ENJOY AI 2024

INTERSTELLAR JOURNEY

CLOSING CEREMONY OF SPORTS

Motion Control

Objectives:

1. Know the basics of the competition
2. Know the types of rolling chassis
3. Make a robot move around

5+

Challenges

Challenges

What challenges will you face in this competition? To have an overview, you can go to the following web page:

https://www.youtube.com/watch?v=oitiXwSqGBM

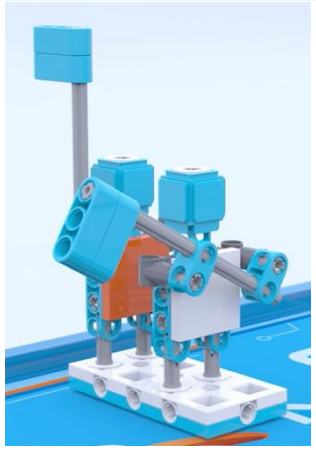
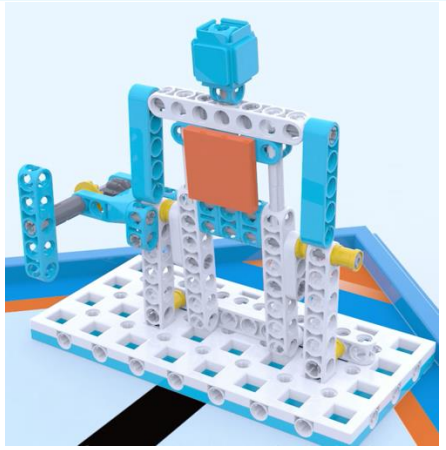
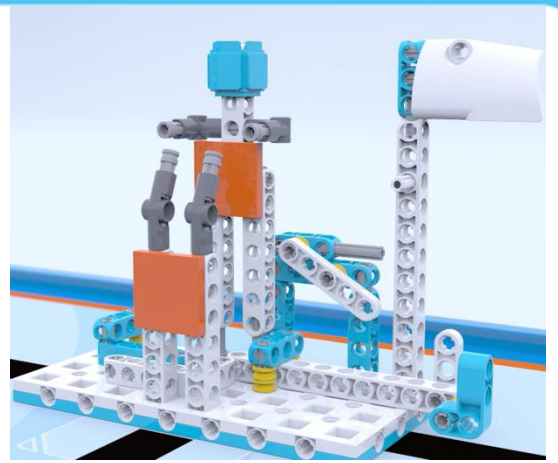
Challenges

Challenges accepted!

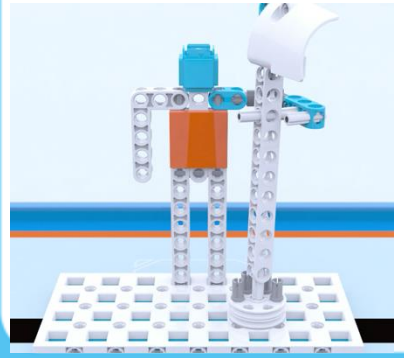
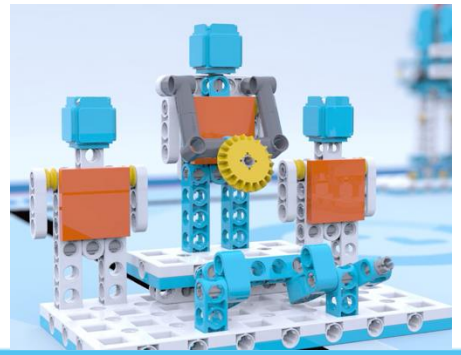
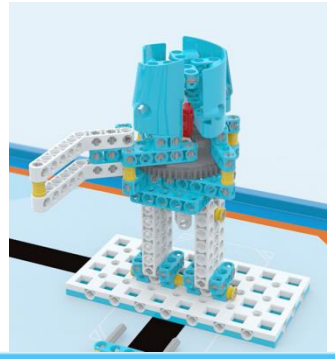
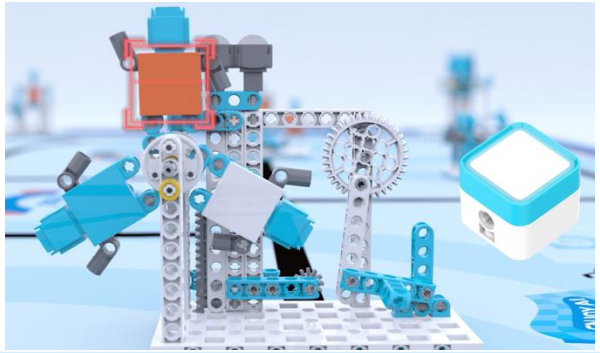
How many challenges do you see in this video?

Challenges

Let's take a look at the tasks you need to complete!

Eight Tasks

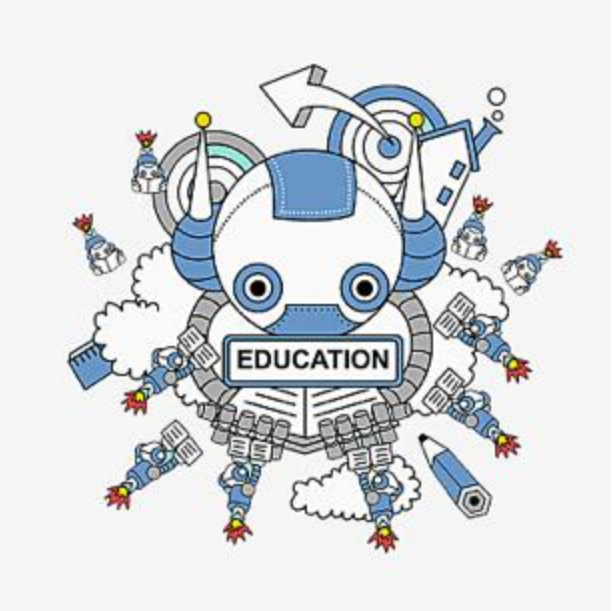
Challenges

To complete these tasks, what kinds of robots will you need?

Challenges

Robots for a simple task?

Challenges



Robots that can handle various tasks?

Challenges

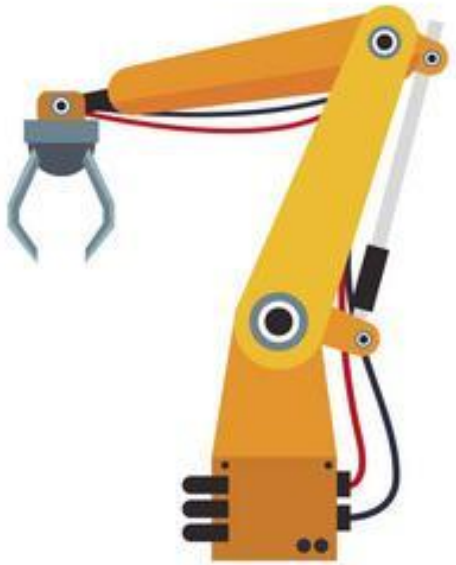
Your robot needs to perform different operations in different tasks. So, you need to build a robot that has different functions.

Brainstorming

Brainstorming

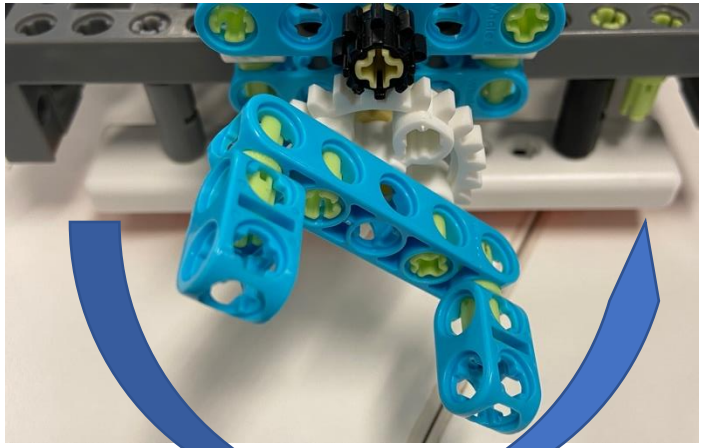
What functions does your robot need?

Brainstorming



Grabbing things?

Brainstorming



Turning rotary knobs?

Brainstorming

Moving around?

Brainstorming

Which function do you think is the most important one in this competition?

Brainstorming

In all tasks, the robot needs to move to specific areas.

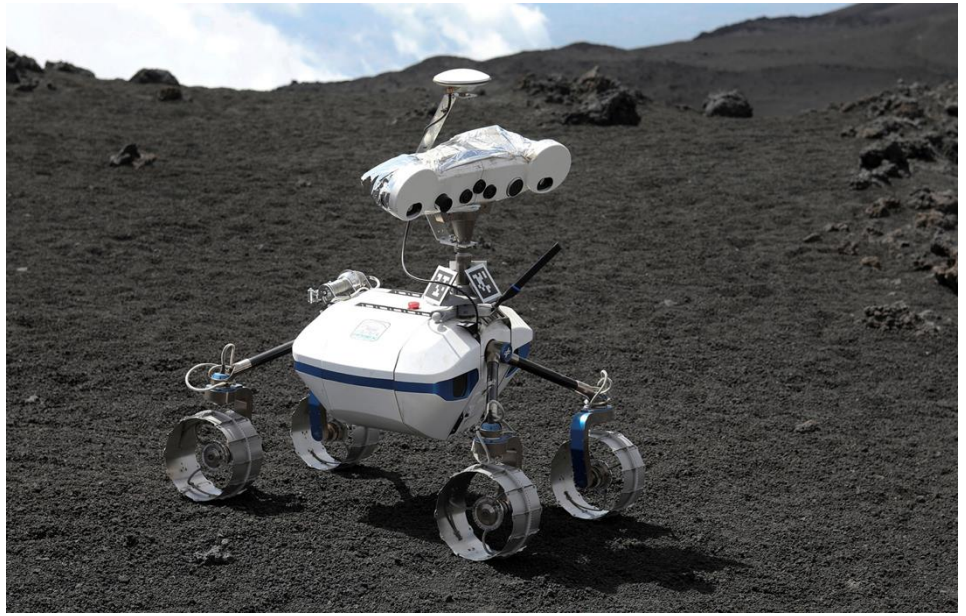
Brainstorming

So, motion control is the most important function. To move around, your robot must have a chassis.

Brainstorming

The previous slide shows an example of chassis.
Can you come up with other types of chassis?

Brainstorming



For vehicles, rolling chassis are most frequently used. Rolling chassis use wheels to achieve motion control.

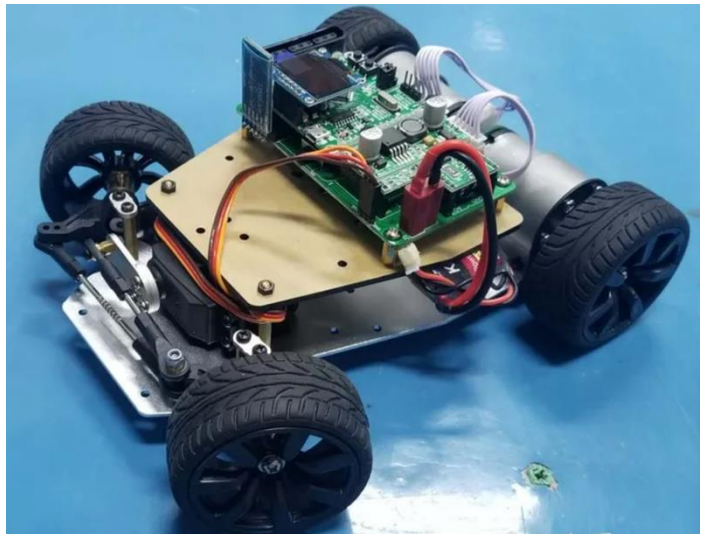
Brainstorming

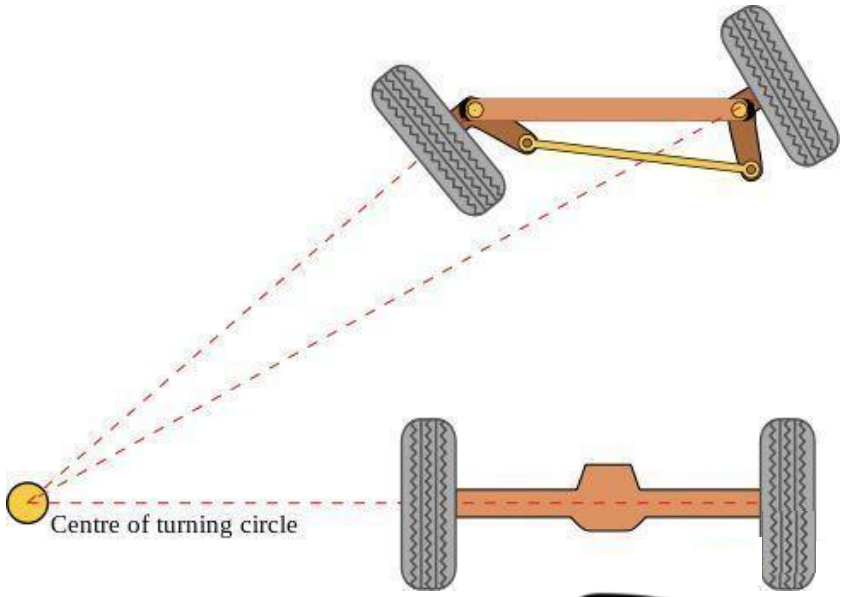
Differential chassis

A differential chassis allows the wheels on each side to rotate at different speeds. It uses a differential to steadily distribute power to the wheels. This allows the vehicle to turn.

Brainstorming

Ackermann chassis





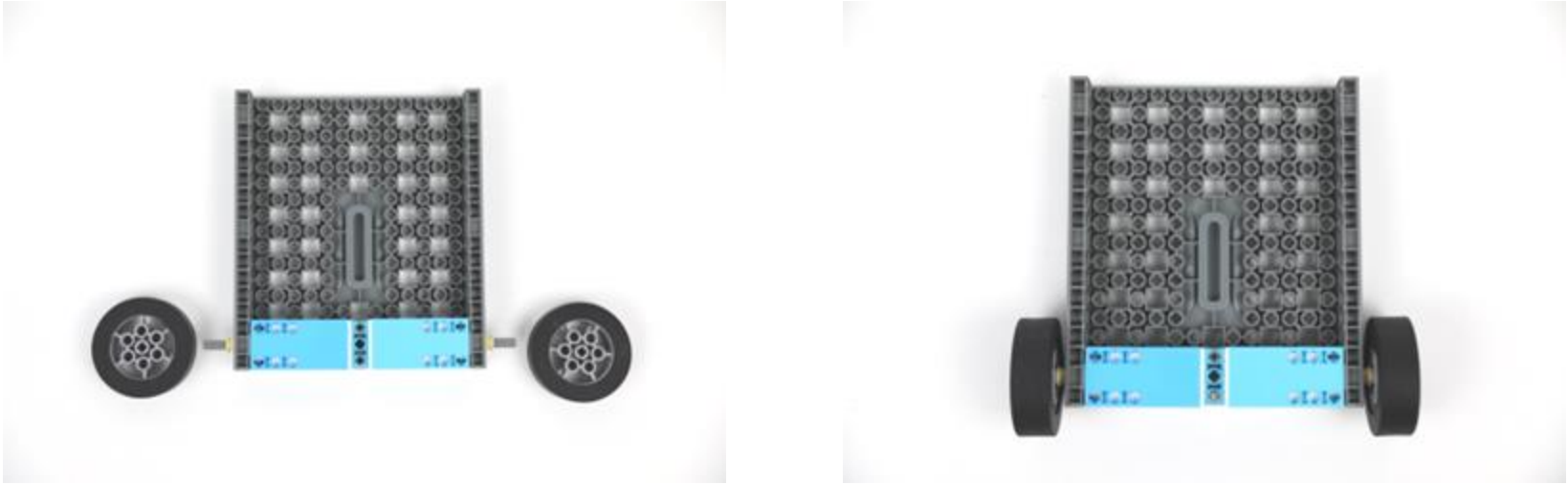
An Ackermann chassis uses a four-bar linkage structure to steer the inner wheels sharper than the outer wheels. This makes the vehicle turn.

Brainstorming

After we talk about chassis types, let's see how to build a chassis.

Assembling

Assembling



Install wheels

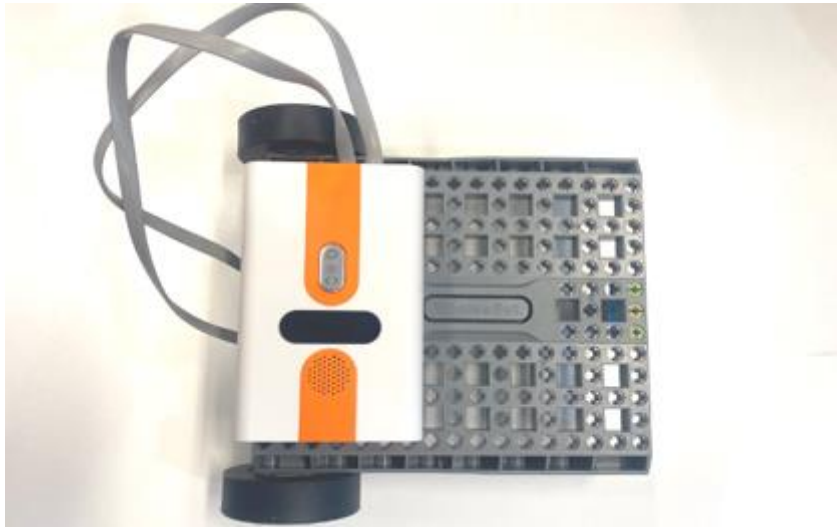
Assembling

Install a universal wheel and a 5-in-1 sensor

Assembling

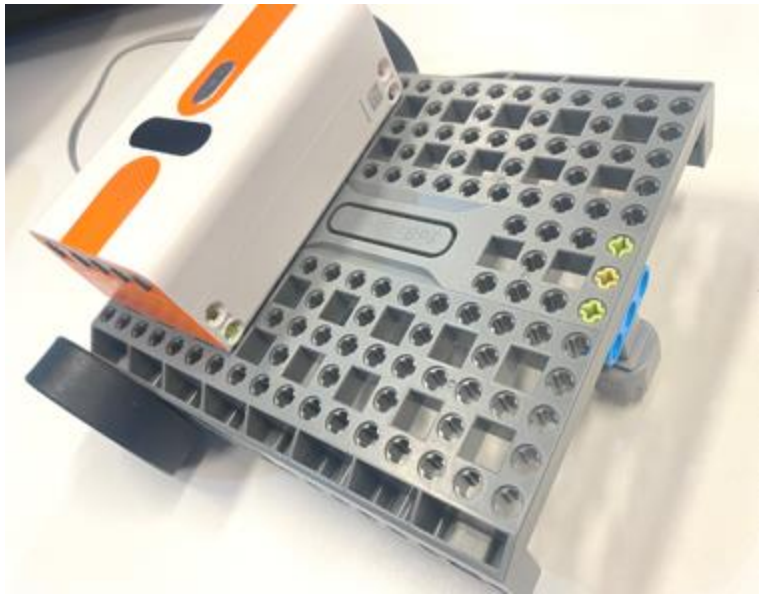
Install the controller

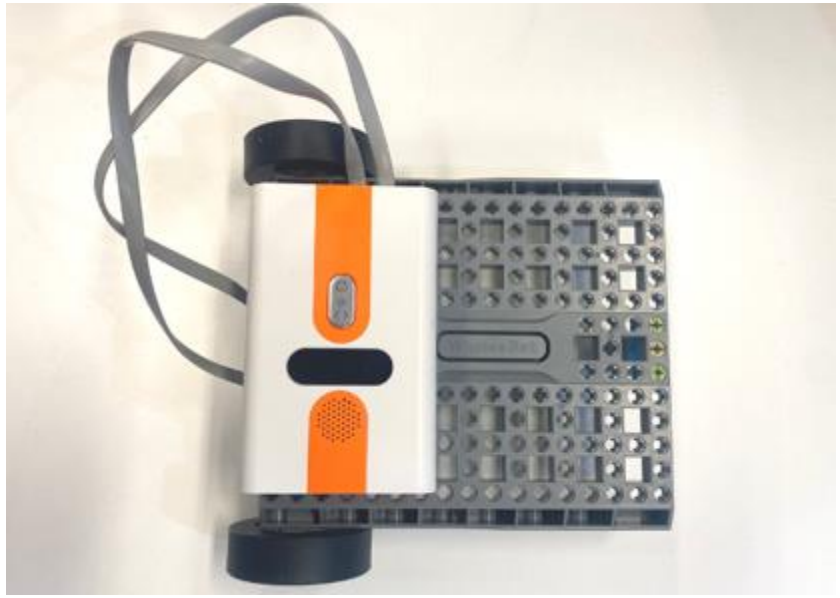
Assembling



Install the controller

Assembling





The robot faces towards the side of the universal wheel. Its movement is driven by the rear wheels.

Connect the left motor to Port A of the controller, the right motor to Port B of the controller, and the grayscale integration sensor to Port 1.

Coding Tasks

Task 1

Let's move the robot through coding!

Task 1

What code blocks do we need to move the robot from the starting zone to the finish zone?

Task 1

Motion

move left motor A right motor B Forward power 40 %

move left motor A right motor B Forward power 40 % run for 1 secs.

stop left motor A right motor B

set motor A power 40 %

set motor A power 40 % motor B power 40 % run for 1 secs.

set motor A power 40 % run for 1 secs.

set motor A power 40 % motor B power 40 % rotate for 360 degrees

set motor A power 40 % rotate for 360 degrees

reverse motor A

stop motor all

set up steering gear angle mode ID 1 speed 40 angle 0

set up steering gear rotation mode ID 1 speed 40

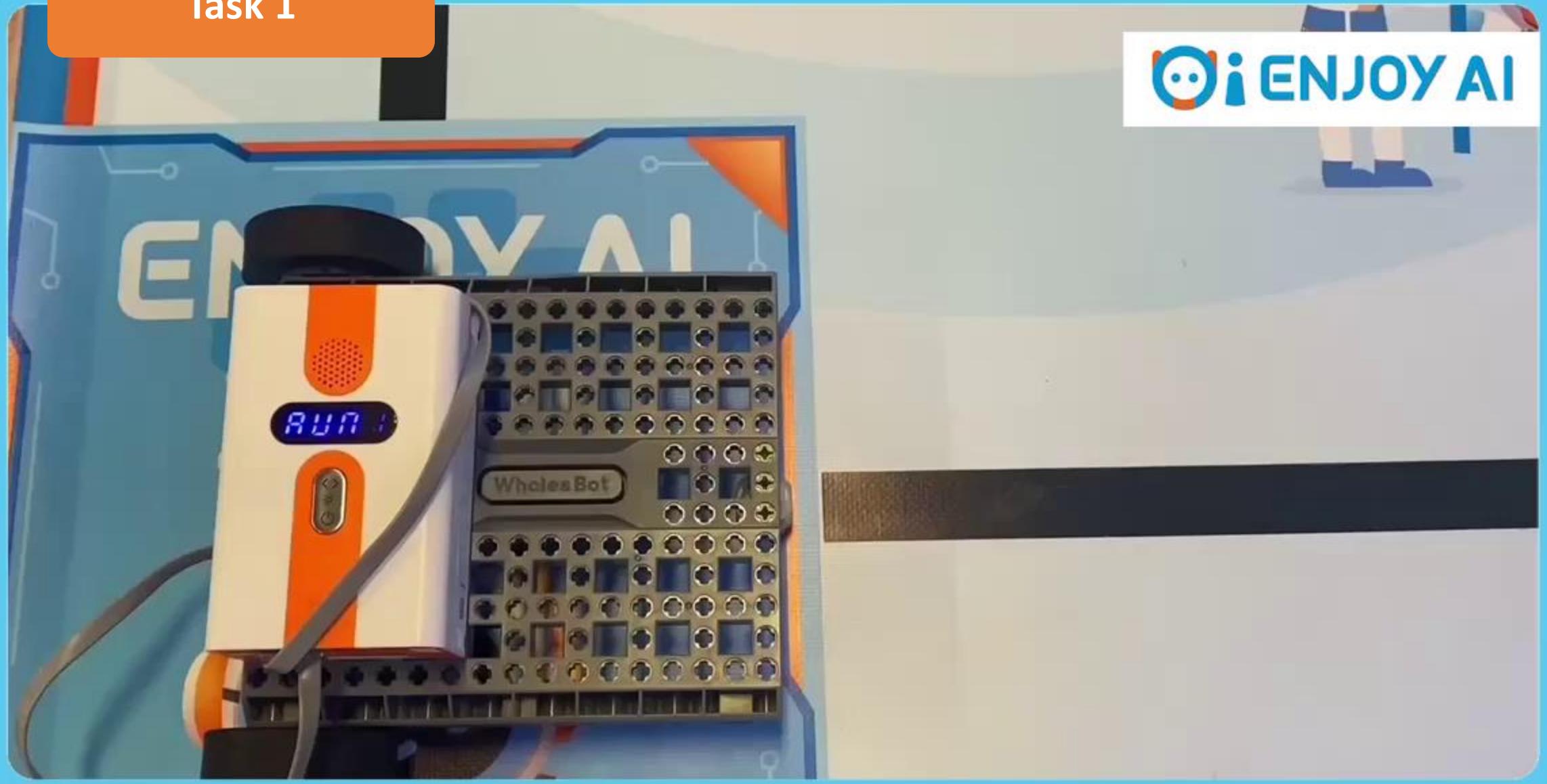
restore steering torque

What blocks do we need to stop the robot after moving it for a while?

Task 1

What will we do in Task 1? Let's watch a video.

Task 1



Task 1

Try to use these code blocks to finish Task 1.

Task 2

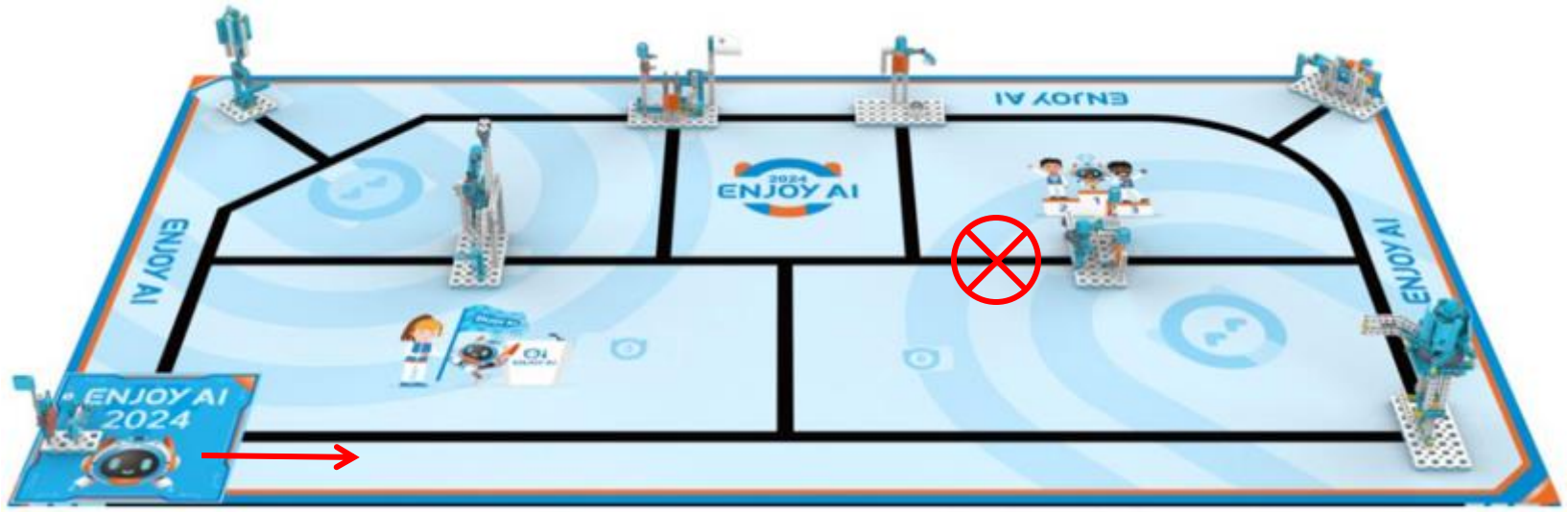
Finish Zone

Object

Starting Zone

Program the robot to move it from the starting zone to the finish zone.

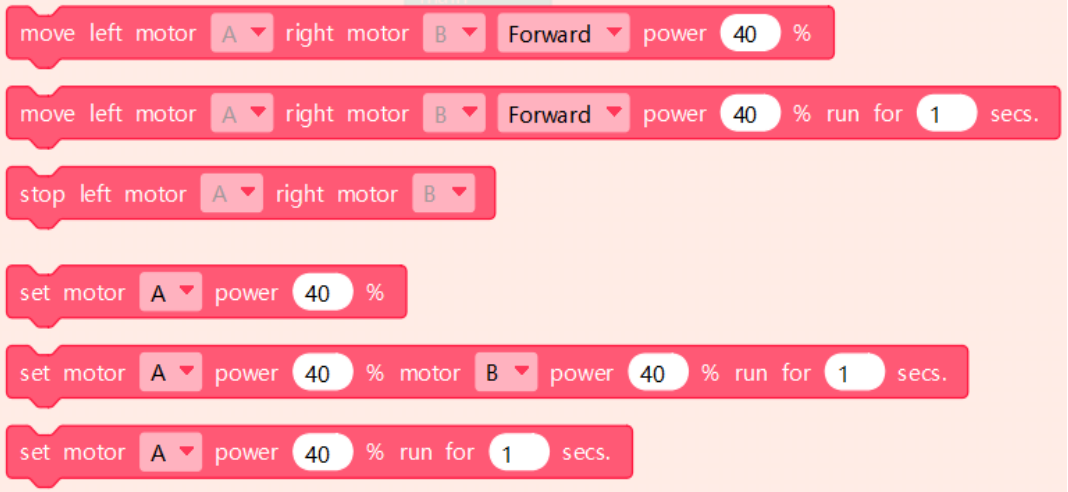
Task 2

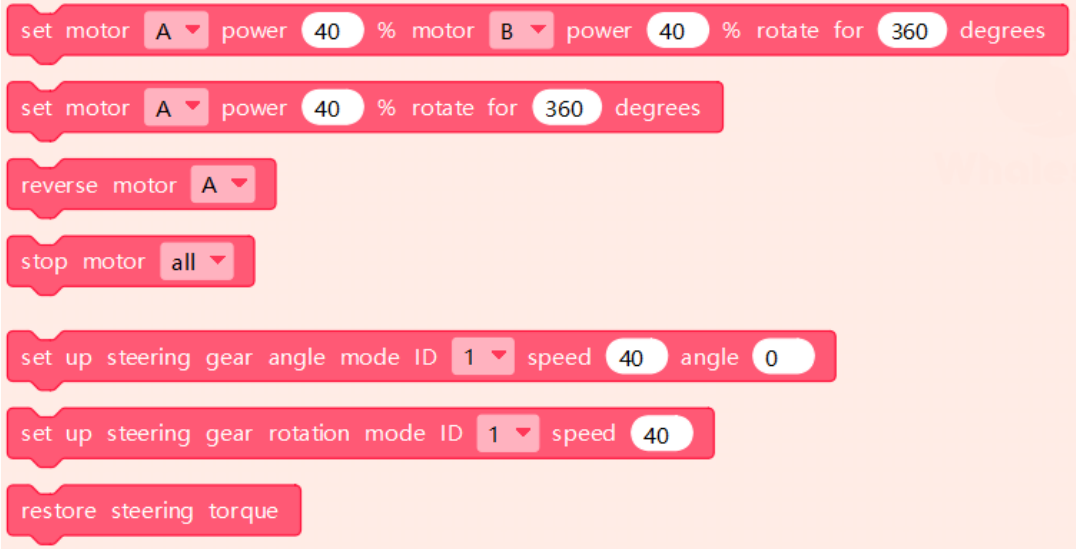


How can the robot go to the place marked in a red cross?

Task 2

Motion



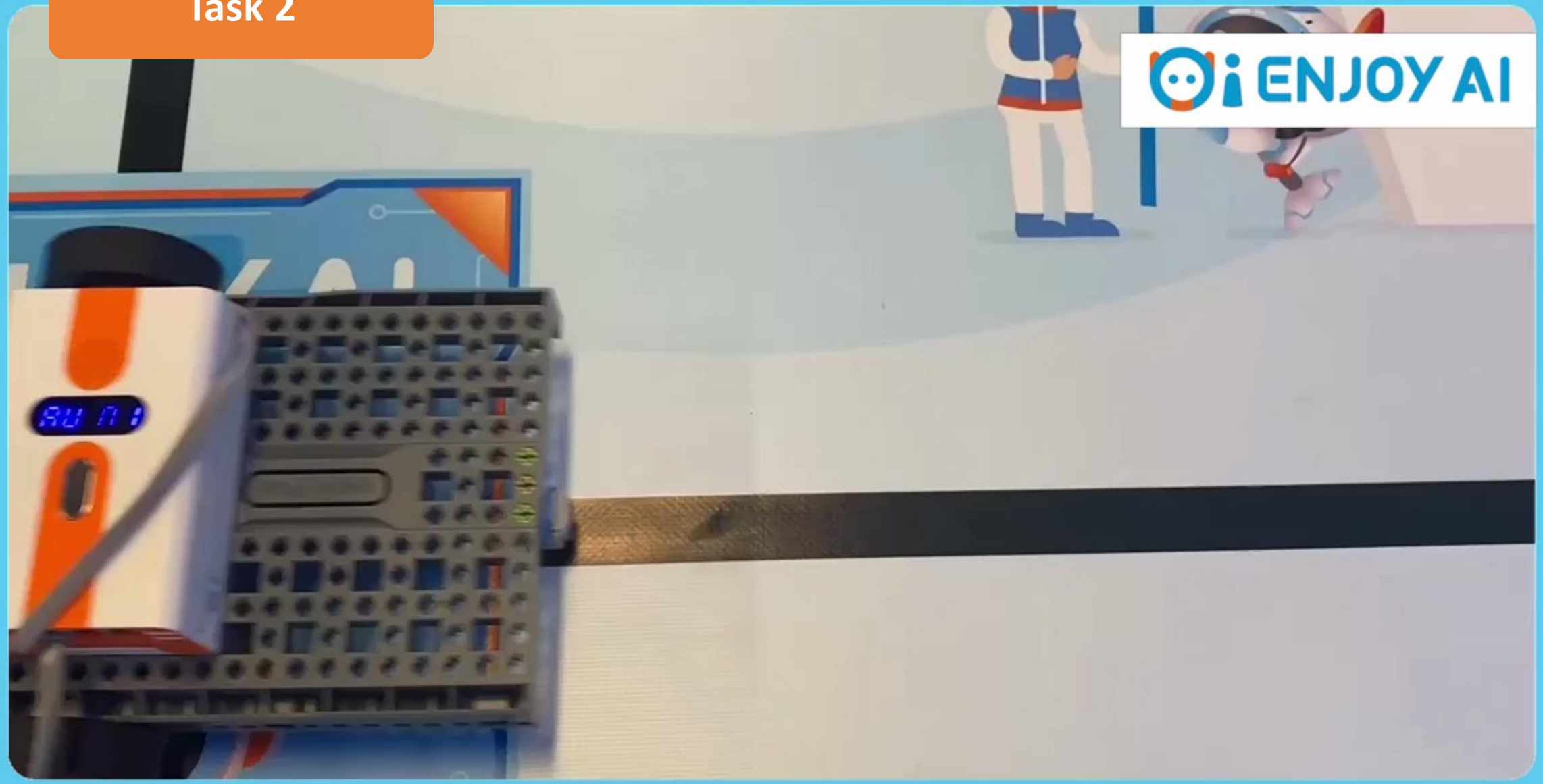


What blocks do we need to make the robot turn?

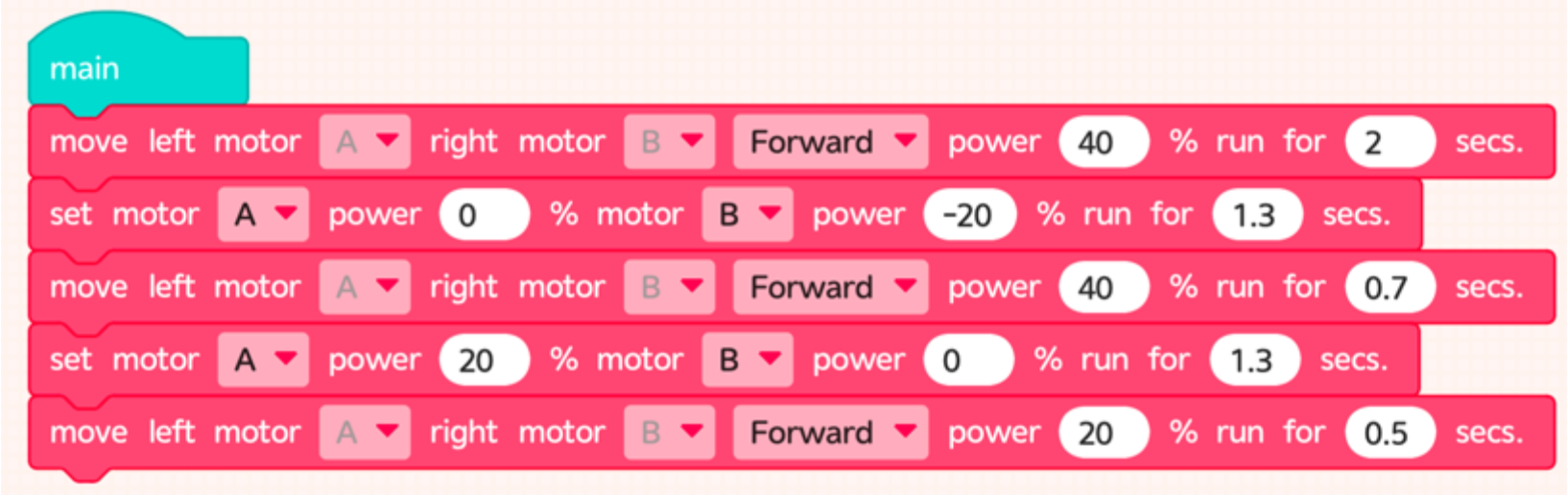
Task 2

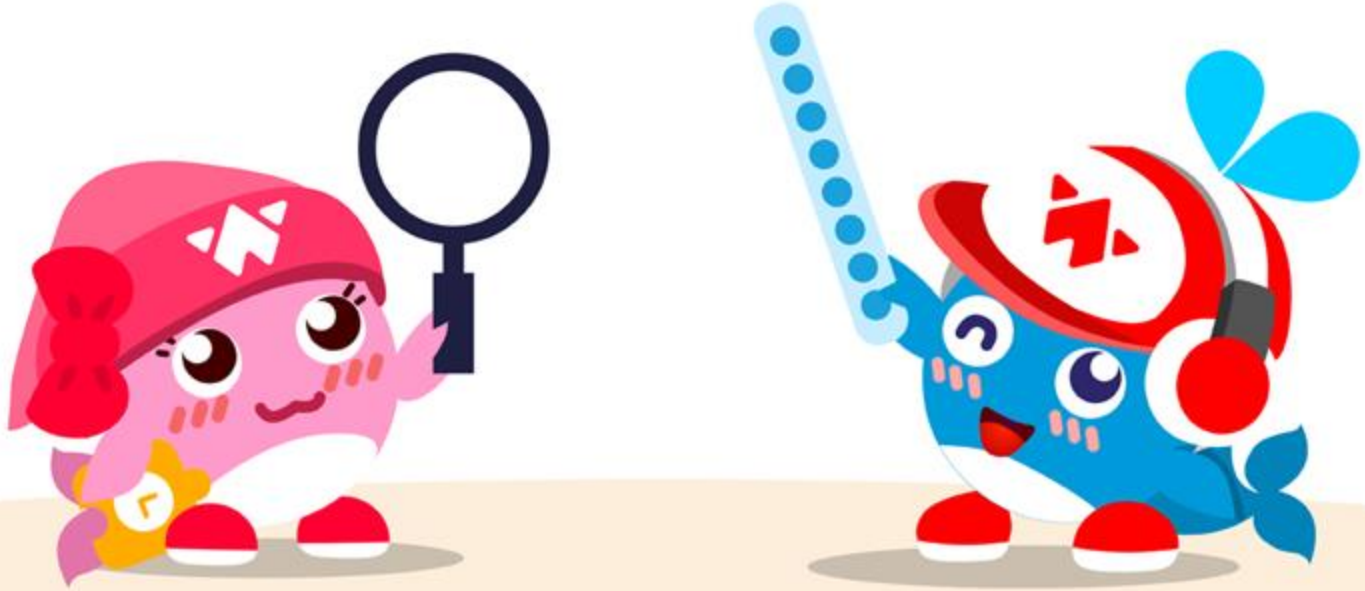
What will we do in Task 2? Let's watch a video.

Task 2



Task 2



Try to use these code blocks to finish Task 2.

See you next time!