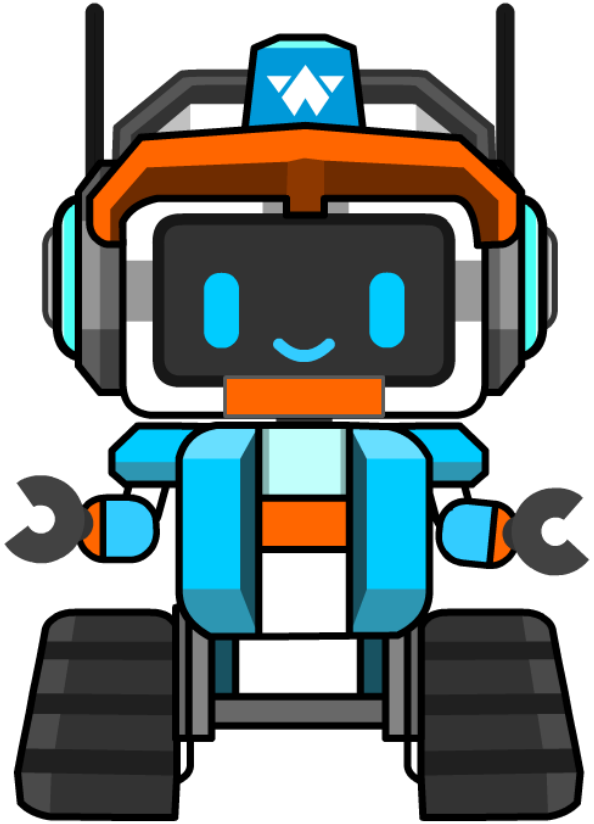
02.Basic programming

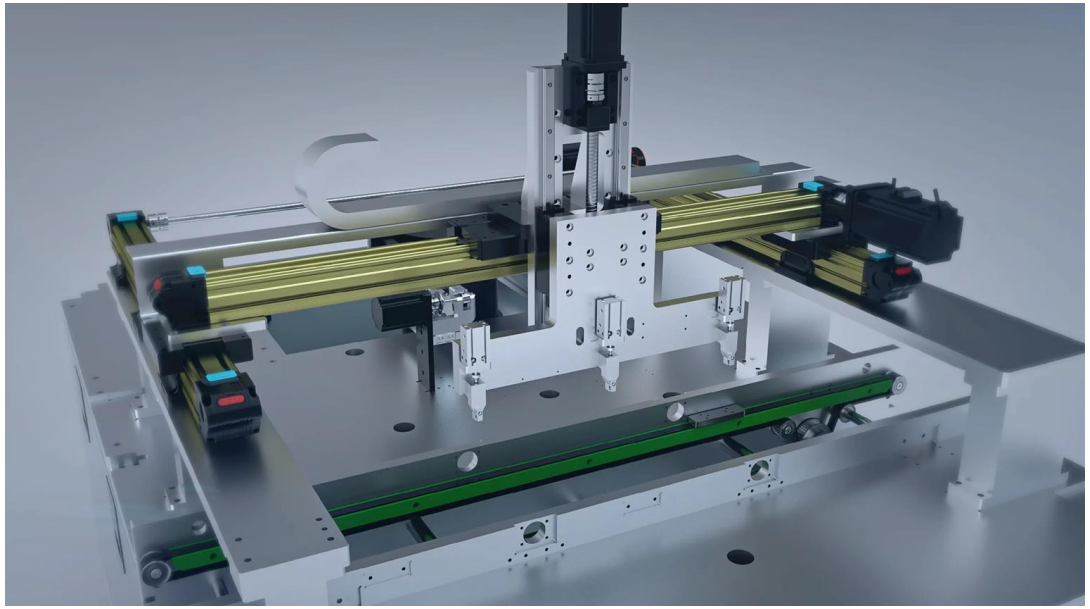
1.Introduction

What is the difference between a robot and an automatic machine?

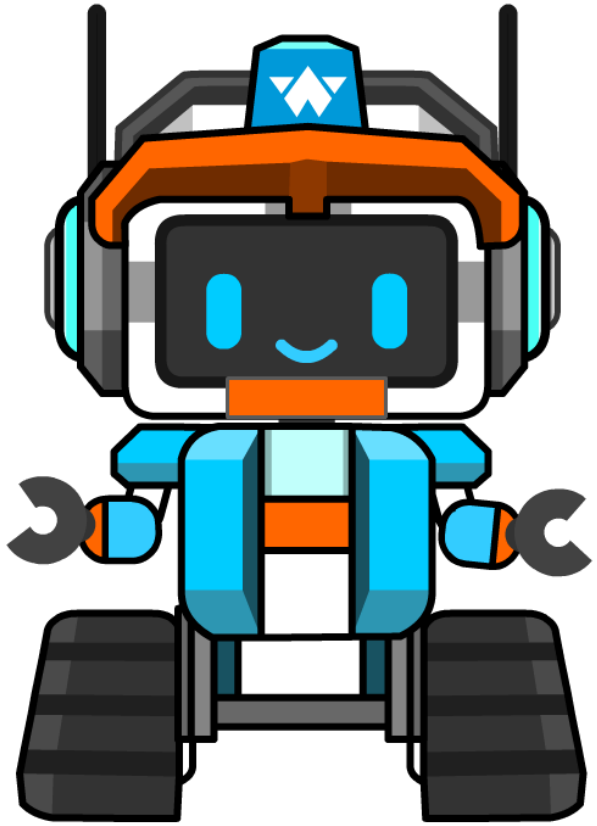


1.Introduction

Automatic machinery refers to machines that operate automatically and repeatedly according to instructions without human intervention.



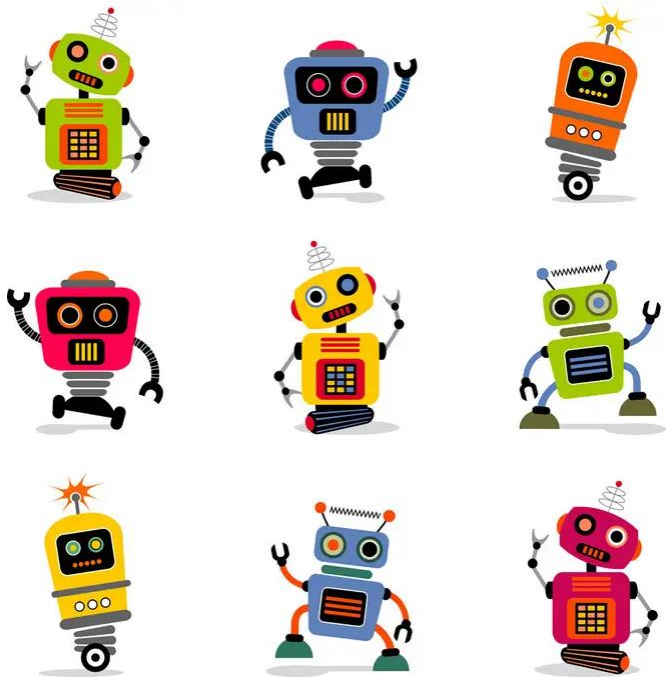
1.Introduction



So what is a robot?

We gave machines the power of a man, and made them work like a man.

1.Introduction



Take a look at our robot suit.
What are the three characteristics of the robot achieved by means of?

2.Exploration

The sensors are the senses used by robots to perceive the outside world;

The controller is the robot's decision-making brain;

The motor is the actuator that the robot uses to do the action. Other actuators include the controller’s speaker sound and emotion screen image output.

Other structures are used to assist robots with different tasks with different requirements.

2.Exploration

As the brain of the robot, the controller can control the robot to achieve different tasks.

But the controller is just like the brain of a newborn baby, it is blank and can't do anything,

Therefore, we need to teach it to do things.

How can we teach it?

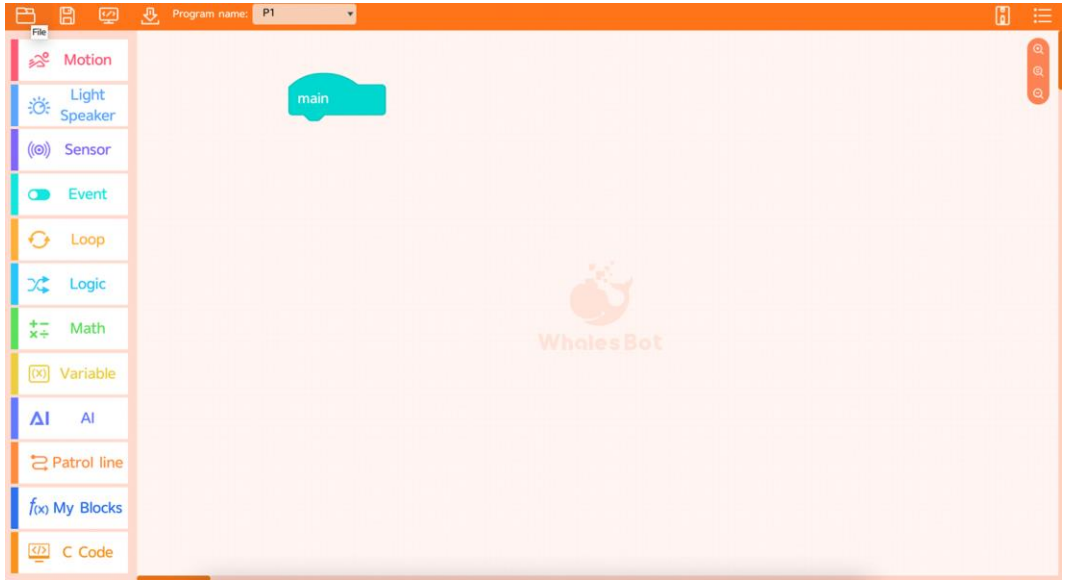


2.Exploration

Programming is used to tell the controller (in a way that the controller can understand) what and how we want it to do.

Now we're going to learn the Scratch programming software, and use it to tell the controller what to do.

Let’s start with opening the whalebot programming software.

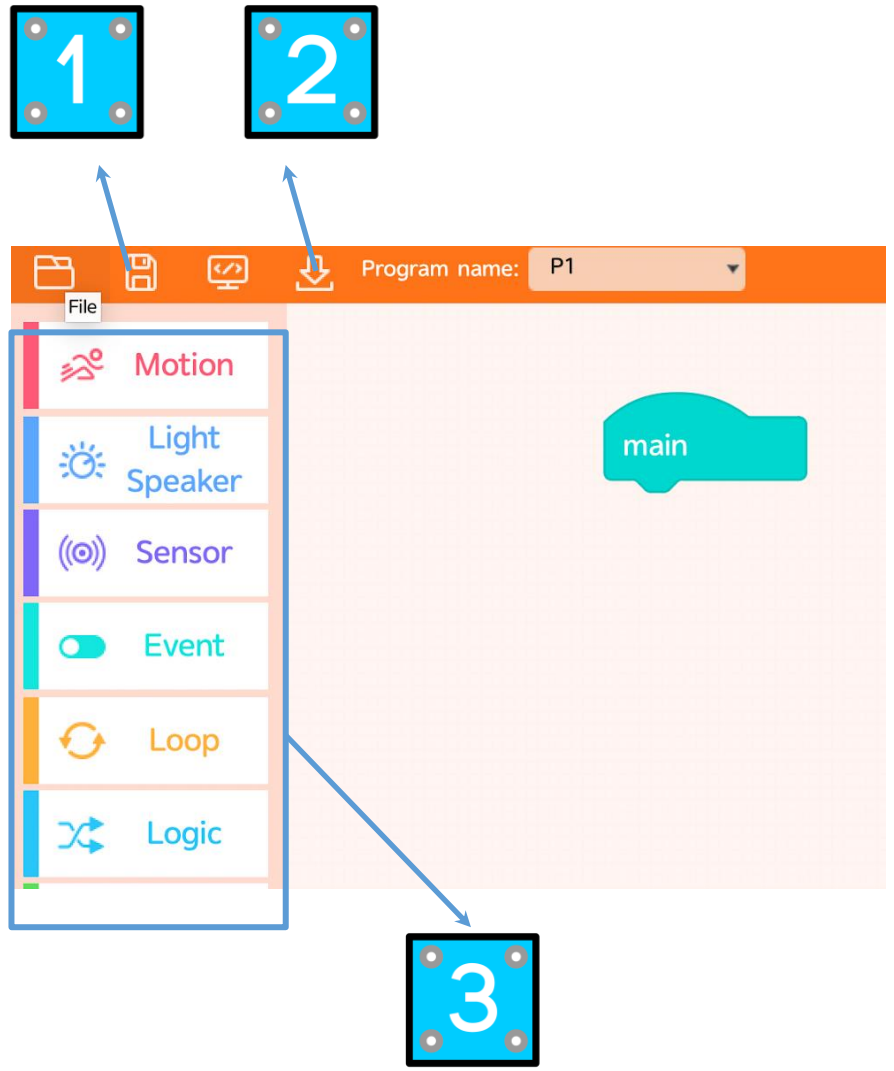


2.Exploration

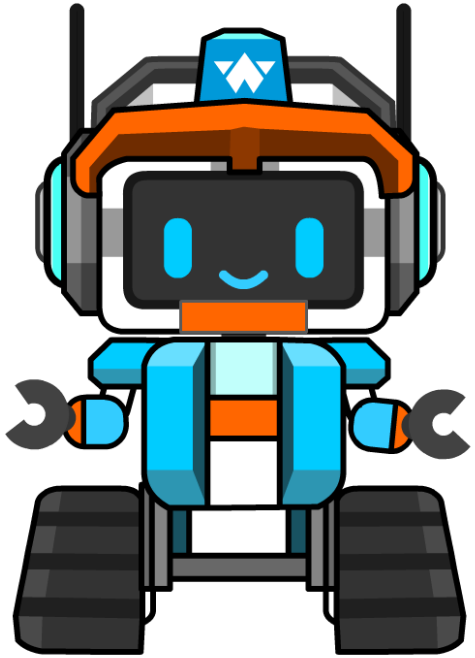
1. Create and save programs. It is strongly recommended to form the habit of saving programs regularly and in different files so that for any data loss due to various reasons, no need start from the blank.

2. Program download. After the programming is completed, we need to download the program into the controller and then run it at the controller.

3. Module library. Various functional modules on the left are commands that we can call directly into programming to achieve complex functions through the combination of various commands.



3.Construction



For this class we need to design a simple robot.

We need to design robots that can turn their bodies and make sounds.

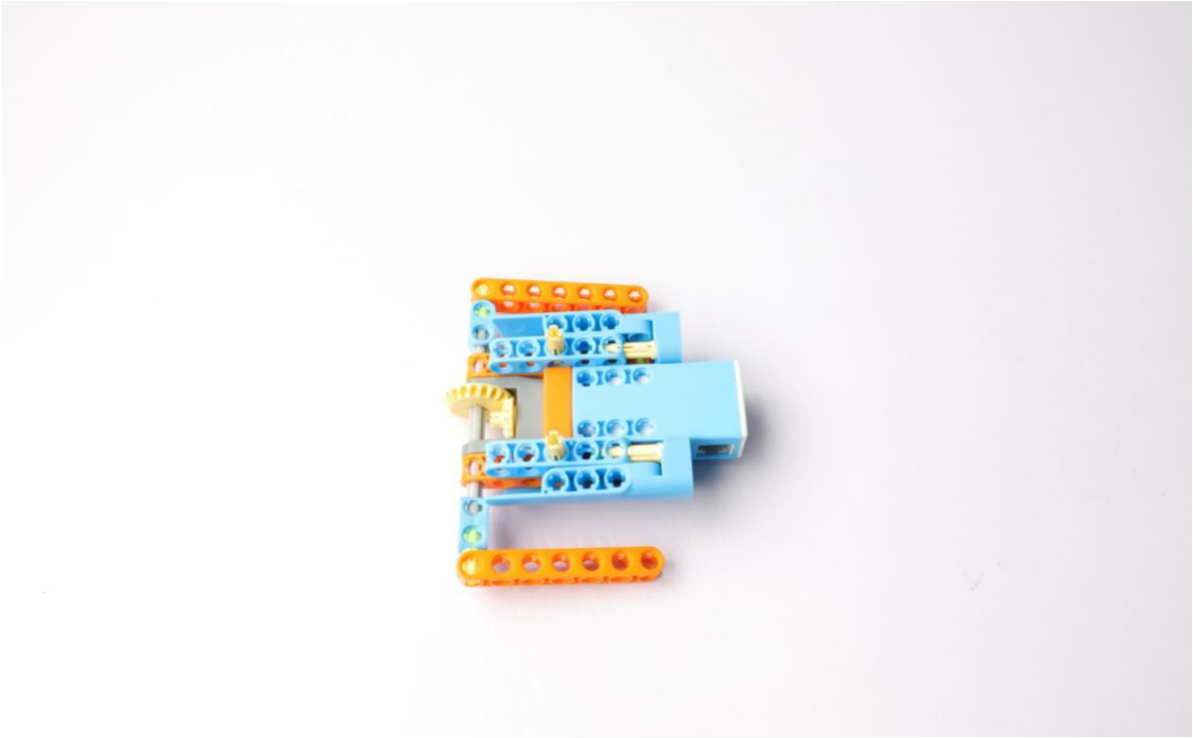
3.Construction



3.Construction



3.Construction



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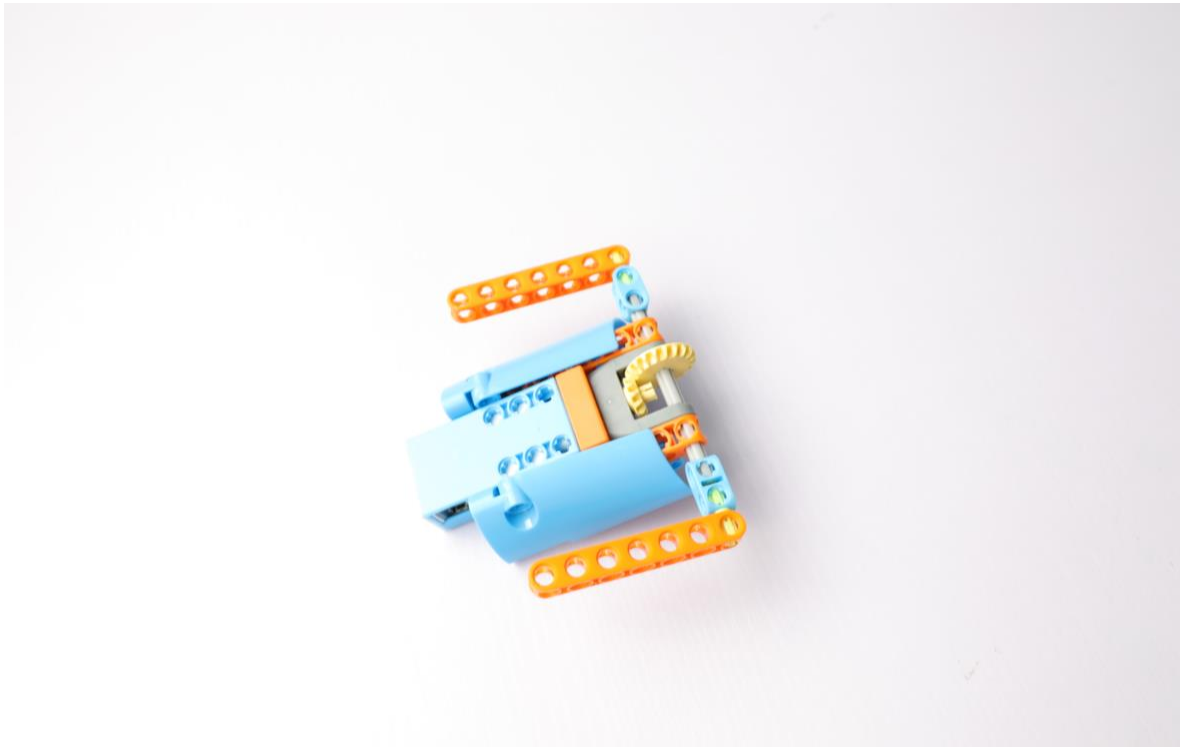

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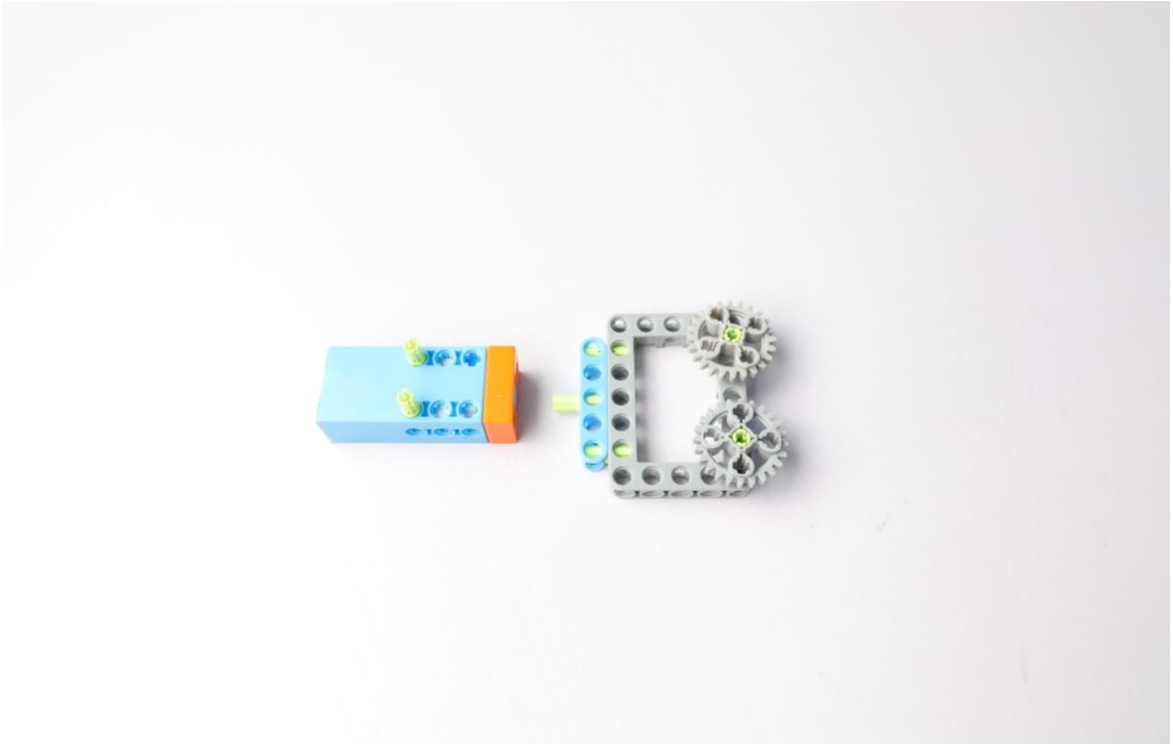

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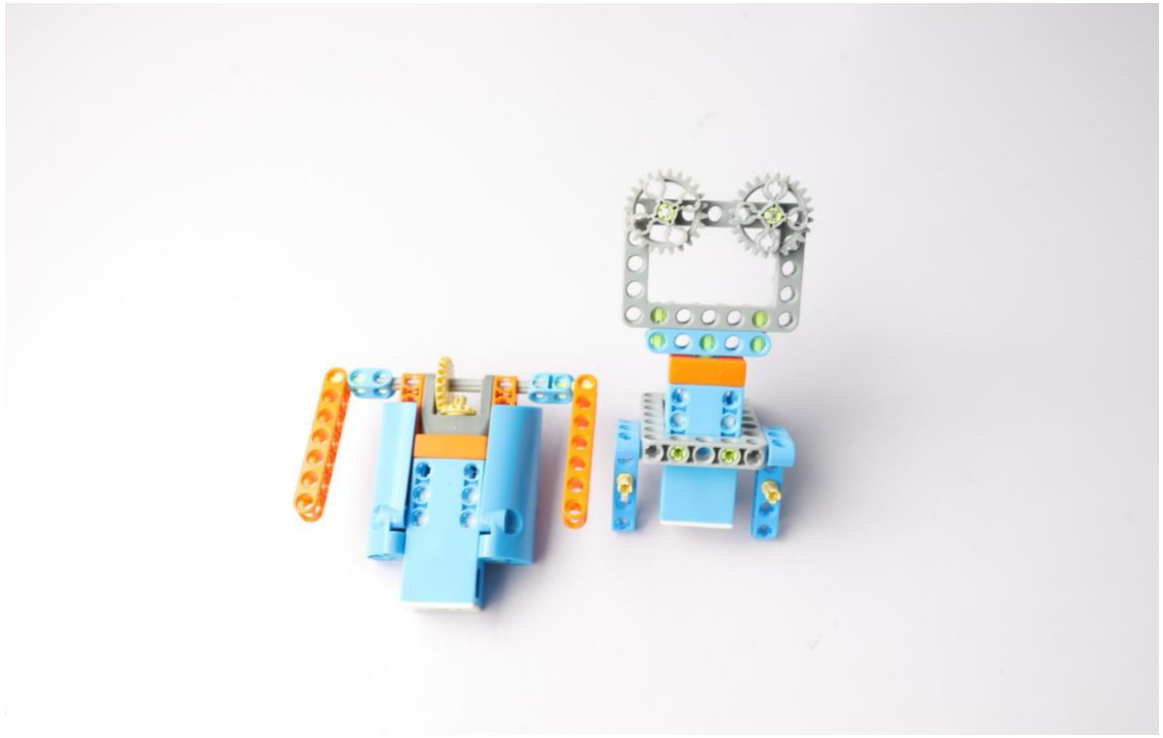

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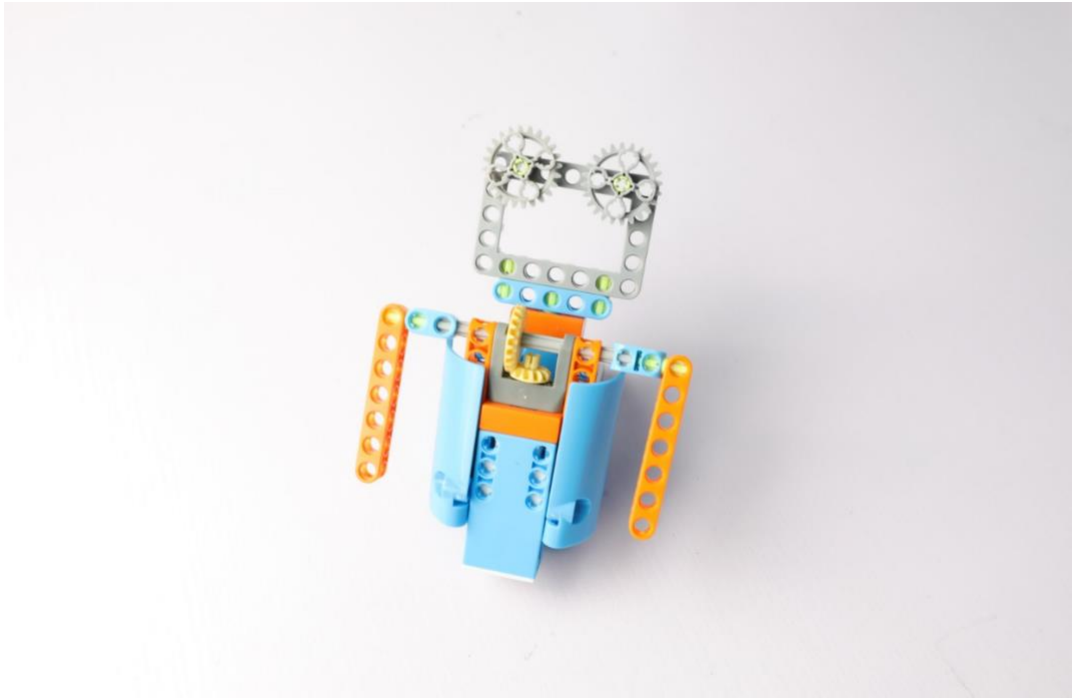

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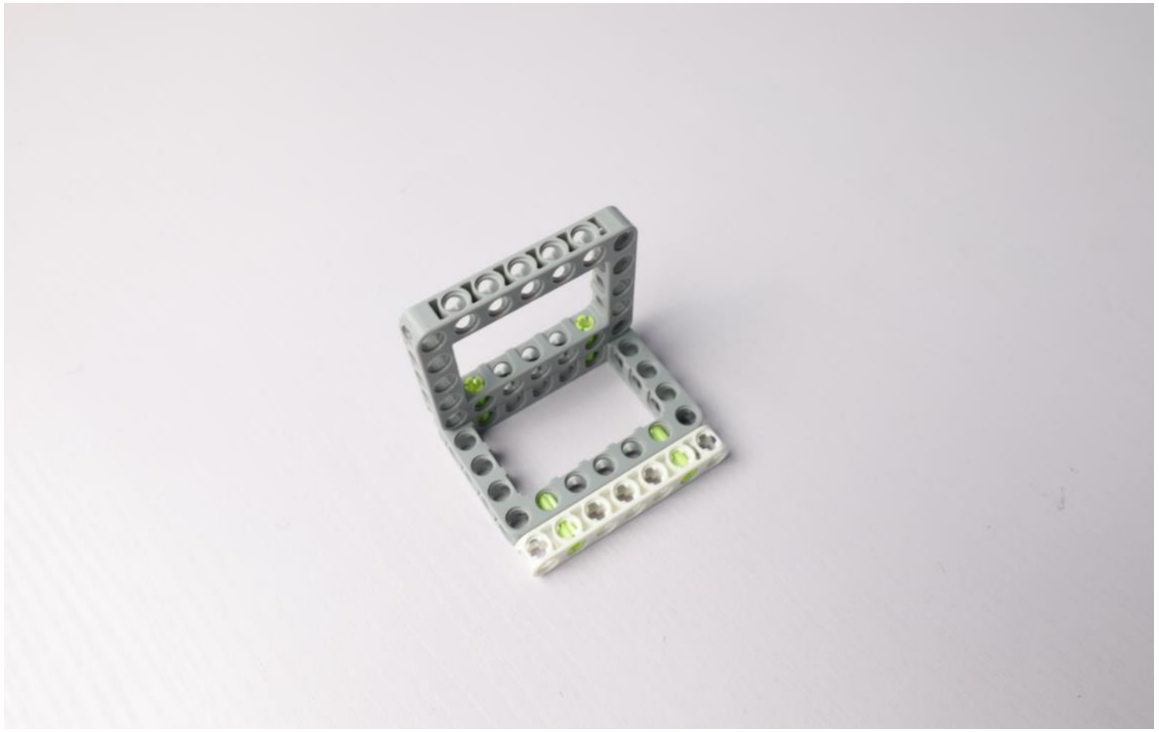

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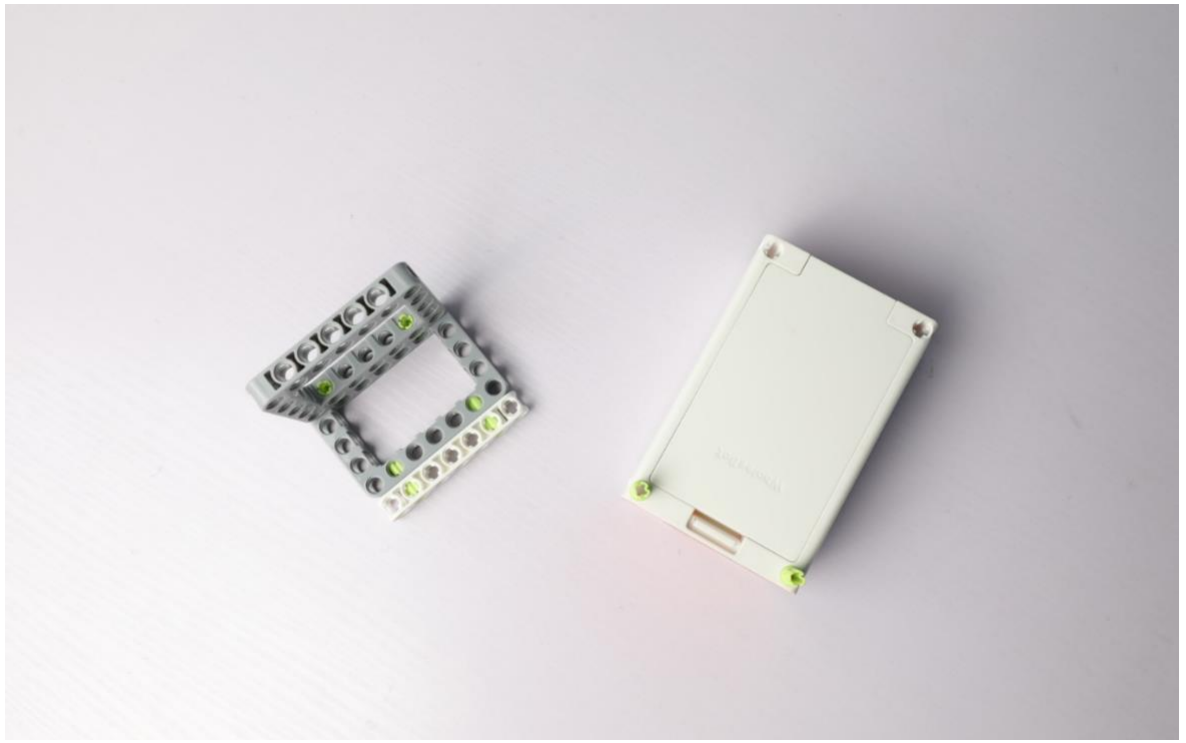

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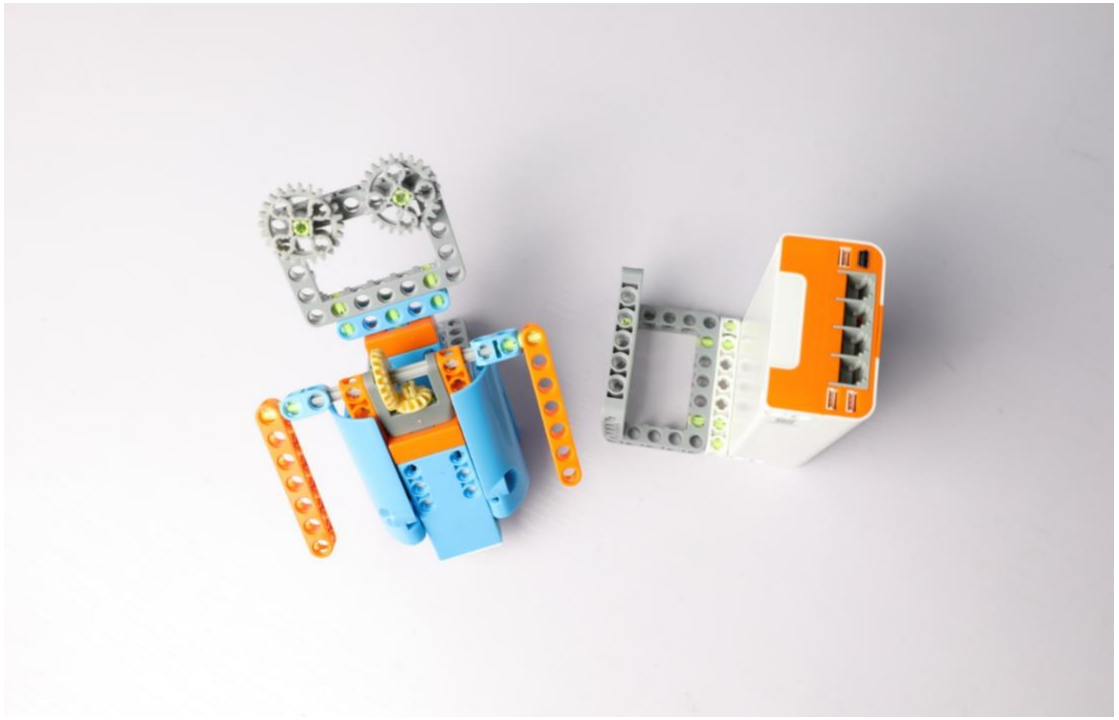

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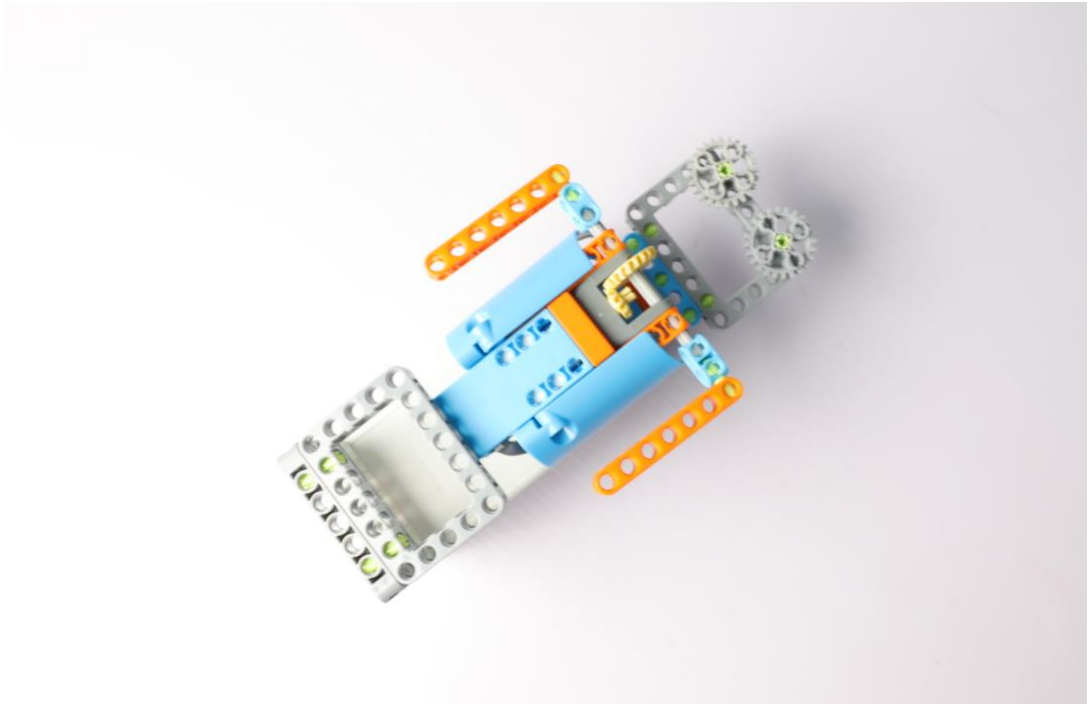

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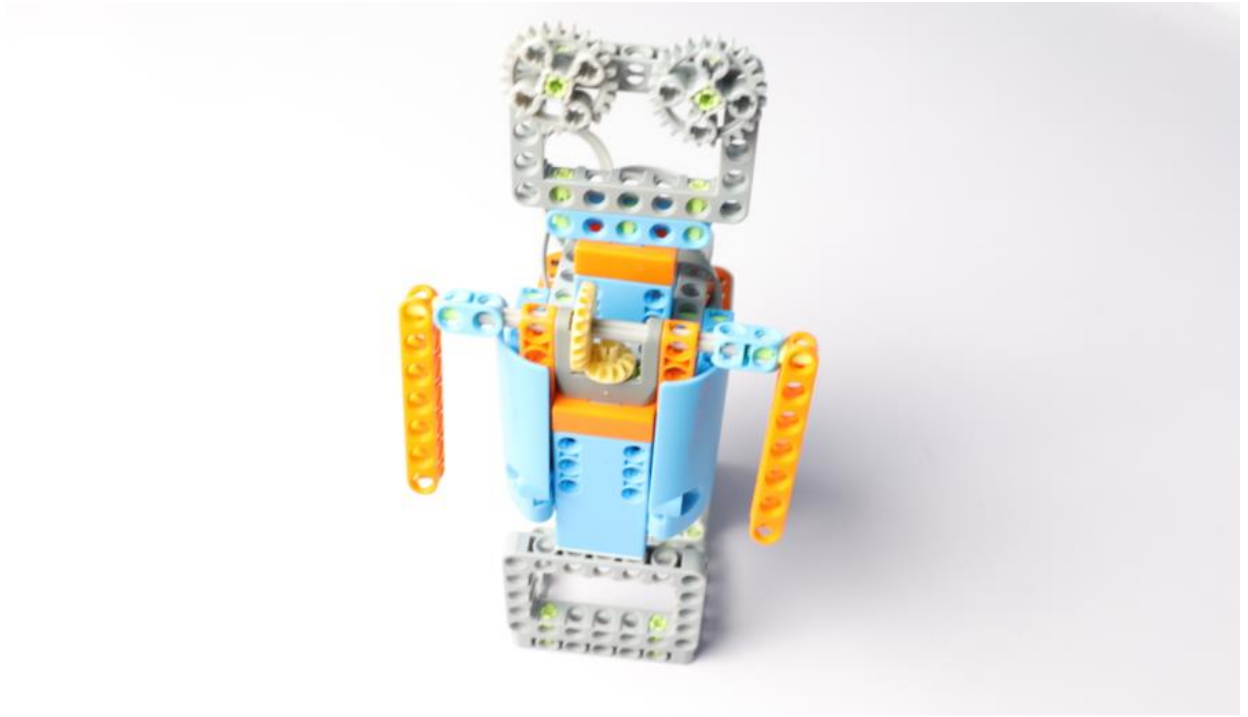


3.Construction

Connect the two motors to port A (head motor) and B (arm motor) of the controller respectively using the grey cables.



4.Coding

What do you do first when you program a robot?



4.Coding

The execution of the program needs to follow a sequential structure, different commands are executed from top to bottom.

We need to figure out the order in which we want the robot to do things.

For this lesson, we need the robot to turn its head for one second, then laugh, and finally wave its arms.



4.Coding



First we need to find these modules.

5.Evaluation

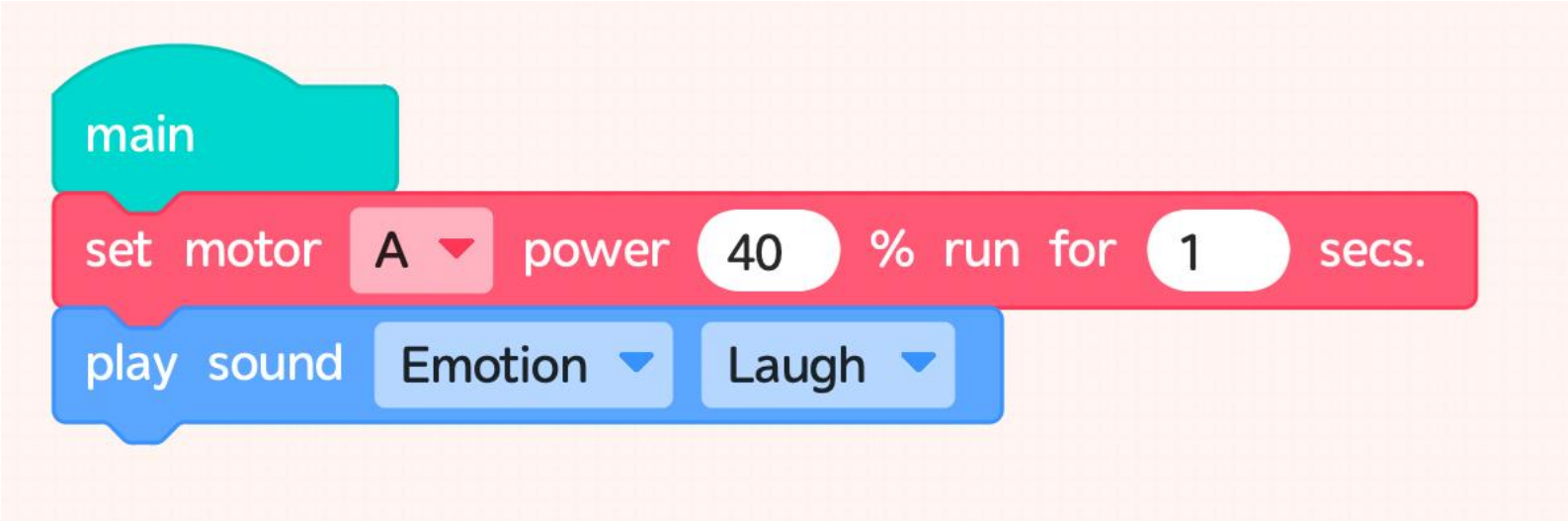
Sequential structure.

Arrange the corresponding modules in the order how they solve the problem, executing from top to bottom



4.Coding

Based on the sequential structure of our program,
how should we arrange our module commands?



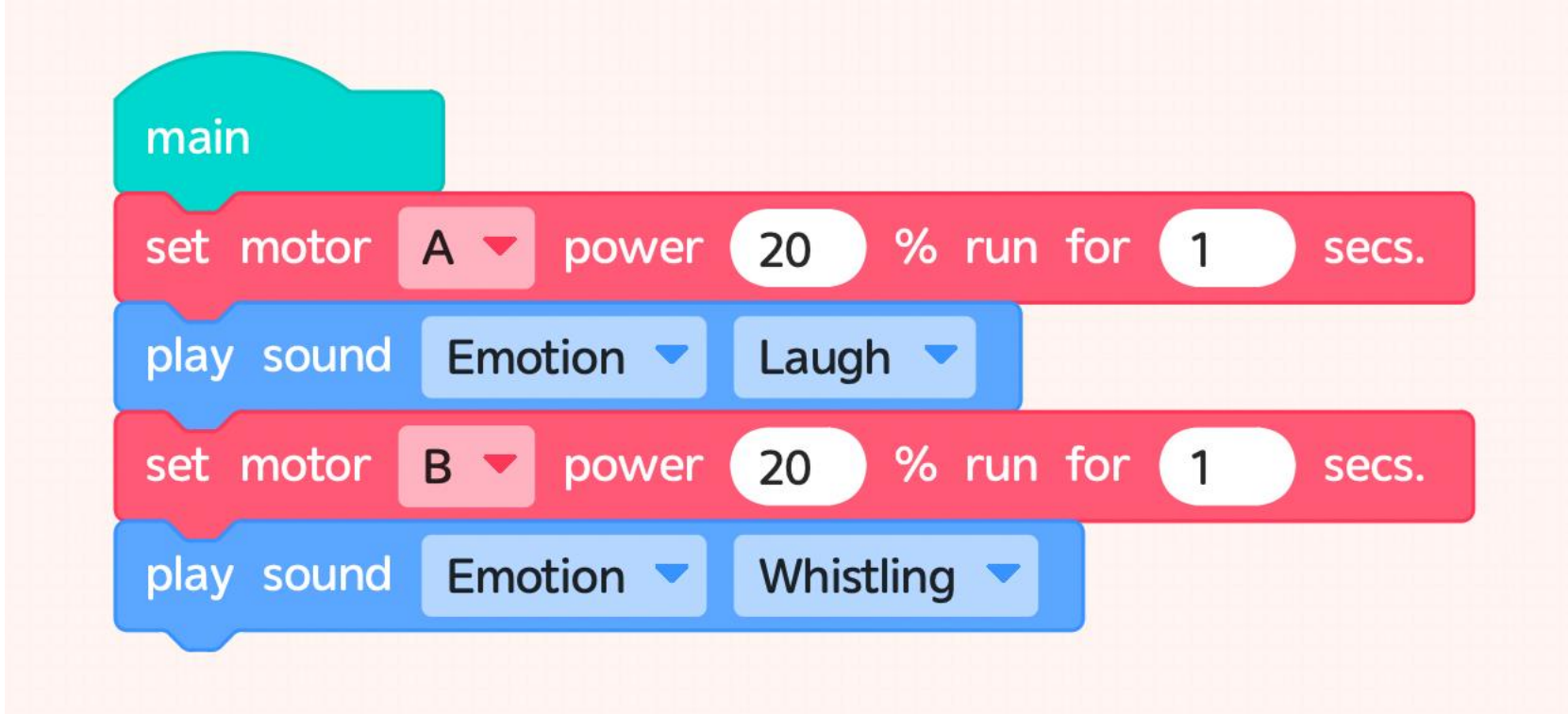
4.Coding

Through the above content we have completed a simple robot, now we can further enrich the robot's functions.

Let’s us add new functions to the robot,
Once the robot completed the earlier tasks, we make it laugh, wave its arms, and finally whistle.



4.Coding


main
set motor A power 20 % run for 1 secs.
play sound Emotion Laugh
set motor B power 20 % run for 1 secs.
play sound Emotion Whistling

5.Evaluation

What is the basic structure that programs follow?
How does this structure work?



6.Summary

Project review

We successfully built a simple robot.

After programming and downloading the program to the controller, we can

- control the rotation of first and second motor,

and

- make sound via controller speaker

