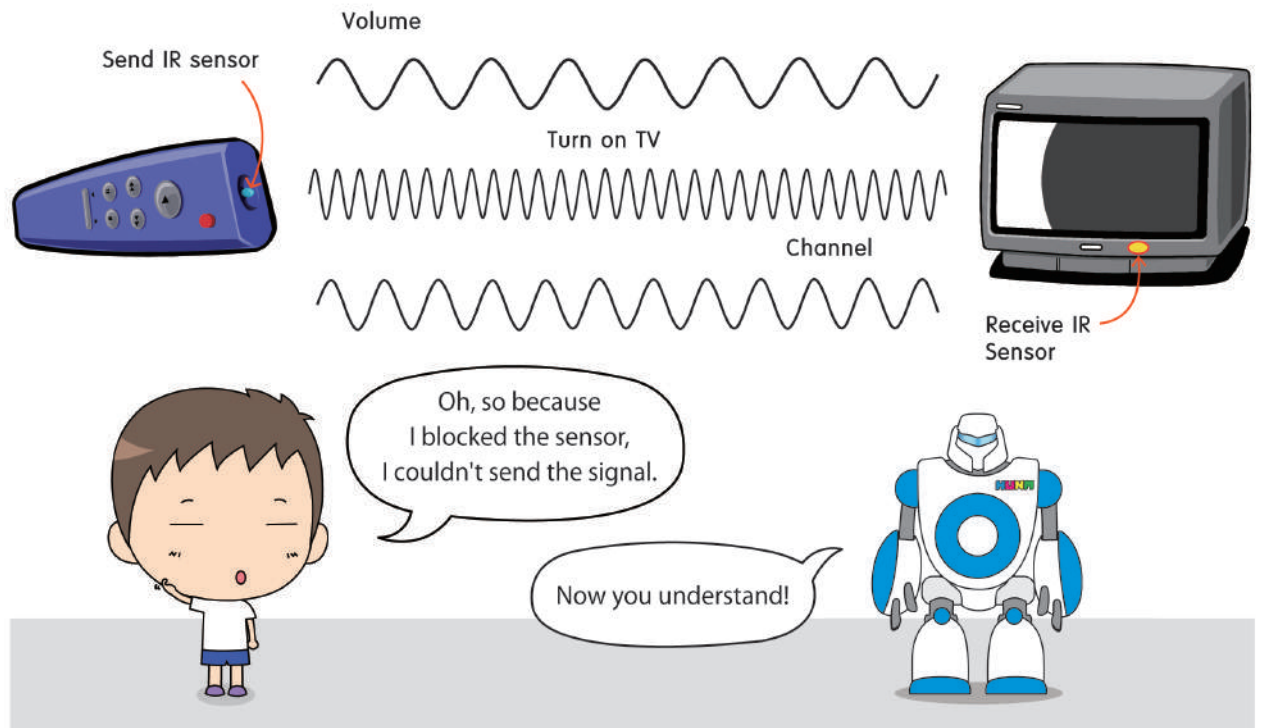
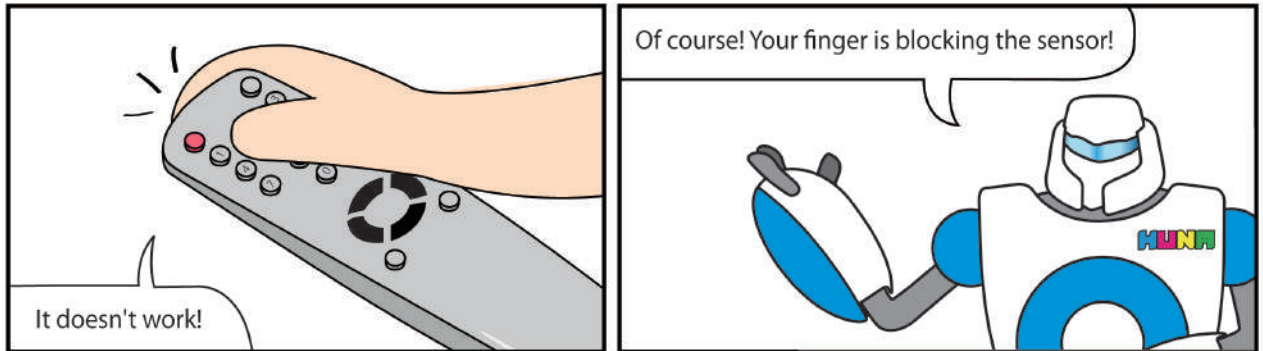
1. Turn on the robot.
2. Select #1 mode of robot. (Red LED turns on)
3. Press CH button while holding \leftarrow button.
The A panel ID LED turns on and shows you what mode you chose.
4. Press CH button while holding \leftarrow button and choose your ID. (Number 1~8)
5. After selecting ID, if you release \leftarrow Button and press CH button, ID will be selected.
6. The LED on the mainboard will blink 3 times and it will turn off automatically.
That means the ID Selection is finished.
7. If you press \leftarrow button, you can see your selected ID.



***If there is a problem, repeat steps 1-7 carefully.**



The principle of a remote control



Using a remote control, what can you order a robot to do?

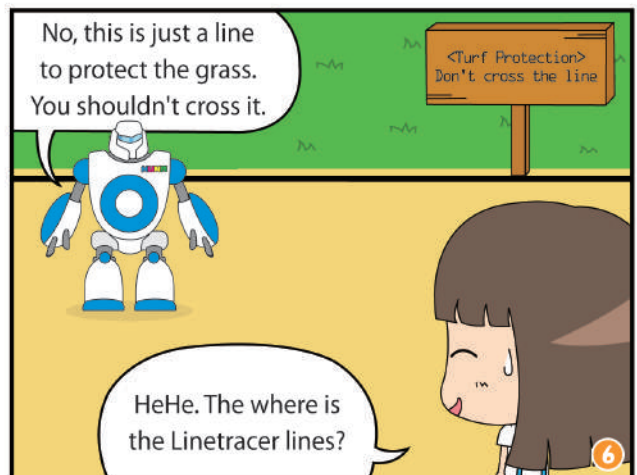
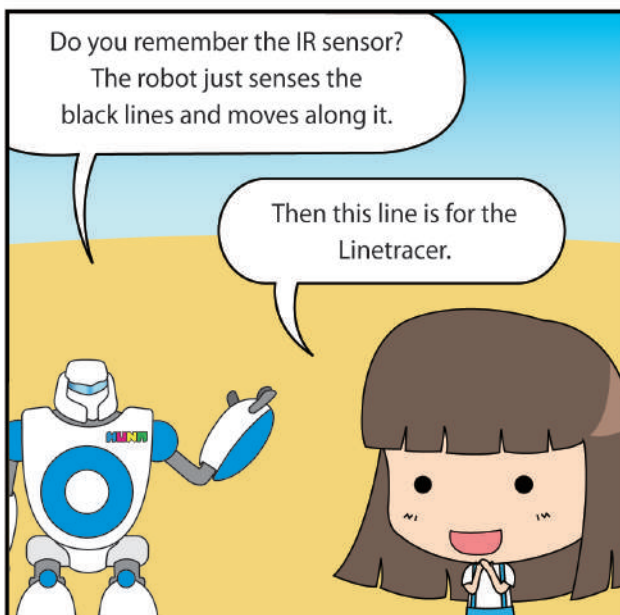
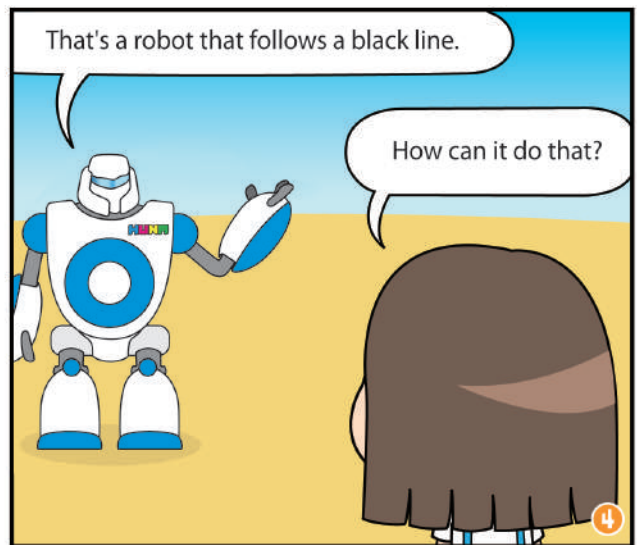
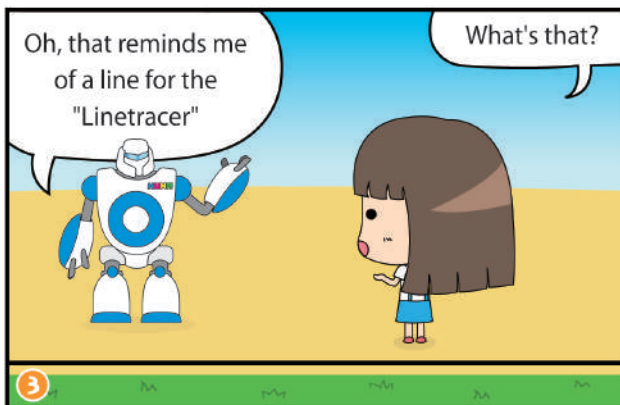
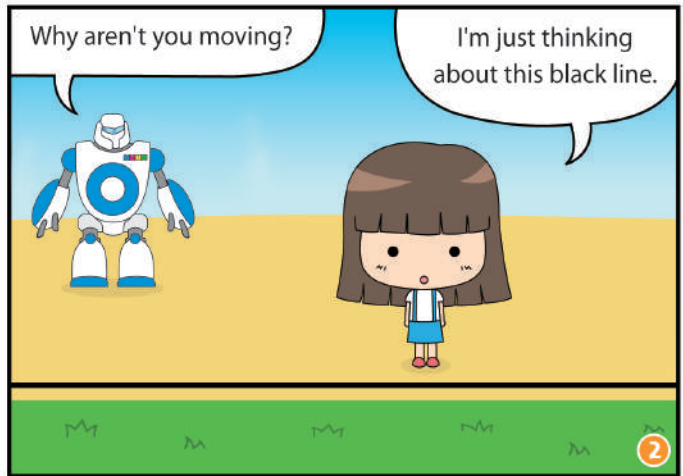
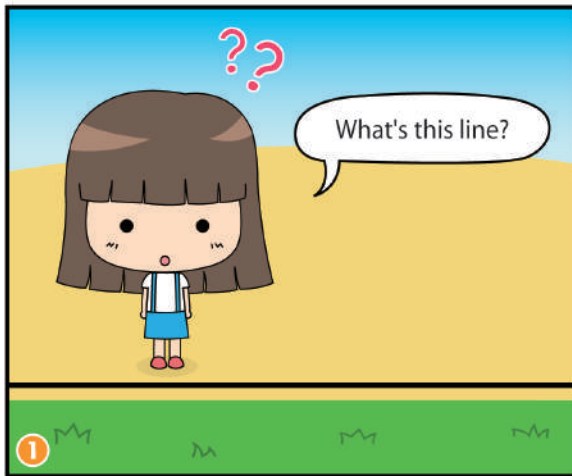


.....

.....



I like the color black - LineTracer



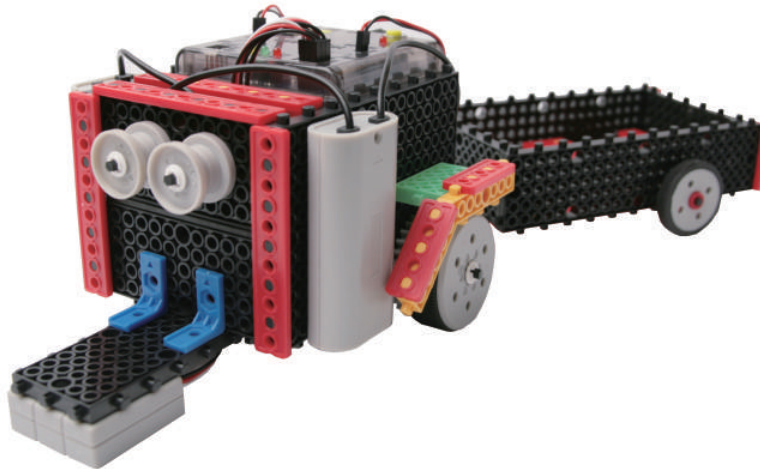


Making a Linetracer



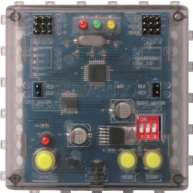
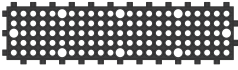






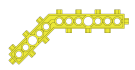
















Thomas Train

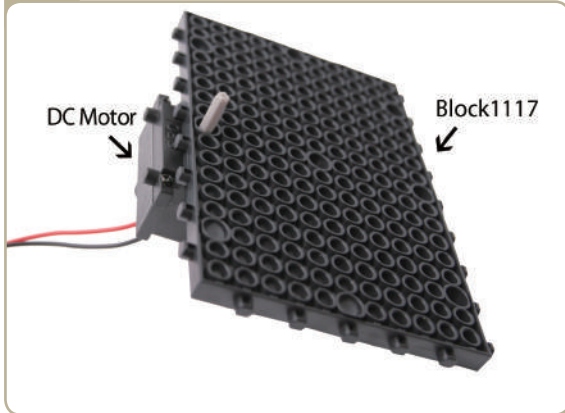
Thomas Train is an animation show for kids. We'll make a similar train below.



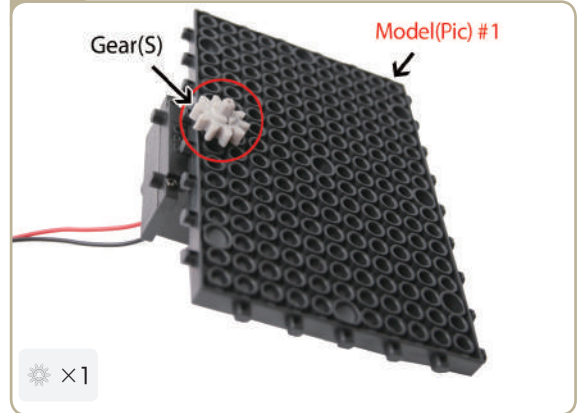
Prepare parts for assembly

	Block1117	×2		Frame21	×4	
	Block523	×2		Frame11	×10	
				Frame5	×6	
	Block511	×6		Adapter2	×1	
				Shaft(S)	×4	
	Block135	×2		Shaft(M)	×2	
				Bush	×10	
	Block111	×5		Half Bush	×6	
				L Adapter	×8	
	Block35	×4		Gear(L)	×2	
	Wheel(S)	×2		Gear(S)	×2	
	Wheel(M)	×2		Guide wheel	×2	
				DC Motor	×2	Battery Case ×1

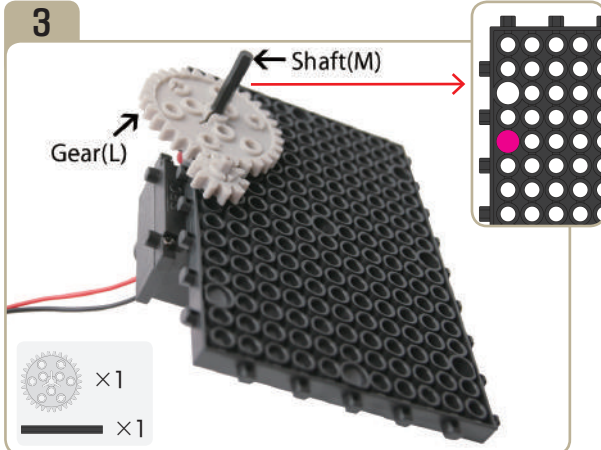
1



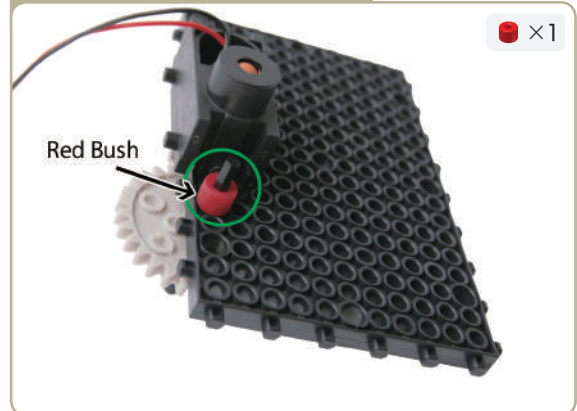
2



3

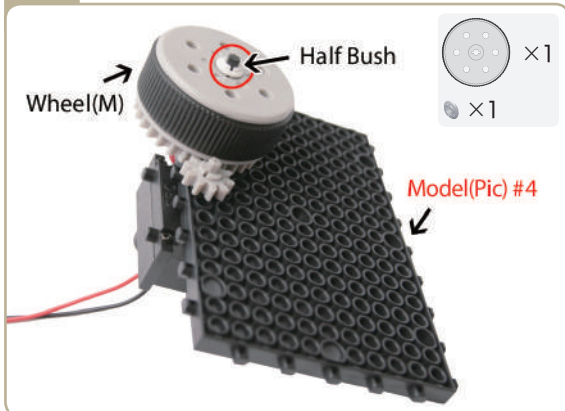


4 (Back of model(Pic)#3)



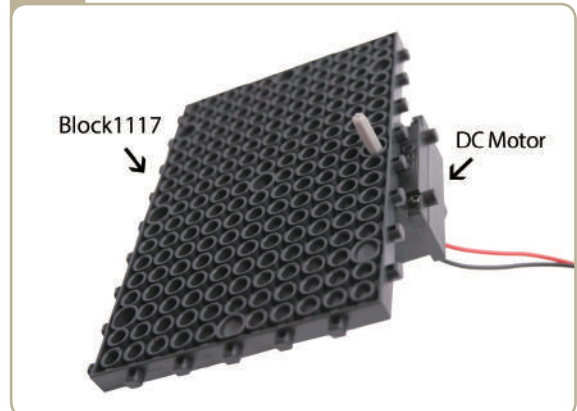
Turn model(pic)#3 upside down, then insert a red bush to medium shaft.

5

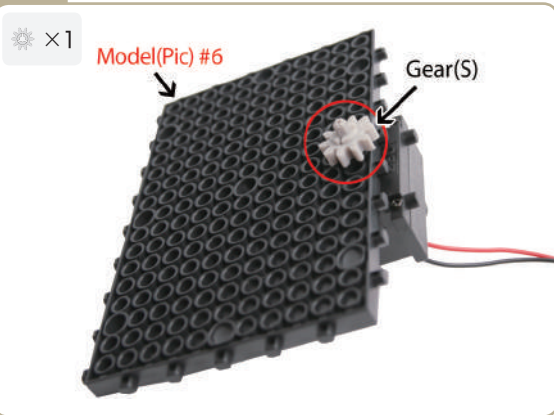


Turn model(pic)#4 upside down, then insert a medium wheel and a half bush to medium shaft.

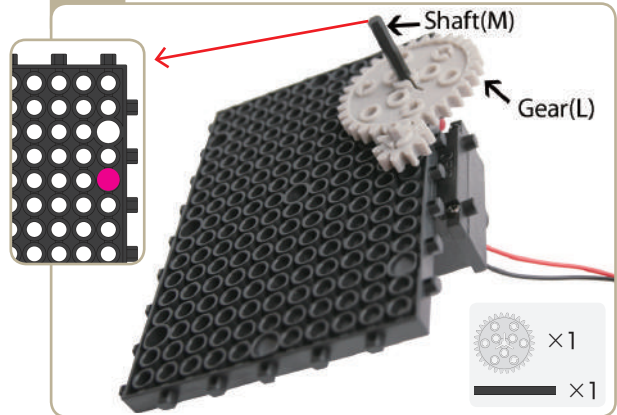
6



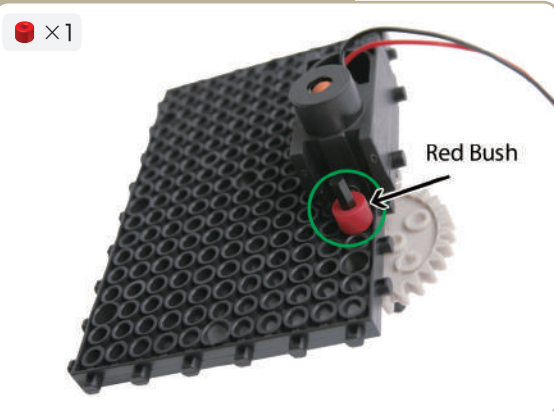
7



8

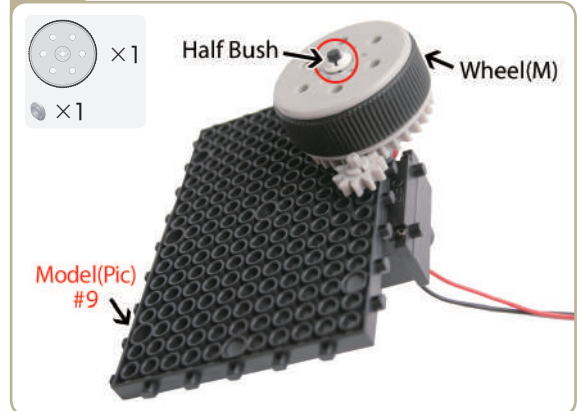


9 (Back of model(Pic)#8)



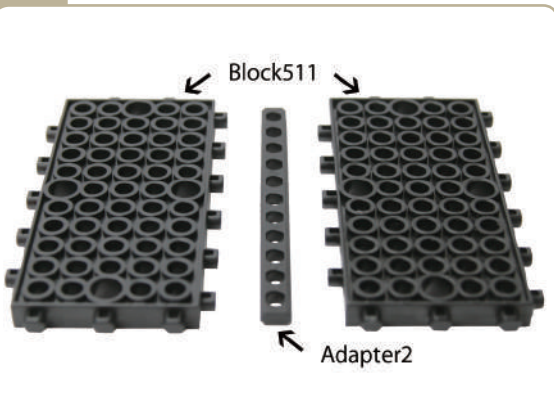
Turn model(pic)#8 upside down, then insert a red bush to medium shaft.

10



Turn model(pic)#9 upside down, then insert a medium wheel and a half bush to medium shaft.

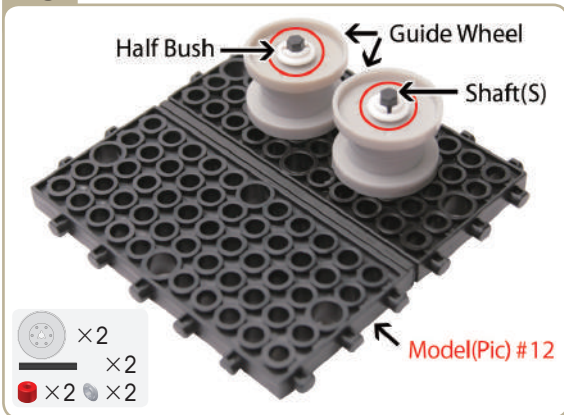
11



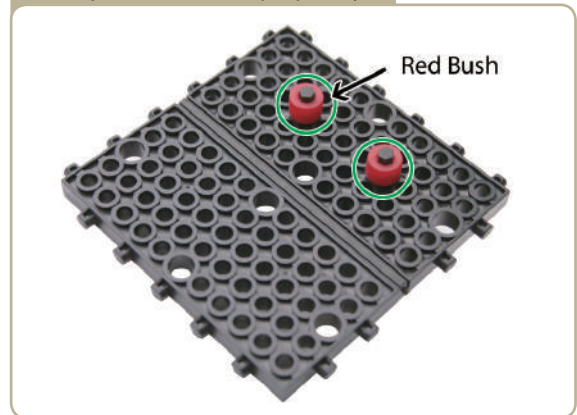
12



13

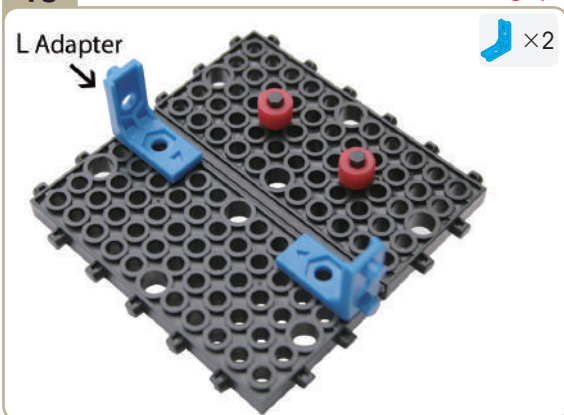


14 (Back of model(Pic)#13)

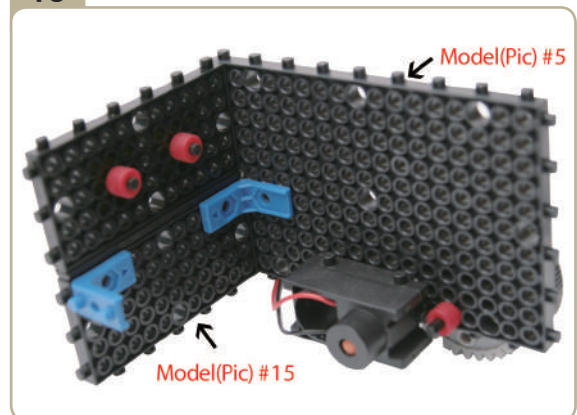


15

* Attach facing up



16

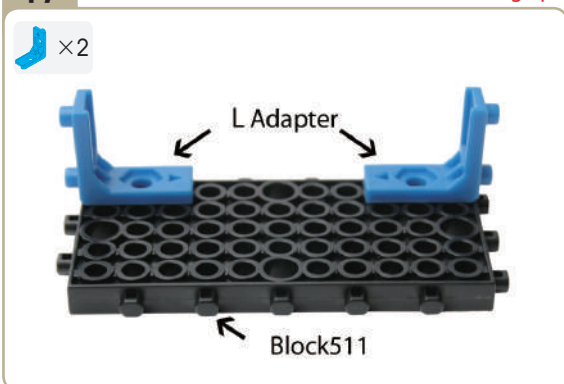


Attach 'L' adapters to model(pic)#14. (Pay close attention to the arrows(▲) that indicate how the adapters should be attached.)

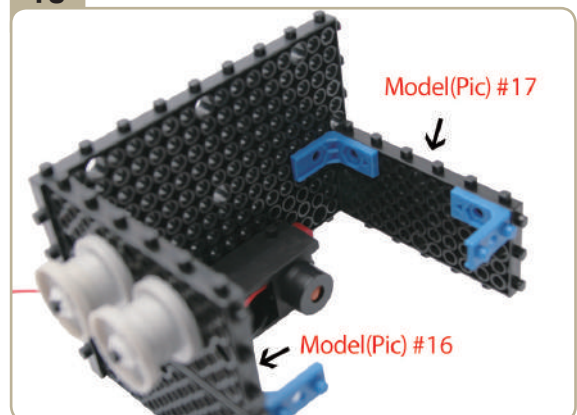
Combine model(pic)#15 with model(pic)#5.

17

* Attach facing up



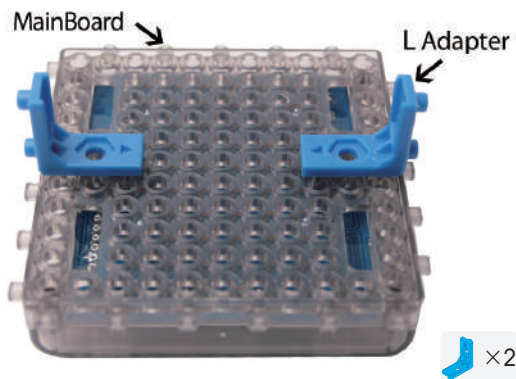
18



Attach two 'L' adapters to 「block511」. (Pay close attention to the arrows(▲) that indicate how the adapters should be attached.)

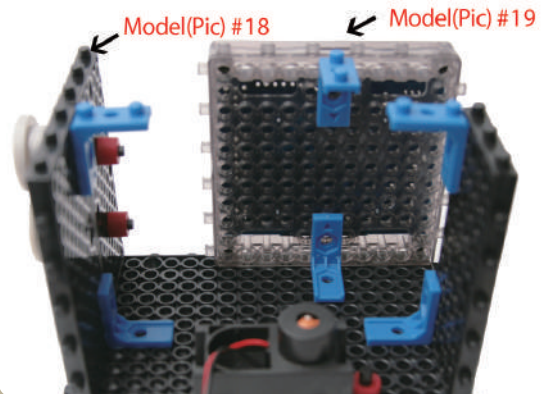
Combine model(pic)#17 with model(pic)#16.

19



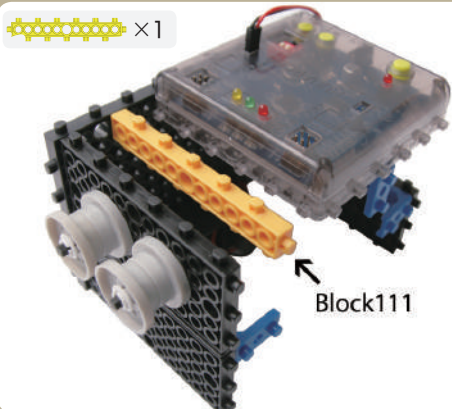
Attach two 'L' adapters to mainboard.
(Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

20

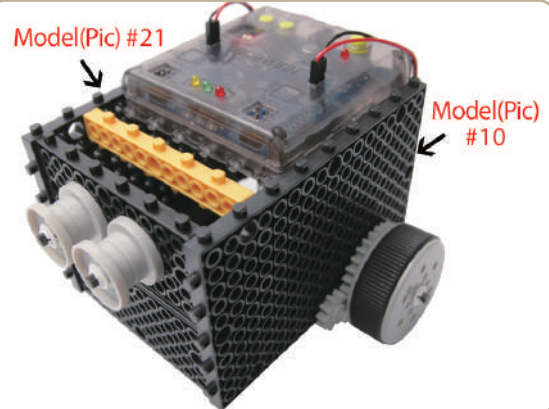


Combine model(pic)#18 with model(pic)#19.

21

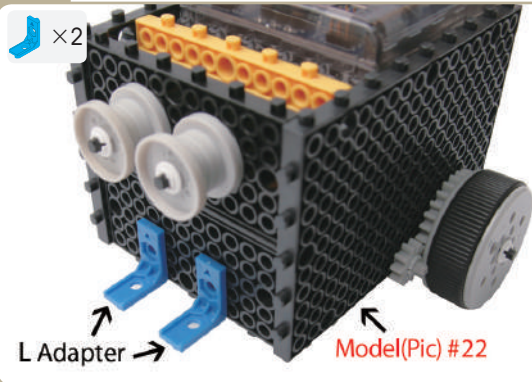


22



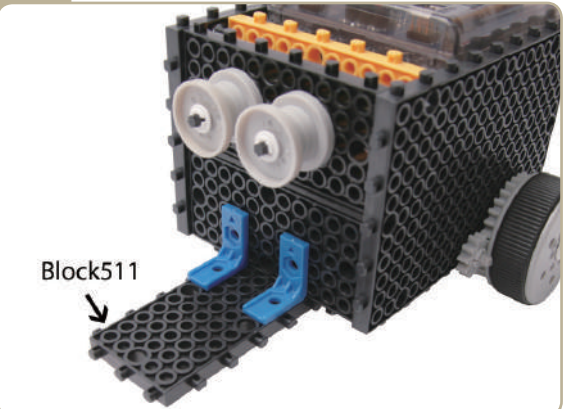
Combine model(pic)#10 with model(pic)#21.

23

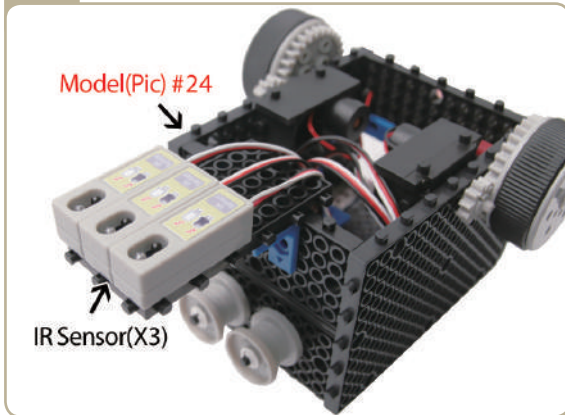


Attach two 'L' adapters to model(pic)#22.
(Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

24

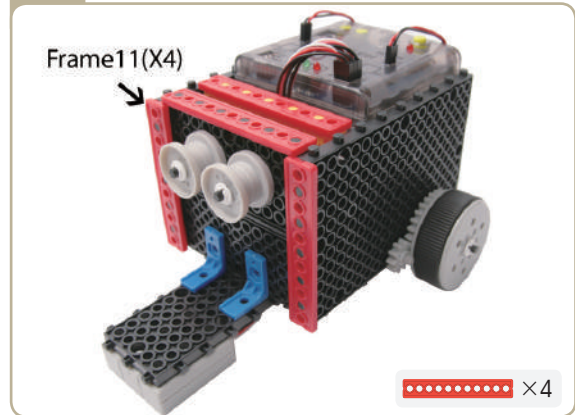


25



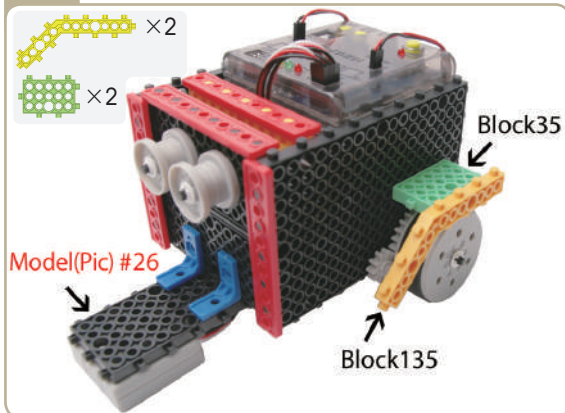
Turn model(pic)#24 upside down, then connect three IRsensors to it.

26



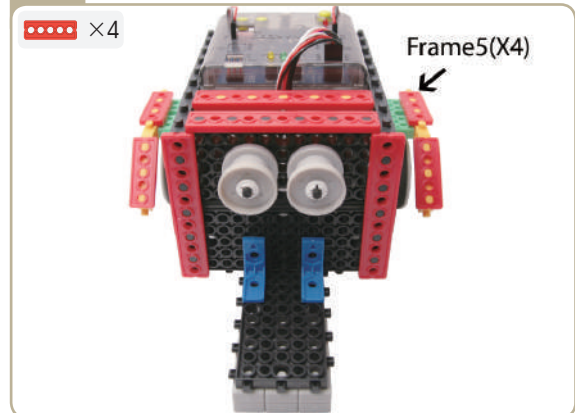
Turn model(pic)#25 upside down, then attach four 「Frame11」s.

27

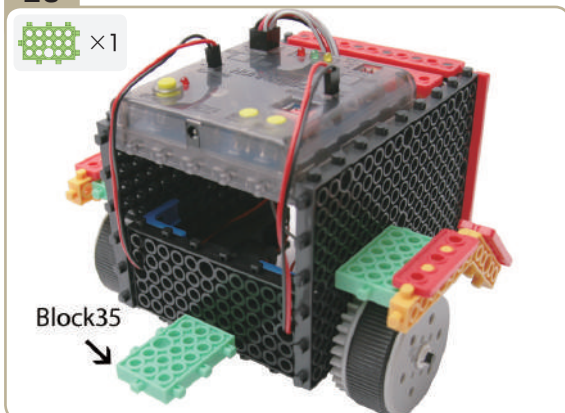


Attach a 「block35」 and a 「block135」 to model(pic)#26.
(Same with other side.)

28

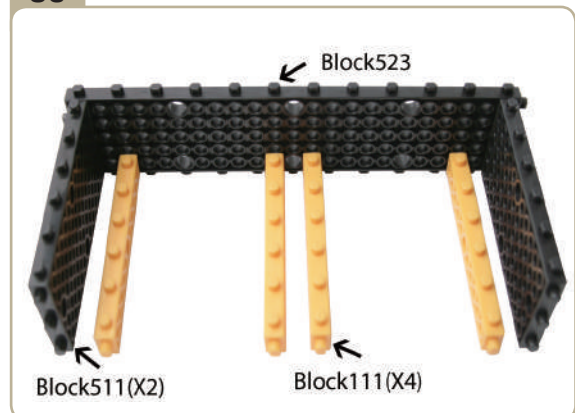


29

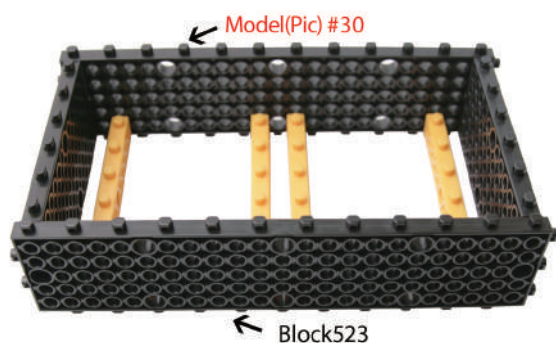


Attach a 「block35」 to the back of model(pic)#28.

30

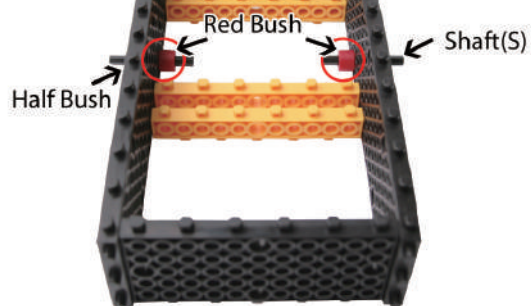


31

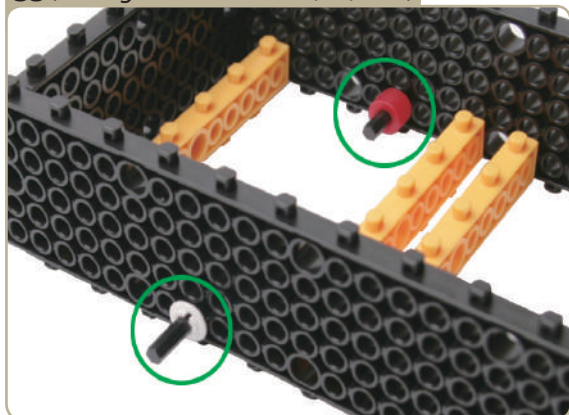


32

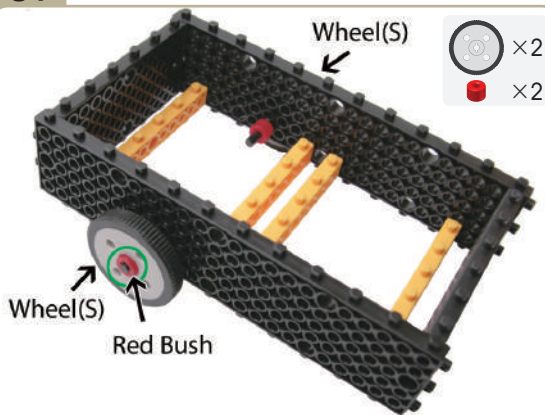
×2
×2



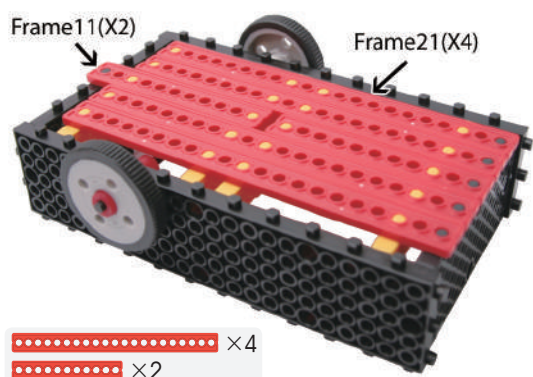
33 (Enlargement of model(Pic)#32)



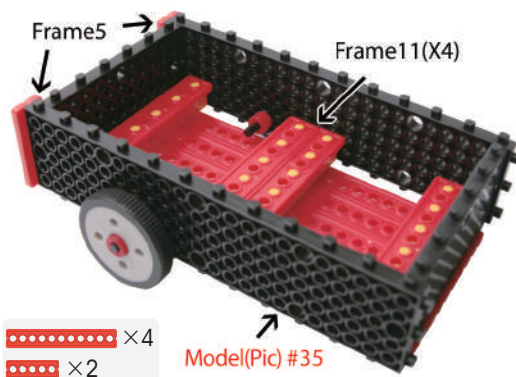
34



35 (Back of model(Pic)#34)

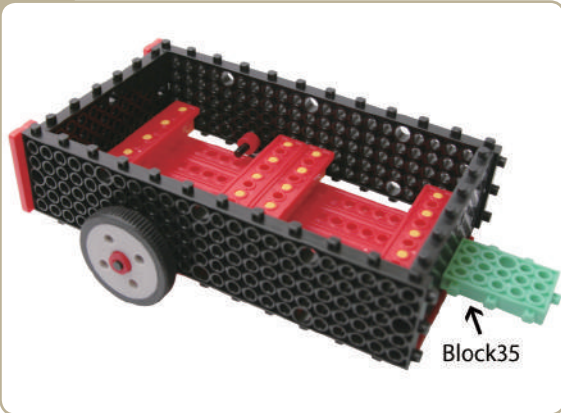


36

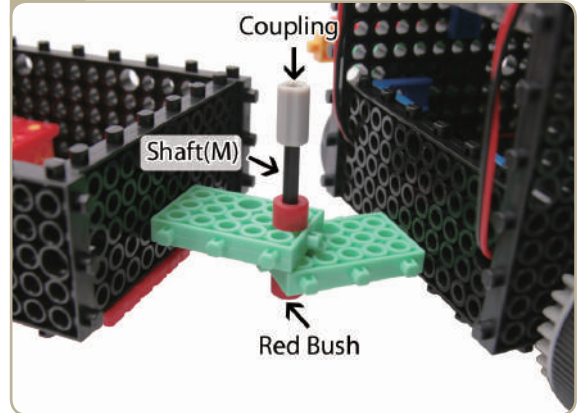


Turn model(pic)#35 upside down, then attach two 「Frame5」s and four 「Frame11」s.

37

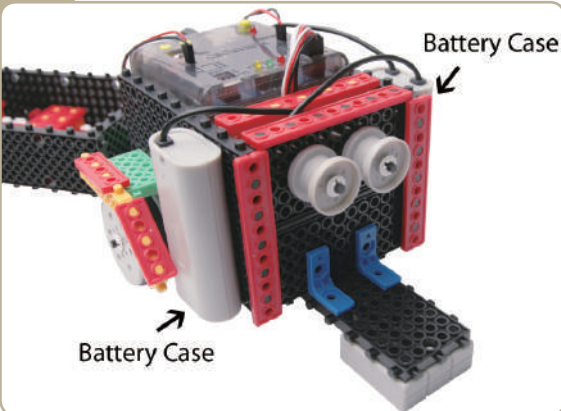


38

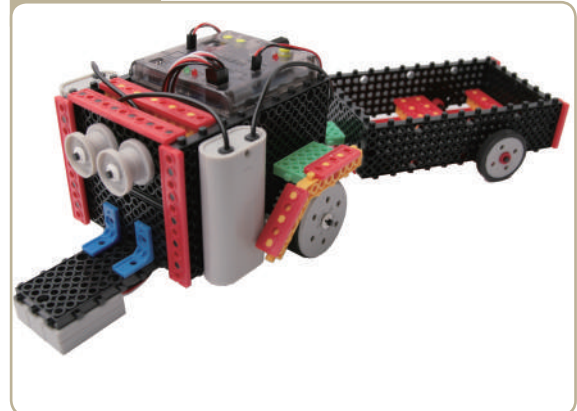


Connect model(pic)#29 to model(pic)#37 by using a medium shaft, red bushes and a coupling.

39



Completed

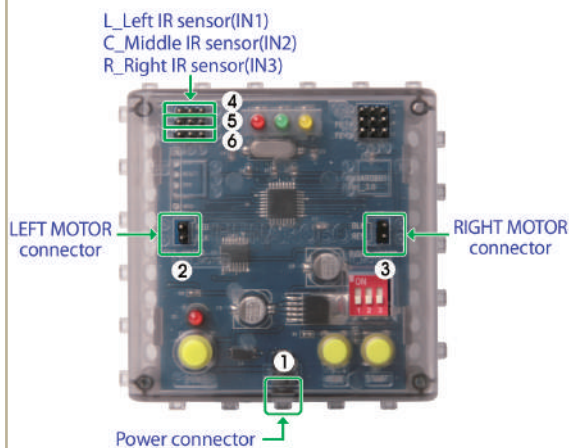


Connect battery cases to model(pic)#38.



How to operate the Thomas Train

Connecting the mainboard



Connect in this order.

1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.
3. Connect Right DC motor to RIGHT MOTOR connector.
4. Connect Left IR sensor to L connector.
5. Connect Middle IR sensor to C connector.
6. Connect Right IR sensor to R connector.



The DC motor red wire must be connected to positive \oplus , the black wire to the negative \ominus .



Insert the black wire of 3P electric wire into the negative \ominus .

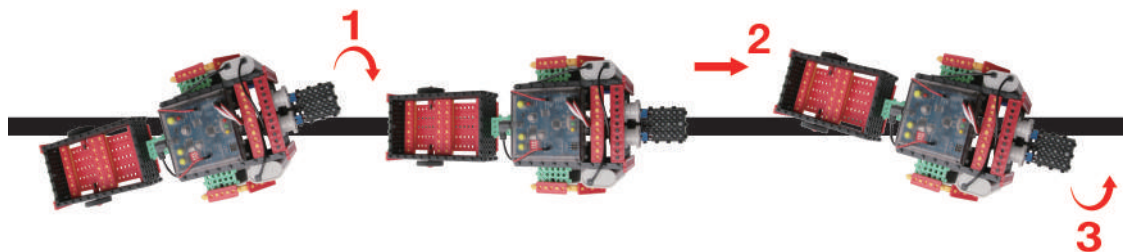
Setting mode

1. Ensure the battery case and DC Motor are connected well.
2. Turn on the power.
3. Press the MODE button and select as shown below. (The yellow LED will turn on.)



4. Press START button and try to move the robot.

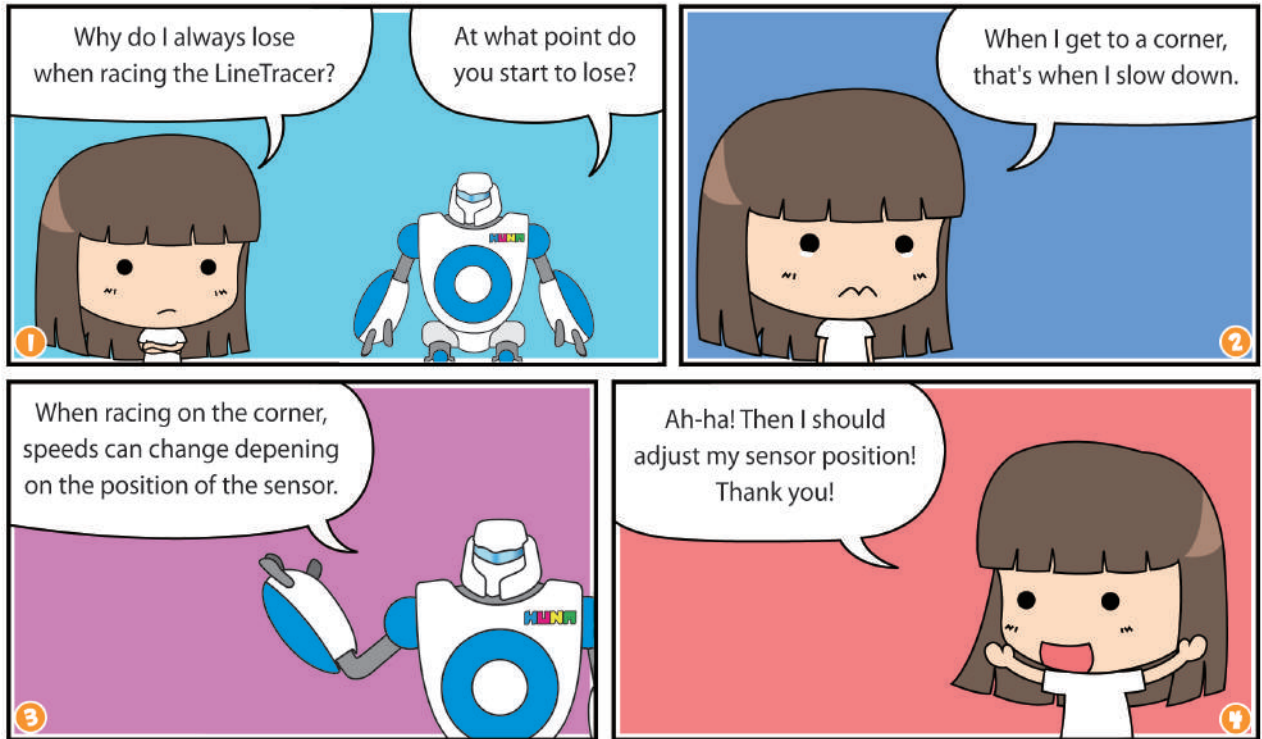
Movement



- A. When the train separates from the line on the left, it automatically turns right.
- B. Straight movement.
- C. When the train separates from the line on the right, it automatically turns left.



Let's know about adjusting the sensor position!

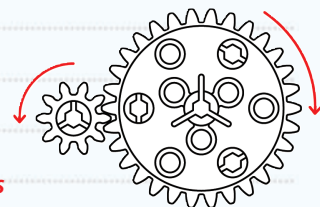


Let's adjust the sensor position and find the best place for you to take those corners!

* Let's change "Thomas" remote control mode.

It might move the opposite. Why?

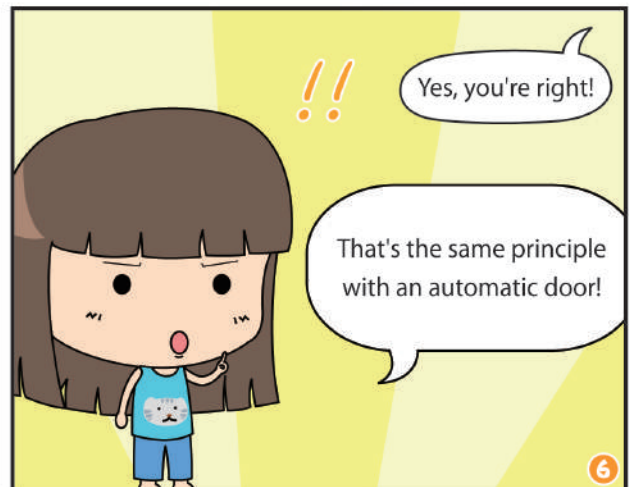
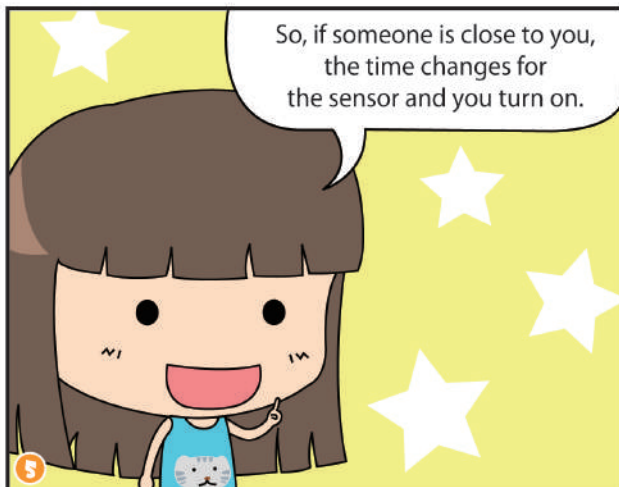
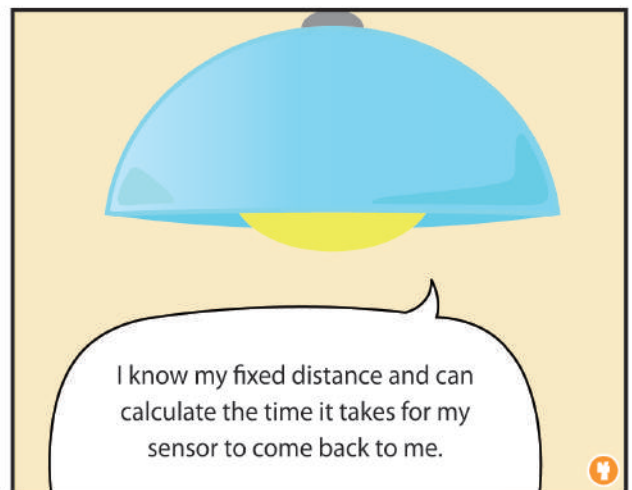
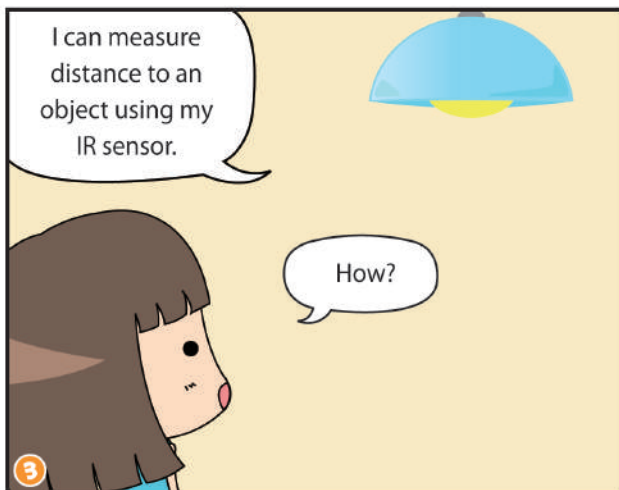
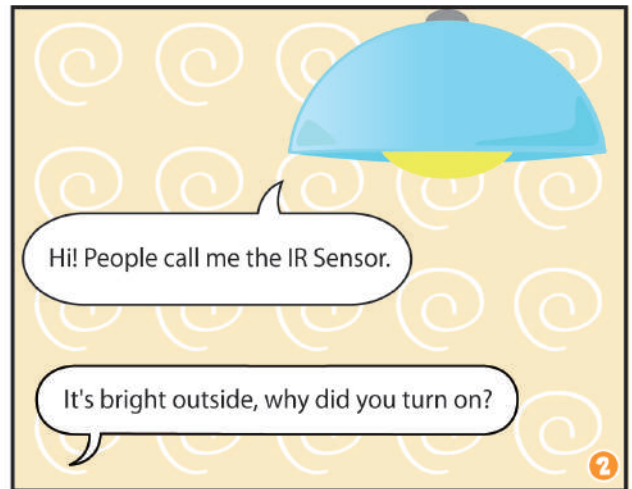
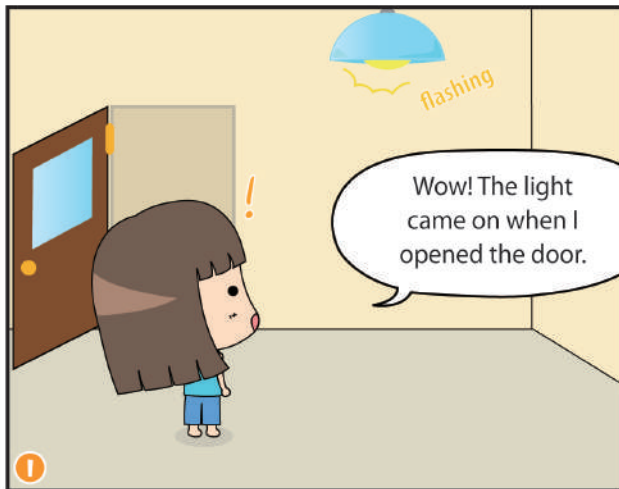
👉 Think about it and write it down.



Hint. Reduction gears



Making the eyes of a robot - IR Sensor 1

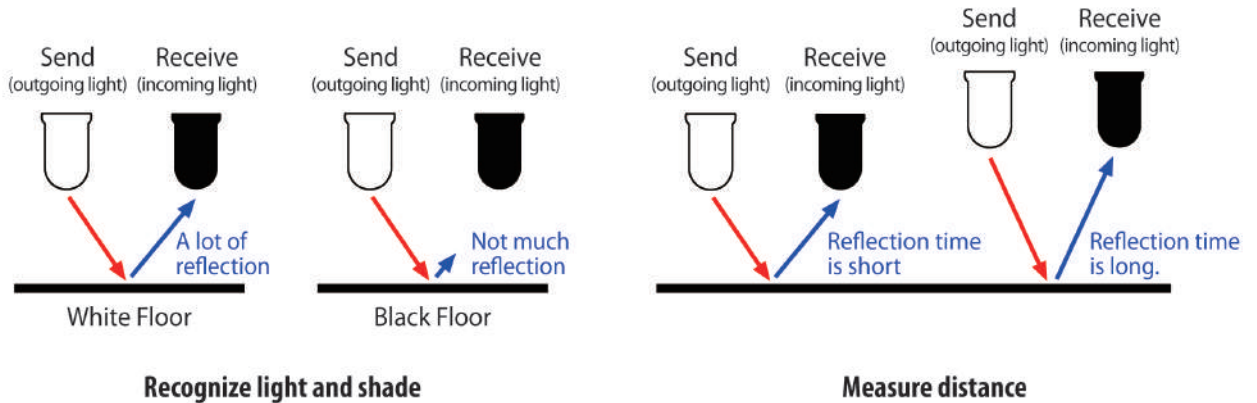




What is an IR Sensor?

IR sensor?

- An IR sensor has a send and receive part. The time taken to receive the signal can be converted into a distance for the robot to measure. An IR Sensor can also detect between light and dark surfaces.



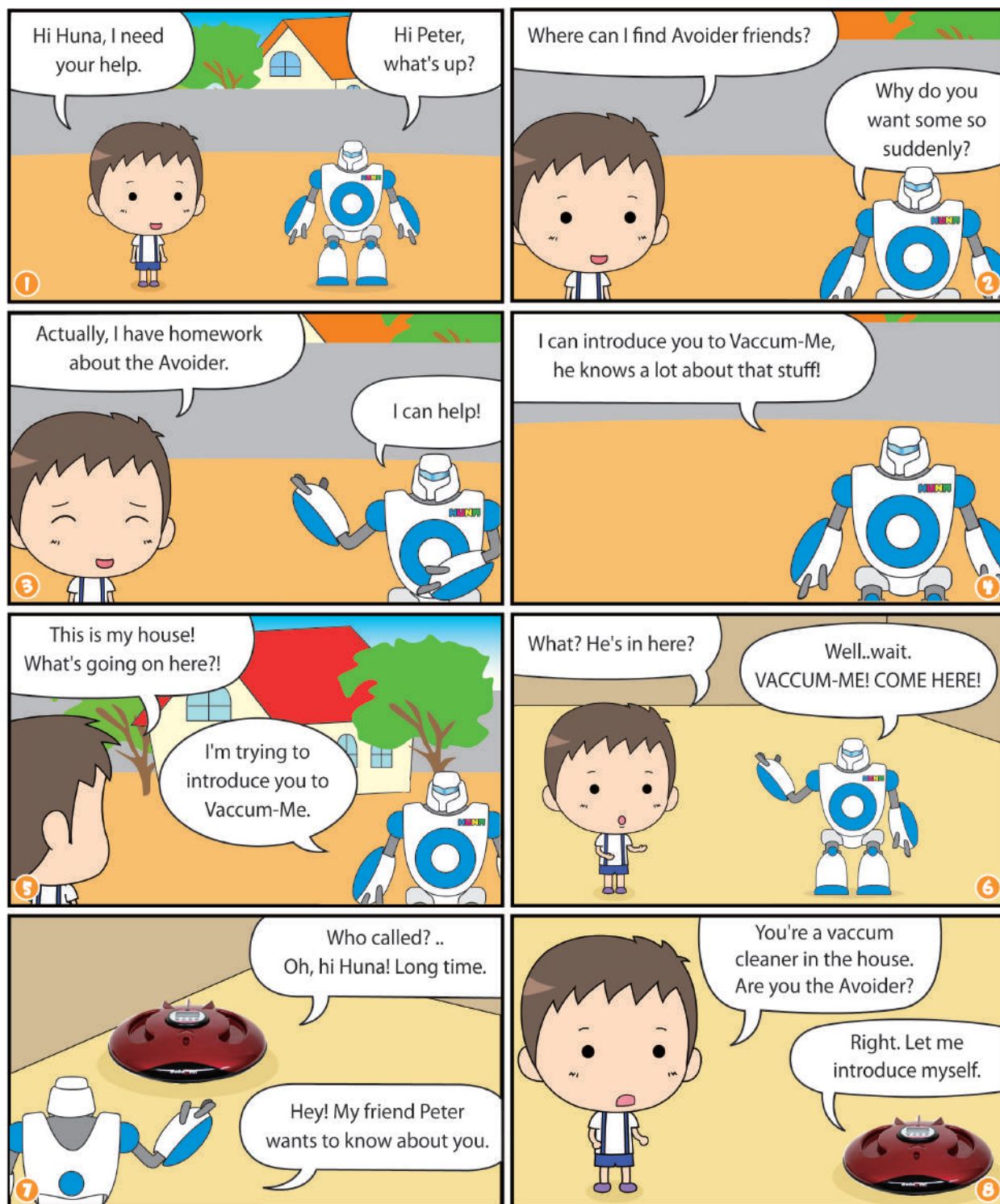
Make a pet robot that will follow you everytime.

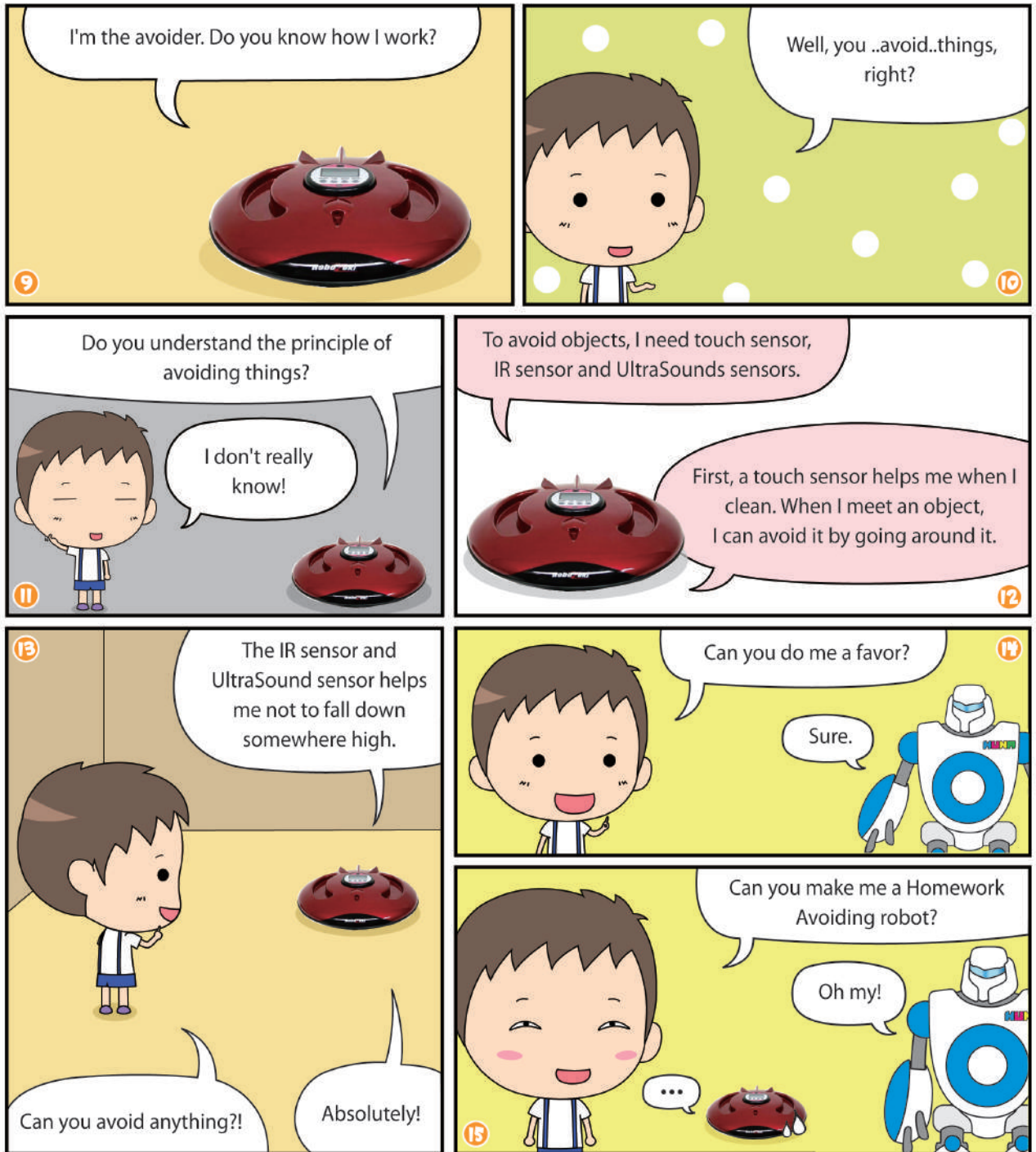


A series of horizontal lines for writing, resembling a notebook page.



What is the Avider?





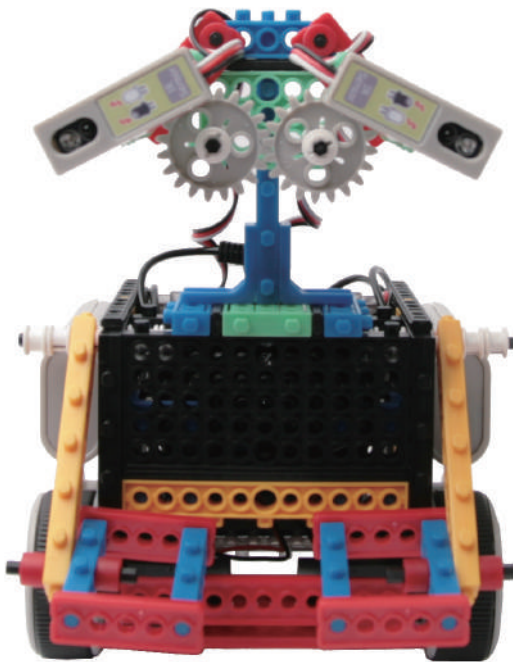
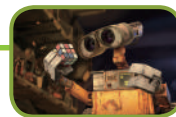


Making an avoider robot



Huna-E

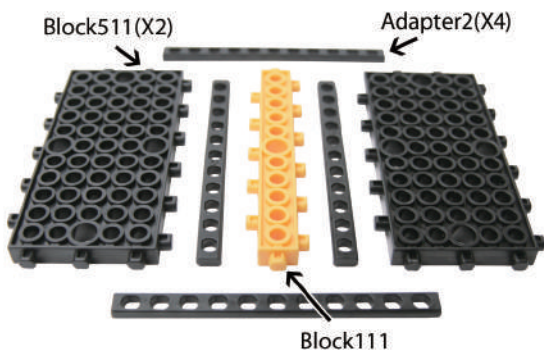
Huna-E is a representation of Wall-E, a famous animation.



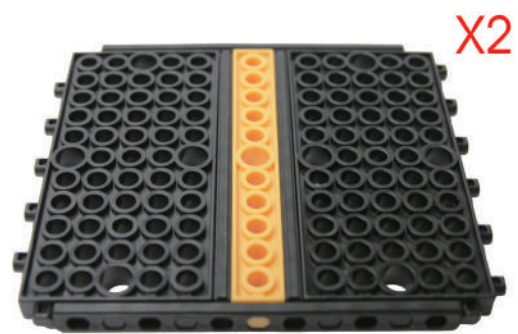
Prepare parts for assembly

	Block511	x5		Frame5	x8	
				Adapter2	x9	
	Block90	x1		Adapter1	x3	Mainboard x1
	Block111	x5		Shaft(S)	x4	
	Block15	x7		Shaft(L)	x4	
	Block35	x4		Connection Shaft	x2	
	Wheel(M)	x2		Bush	x18	
	Guide wheel	x2		Half Bush	x4	
	DC Motor	x2		Red Bush	x10	
				L Adapter	x6	
				Gear(M)	x2	Battery Case x1

1

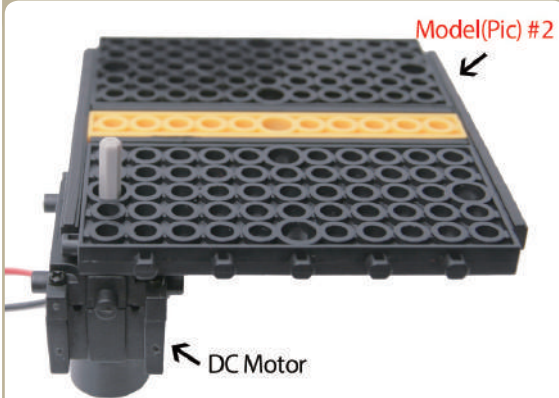


2



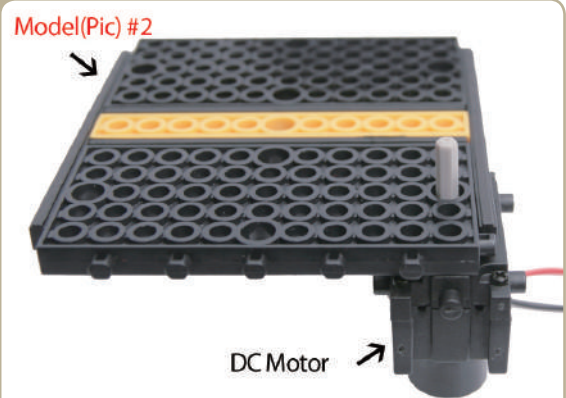
Assemble two identical models.

3



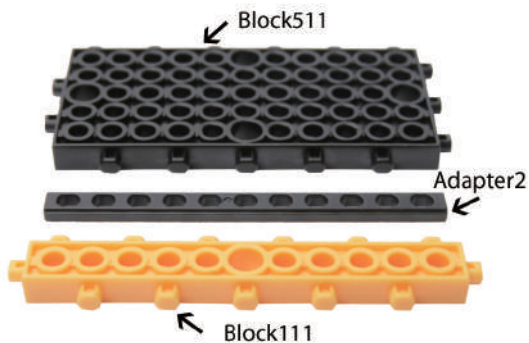
Connect a previously constructed part of model(pic)#2 to DC motor.

4

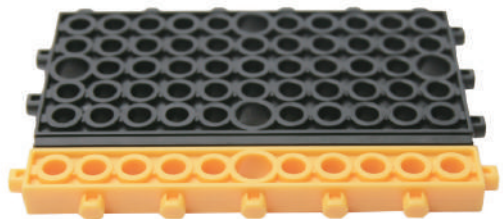


Connect a previously constructed part of model(pic)#2 to DC motor.(Connect the opposite sides of model(pic)#3.)

5

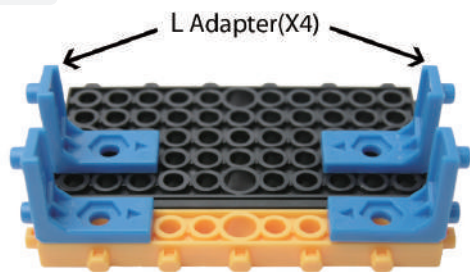


6

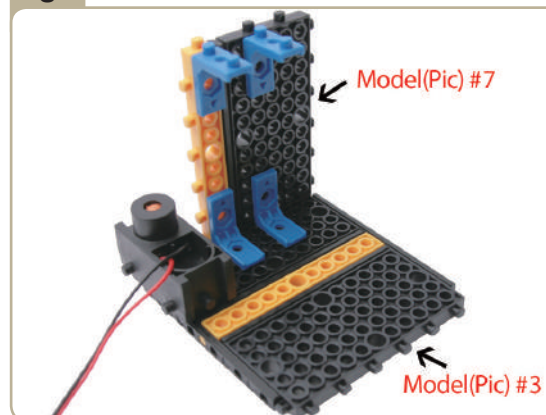


7

 ×4

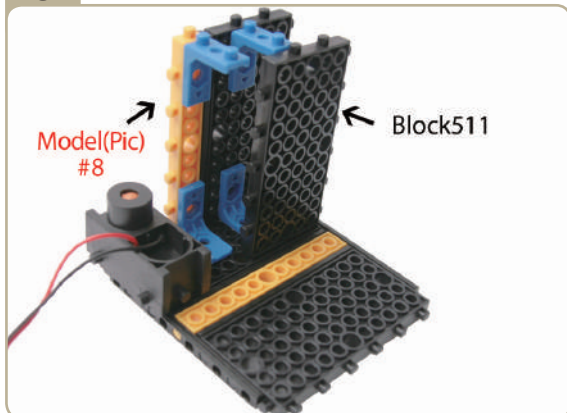


8

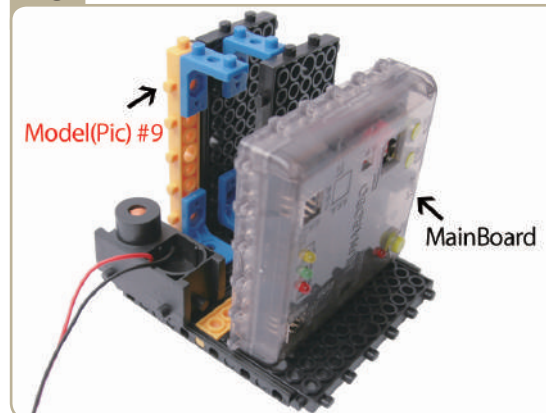


Combine model(pic)#3 with model(pic)#7.

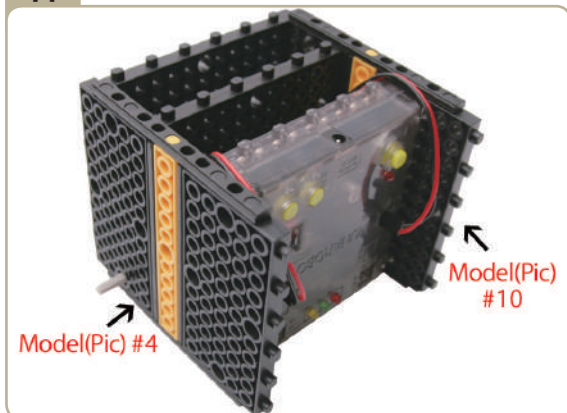
9



10

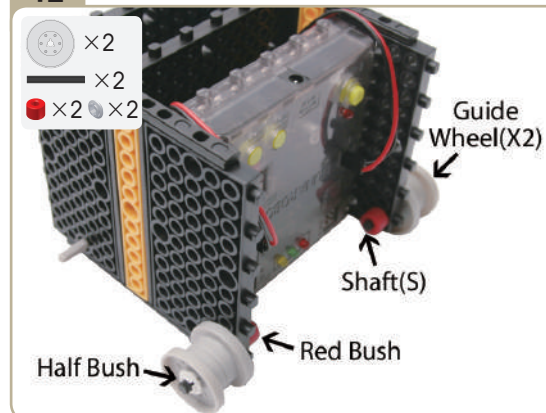


11

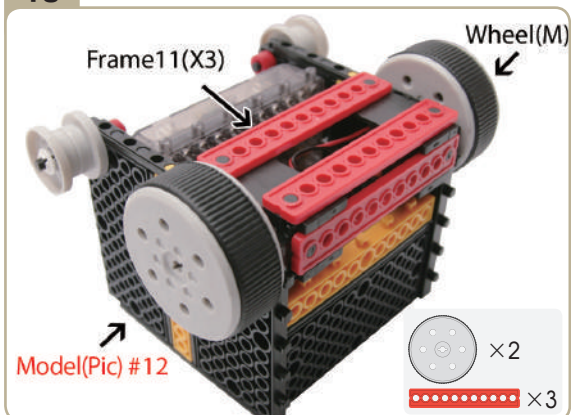


Combine model(pic)#4 with model(pic)#10.

12

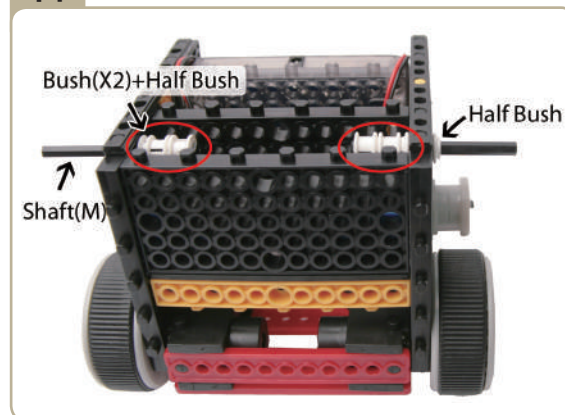


13



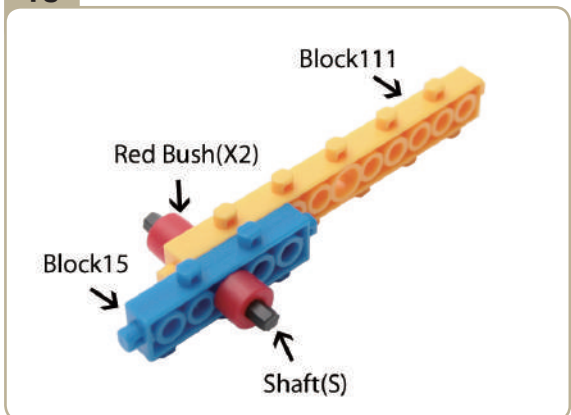
Turn model(pic)#12 upside down, then connect medium wheels and three 「Frame11」s.

14

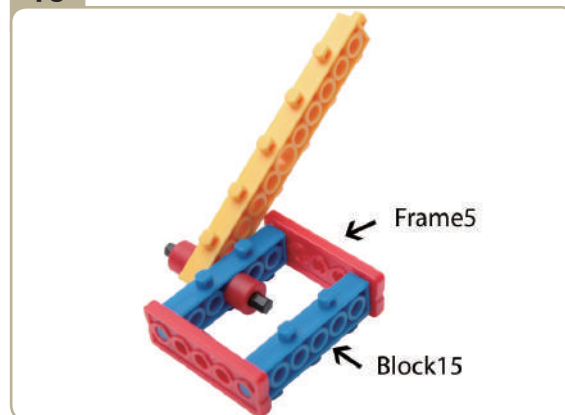


Turn model(pic)#13 upside down, then connect two medium shafts and four half bushes, four bushes.

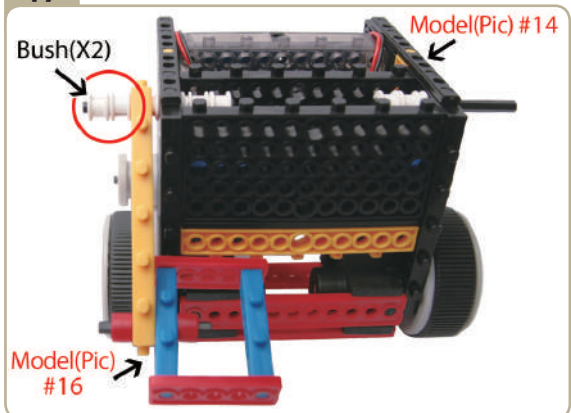
15



16

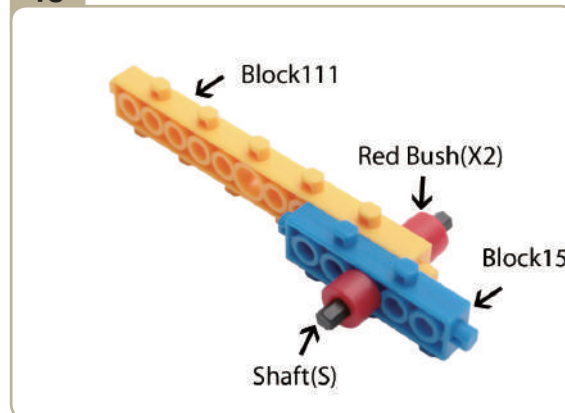


17

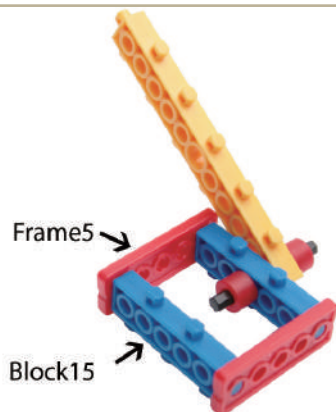


Connect model(pic)#14 to model(pic)#16 with two bushes.

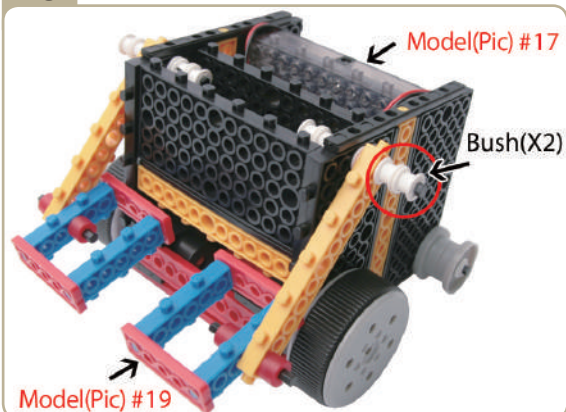
18



19

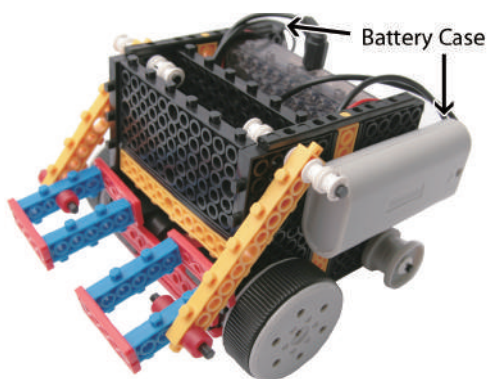


20



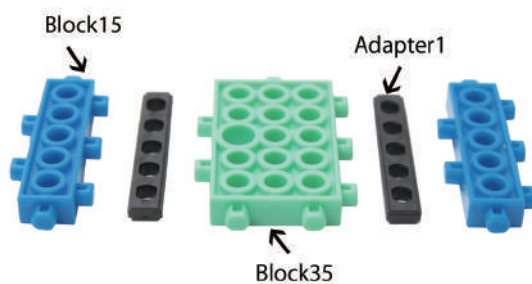
Connect model(pic)#19 to model(pic)#17 with two bushes.

21



Connect battery cases to model(pic)#20.

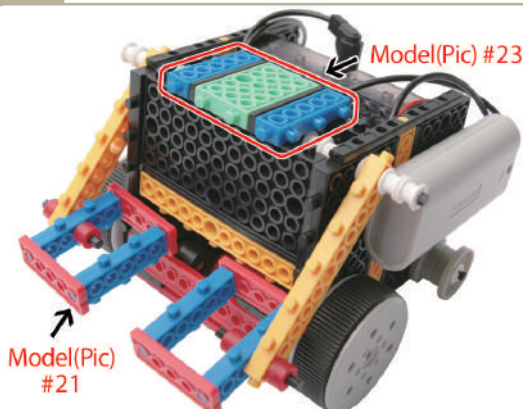
22



23

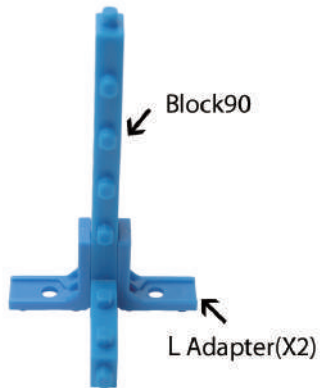


24



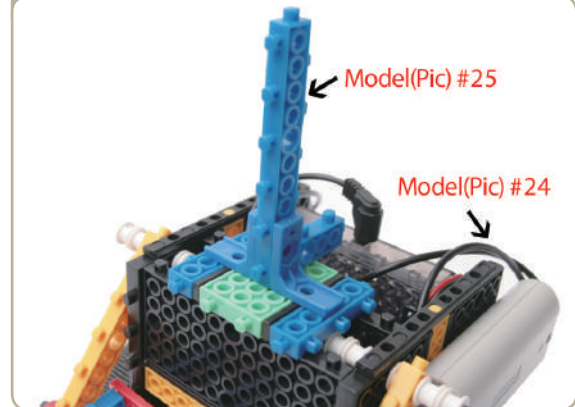
Combine model(pic)#23 with model(pic)#21.

25



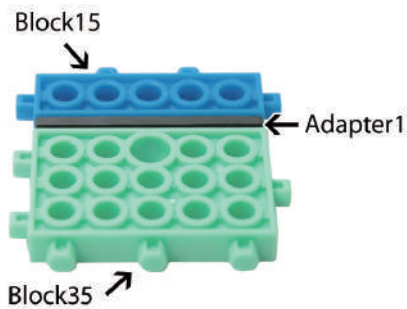
Attach two 'L' adapters to 「block90」.
(Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

26

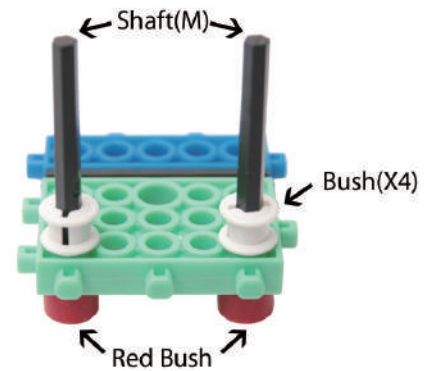


Connect model(pic)#25 to model(pic)#24.

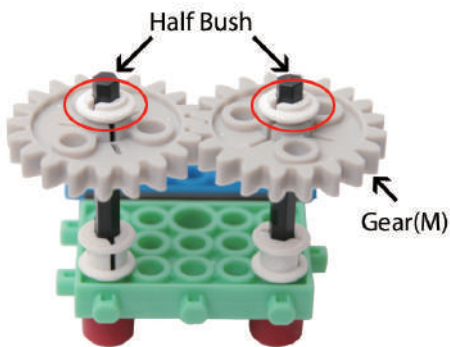
27



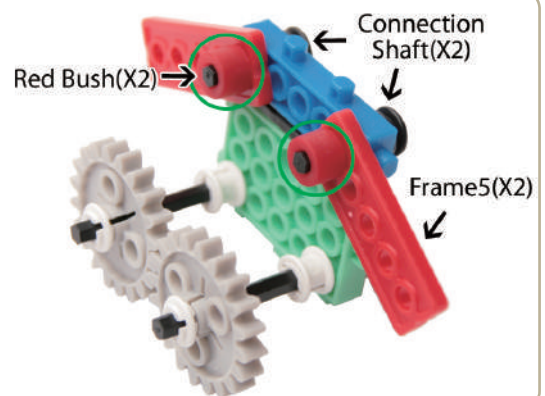
28



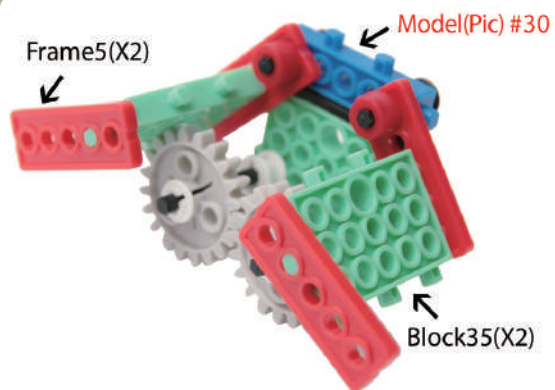
29



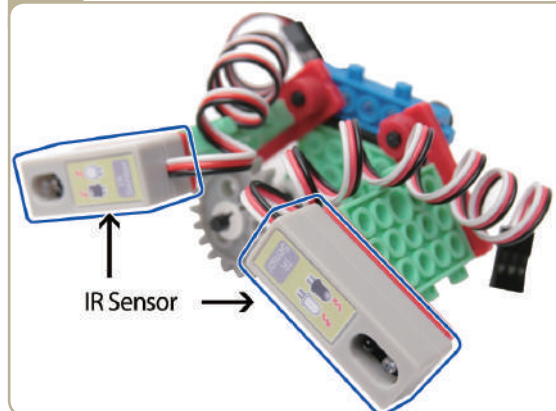
30



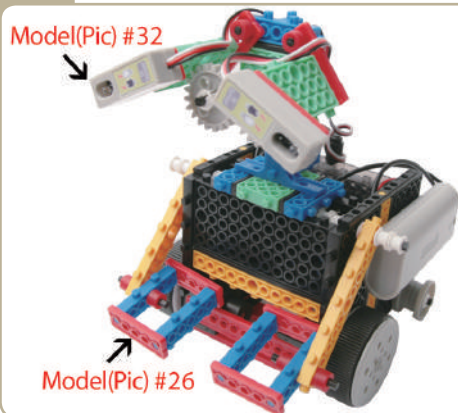
31



32

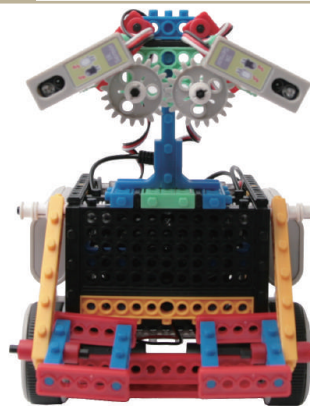


33



Connect model(pic)#32 to model(pic)#26.

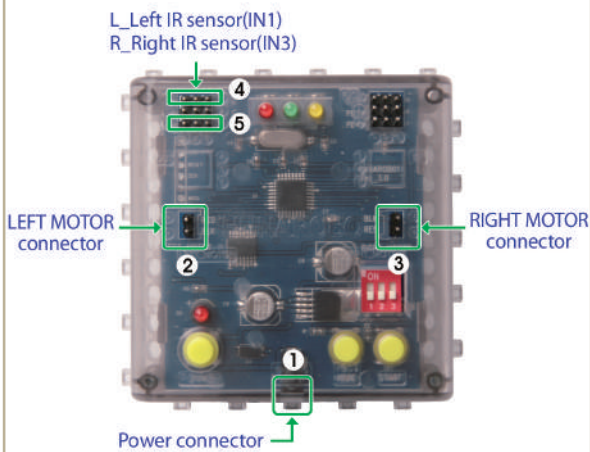
Completed





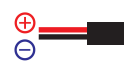
How to operate the Huna-E

Connecting the mainboard



Connect in this order.

1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.
3. Connect Right DC motor to RIGHT MOTOR connector.
4. Connect Left IR sensor to L connector.
5. Connect Right IR sensor to R connector.



The DC motor red wire must be connected to positive \oplus , the black wire to the negative \ominus .



Insert the black wire of 3P electric wire into the negative \ominus .

Setting mode

1. Ensure the battery case and DC Motor are connected well.
2. Turn on the power.
3. Press the MODE button and select as shown below. (The only yellow LED will turn off.)

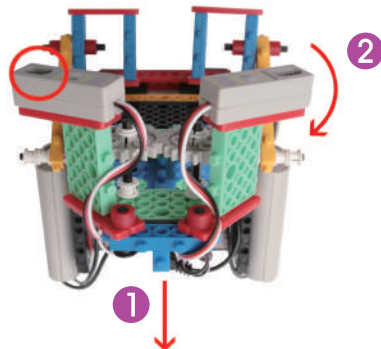


4. Press START button and try to move the robot.

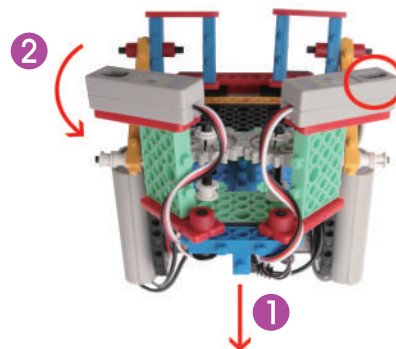
Movement

A

Left IR Sensor receiver


B

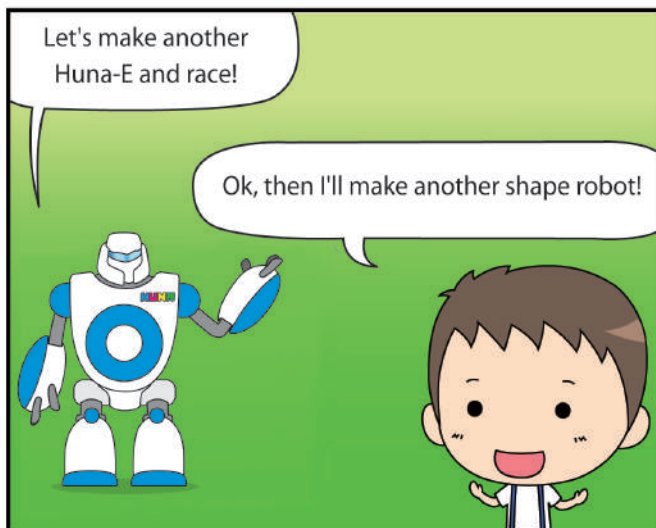
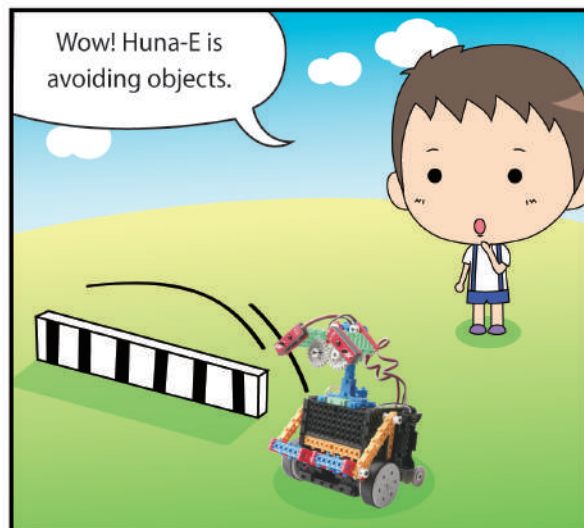
Right IR Sensor receiver



- A. When Left IR sensor recognizes: 1) Backwards 2) Turn Right.
 B. When Right IR sensor recognizes: 1) Backwards 2) Turn Left.



Avoiding objects



Let's make another shape of Huna-E robot avoid object.



Eve (Searching for plants)



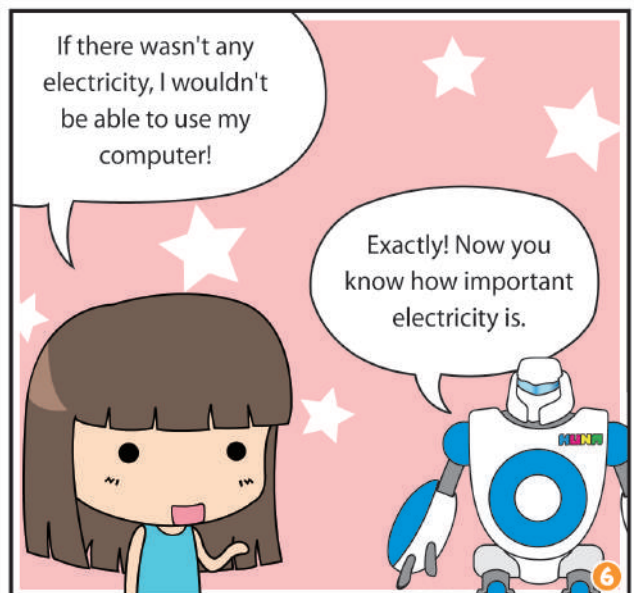
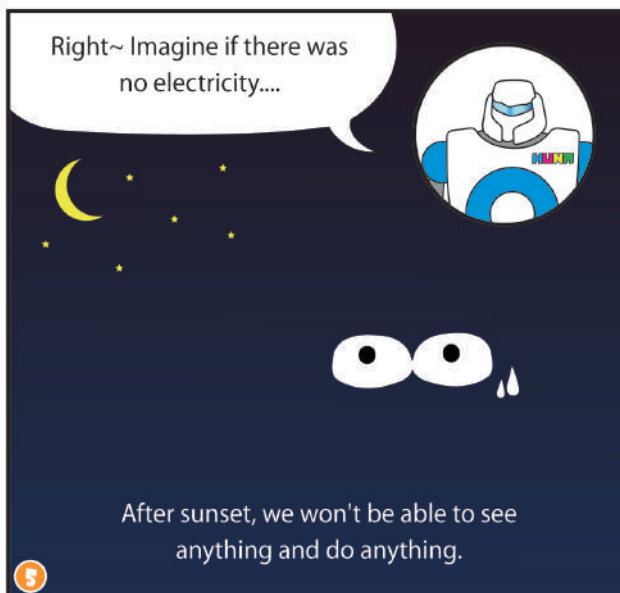
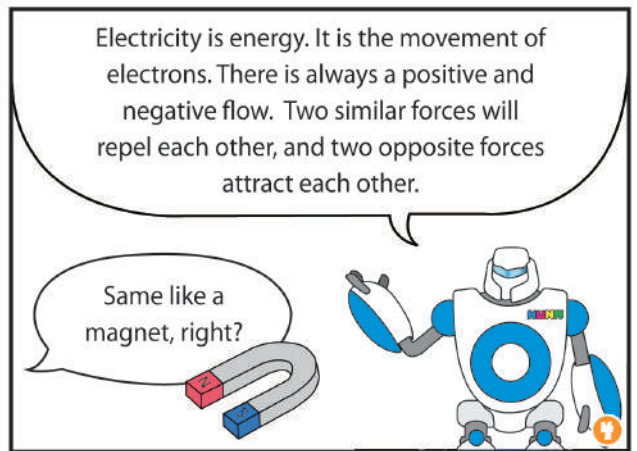
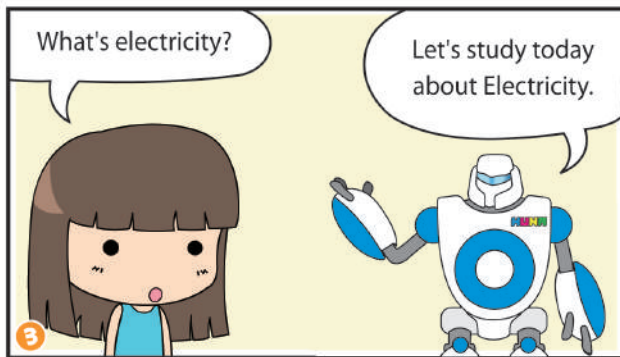
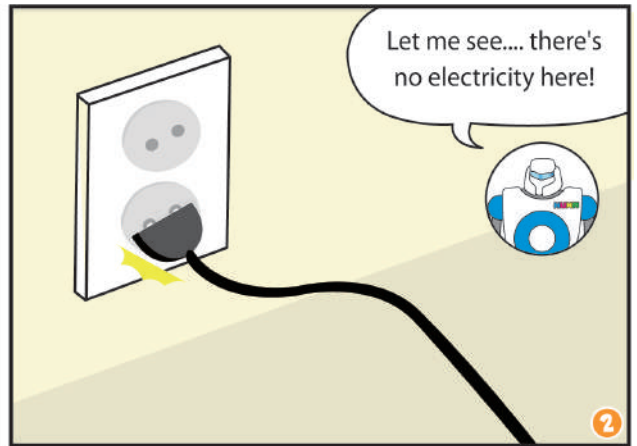
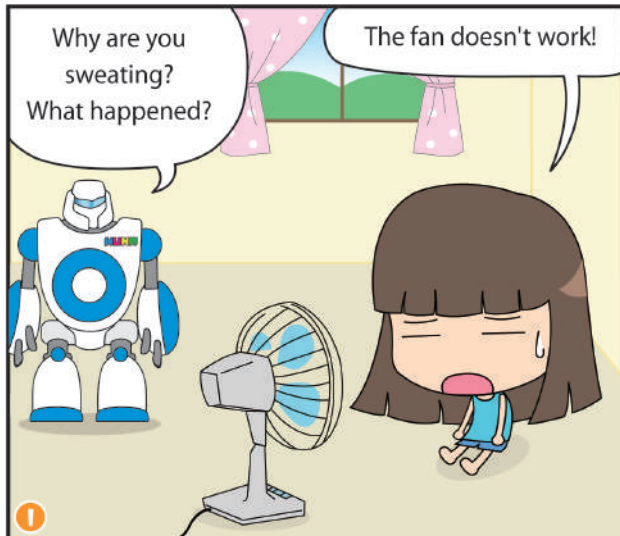
Mo (Pollution control)



Go-4 (Stewardess)

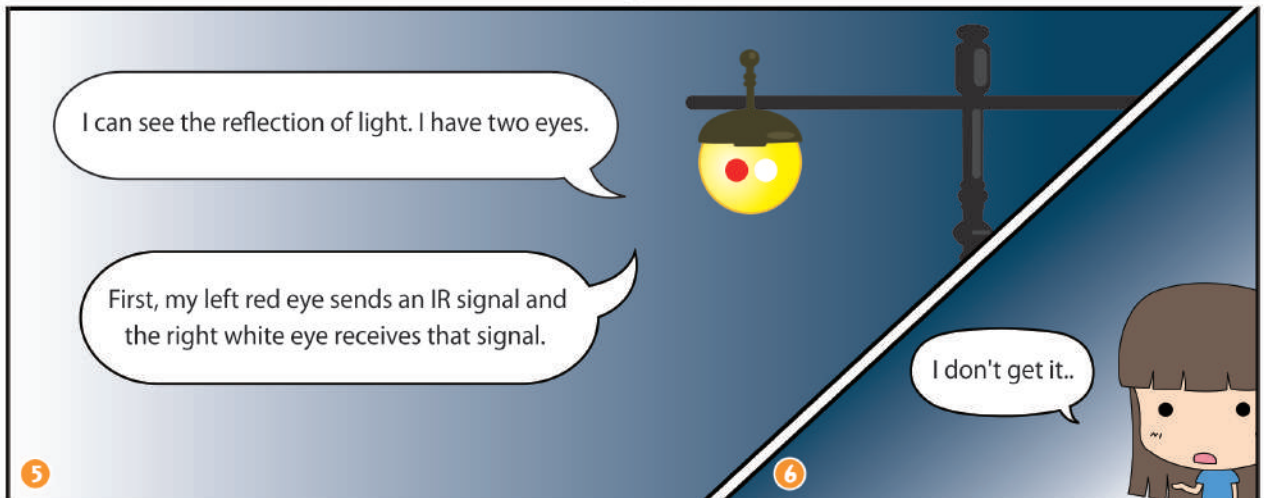
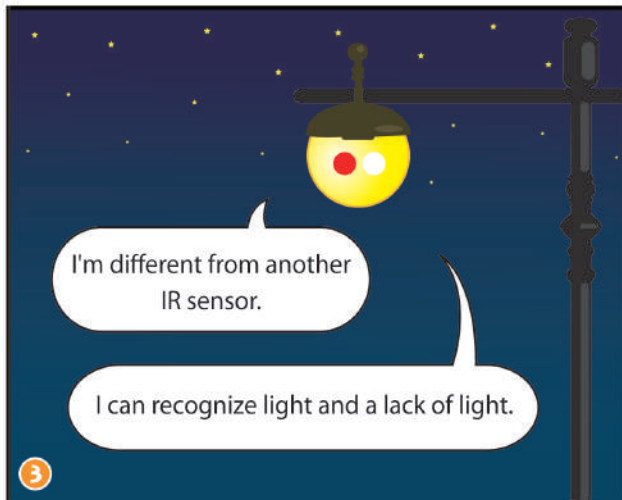
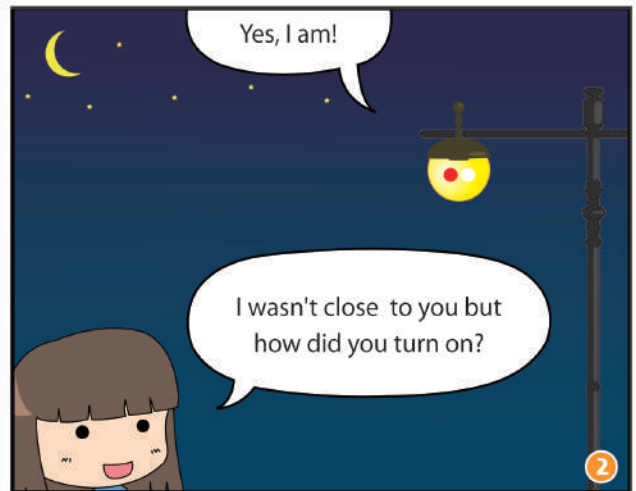
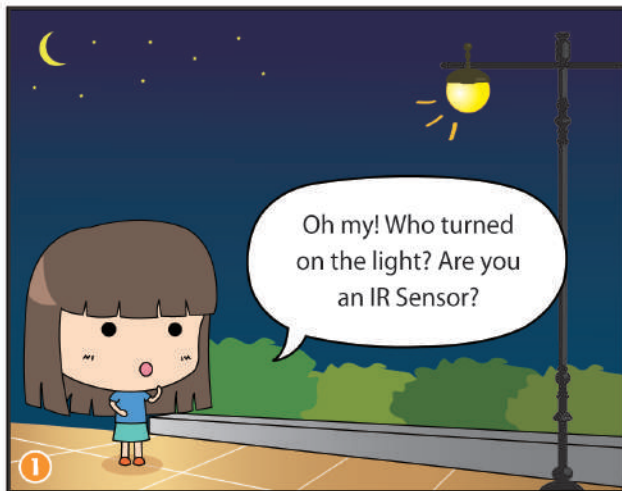


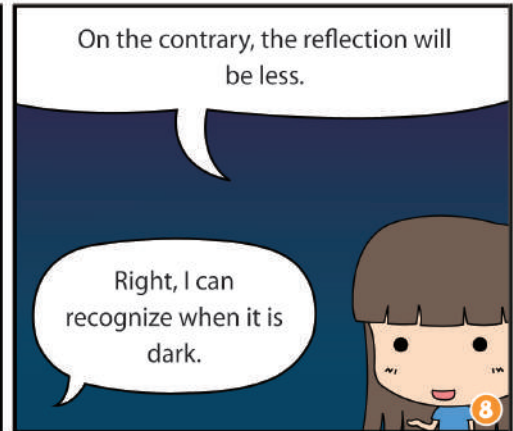
Power of a robot - Electricity





Making the eyes of a robot - IR Sensor 2







Let's
Make it 3

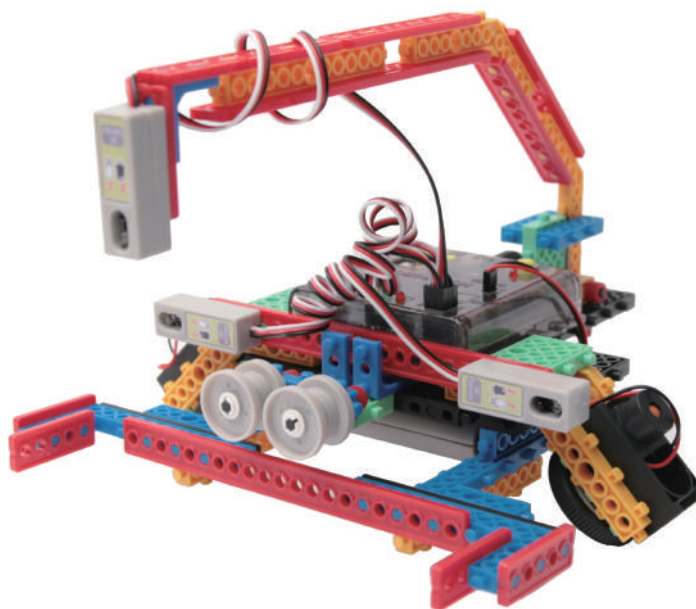
Making a robot that can follow an object



Scorpion-Bot



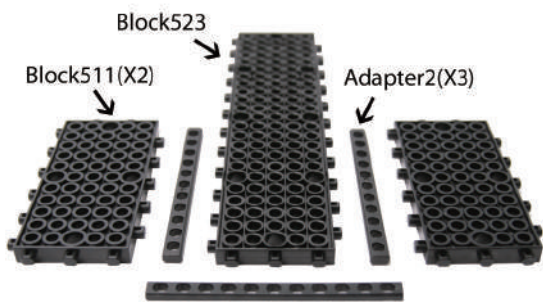
This robot can follow objects using an IR Sensor.



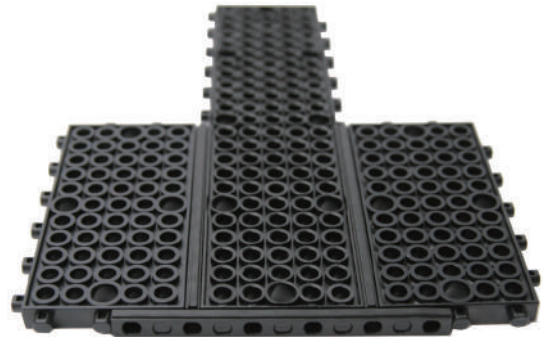
Prepare parts for assembly

	Block523	x1		Frame21	x4		Mainboard x1
	Block511	x2		Frame11	x4		
	Block90	x4		Frame5	x4		
	Block135	x6		Adapter2	x5		IR Sensor x3
	Block111	x5		Adapter1	x3		
	Block15	x5		Shaft(S)	x4		
	Block35	x4		Shaft(M)	x1		Battery Case x1
	Motor Mount	x2		Bush	x2		
				Half Bush	x2		
				Red Bush	x10		DCMotor x2
				Guide Wheel	x2		
				Wheel(S)	x2		

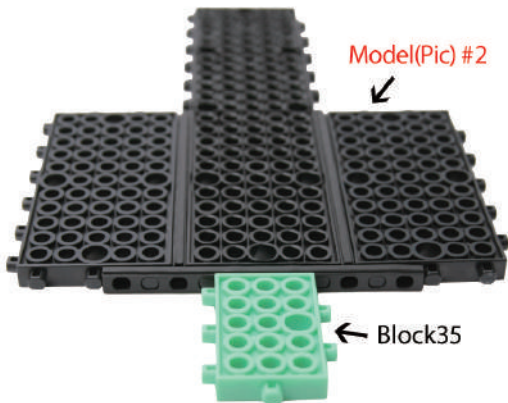
1



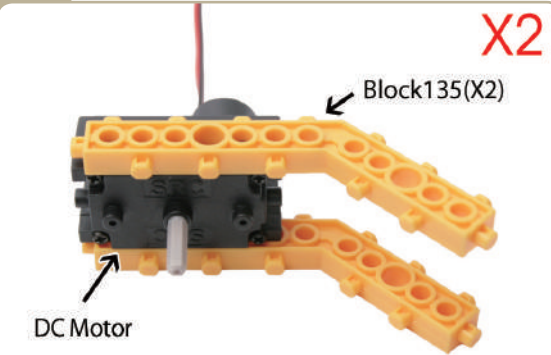
2



3

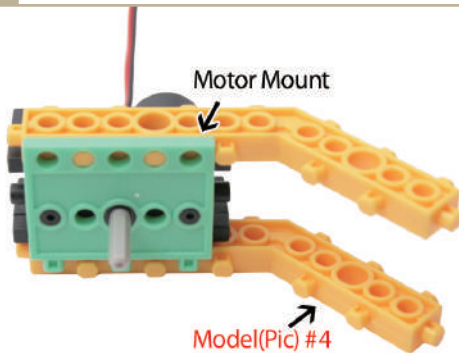


4

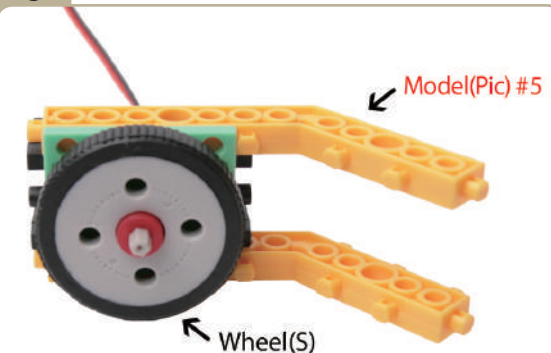


Assemble two identical models.

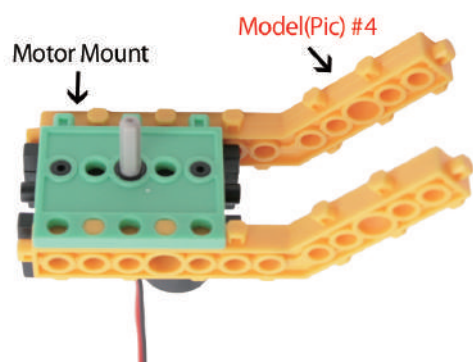
5



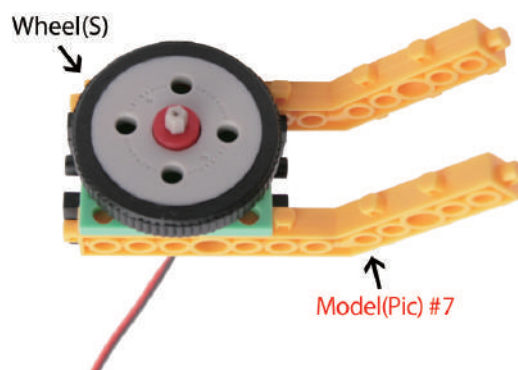
6



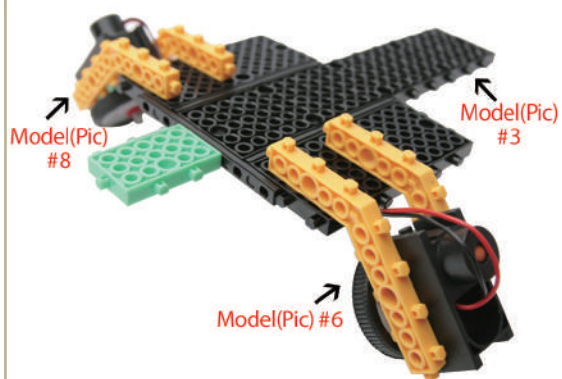
7



8

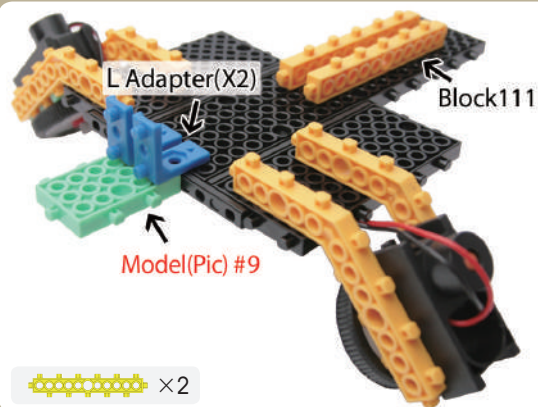


9

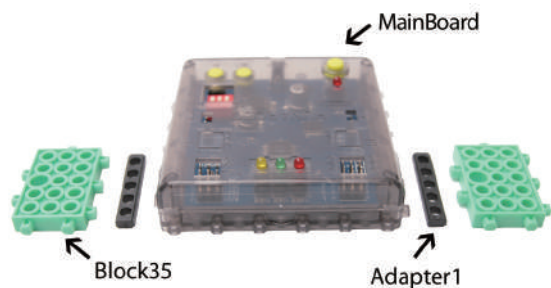


Connect model(pic)#6 and model(pic)#8 to model(pic)#3.

10



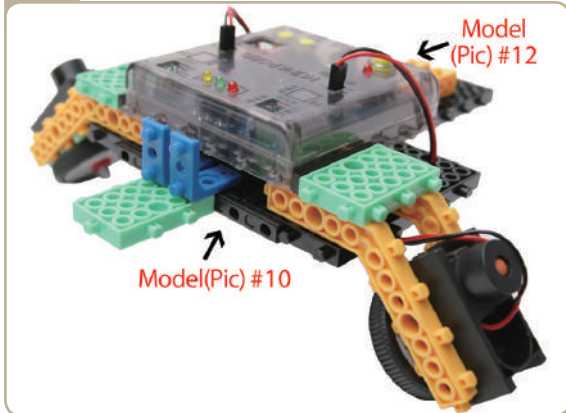
11



12

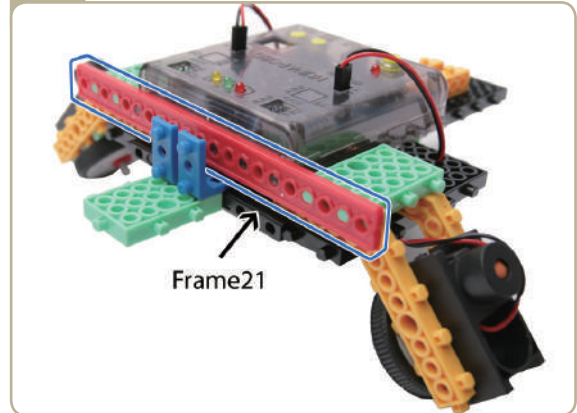


13

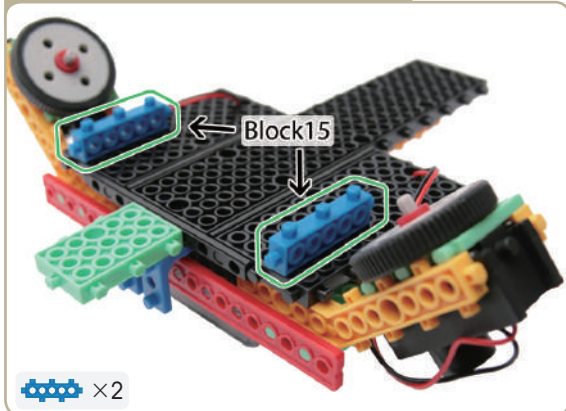


Connect model(pic)#12 to model(pic)#10.

14

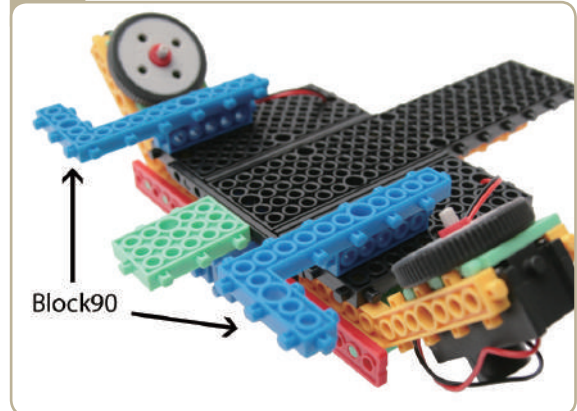


15 (Bottom of model(Pic)#14)

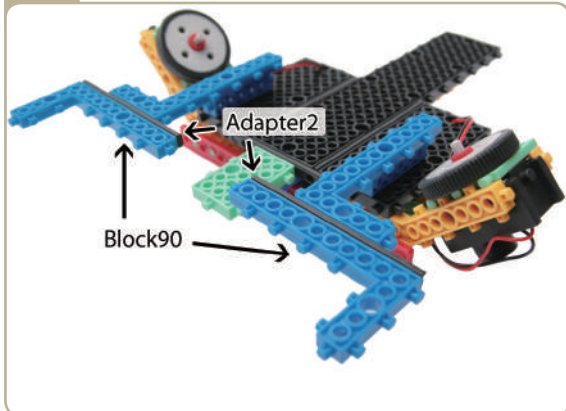


Turn model(pic)#14 upside down, then attach two 'block15's.

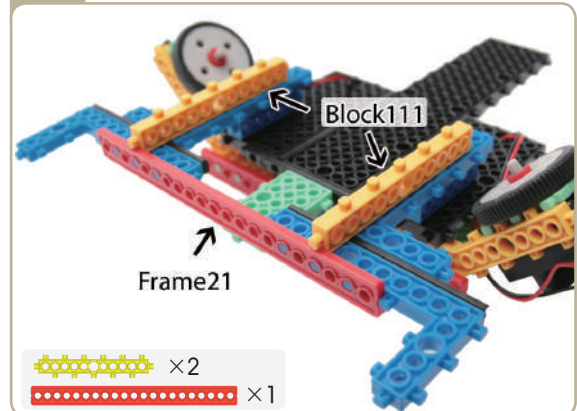
16



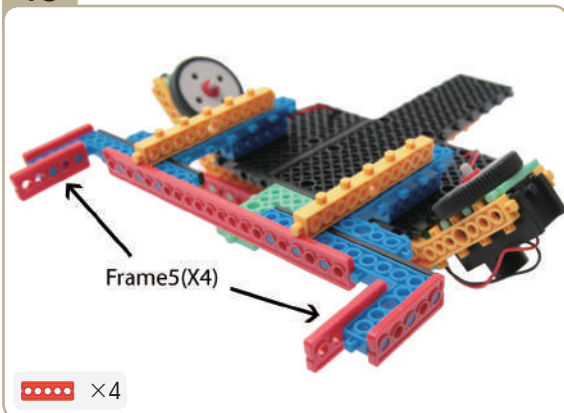
17



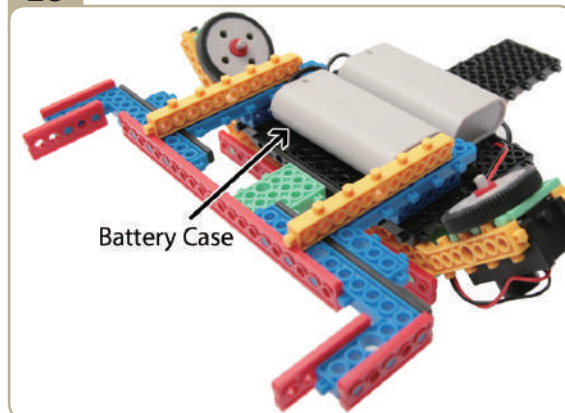
18



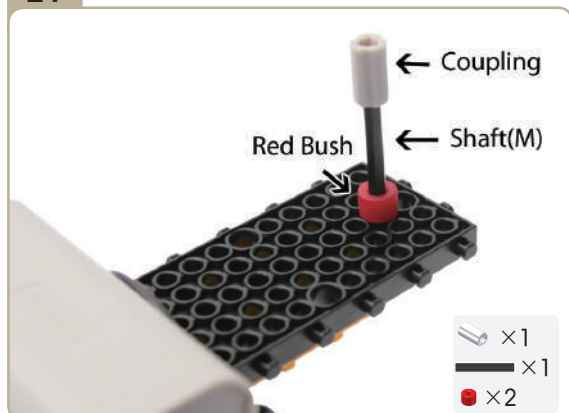
19



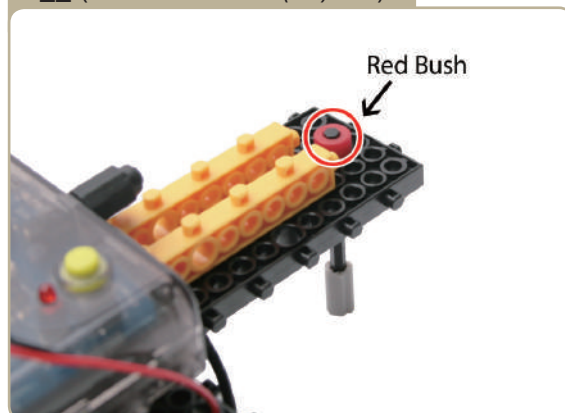
20



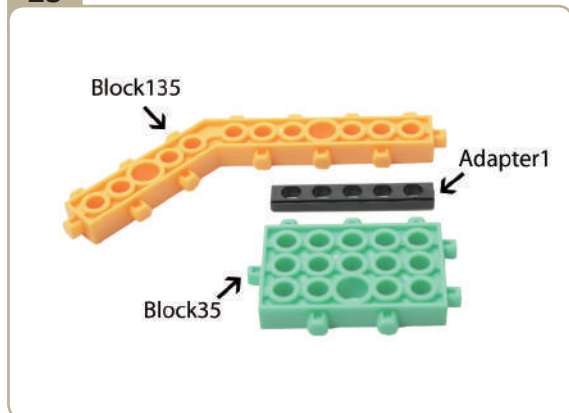
21



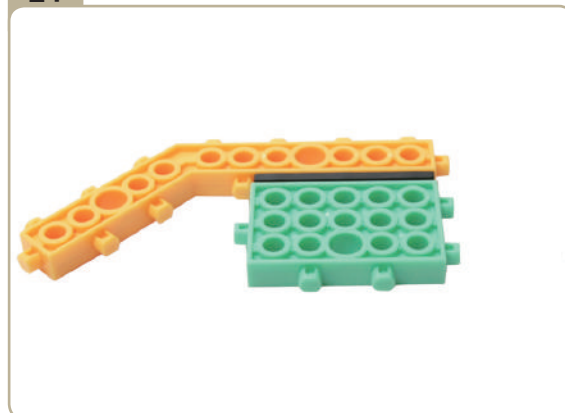
22 (Bottom of model(Pic)#21)



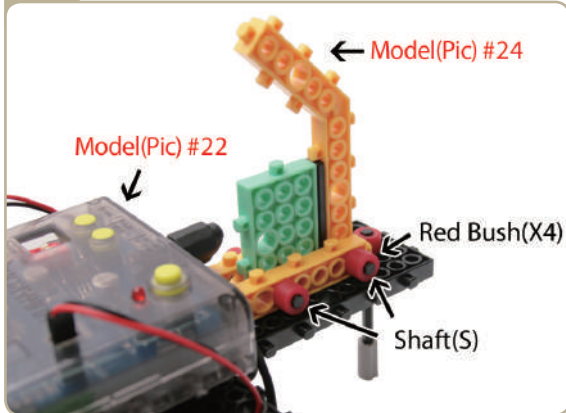
23



24

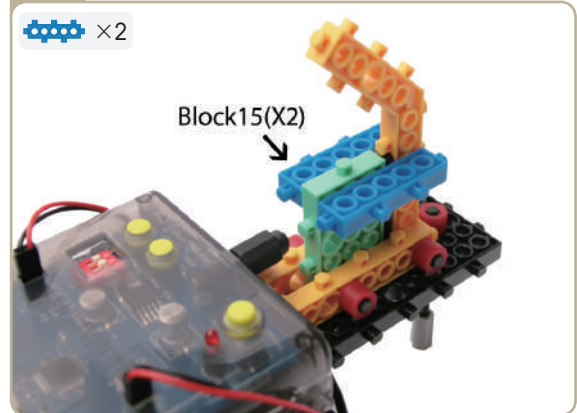


25

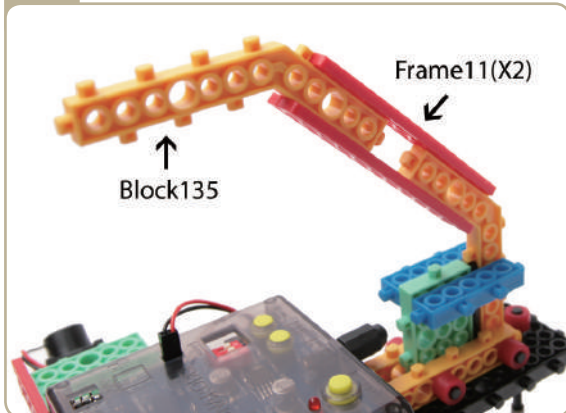


Connect model(pic)#24 to model(pic)#22 and fix it with two short shafts and four red bushes.

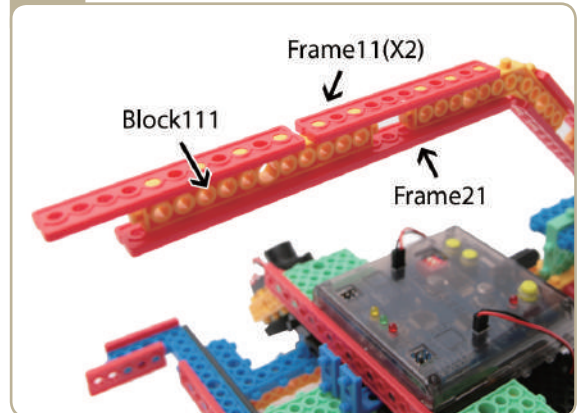
26



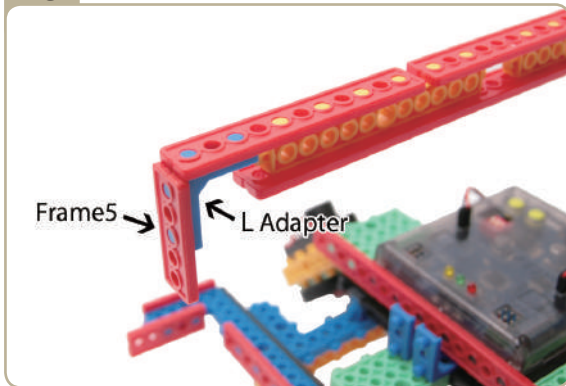
27



28

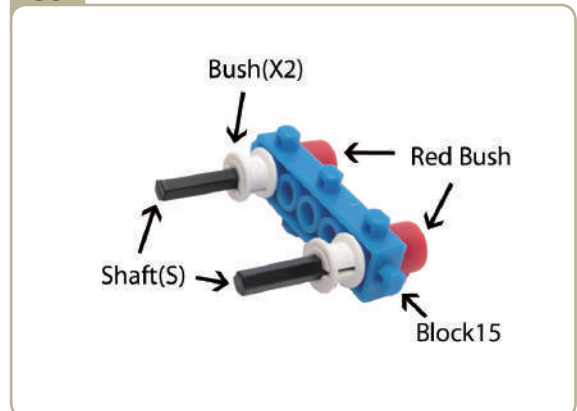


29

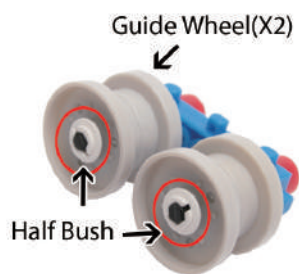


Attach a 'L' adapter and a 'Frame5' to model(pic)#28. (Pay close attention to the arrows (▲) that indicate how the adapters should be attached.)

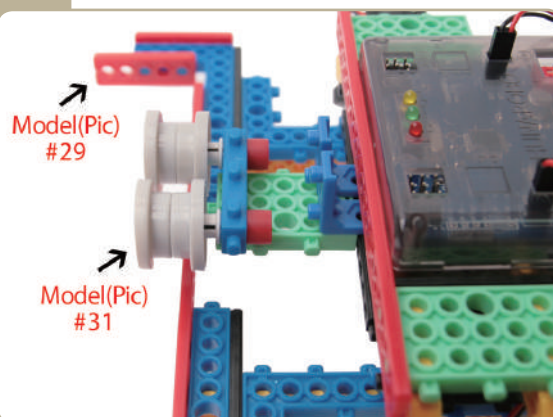
30



31

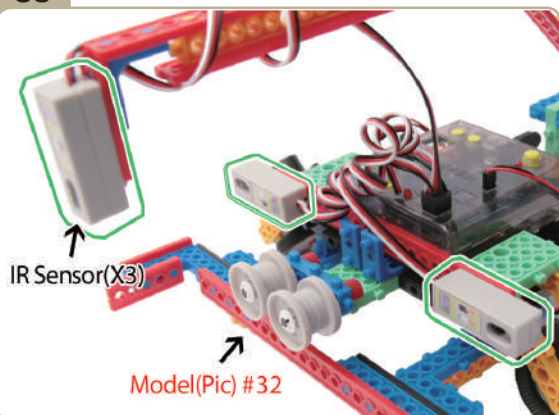


32

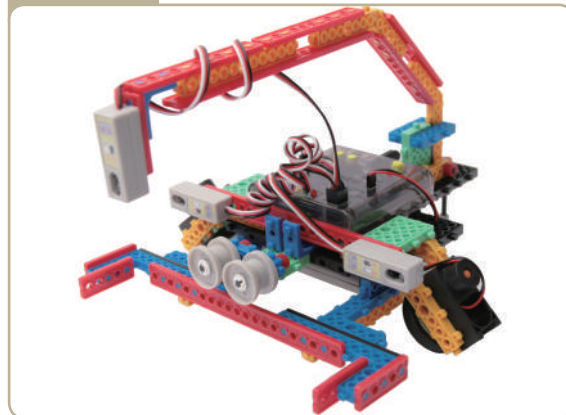


Combine model(pic)#29 with model(pic)#31.

33



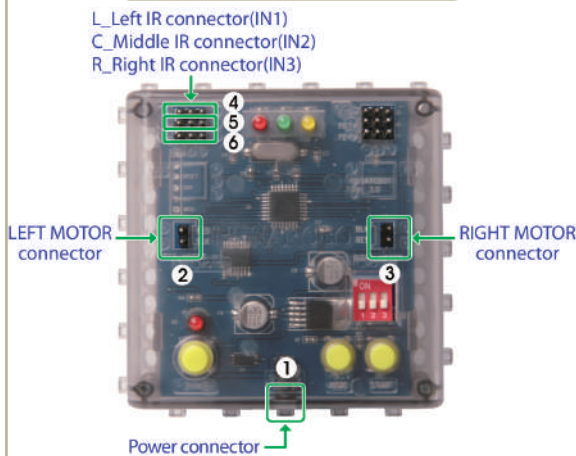
Completed





How to operate the Scorpion-Bot

Connecting the mainboard



Connect in this order.

1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.
3. Connect Right DC motor to RIGHT MOTOR connector.
4. Connect Left IR sensor to L connector.
5. Connect Middle IR sensor to C connector.
6. Connect Right IR sensor to R connector.

⊕ — The DC motor red wire must be connected to positive ⊕, the black wire to the negative ⊖.

⊖ — Insert the black wire of 3P electric wire into the negative ⊖.

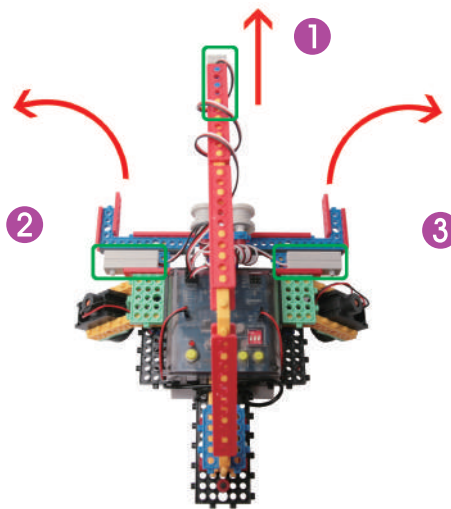
Setting mode

1. Ensure the battery case and DC Motor are connected well.
2. Turn on the power.
3. Press the MODE button and select as shown below. (Only The red LED will turn off.)



4. Press START button and try to move the robot.

Movement



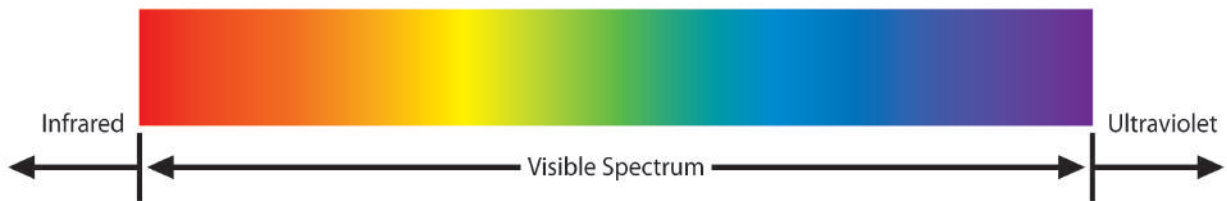
1. Recognize middle IR Sensor : Follow center
2. Recognize left IR Sensor: Follow left side
3. Recognize right IR Sensor: Follow right side



Let's know about Light

Kind of light

- **Infrared light** : Infrared radiation is popularly known as "heat" or sometimes "heat radiation", since many people attribute all radiant heating to infrared light and/or to all infrared radiation to being a result of heating.
- **Visible light** : Humans can see this kind of light. More specifically, you see the light that is not absorbed by objects.
- **Ultraviolet light** : It is believed to induce the production of Vitamin D and can also be used for sterilization and pasteurization. However, it is harmful to our eyes and skin if we are exposed to direct sunlight.



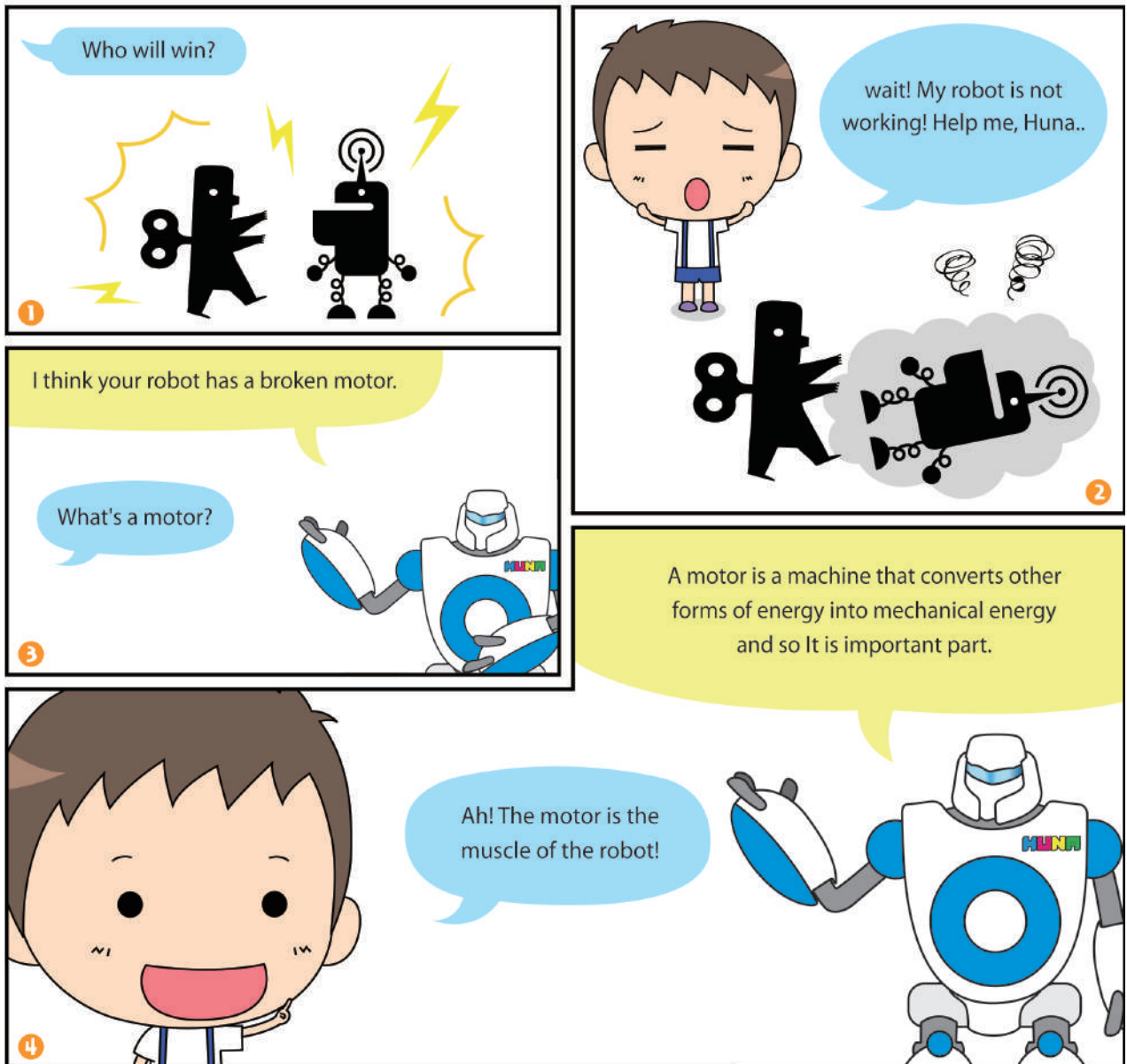
Let's make a pet robot that can follow you everywhere.



A series of horizontal dashed lines for writing on a notebook page.



Muscle of the robot - Motor



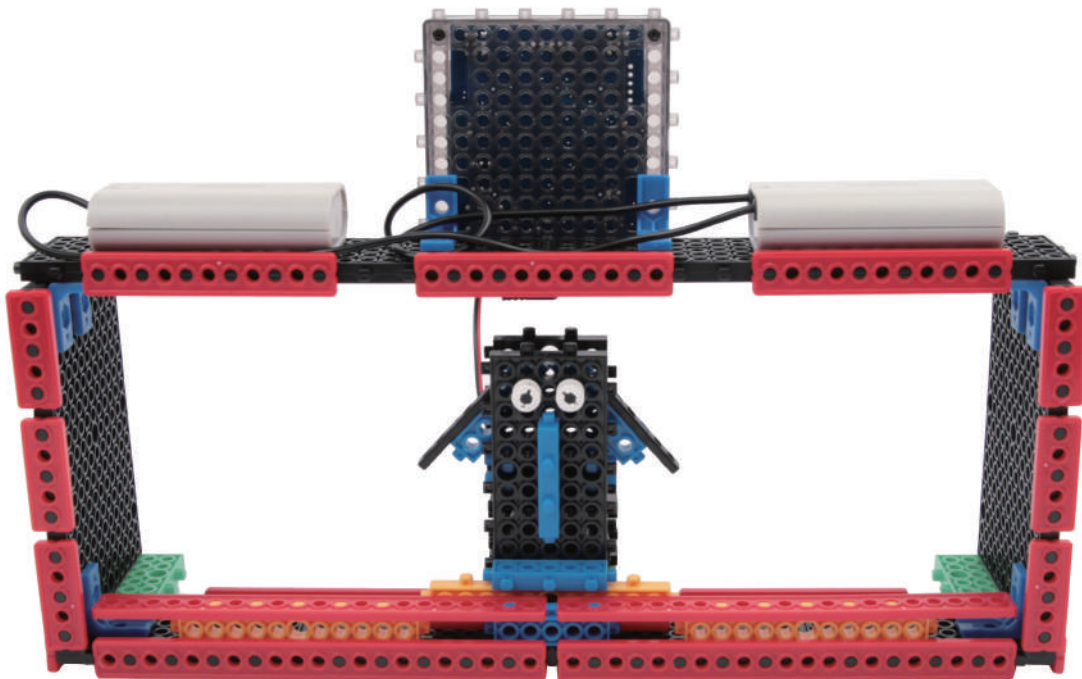


Making a robot using a motor



Penguin Show

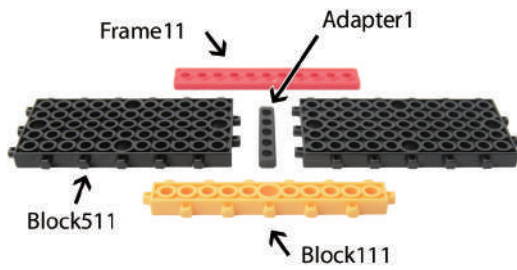
Penguin Show- The penguin dances on the stage using 1 DC motor and uses Free Move mode.



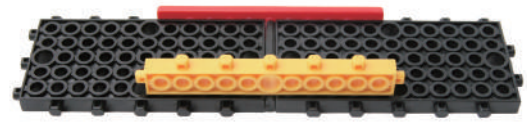
Prepare parts for assembly

	Block1117	x2		Frame21	x4	
				Frame11	x6	
				Frame5	x6	
	Block523	x2		Adapter1	x2	
				Shaft(S)	x2	
	Block511	x6		Bush	x2	
				Half Bush	x4	
	Block111	x3		L Adapter	x8	
	Block15	x7				
	Block35	x1		wheel(S)	x1	

1

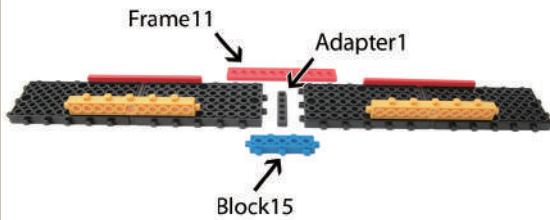


2



Assemble two identical models.

3

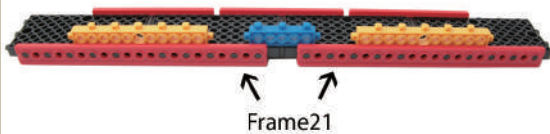


4

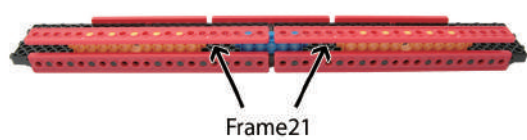


Combine two previously constructed parts of model(pic)#2 with a 「Adapter1」, then attach a 「block511」 and a 「Frame21」.

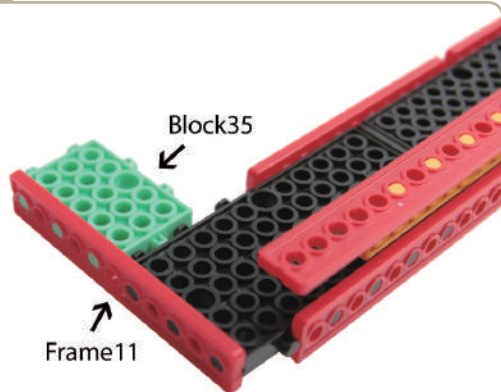
5



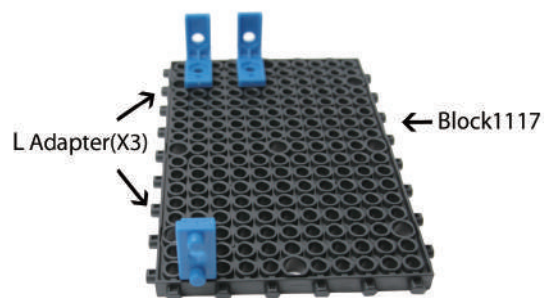
6



7

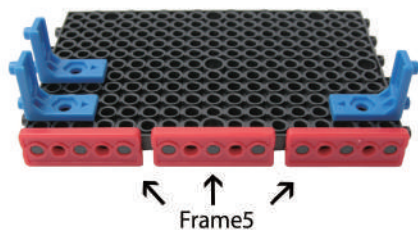


8

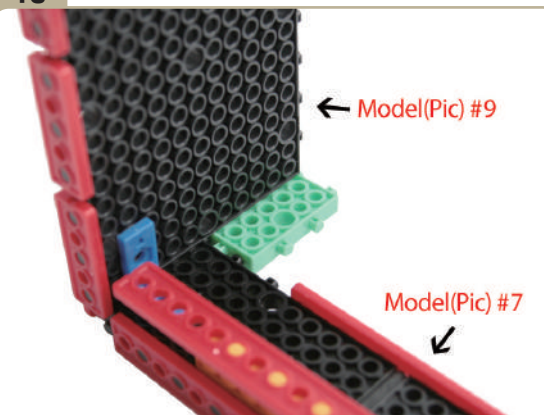


Attach three 'L' adapters to 「block1117」.
(Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

9

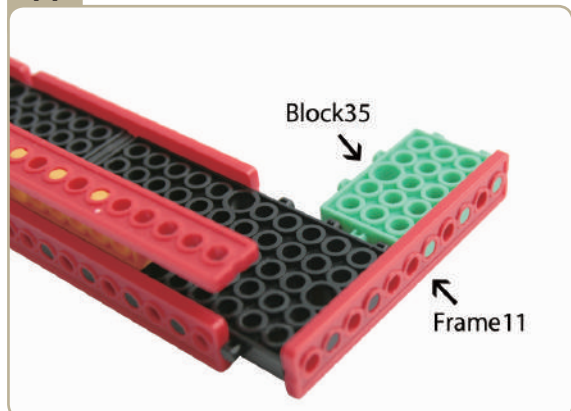


10



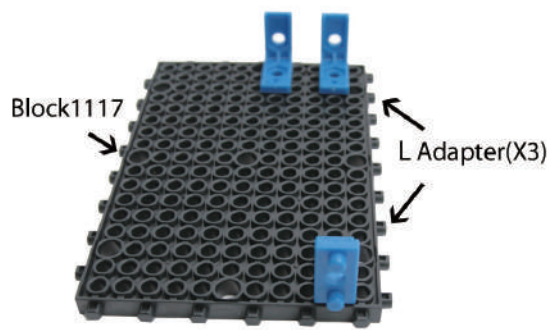
Combine model(pic)#7 with model(pic)#9.

11



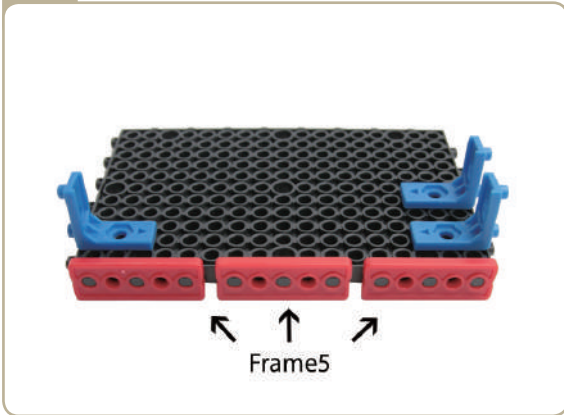
Attach a 「block35」 and a 「Frame11」 to the opposite side of model(pic)#7.

12

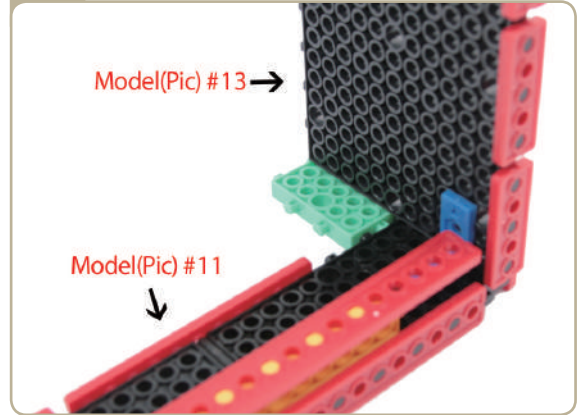


Attach three 'L' adapters to 「block1117」.
(Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

13

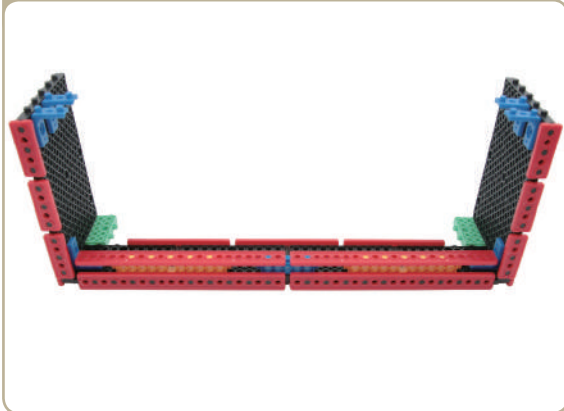


14



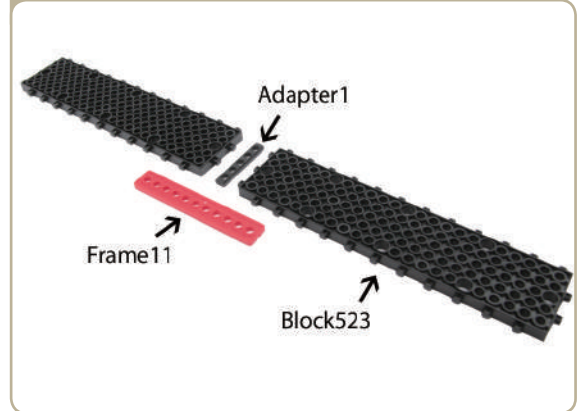
Combine model(pic)#11 with model(pic)#13.

15



Completed of model(pic)#14.

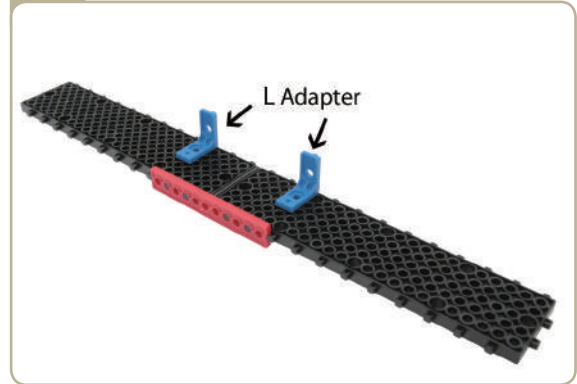
16



17

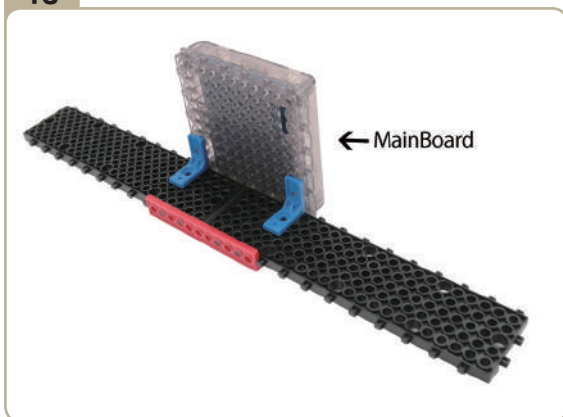


18

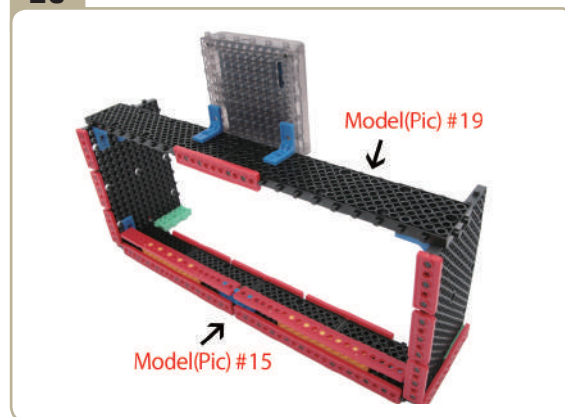


Attach two 'L' adapters to model(pic)#17.
(Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

19

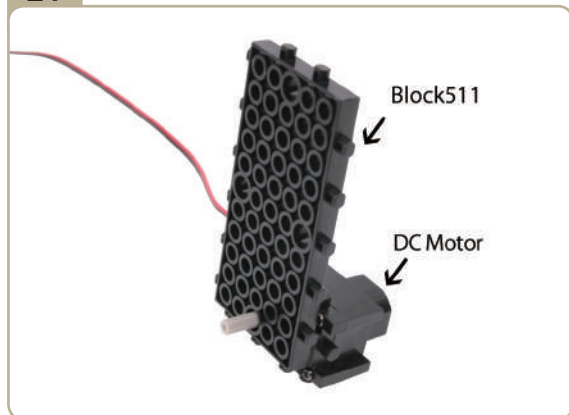


20

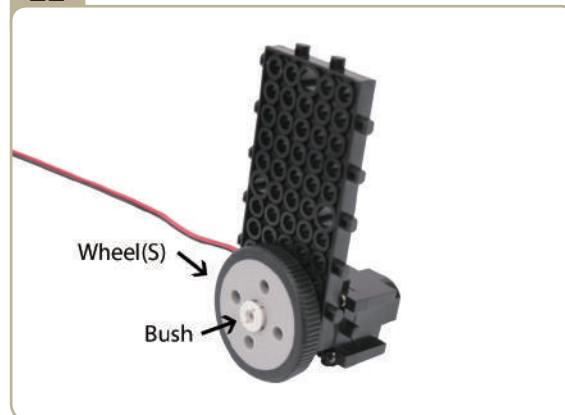


Combine model(pic)#15 with model(pic)#19.

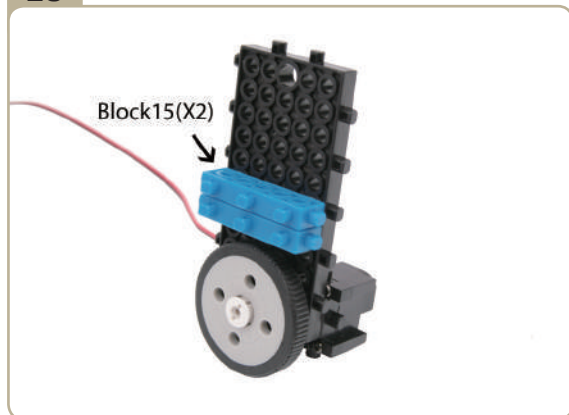
21



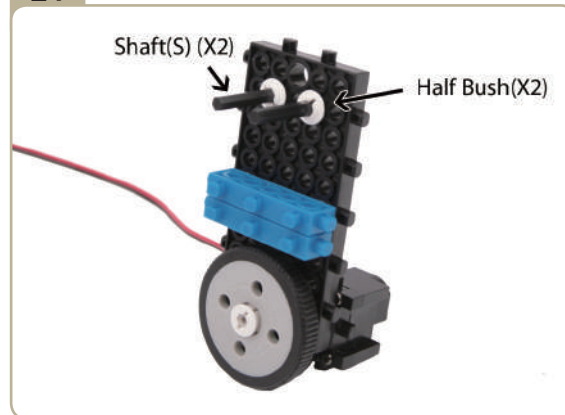
22



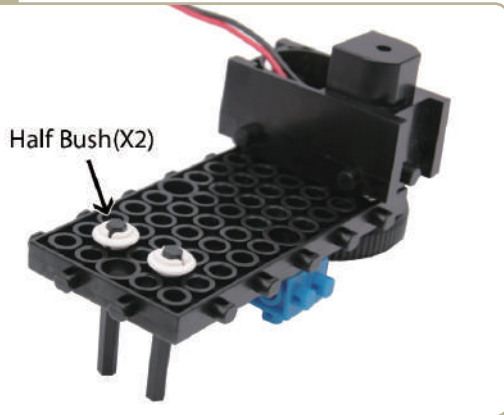
23



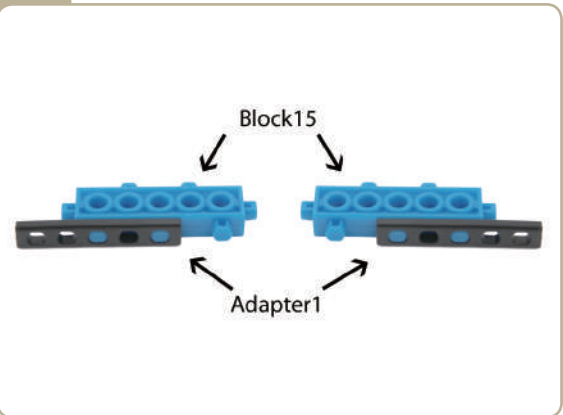
24



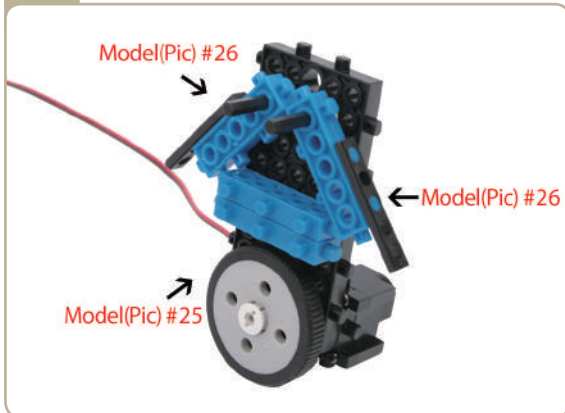
25



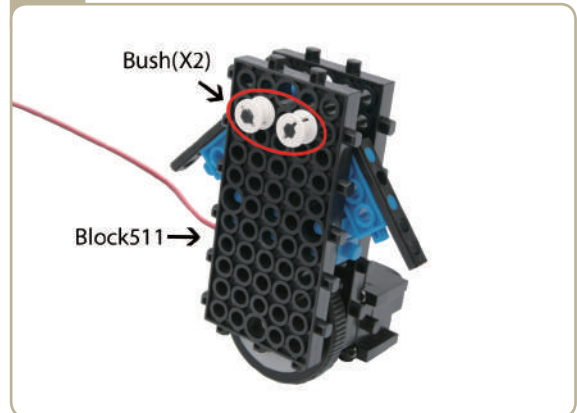
26



27

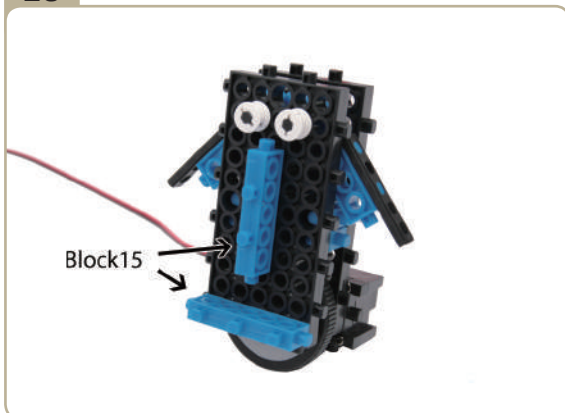


28

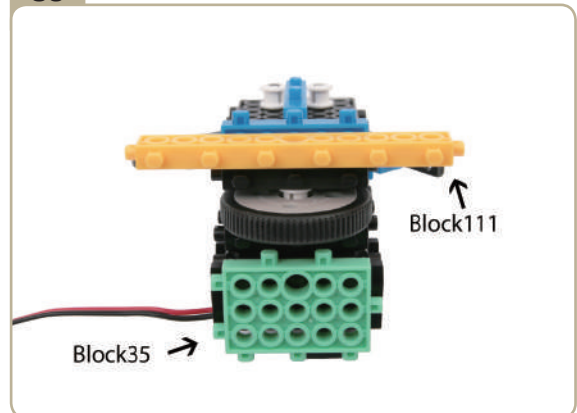


Combine model(pic)#25 with model(pic)#26.

29

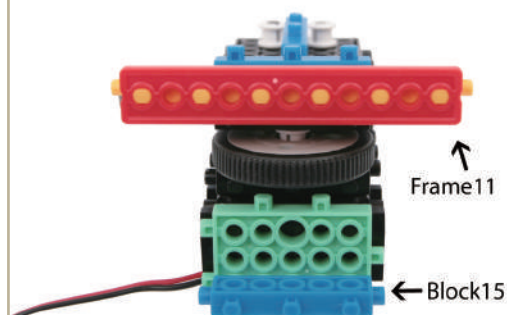


30

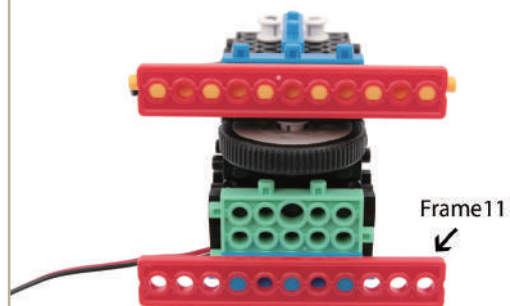


Attach a 「block111」 and a 「block35」 to the bottom of model(pic)#29.

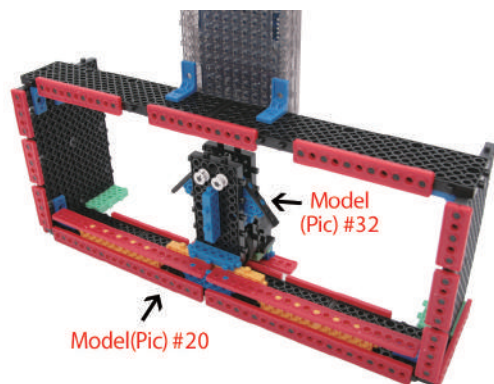
31



32

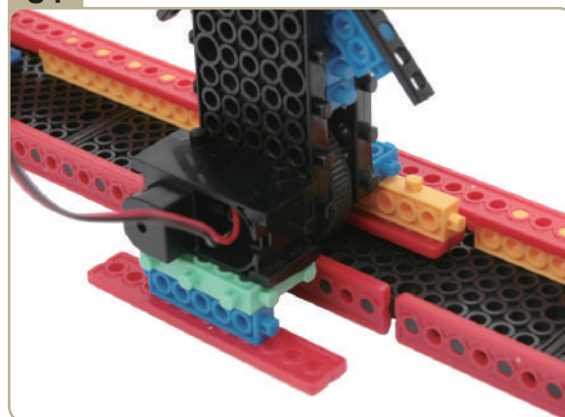


33



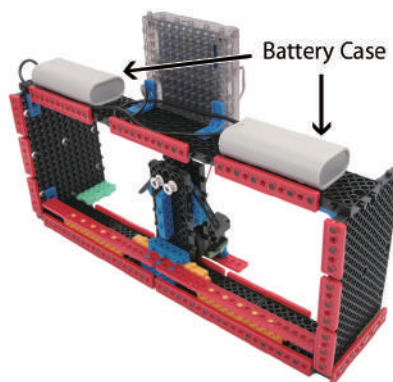
Put model(pic)#32 in the model(pic)#20.

34

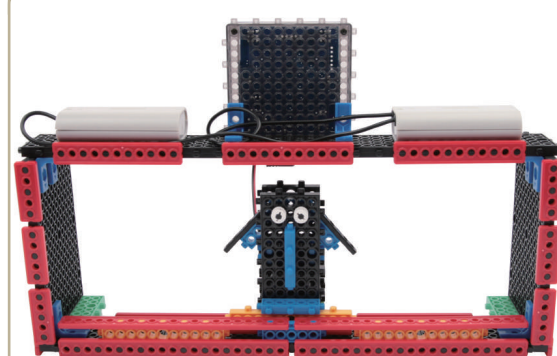


Enlargement of model(pic)#33' back

35



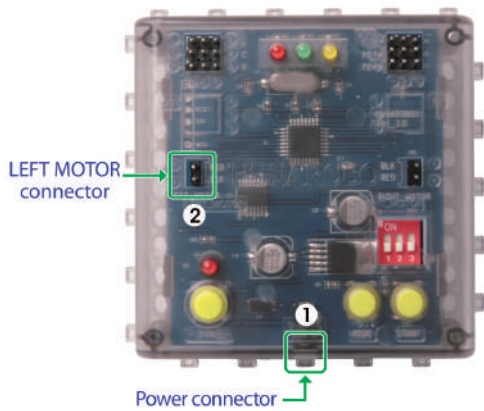
Completed





How to operate the Penguin Show

Connecting the mainboard



Connect in this order.

1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.



The DC motor red wire must be connected to positive \oplus , the black wire to the negative \ominus .

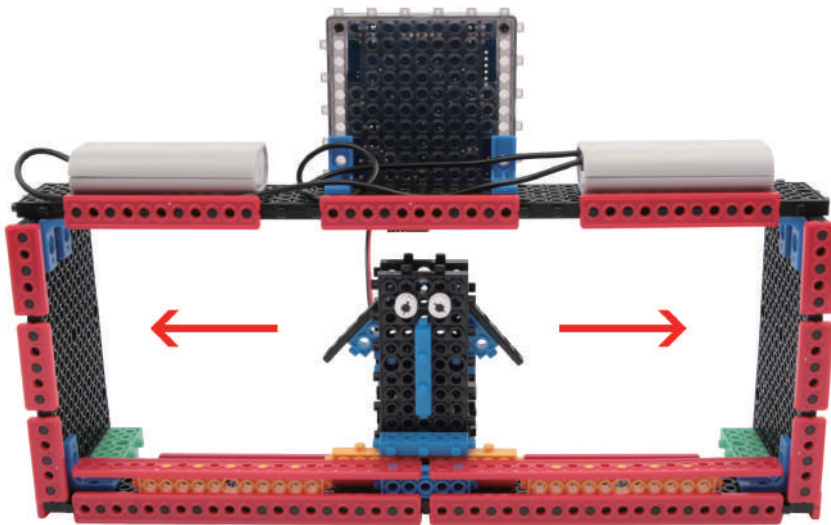
Setting mode

1. Ensure the battery case and DC Motor are connected well.
2. Turn on the power.
3. Press the MODE button and select as shown below. (All LED will turn on.)



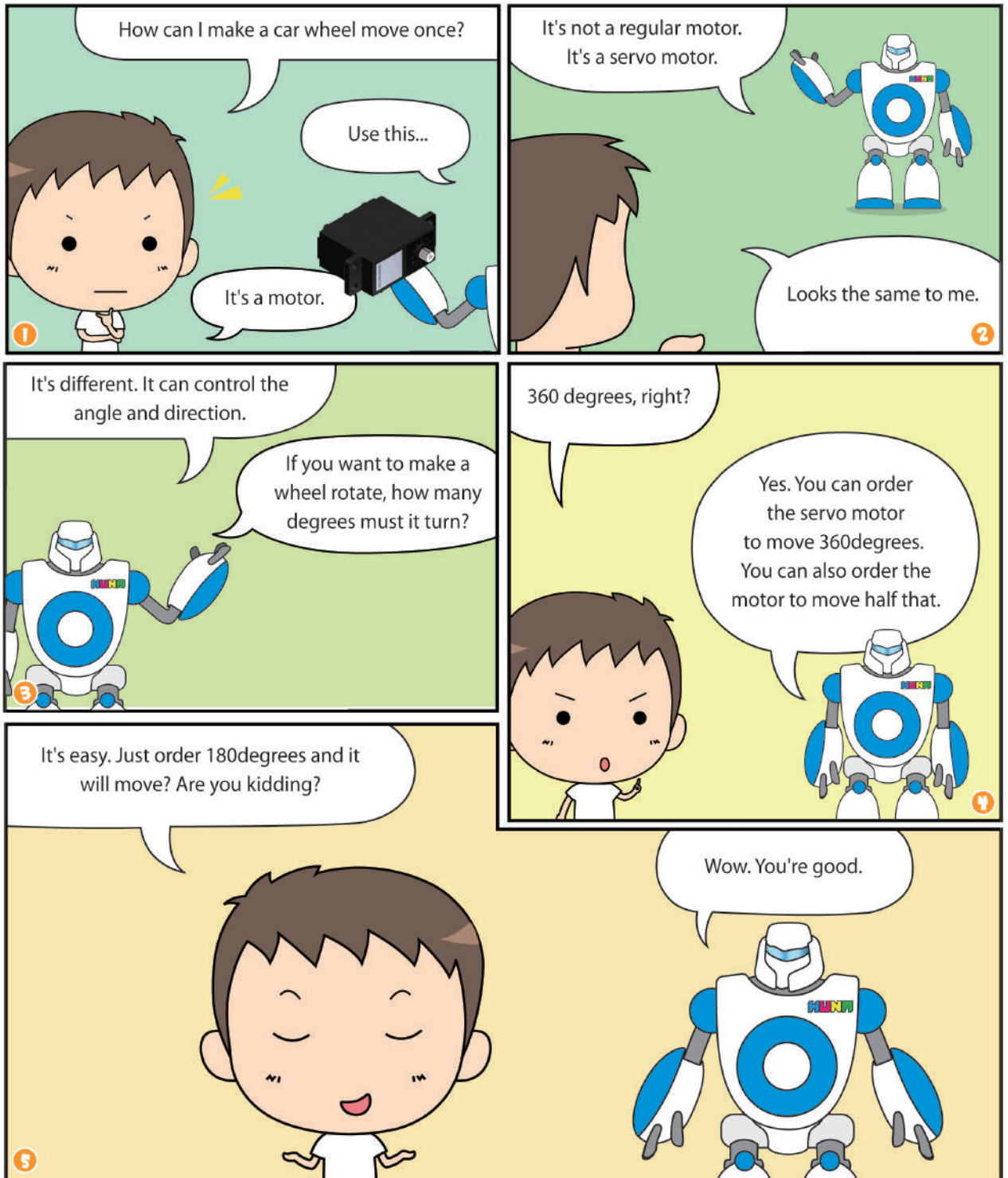
4. Press START button and try to move the robot.

Movement



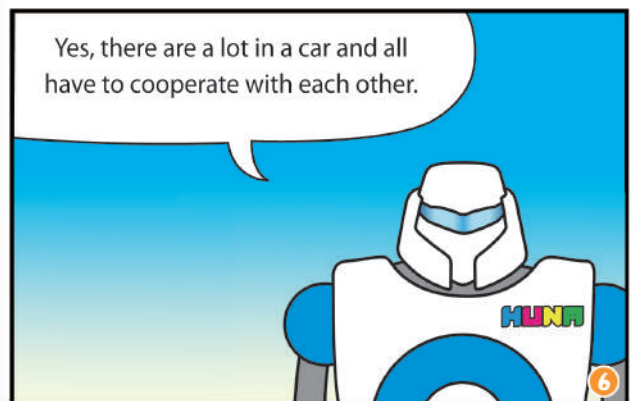
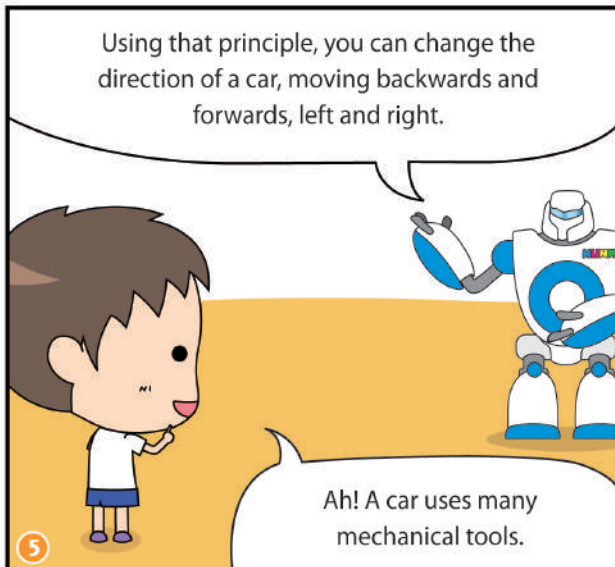
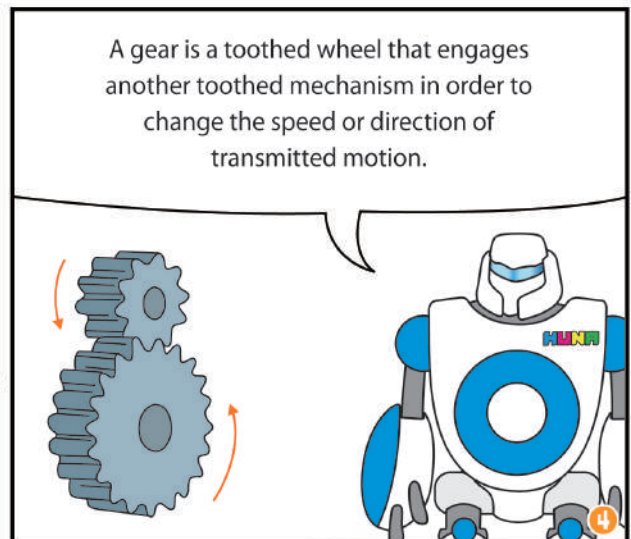
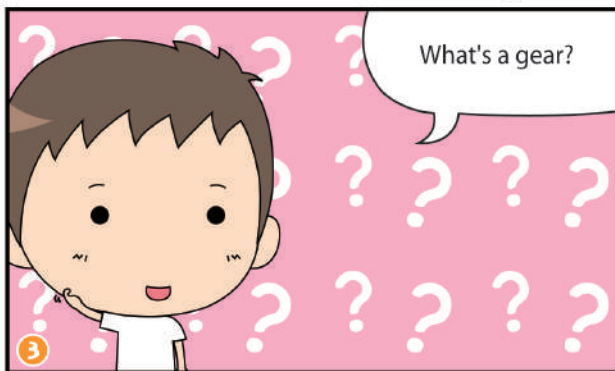
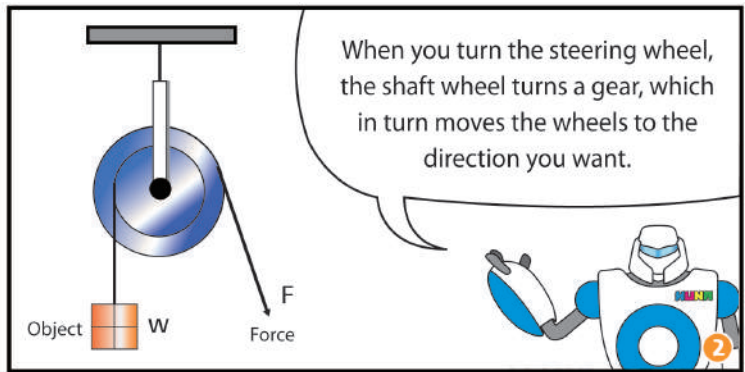
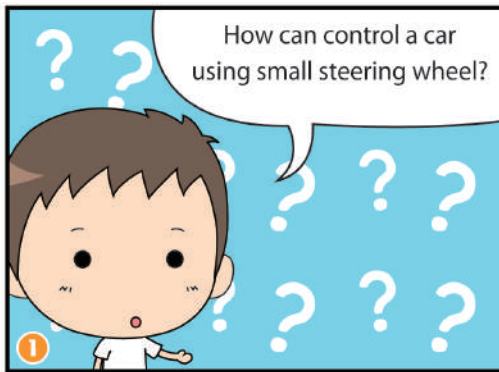
When press START button, Penguin will dancing left and right.

Servo Motor





Shaft Wheel and Gear





Let's

Make it 5

Making a soccer robot using a remote control






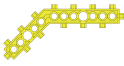















Soccer-Bot

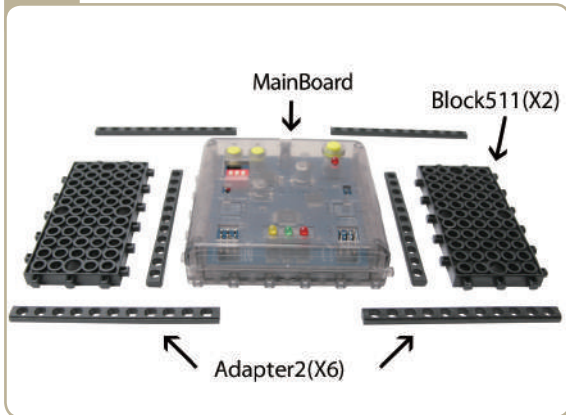
A Soccer-Bot uses 2 DC motors and can move in 4 directions. It is controlled by a remote control.



Prepare parts for assemble

	Block511	x6		Frame21	x4	
	Block90	x4		Frame11	x10	
	Block135	x6		Frame5	x2	
	Block111	x4		Adapter2	x6	
	Block15	x2		Adapter1	x2	
	Motor Mount	x2		L Adapter	x4	
	DCMotor	x2		Red Bush	x2	
				Wheel(S)	x2	
				Battery Case	x1	Remote Control x1

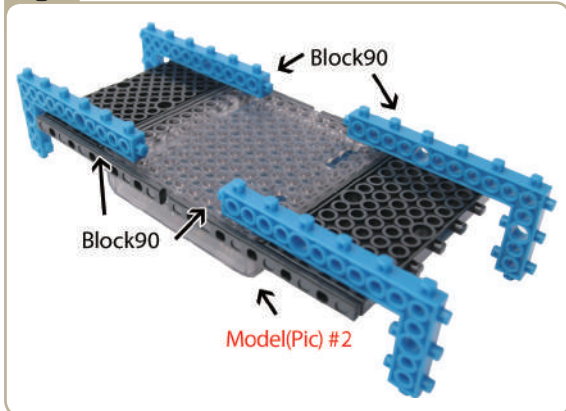
1



2

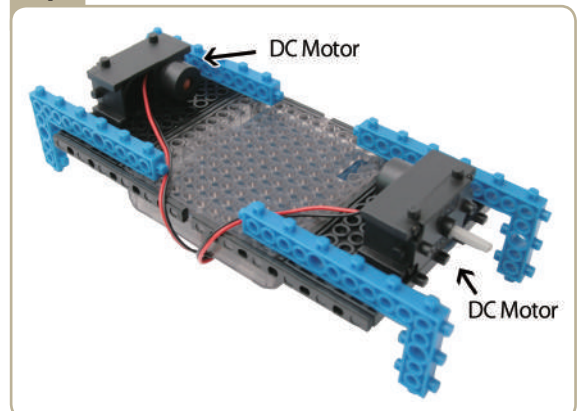


3



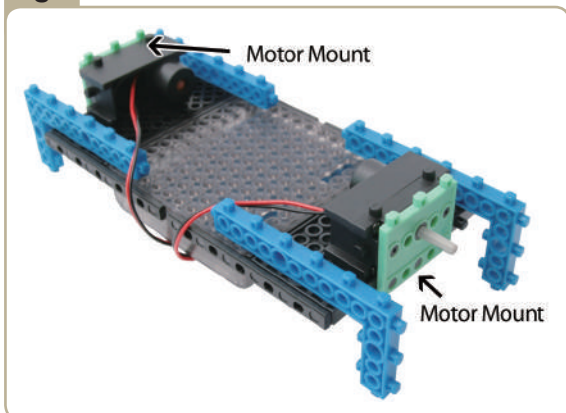
Turn model(pic)#2 upside down, then attach four 'block90's.

4

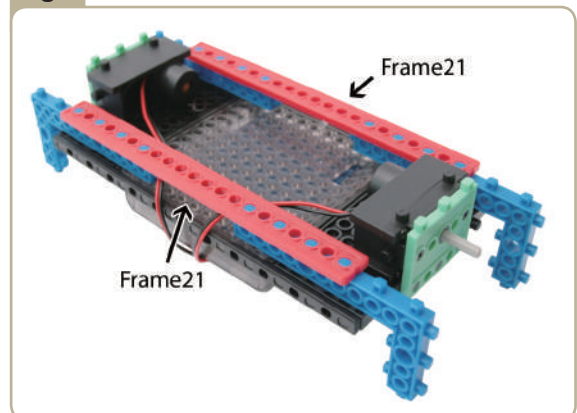


Connect DC motors to model(pic)#3 as illustrated in the picture.

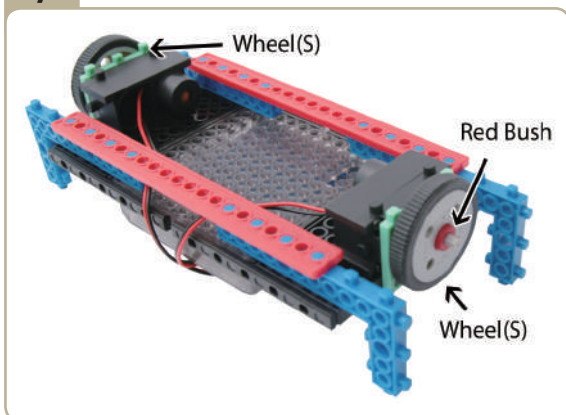
5



6

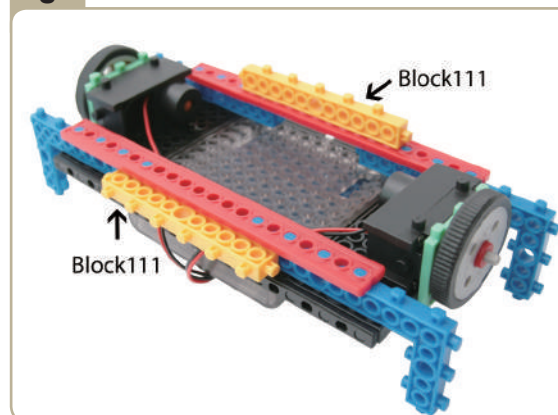


7

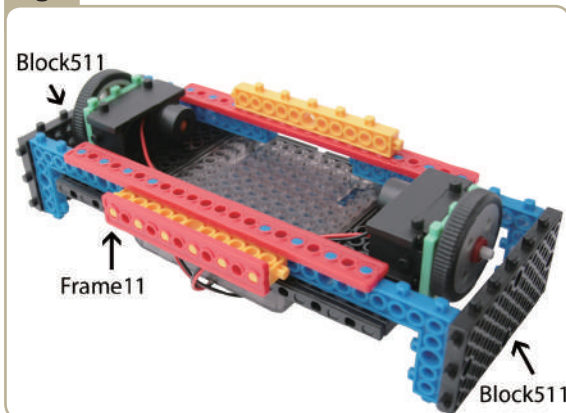


Insert small wheels and red bushes to the shaft of DC motor.

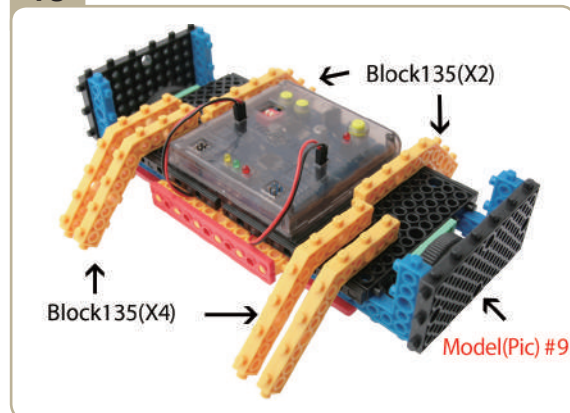
8



9

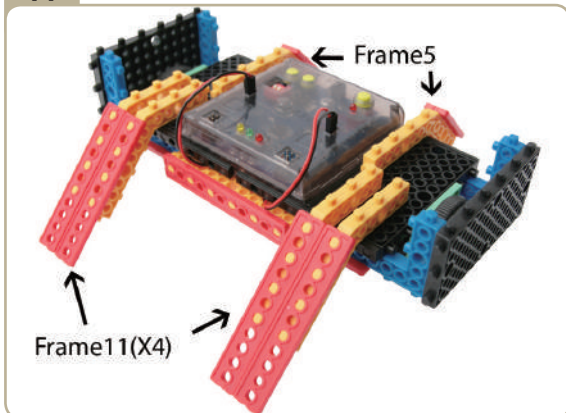


10

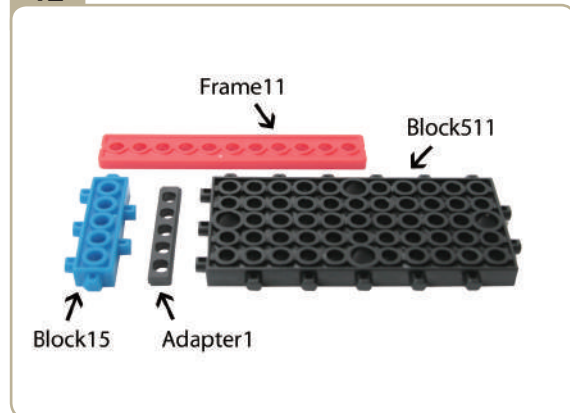


Turn model(pic)#9 upside down, then attach six 'block135's.

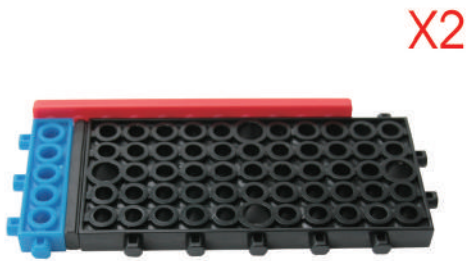
11



12

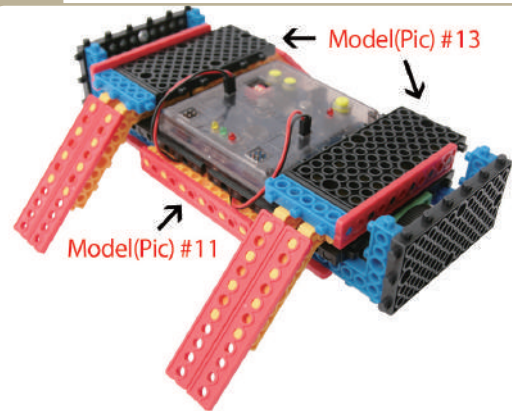


13



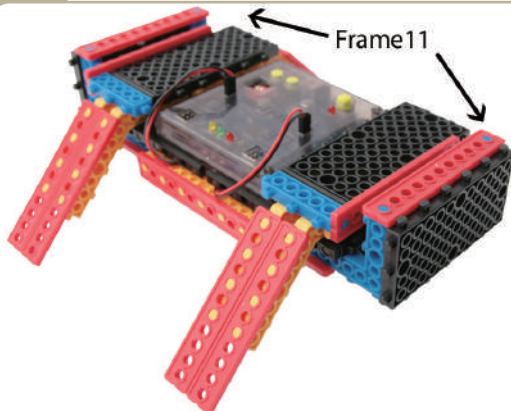
Assemble two identical models.

14

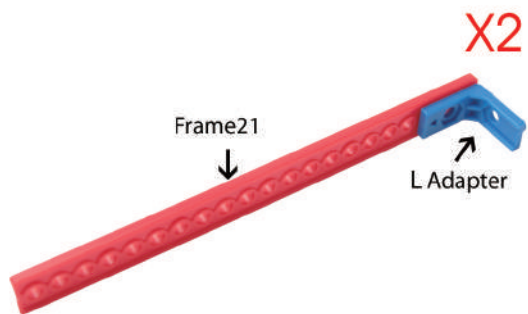


Combine two previously constructed parts of model(pic)#13 with model(pic)#11.

15

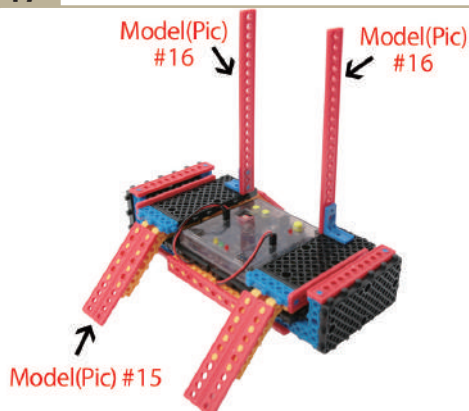


16



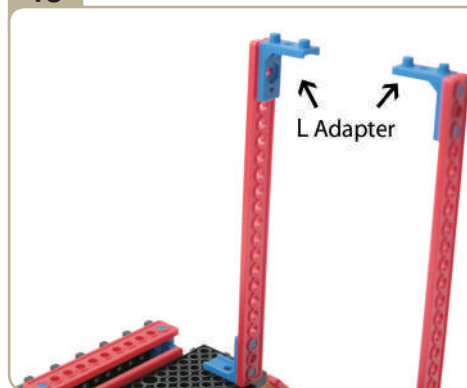
Attach a 'L' adapter to 「frame21」. Pay close attention to the arrows(▲)that indicate how the adapters should be attached. (Assemble two identical models.)

17



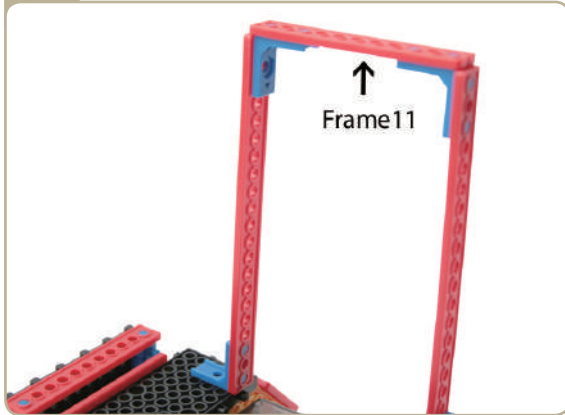
Combine two previously constructed parts of model(pic)#16 with model(pic)#15.

18

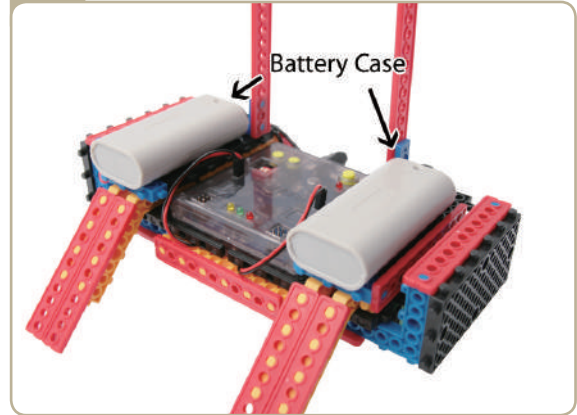


Attach a 'L' adapter to to model(pic)#17. (Pay close attention to the arrows(▲)that indicate how the adapters should be attached.)

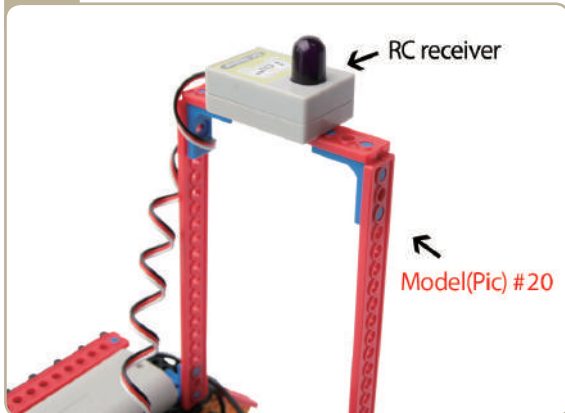
19



20



21



Connect RC receiver(remote control receiver board)to model(pic)#20.

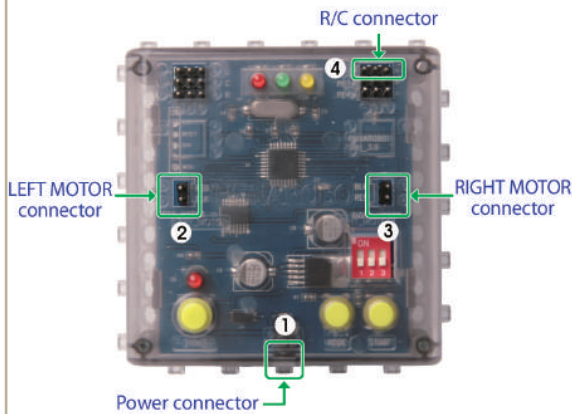
Completed





How to operate the Soccer-Bot

Connecting the mainboard



Connect in this order.

1. Connect Battery cases to Power connector.
2. Connect Left DC motor to LEFT MOTOR connector.
3. Connect Right DC motor to RIGHT MOTOR connector.
4. Connect RC receiver board to R/C connector.

⊕ ⊖ The DC motor red wire must be connected to positive ⊕, the black wire to the negative ⊖.

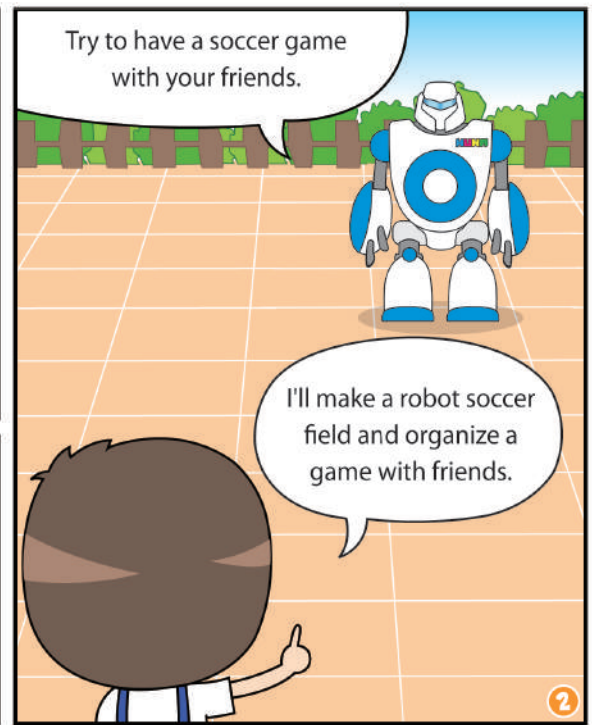
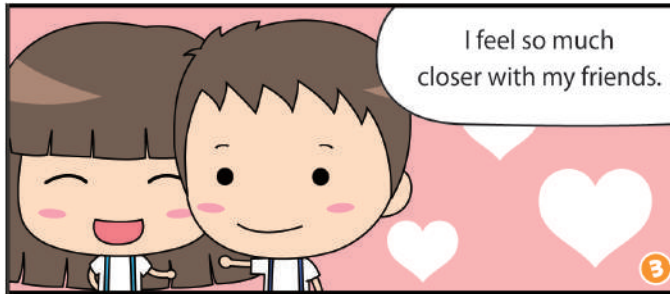
⊕ ⊖ Insert the black wire of 3P electric wire into the negative ⊖.

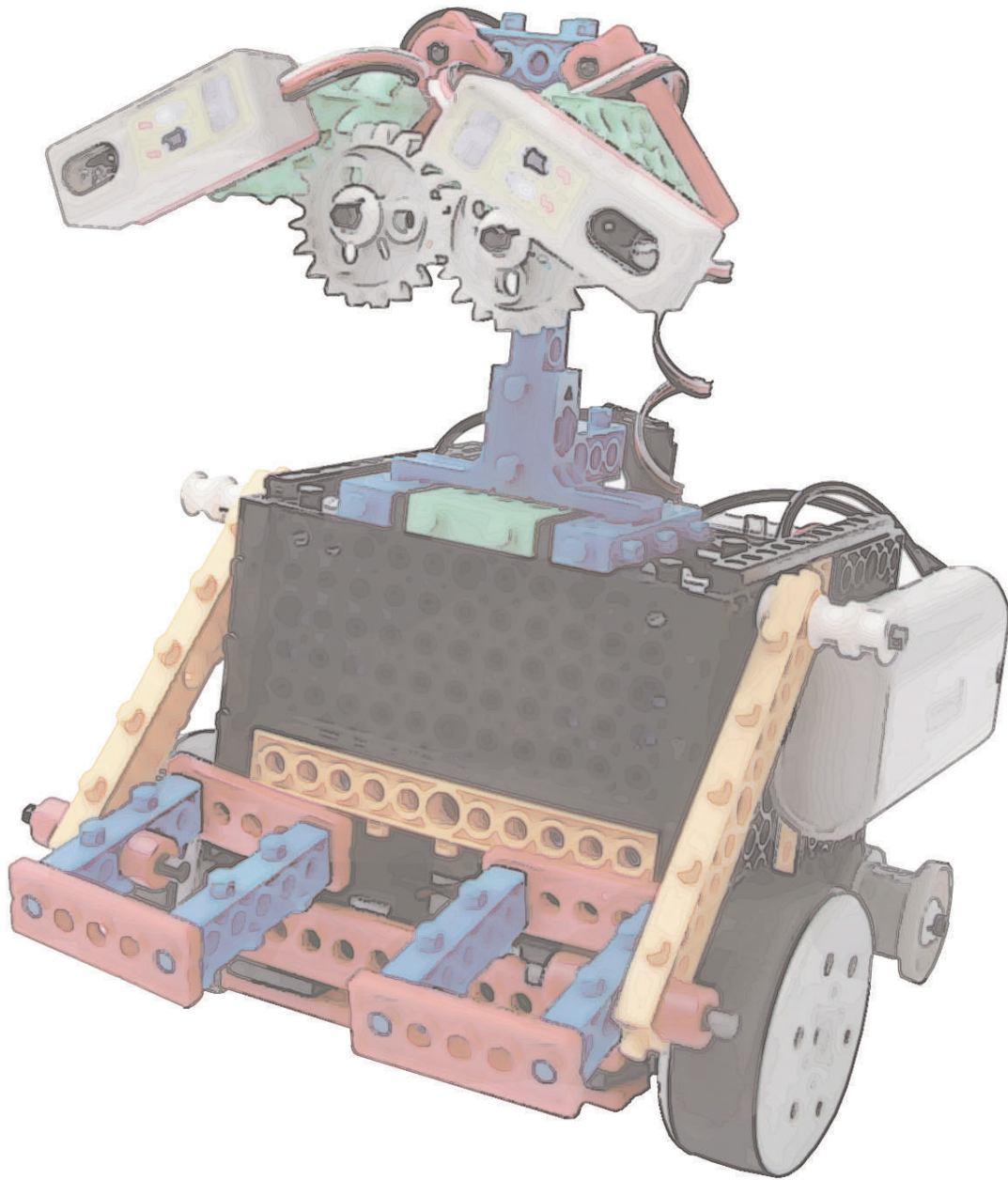
Setting mode

1. Ensure the battery case and DC Motor are connected well.
2. Turn on the power.
3. Press the MODE button and select as shown below. (The red LED will turn on.)

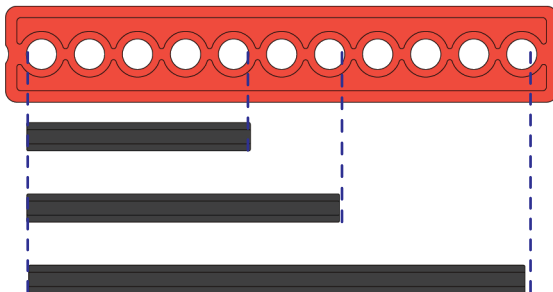


4. Select RemoteCon ID. (See below.)
5. Press START button and try to move the robot.

[illegible]



Shaft



Frame11

Short Shaft(5holes spacing) **Shaft(S)**

Middle Shaft(7holes spacing) **Shaft(M)**

Long Shaft(11holes spacing) **Shaft(L)**

⚠ Caution

1. Fully understand the material before assembling.
2. Ensure that the assembling parts are handled properly.
3. Some parts can be dangerous for children and babies. Adult supervision may be required.
4. Some parts are sharp that may cause wounds for children. Please handle with care.
5. We reserve the right to change parts and products to improve quality and to meet international standards.
6. SRC is not responsible for consumer's incompetency. Please follow the instructions carefully.
7. HunaRobo SRC is a registered name.
8. No information here will be copied or reproduced without the express written consent of SRC Company.

➡ USE OF BATTERY

1. Ensure + & - are inserted correctly. Upon removal of battery, push the battery a little and nudge outwards.
2. Don't mix old and new batteries, nor different quality batteries.
3. Adult supervision is required when charging batteries.
4. Do not use alkaline batteries for recharging.
5. Remove batteries and store in a safe location when robot not in use.
6. Don't throw batteries into an open flame. Explosions can occur.
7. Ensure that the batteries are inserted correctly otherwise the battery case can short out.



HUNAROBO 1 (Beginning Course)

Entrance level - learning basics using a variety of blocks, making hardware and using the in-house program



HUNAROBO 2 (Intermediate Course)

Mid-level - A step up from level 1, making hardware and using HunaRobo compiler. Learn how to make your own program.



HUNAROBO 3 (Advanced Course)

A addendum to Level 1 and 2. Using a variety of sensor modules to make a concrete and creative mode. Learn high level programing.



www.huna.asia Get more information by visiting our website.

