

About this Manual

Thanks for choosing our PiSloth.

PiSloth is a biped artificial intelligence robot based on Raspberry Pi. It has 4 movable joints that can perform bionics movements, such as walking, standing, dancing and so on. In addition, it is also equipped with an ultrasonic module to support it to complete some interesting behaviors, such as playing football, tracking, obstacle avoidance, etc.

Taking the SunFounder-designed Robot HAT as the driving module, it integrates the motor driving, servo driving and presets ADC, PWM, Digital pins for your function extension. A speaker has already been inserted in the Robot HAT to realize TTS (Text-to-Speech), sound effect, background music, etc.

This manual introduces lists, assembly, program, etc. The program part is divided into two chapters: To Play in Ezblock and To Play in Python and each of them can get you started on making PiSloth work in a way you want.

★ **To Play in Ezblock**

If you are a programming newbie, please check this chapter for it introduces a block-based visual programming software — Ezblock Studio to guide you to grasp the programming. There are 9 examples to help you completely grasp the blockly program skill and the use of several functions of PiSloth.

★ **To Play in Python**

If you prefer the traditional program environment — Python, skip to read this chapter directly for it introduces the RPi environment configuration and the methods of running the provided Python example codes and checking running effects.

Absorbed the application of these functions, you are expected to create your own marvellous and inspiring projects. We will be glad if you are willing to share your experience and harvest on our forum.

Thanks once again for your unremitting support for SunFounder company.

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To Play in Python

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Component List



M1.4 Nut
(6)



M1.4 x 6
Screw
(6)



M1.5 x 4
Self-Tapping Screw
(14)



M2 x 10
Screw
(10)



M2.5 x 6
Screw
(6)



M3 x 4
Countersunk
Screw
(4)



M3 x 6
Screw
(10)



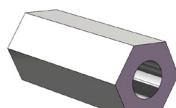
Screwdriver
(1)



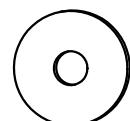
M2.5 x 8 + 6
Nylon Standoff
(6)



M2.5 x 11 + 6
Nylon Standoff
(6)



M3 x 20
Nylon Standoff
(6)



Washer
(4)



Ultrasonic Module
Cable
(2)



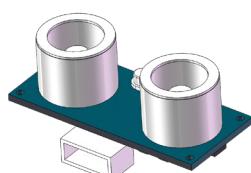
Spiral Cable Wrap
(2)



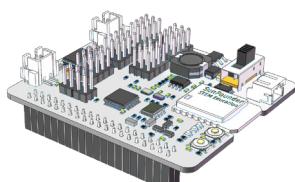
Battery Ribbon
(1)



Foot Pad
(8)



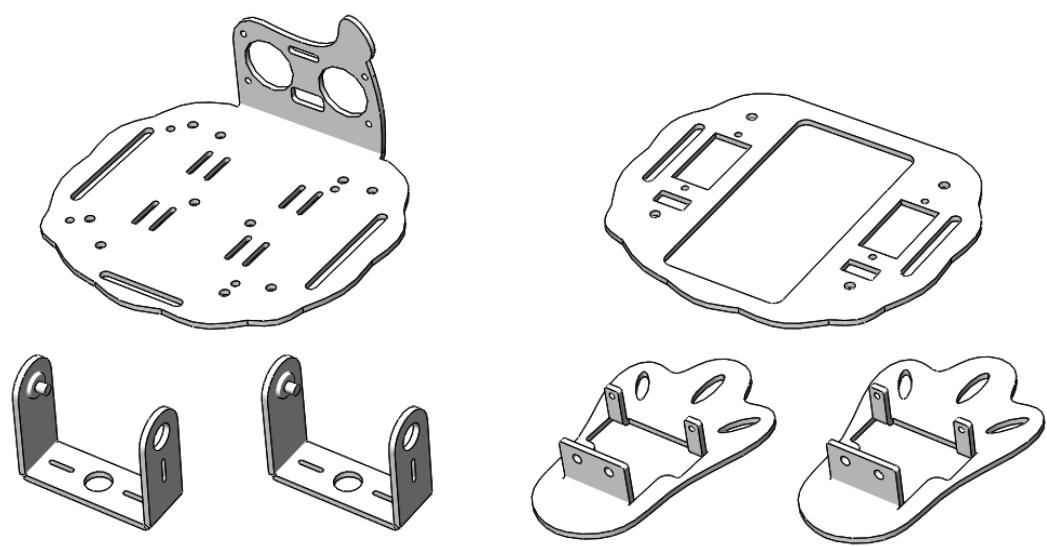
Ultrasonic Module
(1)



Robot HAT
(1)



Battery Holder
(1)



Self-Provided Component

1. You are recommended to use 18650 batteries without a protective board. Otherwise, the product may be powered off and be stopped running because of the overcurrent protection of the board.
2. Please use a battery with the largest possible power to increase the duration of use.



18650 Rechargeable
Li-ion Battery
(2)

Burn System

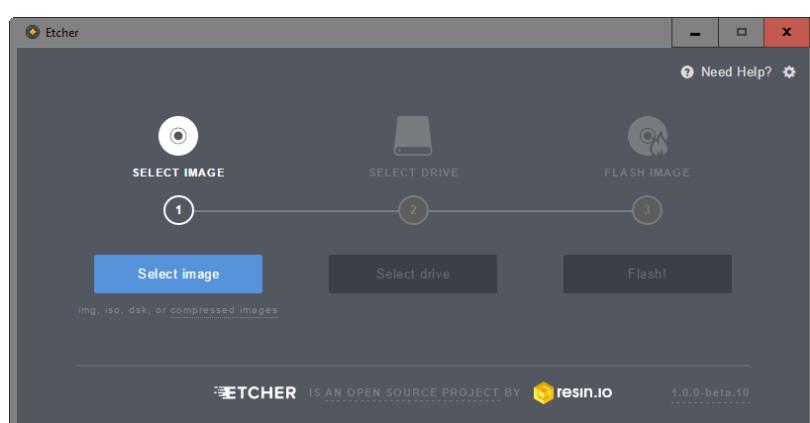
In addition to playing this product, you ought to flash the system into the Raspberry Pi.

Required Components

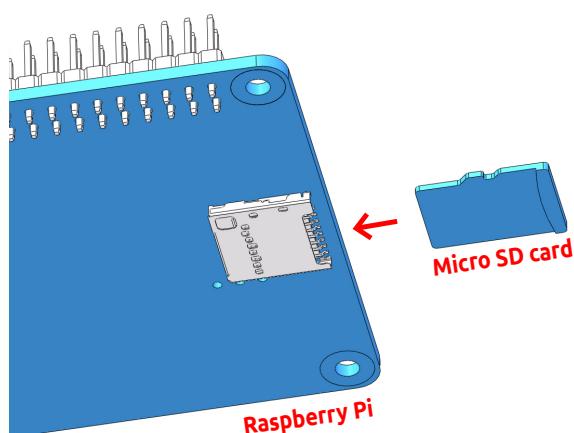
Raspberry Pi	1 * Power Adapter
1 * Mirco SD Card	1 * Personal Computer

Procedures

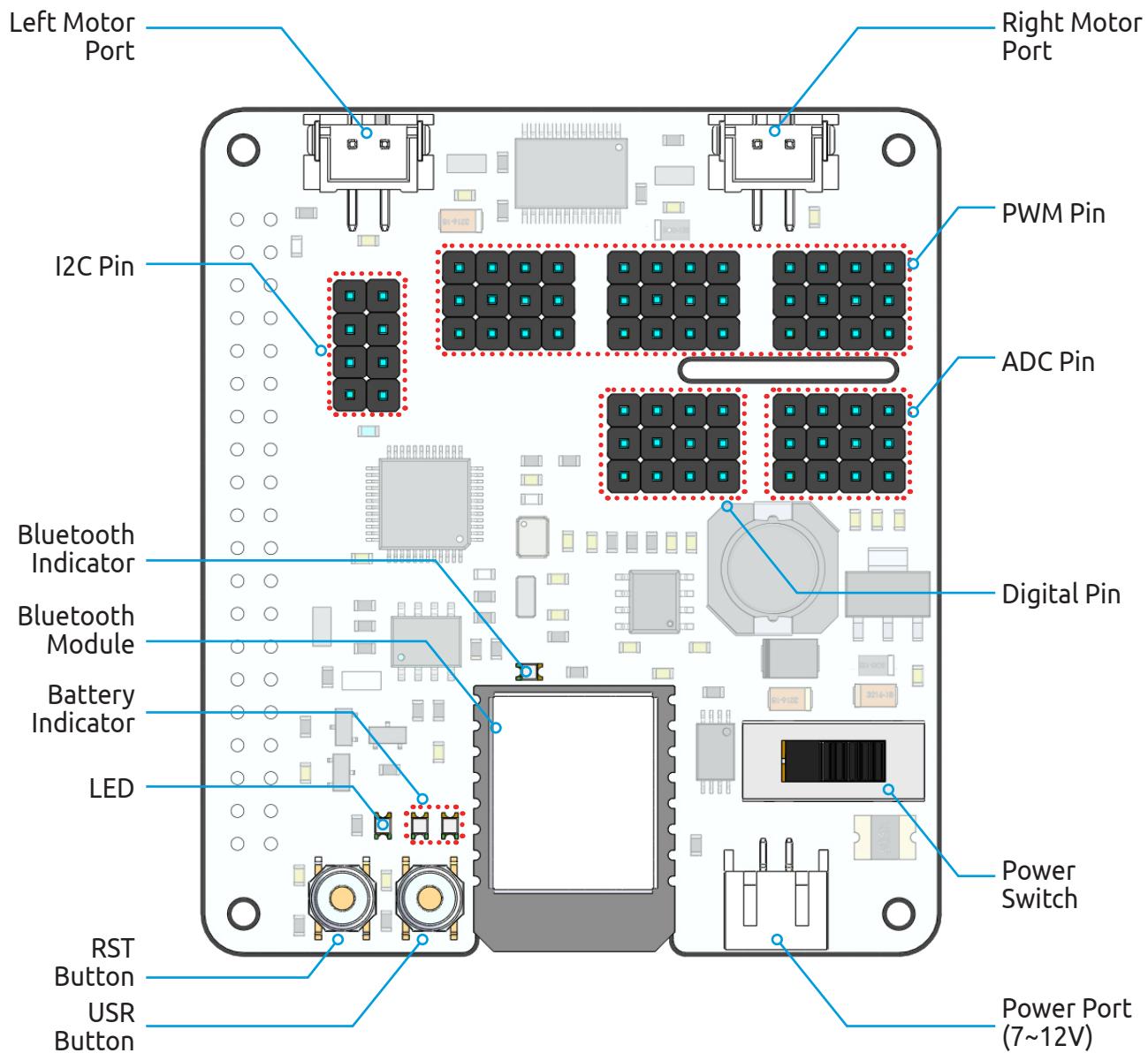
1. Prepare the tool of image burning. Here we use the **Etcher**. You can download the software here: <https://www.balena.io/etcher/>.
2. Download the **Ezblock for Raspberry Pi** image file here:
<http://ezblock.cc/download/index.html>
3. Unzip the package downloaded and you will see the **.img** file inside.
4. With Etcher, flash the image file into the SD card.



5. At this point, Ezblock for Raspberry Pi is installed. Please insert the Micro SD card into your Raspberry Pi.



About Robot HAT



RST Button:

- Short pressing RST Button causes program resetting.
- Long press RST Button till the LED lights up then release, and you will disconnect the Bluetooth.

USR Button:

- The function of USR Button can be set by your programming. (Pressing down leads to a input "0"; releasing produces a input "1")

LED:

- Set by your program. (Outputting 1 turns the LED on. Outputting 0 turns it off.)

Battery Indicator:

- The voltage ranging above 7.8V, two LEDs light up; ranging 6.7V~7.8V, one LED turns on; ranging below 6.7V, all LEDs turn off.

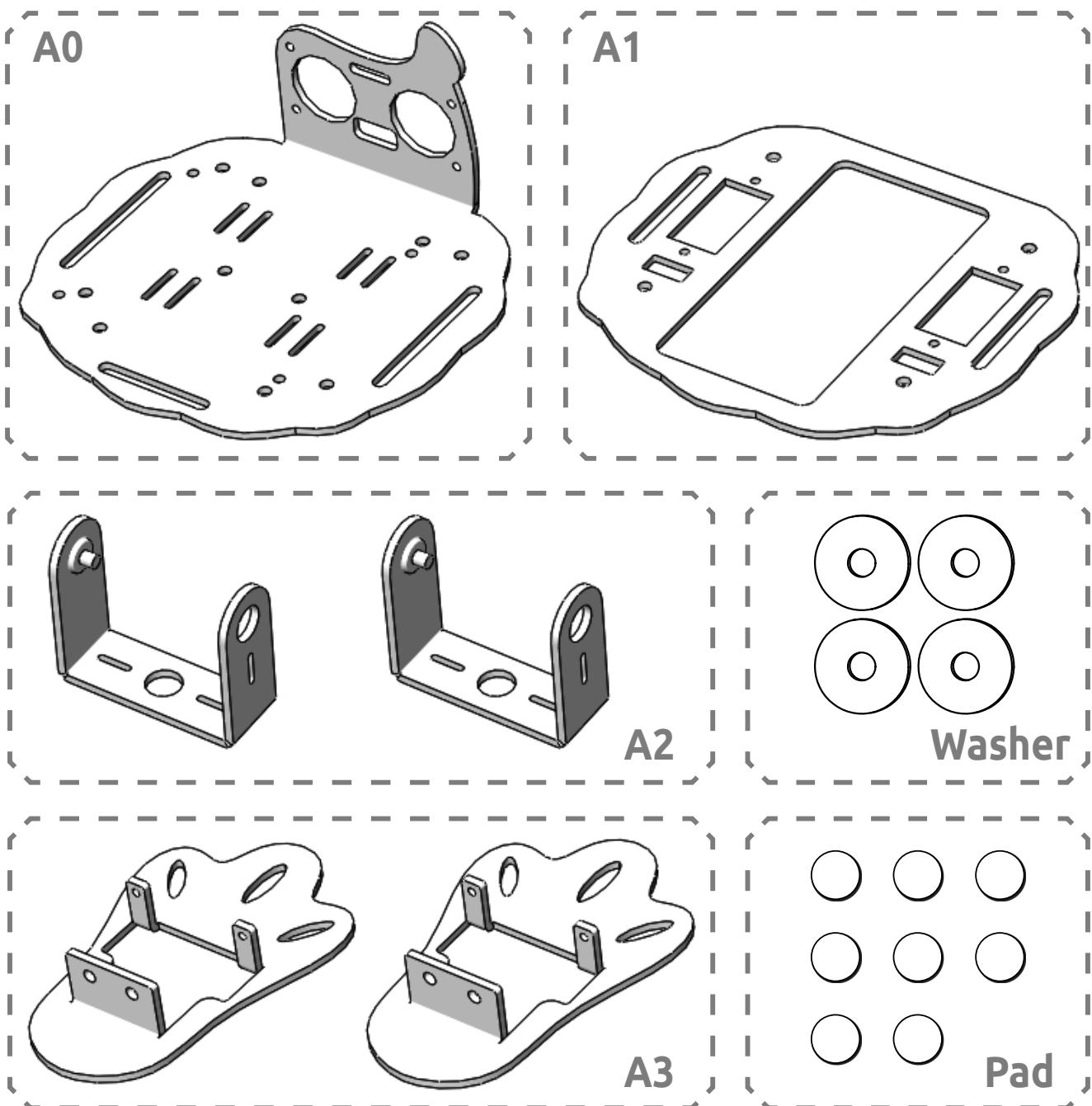
Bluetooth Indicator:

- The Bluetooth indicator keeps turning on at a well Bluetooth connection, blinks at a Bluetooth disconnection, blinks fast at a signal transmission.

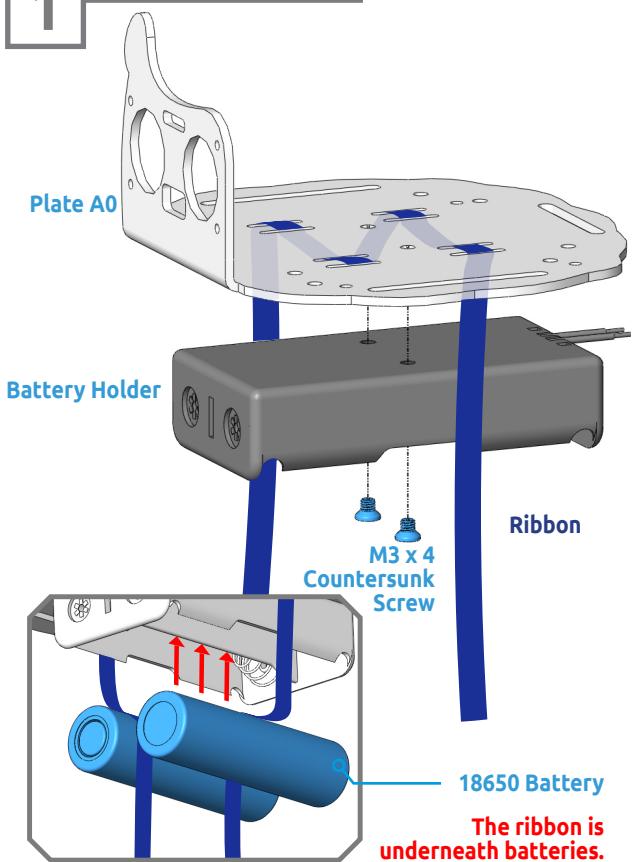
Building the PiSloth

Now get familiar with these components in this package. In the following steps, there are so many details that you need to notice especially in the operation of calibrating the servo angle. In addition, you ought to check whether your wiring conforms to the instruction of this manual.

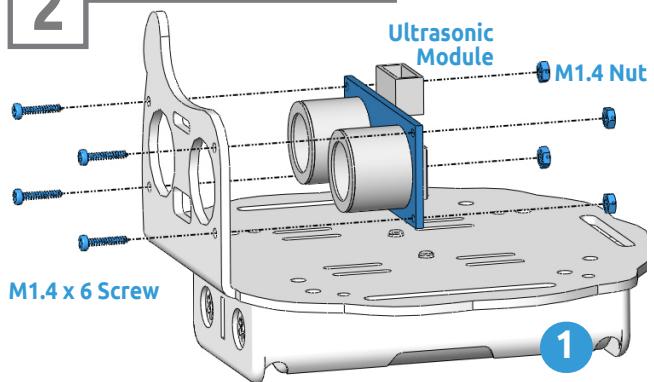
Structural Plate



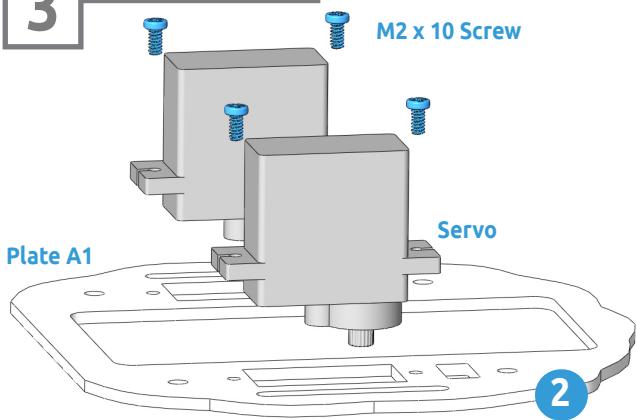
1 Assemble Battery Holder



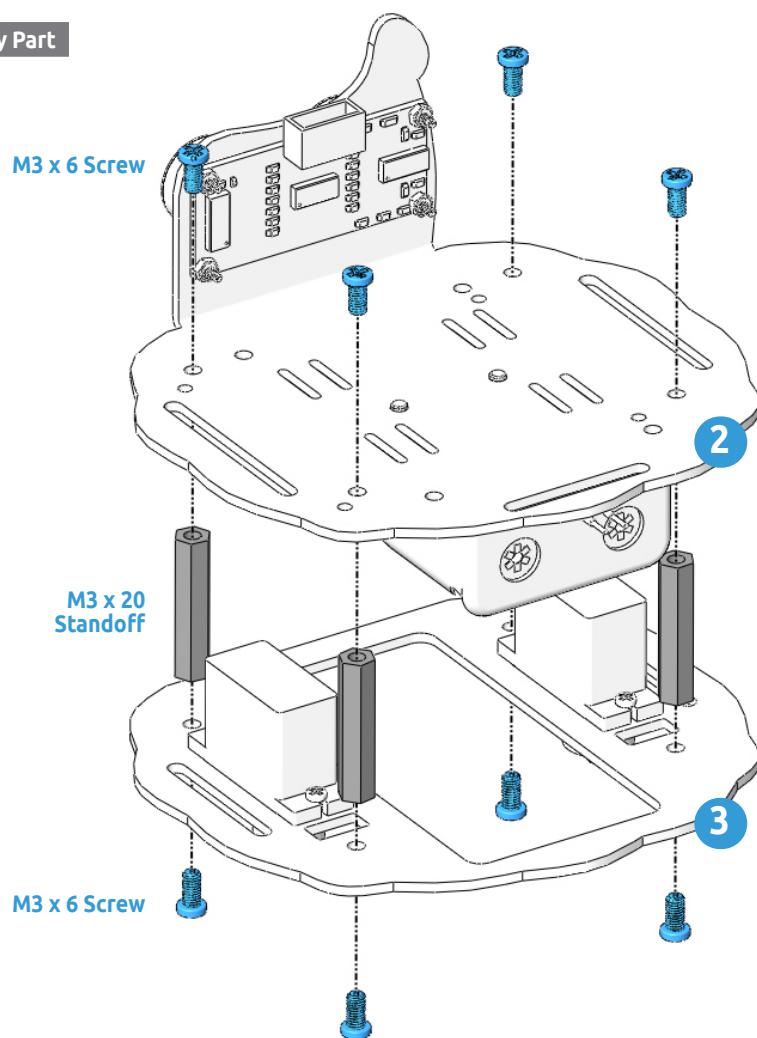
2 Assemble Ultrasonic Module



3 Assemble Body Servo

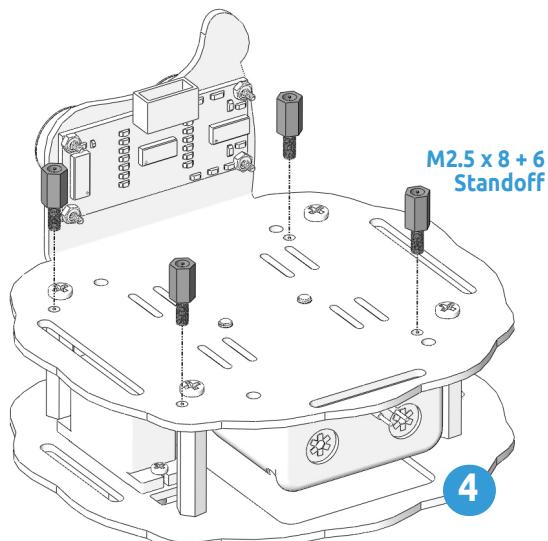


4 Complete the Body Part

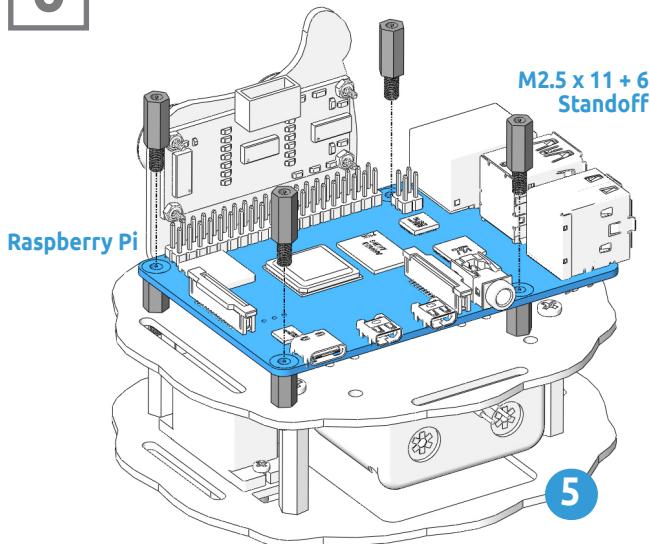


5

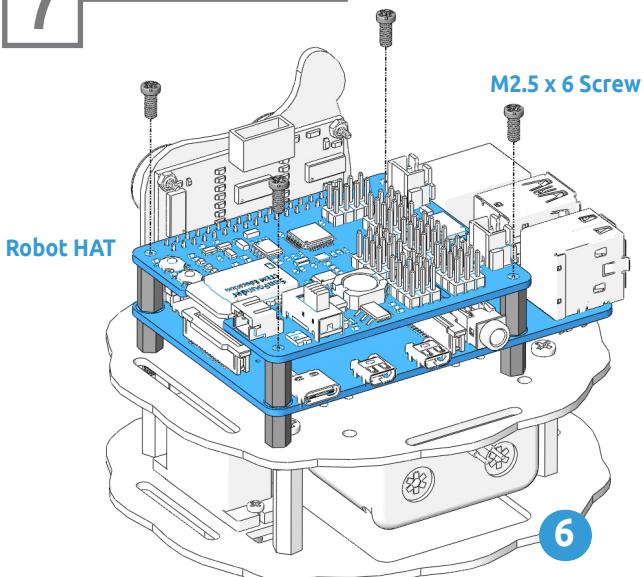
Assemble Control Board

**6**

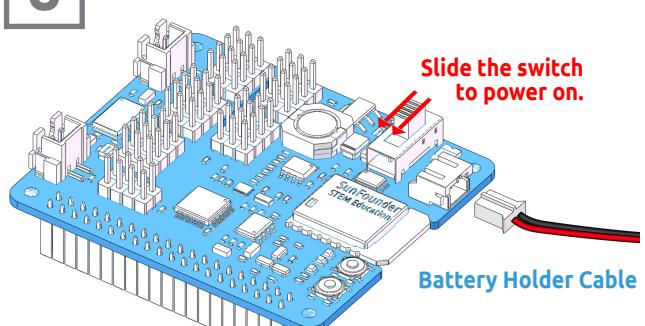
Assemble Control Board

**7**

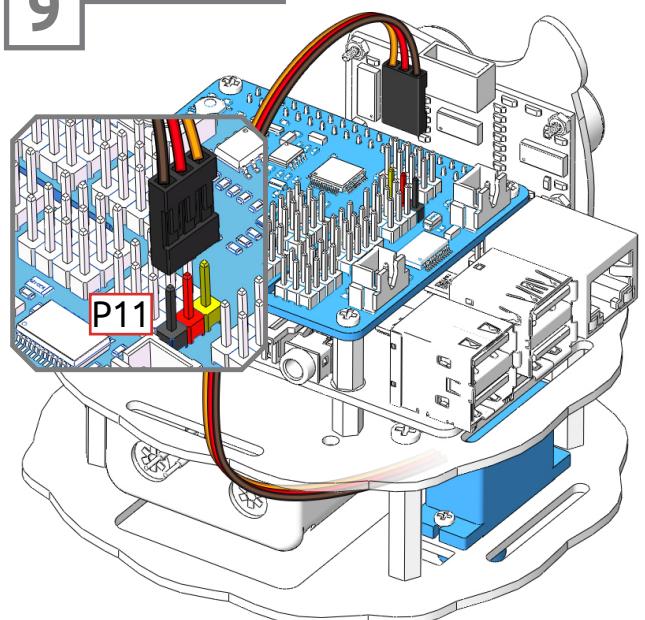
Assemble Control Board

**8**

Power on

**9**

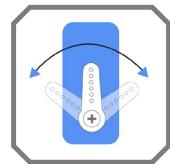
Servo Adjustment



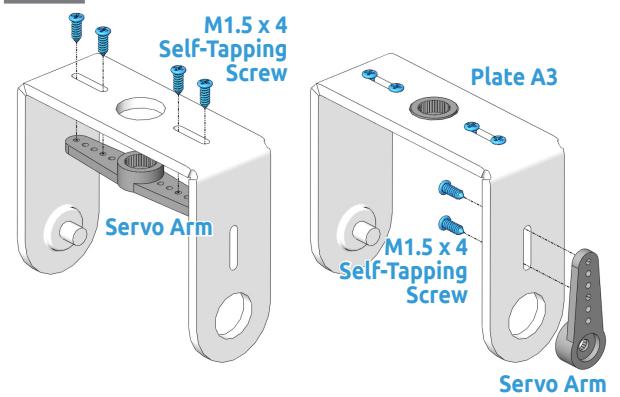
After burning the Ezblock system, P11 was set to calibrate the servo angle to 0 °. Therefore, before assembling **each servo**, you need to plug the servo pin into P11 and keep the power on.

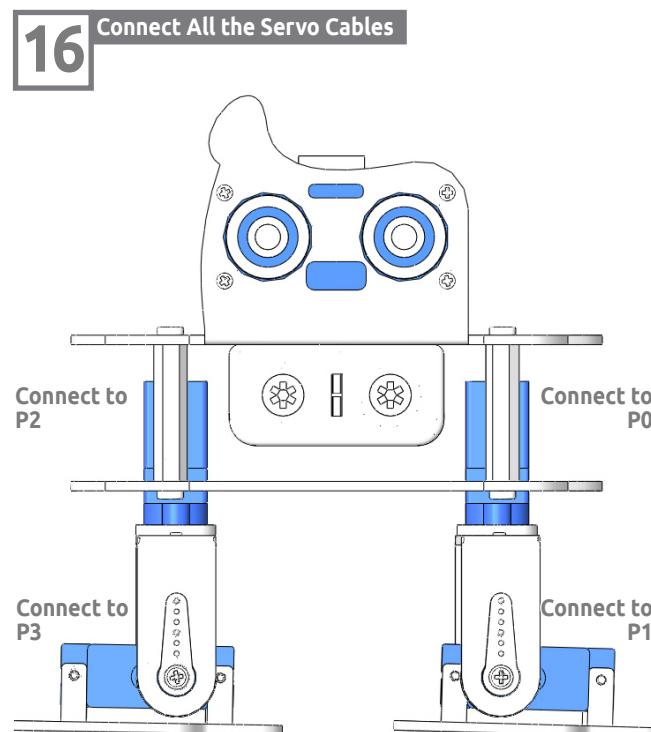
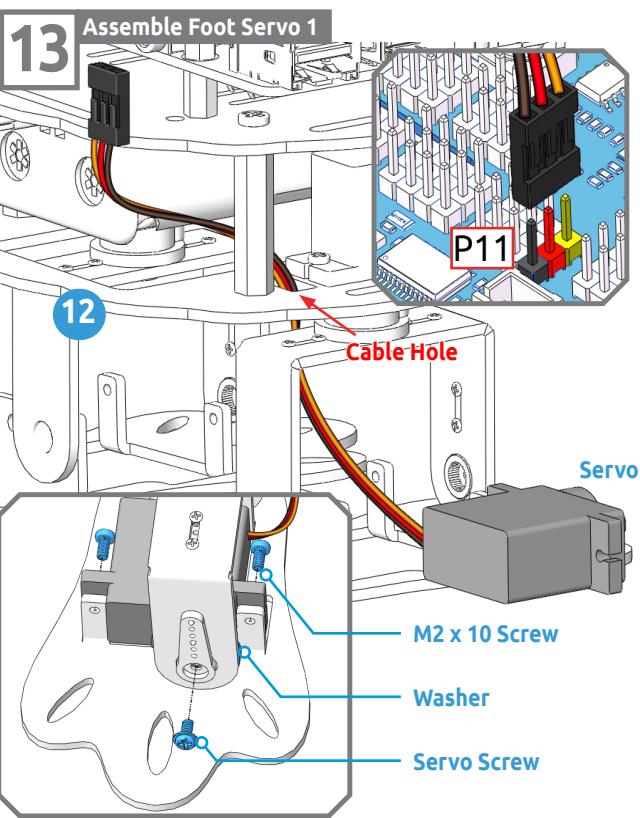
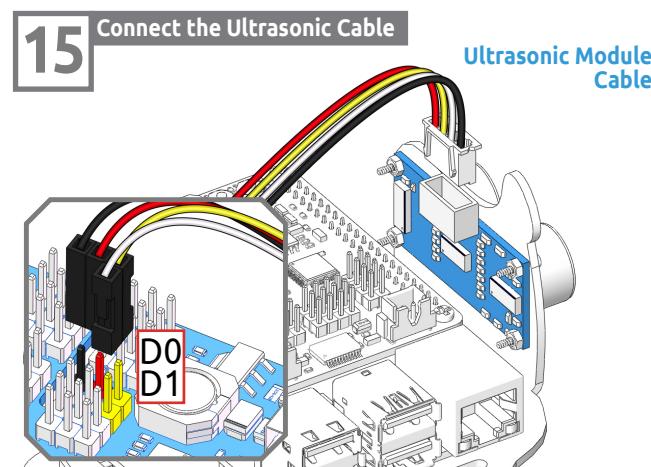
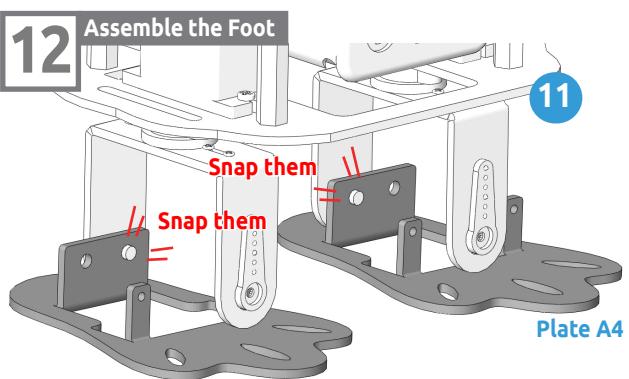
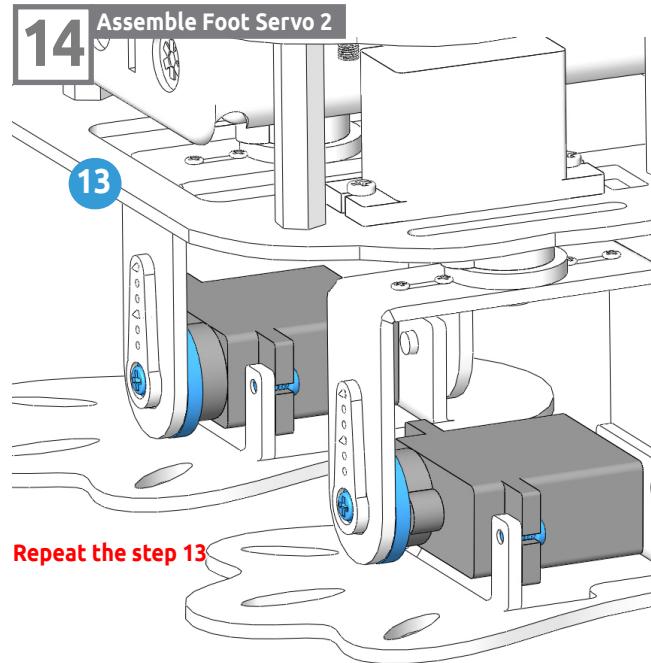
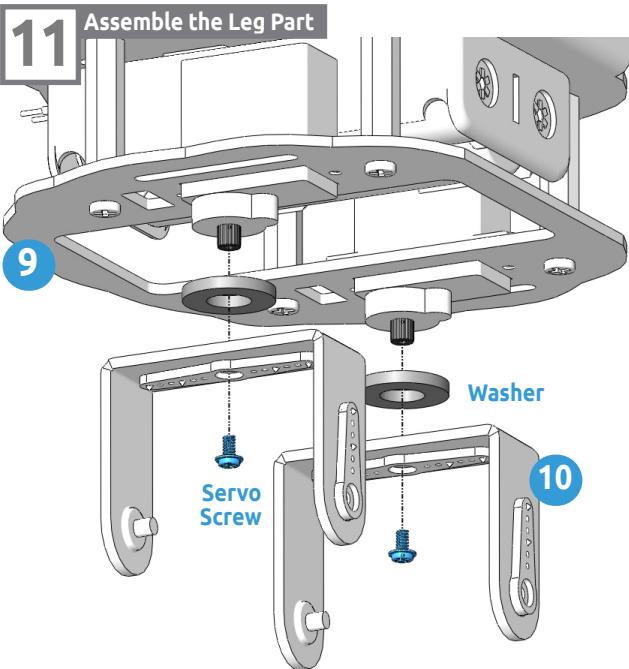
You can put a servo arm into the output shaft and twist gently. If Servo arm returns later, the function will take effect. If not, press **Reset Button** to restart it.

NOTE: This function will be invalid after writing any programs.

**10**

Complete the Leg Part





To Play in **Ezblock**

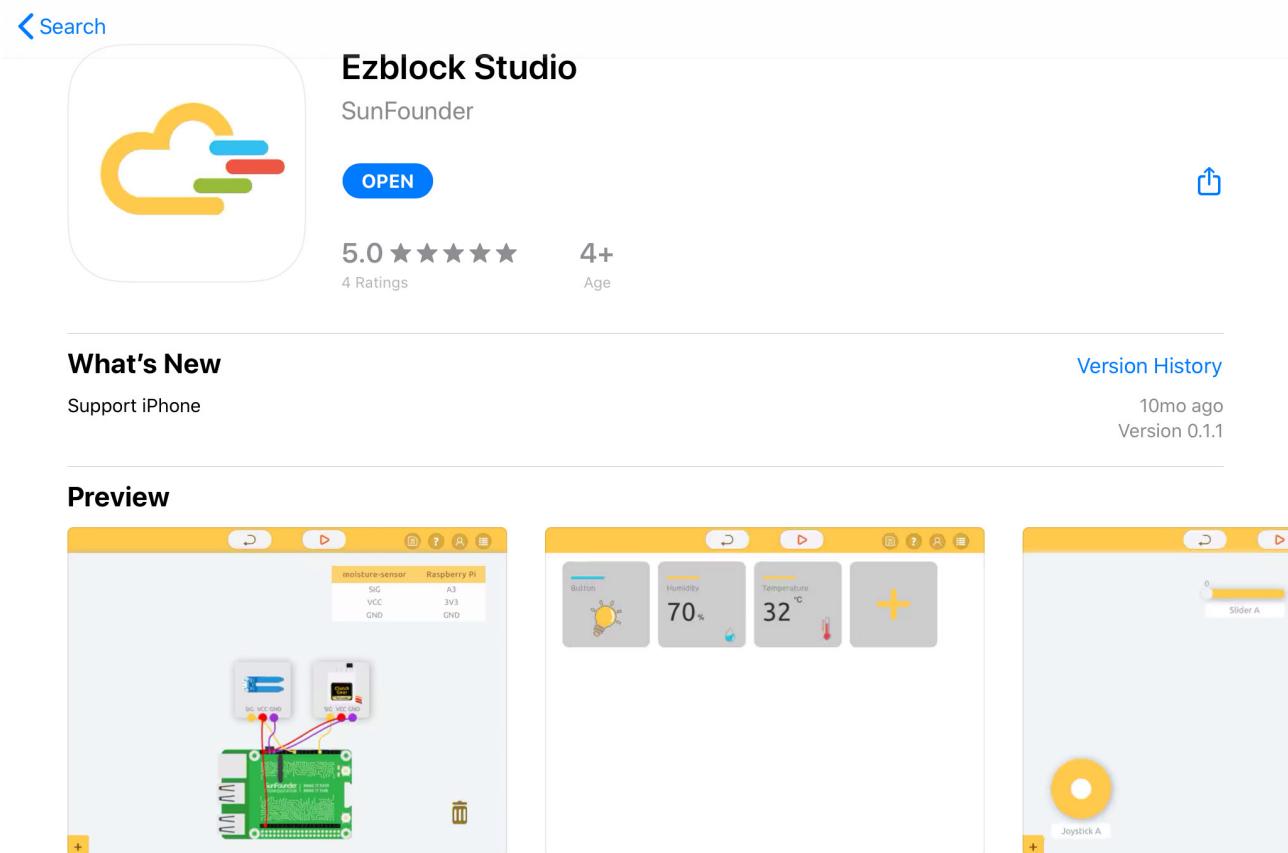


Introduce Ezblock Studio

Ezblock Studio is a new open-source platform for building electronic projects and graphical programming.

Ezblock Studio also serves as a coding platform that runs on your phone, tablet and computer. In addition, the Ezblock Studio applies Blocks and Python, making it easier to learn programming. By and large, Ezblock Studio integrates Hardware Simulator, Bluetooth Debugger, IoT Panel and Customizable Remote Controller, which are conducive to the operation of prototyping, debugging, and so on.

Open App Store (iOS/Mac OS X system) or Play Store (Android/Windows/Linux system), then search and download Ezblock Studio.

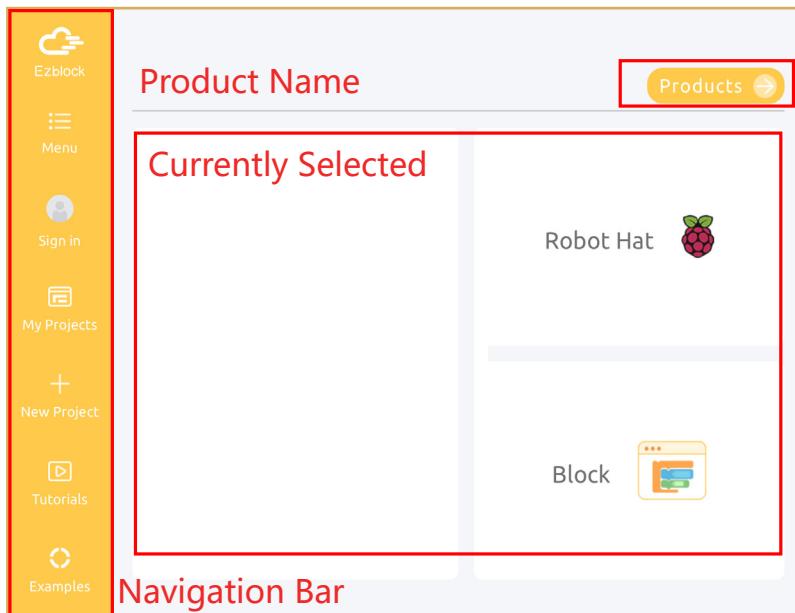


Quick Guide on Ezblock

This chapter is used to help learning basic operation of Ezblock, from choosing products to flashing the project to your control board.

Home Page

When entering the Ezblock Studio, we can see the main page as shown below. The Main page consists of three parts:



1. Currently Selected
2. Products.
3. Navigation Bar

Currently Selected shows our currently selected products, control board and programming environment.

Click **Products** button, we can turn to the products selecting page.

Navigation bar is composed of some sub menus designed for leading in different pages of the App.

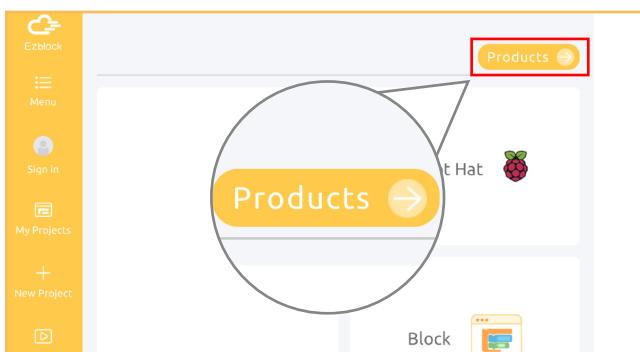
- **Menu:** Some information of the App, such as language setting and FAQ.
- **Sign in:** Sign in your account.
- **My Project:** Turn to My Project page.
- **New Project:** Create a new project.
- **Tutorials:** Teach projects step by step.
- **Examples:** Project examples.

NOTE: Please refer to "Appendix: Page Introduction" for more details about other pages.



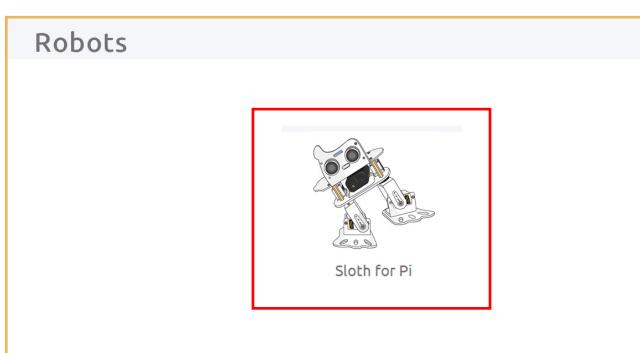
Sign in or Sign up

We suggest you create a new account at the first time you use it so as to save your projects in the cloud.



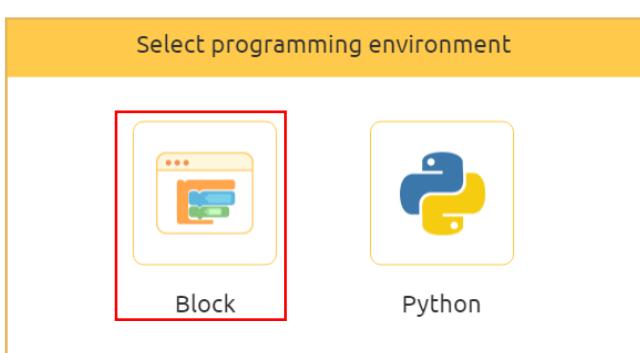
Go to Product Page

Go to the home page of Ezblock Studio and click the word, Product in the top right corner to enter the product selection page.



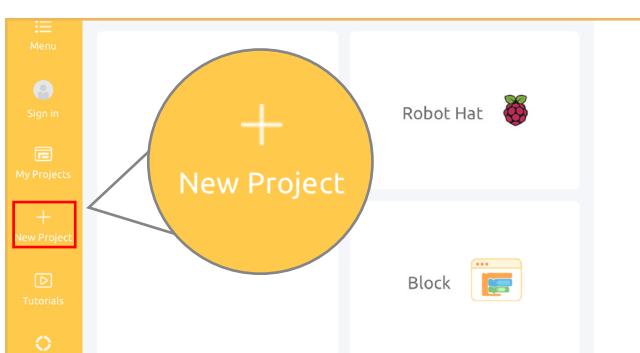
Choose Product

Choose the product, PiSloth under the Robots category.



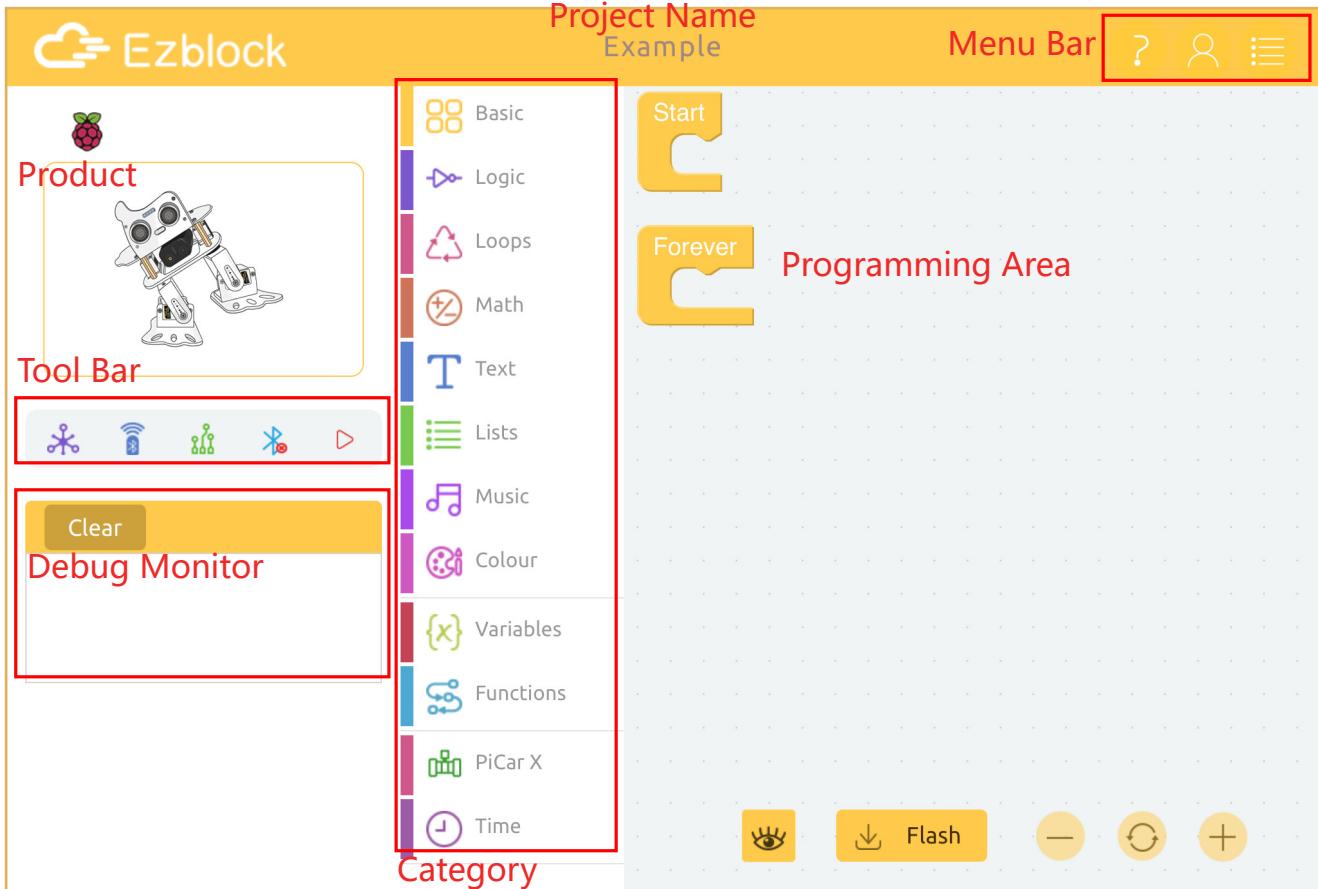
Select Environment

Select the programming environment, Block.



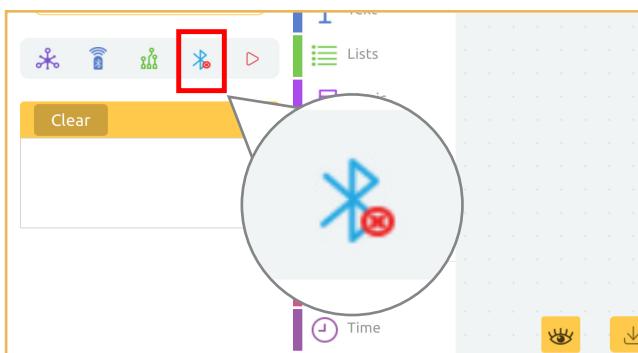
Create a New Project

Click the button, New Project on the left side of main page to create a new project.



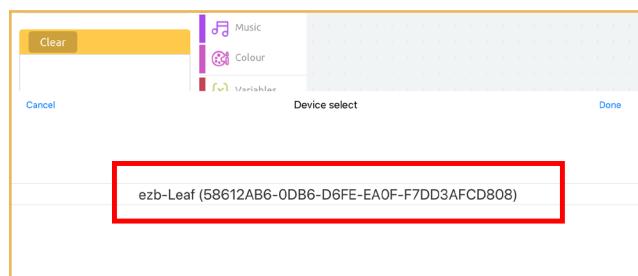
Programming Page

We can program by dragging the blocks from Category to Programming Area. Click the icons on Tool Bar and Menu Bar to perform some functions. Please refer to the appendix for more details.



Connect Bluetooth

Click the Bluetooth connection button, then in device selection prompt, choose your device and click Done, and wait "Connected" to appear.

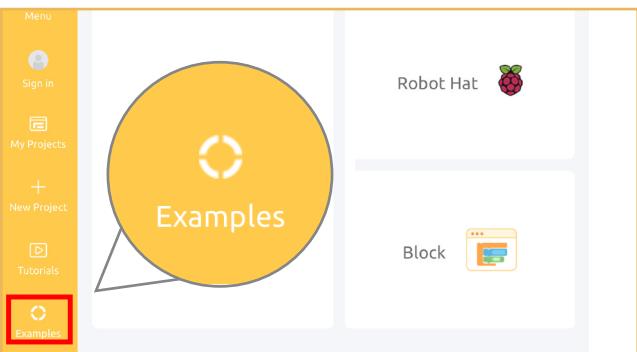


In case of cross connection between several RPi boards, Robot HAT decrease its Bluetooth signal strength while being connected. You need to put it as close as possible to your device. As long as they are connected, the signal strength will return to normal.



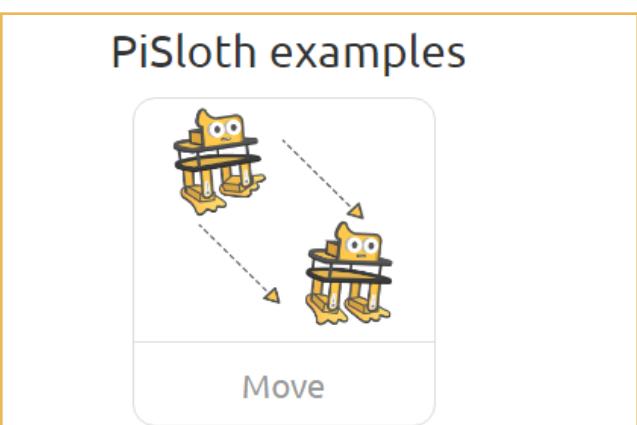
Flash Your Code

After the connection is done, click the Flash button to compile and download the code to the Raspberry Pi.



Enter Example Page

In addition to creating new projects, you can also directly open ready-made programs in Examples.



Open an Example Project

Here we open Example-Move. This is the first code that we will use later.

Example

Here we show you the basic operation of playing PiSloth with Ezbblock. If you are new to these, you can try to write the corresponding function according to TIPS, or directly use the reference code in Example. We suggest you do it yourself and experience the fun of challenge.

🚩 Move

The example of Move has three basic actions, including forward, turn right, turn left that can make the PiSloth move back and forth.

By the way, you can also provide compensation for the angle of a servo by using set offset.

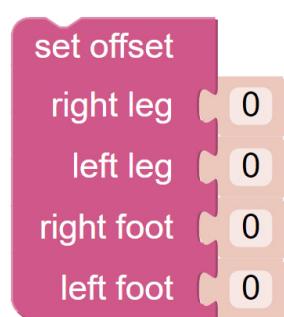
TIPS



The Start block is called when a program starts. Use it to initialize variables, module setting, etc. It will only run once, after each flash or reset of the program.



After creating a Start block, the Forever block does precisely what its name suggests, and loops consecutively, allowing your program to change and respond.



This block writes the compensation values of each pin of PiSloth into the config file to automatically correct the coordinate deviation at each startup. It should be placed in the Start block.

Generally, the correction range is within "-5 ~ 5". If the deviation value is large, re-assembly is recommended.



This block makes PiSloth act in a certain step and speed. The speed ranges 0~100.

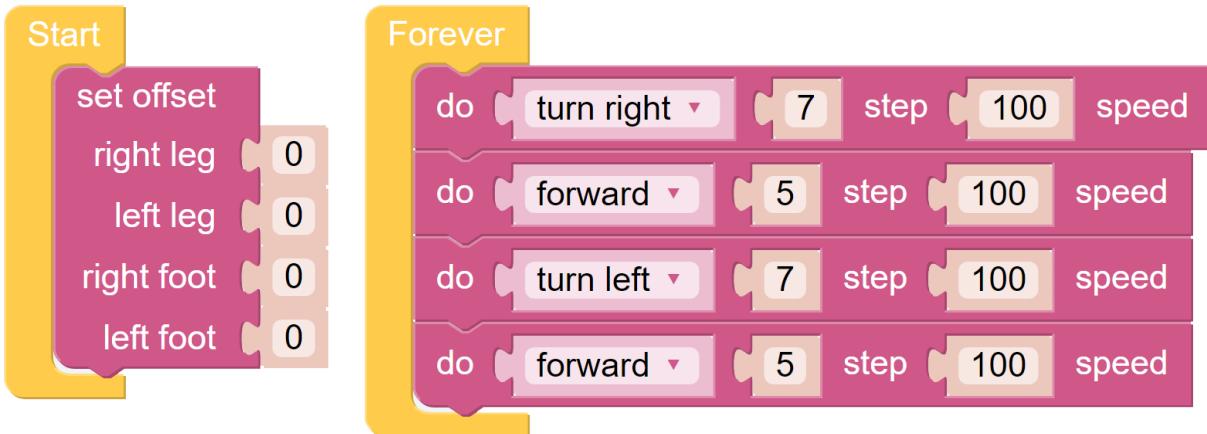
Tap ▾ next to **forward**. In addition to "forward", "backward", "turn left" and "turn right", the actions "stop" and "swing" are also included.



You can disable some blocks to debug the program. As in this example, you can disable all the blocks in forever to make the set offset block work independently in start.

- Duplicate
- Add Comment
- External Inputs
- Collapse Block
- Disable Block**
- Delete 4 Blocks

EXAMPLE



🚩 Dance

The example of Dance has several funny basic actions which, if executed one by one, will drive PiSloth to gaily dance.

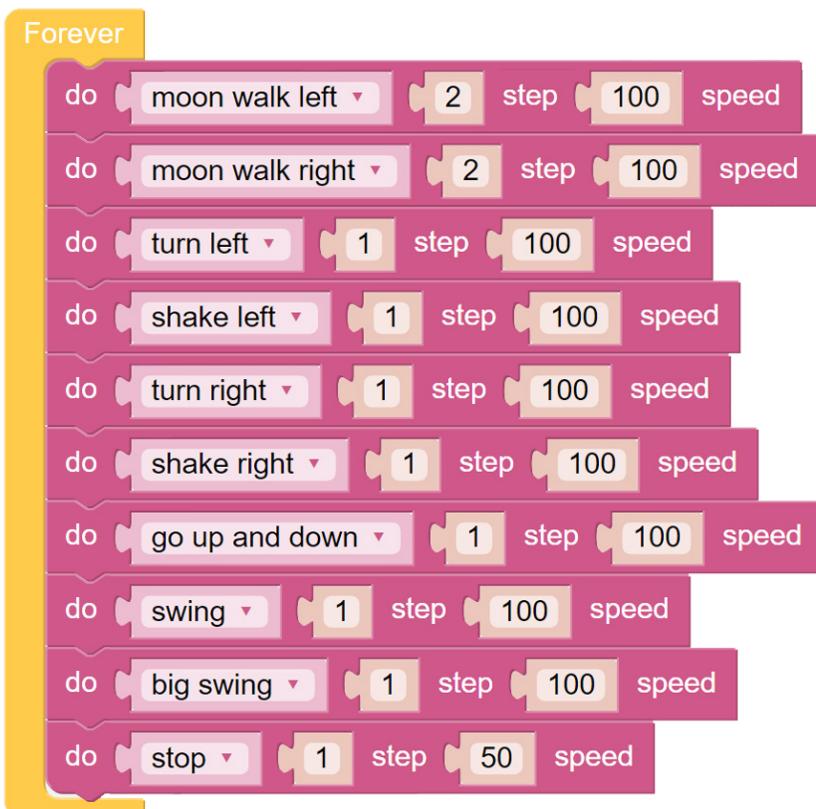
TIPS



For better use, you can long press the block to pop-up the menu and select Duplicate, you can copy the block.

- Duplicate
- Add Comment
- External Inputs
- Collapse Block
- Disable Block
- Delete 4 Blocks

EXAMPLE



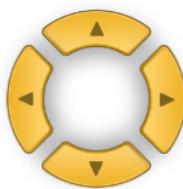
FLAG Remote Control

About the example of Remote Control, you can control the direction of its moving on the page of Remote Control. For your more wonderful operations, like driving PiSloth to play soccer, you can add controlling blocks and codes accordingly.

TIPS



To use the remote control function, you need to enter the Bluetooth control page .



Drag a D-pad to the central area, then a Remote category appears. There are 4 buttons that control the going forward, back, left and right.

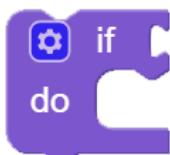
Once you press a button, you get a value 1. Release the button, and you'll get a value 0.

read from remote

To enable the remote control, please add this block from the Remote category to the Forever block.

D-pad A ▼ get UP ▼ value

This block reads the D-Pad value in the Bluetooth control page. You can tap ▼ next to UP to switch options.



To achieve conditional judgment of "if" type, you need to use an if do block.



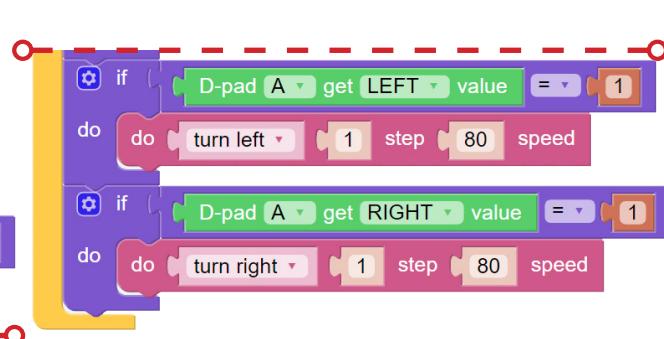
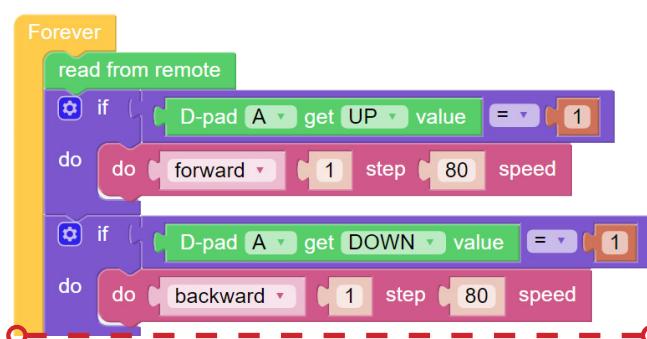
You need to use a conditional statements block in conjunction with if do. Judging conditions can be "=, >, <, ≥, ≤, ≠".



A number block can be used in comparison in the conditional judgment block.

EXAMPLE

NOTE: After you upload, click the icon again, then click the icon in the upper right corner to start the remote control.



🚩 Obstacle Avoidance

In the example of Obstacle Avoidance, the ultrasonic module is used to detect the distance to obstacles ahead. With code run, PiSloth goes forward, and if there is an obstacle in front of it, it will firstly take a step back and then adjust to an appropriate direction.

TIPS

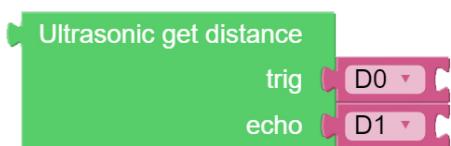


To use the ultrasonic or grayscale module, you need to enter the simulation page from the left side of main page.



Drag the ultrasonic module to the blank area. There will appear 4 colored dots under the module.

Connect the colored dots on this interface according to the physical wiring. Here we connect Trig to D0 and Echo to D1.



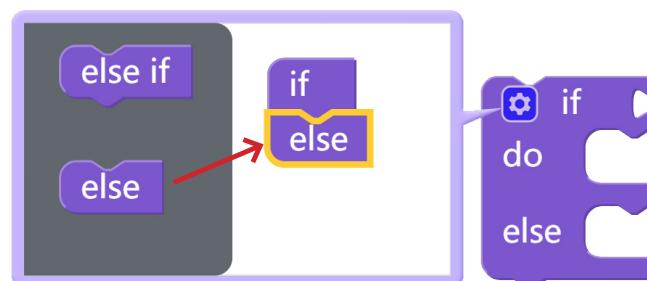
The Modules category will appear and the Ultrasonic block in it after your connection on the simulation page. You can directly use this block to read the distance to the obstacle right ahead.



You may want to simplify your program with Variable. For example, when you have multiple functions that need to read the obstacle distance, you don't need to read the value for each function, just load the value into a variable and use it multiple times.

Create variable...

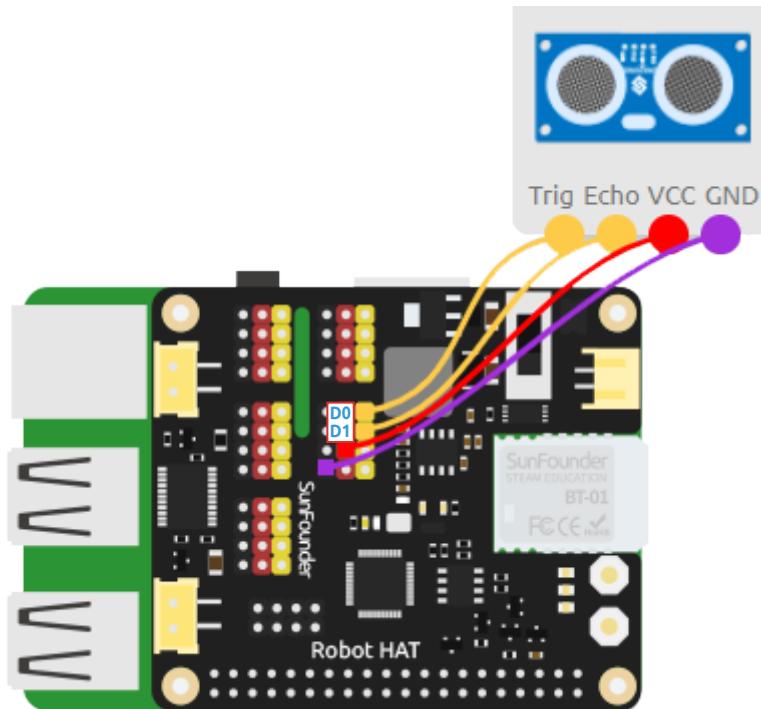
Click the **Create variable** button on the Variables category to create a variable named **distance**.



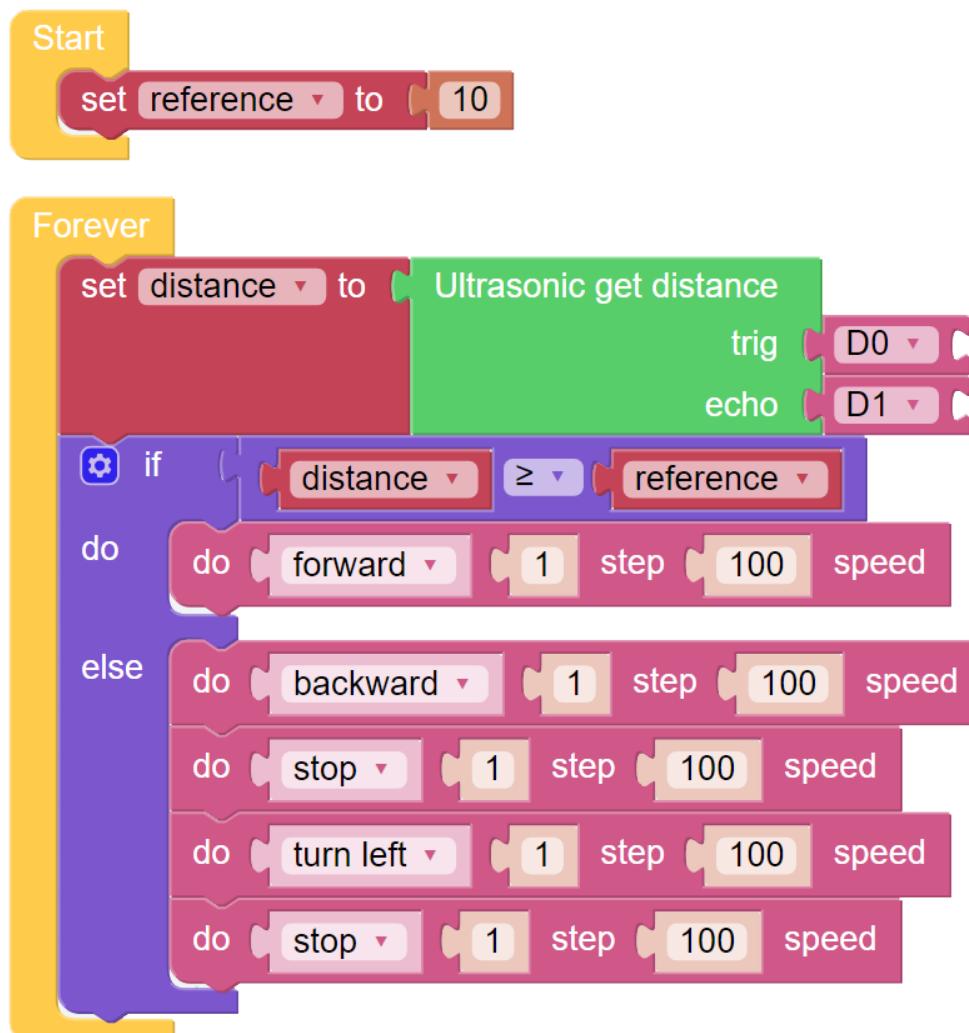
When you need to implement multiple conditional judgments, you will have to change if do into if else do or else if do.

This can be achieved by clicking on the icon.

WIRING



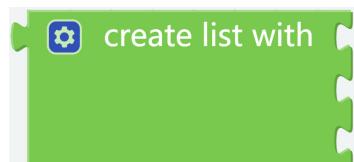
EXAMPLE



🚩 Wander

The Wander example uses the two kinds of functions: list and random and it can get your PiSloth wandering. By revising the structure and numerical value of them, you can make your PiSloth wander much more freely.

TIPS



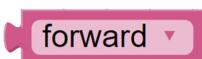
You can use List block to simplify your program. Here we create a list with three different PiSloth actions for a variable.



Get the elements in the list. Such as **in list "A"** **get #2** will get the value of the 2nd element.

Tap ▼ next to get to change it to remove.

Tap ▼ after "#" to select the first, last or random element.



The block is the basic action of PiSloth, we use it for create list.



Randomly generate an integer from 1 to 100.



Arithmetic operations on two numbers.

Tap ▼ next to "+" to change it to "-", "x", "÷", "^".



Pauses the program for the amount of time (in milliseconds) specified as parameter. (There are 1000 ms in a second.)

EXAMPLE

A Scratch script consisting of two main sections: 'Start' and 'Forever'.

Start:

- Set 'turn' to [right v.]
- Create a list with [turn right v.], [turn left v.], and [stop v.]

Forever:

- Do:
 - In list [turn v.] get [random v.]
 - Random integer from [2] to [7] step [10]
- Do:
 - Forward [random integer from 4 to 7 step 100 speed 100] speed
 - Stop [step 100 speed 100]
- Delay [random integer from 4 to 15] × [100] speed

A circular callout highlights the 'speed' parameter in the 'stop' block of the 'do' loop, which is set to 100.

🚩 Sound Effect

PiSloth can make voice. You can enter text to make it speak, or make specific sound effects. Let us fire a gun as soon as a 3s countdown stops.

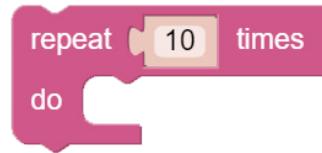
TIPS



Write the sentence in this block, and PiSloth will say it. It can be used with Text.



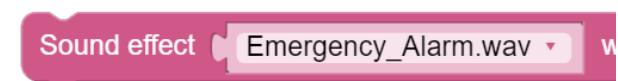
A number block.



You may want to use repeat which can help you repeatedly execute the same statement and reduce code size.

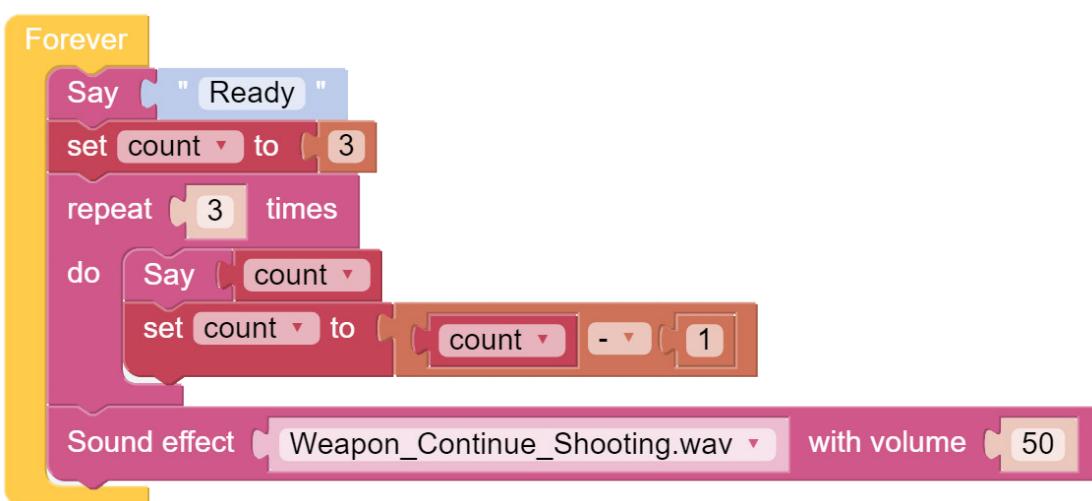


Mathematical operation block can perform "+ , - , x , ÷ ".



This block can emit some preset sound effects, such as siren sound, gun sound and so on. The range of volume is 1~100.

EXAMPLE



🚩 Background Music

In addition to having PiSloth play sound effects or speak on specific occasions, you can also add background music to it. Use a Slider here to control the adjust music volume.

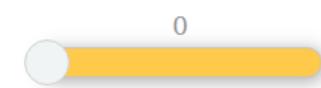
TIPS



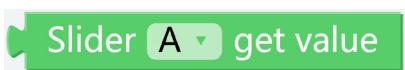
You can choose different background music in the block drop-down menu to let PiSloth play.



Adjust the volume in the range "0 ~ 100".

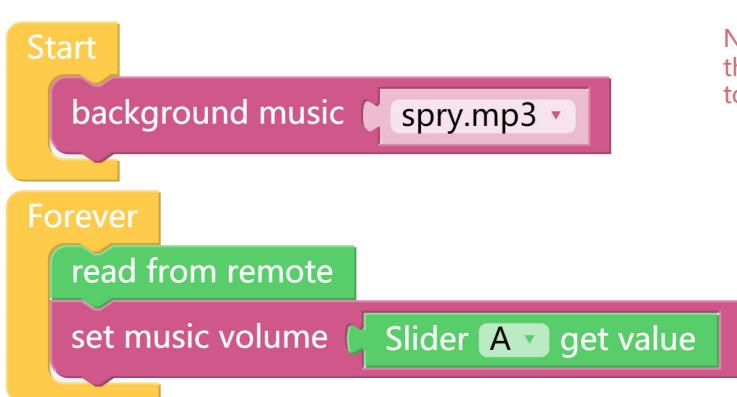


Here we drag a Slider from the page to adjust music volume.



This block reads the Slider value in the Bluetooth control page.

EXAMPLE



NOTE: After you upload, click the icon again, then click the icon in the upper right corner to start the remote control.

FLAG DIY Action

In the example of DIY Action, the angles of the four servos of PiSloth can be controlled by your operation on the Remote Control page.

If you get the proper angle, you can add it into the custom action list to realize more interesting effects.

TIPS

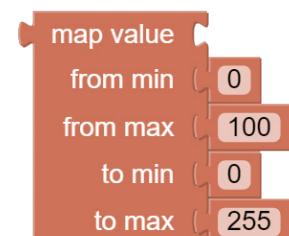


This step block produces a new STEP of PiSloth. The numbers on this block work as the corresponding turning angles ranging -90~90.



This block drives PiSloth's STEP.

Here we drag four Sliders from the page to adjust the angle of the servos.



The map block can remap a number from one range to another. If a number is 50, it is at 50% position of the range of 0~100; then if we map it to the range 0~255 via the map block, the number will be 127.5.



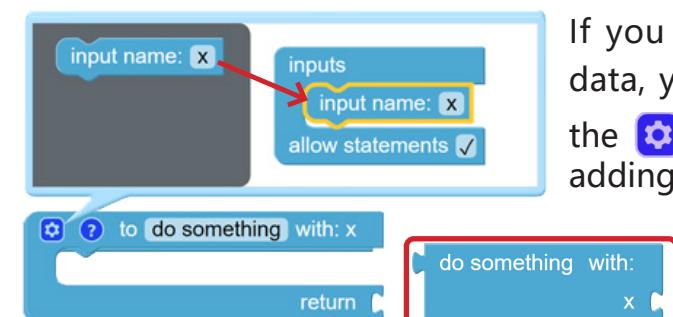
The round function rounds the number to an integer.



You may want to simplify the program with Functions, especially when you perform the same operation multiple times. Putting these operations into a newly declared function can greatly facilitate your use.



You can drag the corresponding calling block from the function category.



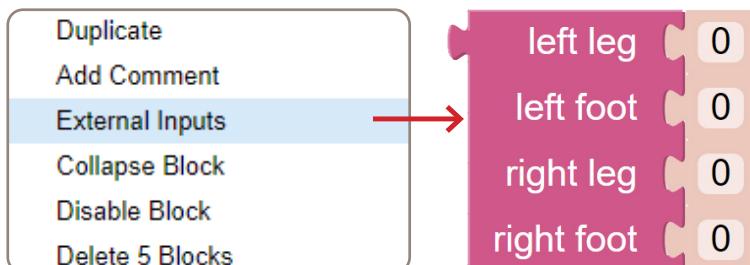
If you want this function to process different data, you need to add parameters. You can tap the icon to add parameters. Once you finish adding, the form of calling block will change.

```
print "abc"
```



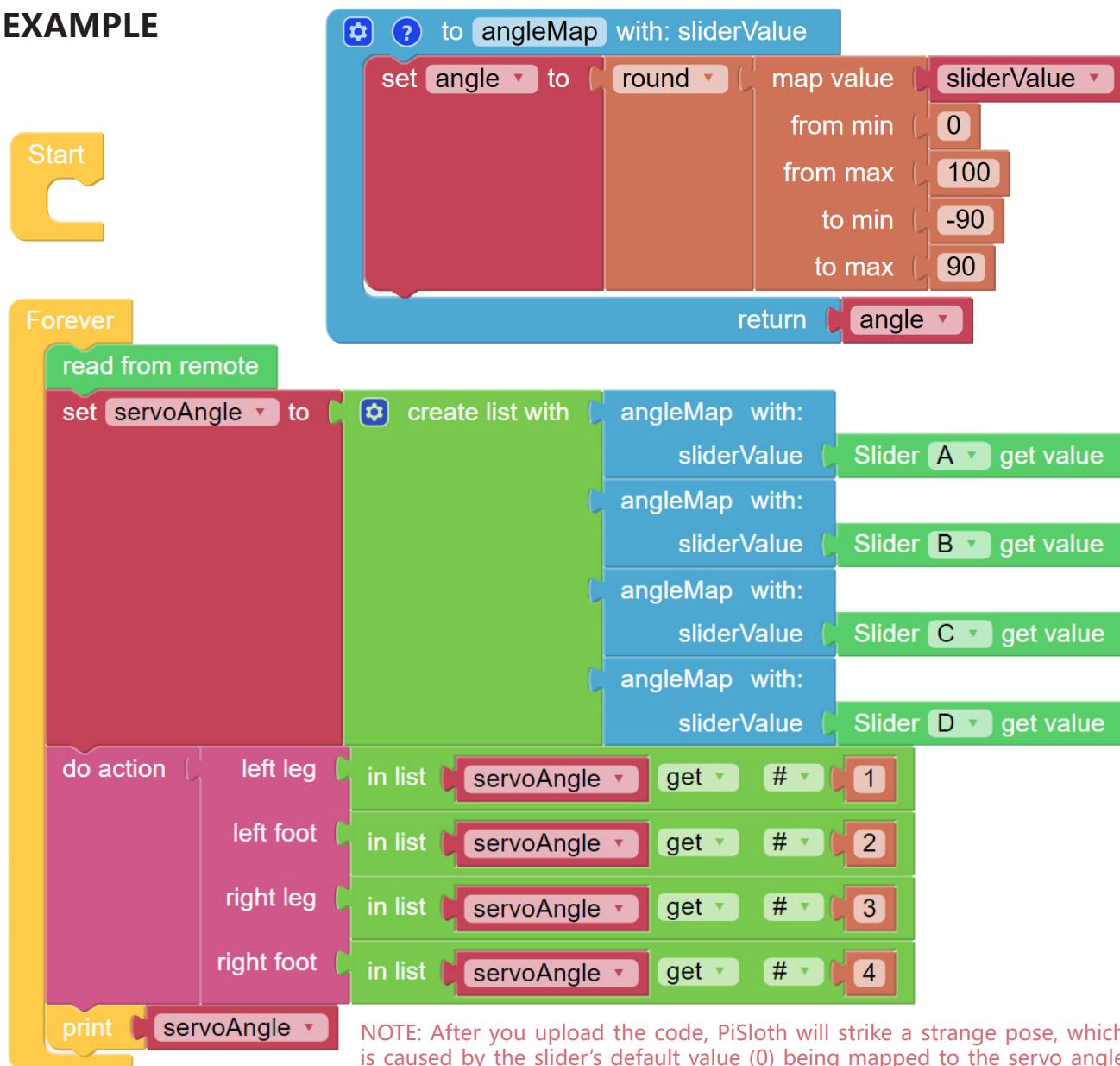
The Print function can print data such as variables and text for easy debugging.

The data printed by the Print function will appear in the Debug Monitor on the left. In other interfaces, you can also click on the Debug Monitor in the upper right corner.



For better use, you can long press the block to pop-up the menu and select external inputs, you can change its shape. The converted step block is as shown.

EXAMPLE

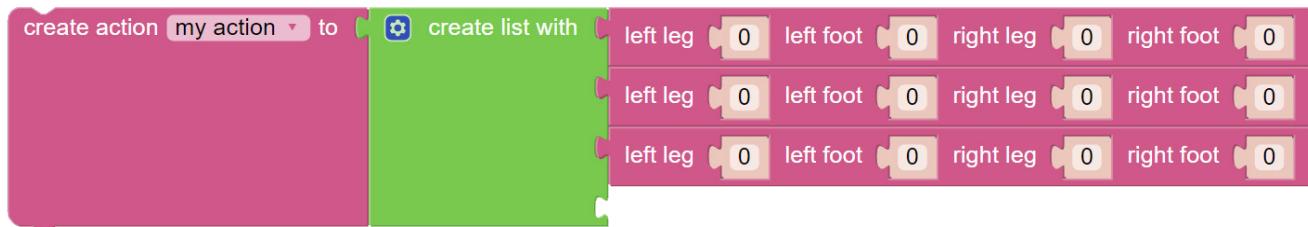


NOTE: After you upload the code, PiSloth will strike a strange pose, which is caused by the slider's default value (0) being mapped to the servo angle (-90°). After starting the remote control, slip all four sliders to the center and let PiSloth stand!

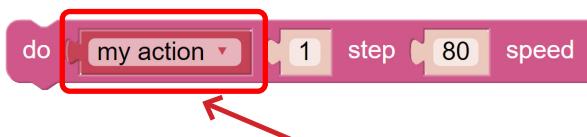
FLAG DIY Action 2

In the last experiment, we operated the Slider to control PiSloth to put out the STEP we wanted (and printed the angle of the servo). Now, what you need to do is to record these STEP and combine them into a complete Action to use.

TIPS

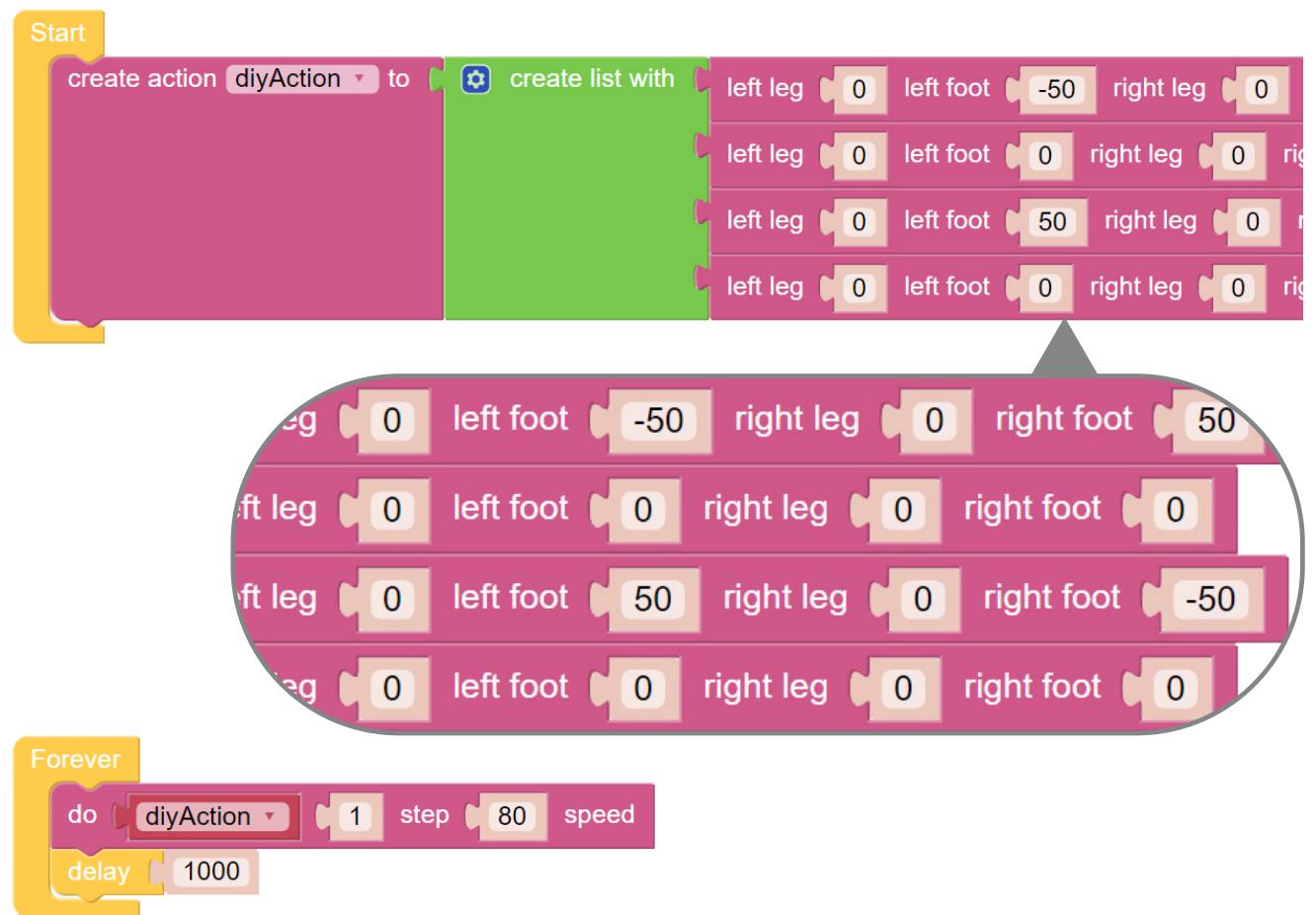


This block generates a new action of PiSloth. Here, these actions are produced by the STEP-formed list. (STEP: Refer to the last lesson.)



The generated customized action appears under the variable category. Place the action in do block to execute it.

EXAMPLE



Appendix: Page Introduction

Tool Bar

Some basic functions available for the product are displayed on Tool Bar.

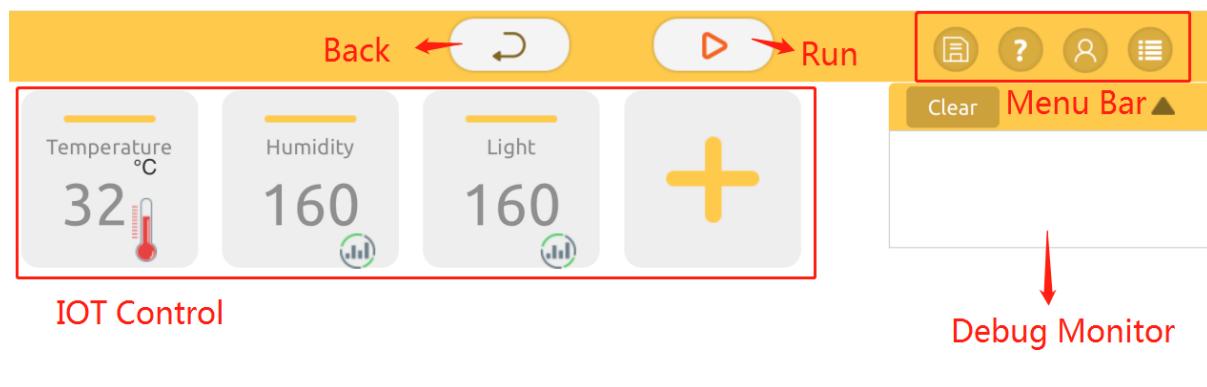
NOTE: Compared with other products, Raspberry Pi reflects its uniqueness by the application of IoT.



- 1. IoT Control:** Click this icon to go to the IoT Control page in which you can execute operation of sensor monitoring and apply IoT. Refer to the introduction of IoT Control page for more details.
- 2. Remote Control:** When this icon is pressed, you can enter the Remote Control page so as to add virtual controls to the project to control the device remotely. Refer to the introduction of IoT Control page for more details.
- 3. Simulation Page:** Click this icon, you can access the Simulation Page and program by adding some simulation blocks. From the kit of PiSloth, you may use the ultrasonic sensor module.
- 4. Bluetooth Connection:** This operation ought to be executed before flashing code.
- 5. Run:** This icon is to bring you to the page of simulation and then you can check the simulation effect.

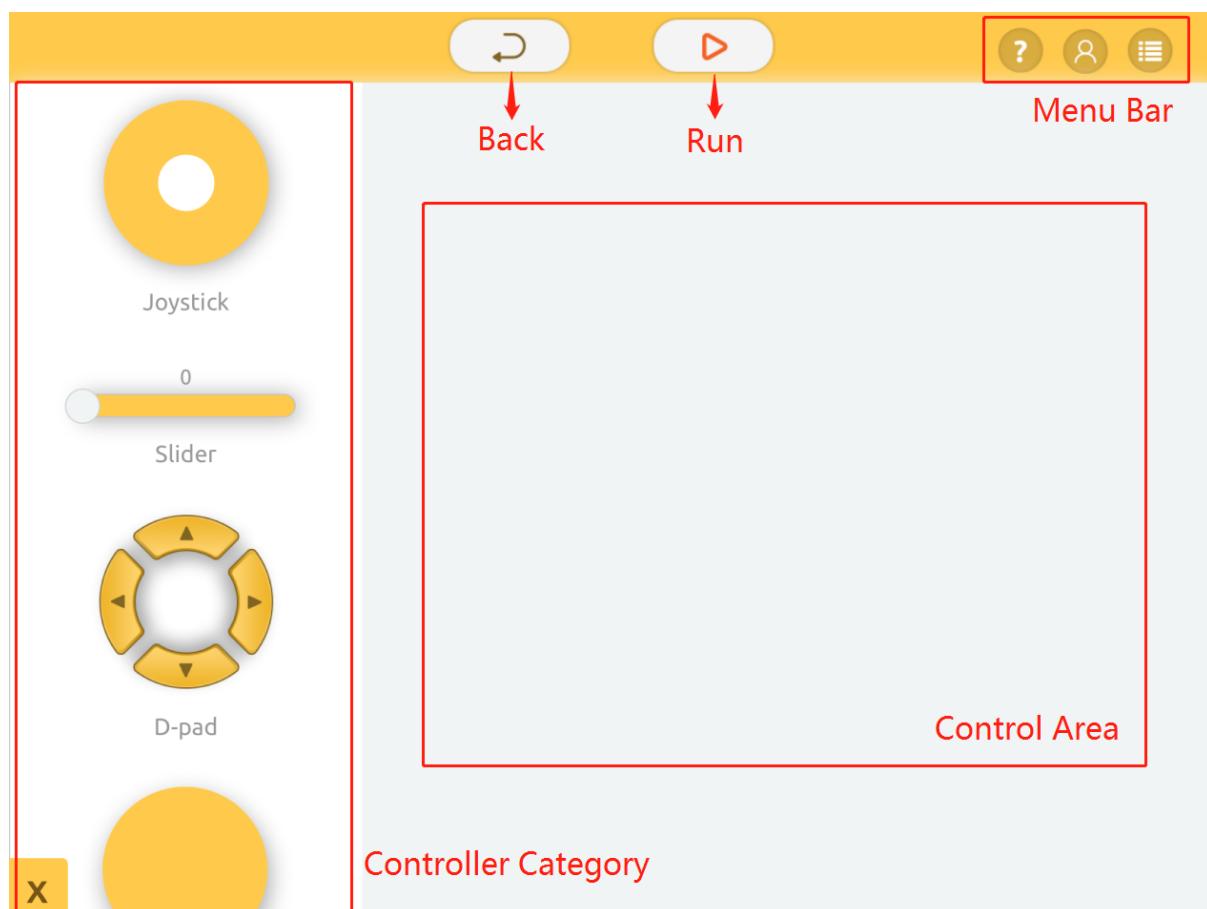
IoT Control Page

IoT Control page contains Sensors/Actuators, Add button, Debug Monitor and Menu Bar. To add Sensors and Actuators, we should click on the Add button. In addition, when we press the Run button on the top of the page, we can control relevant components and notice the data of sensor are changing.



Remote Control Page

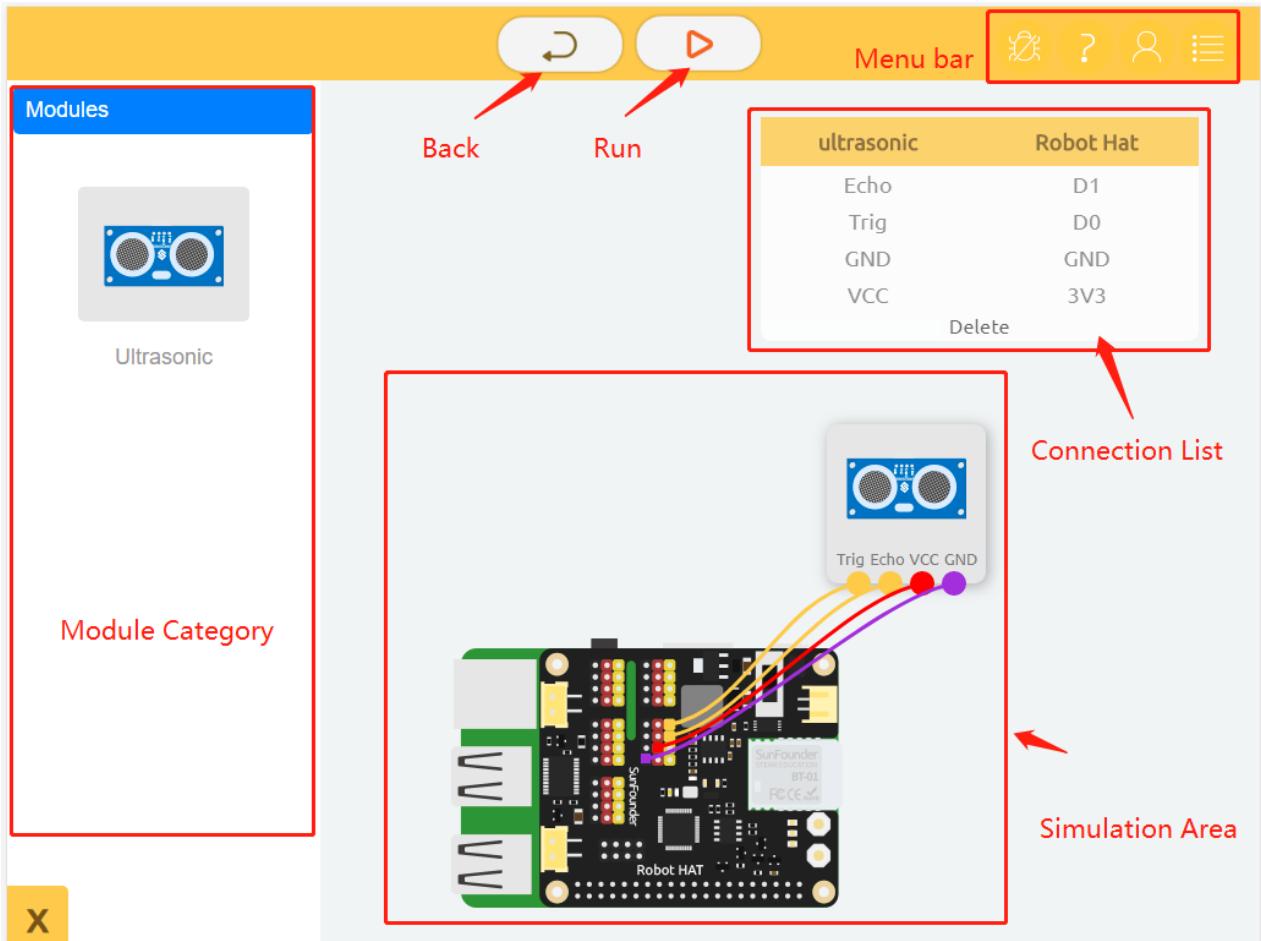
In some projects, we control the components by the remote controller on the Ez-block Studio. Create some virtual control components to the right area in order to add something to the project.



Simulation Page

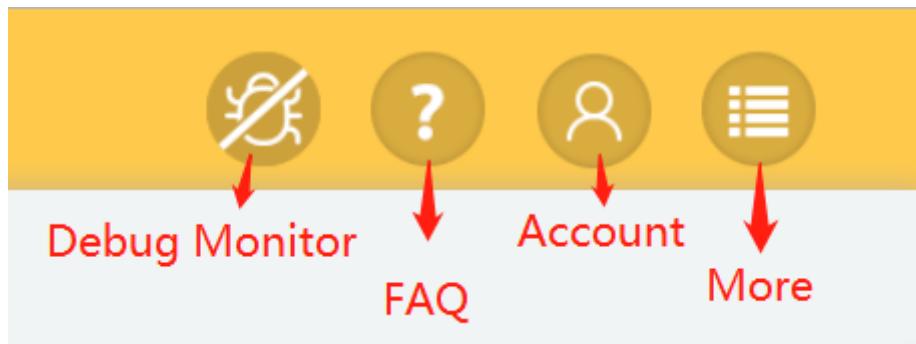
In some projects, we need some external equipment to get some certain effects, such as applying ultrasonic sensor module to detect the distance.

Now what we need to do is dragging some modules from Module Category and then wire them up according to the prompt.



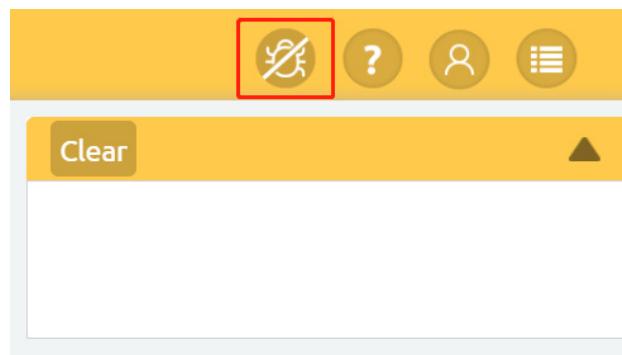
Menu Bar

On many pages, you can see the similar Bar as shown, with which you can log into your account conveniently.



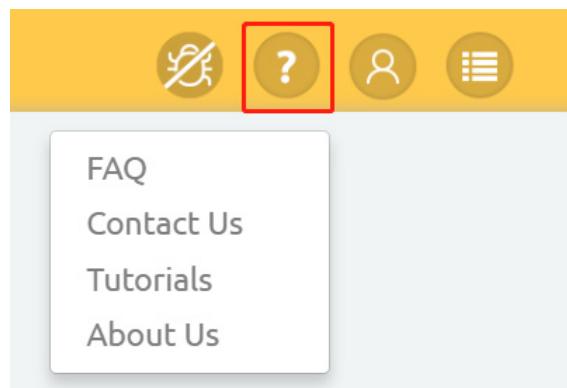
Debug Monitor

You can open or close the window of Debug Monitor by clicking this button marked.



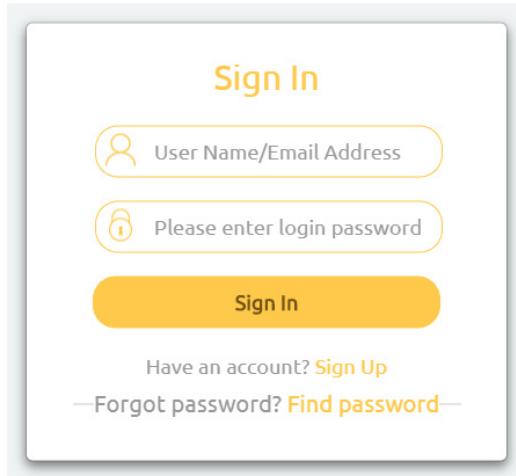
FAQ

You can find FAQ, Contact Us, Tutorials, and About Us after clicking the question mark.



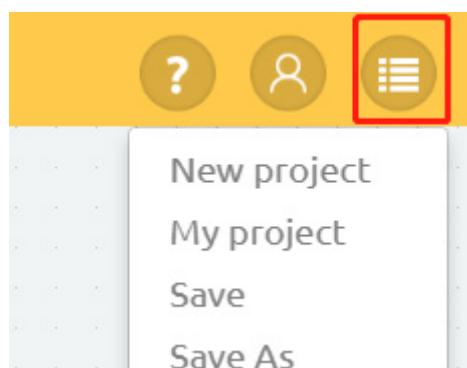
Account

By clicking the Account icon as marked in the previous picture, you can go to the following page on which you can log into or log out your account.

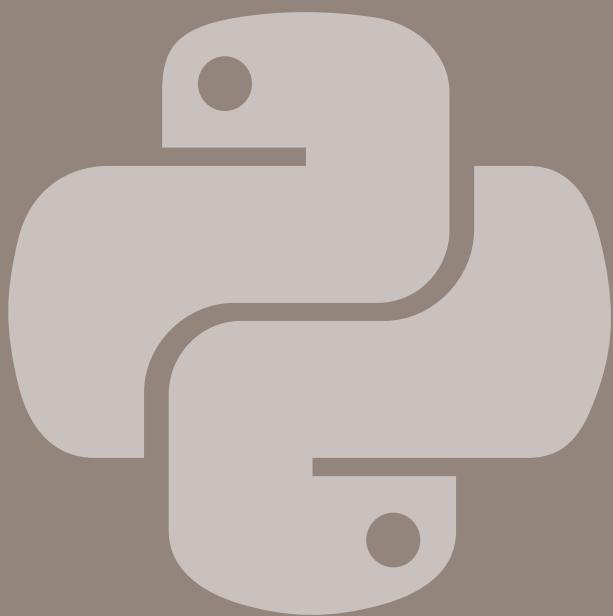


More

To execute more operation, press the button as shown so as to get the list in which you can see these options, including New project, Save and so on.



To Play in Python



Quick Guide on Python

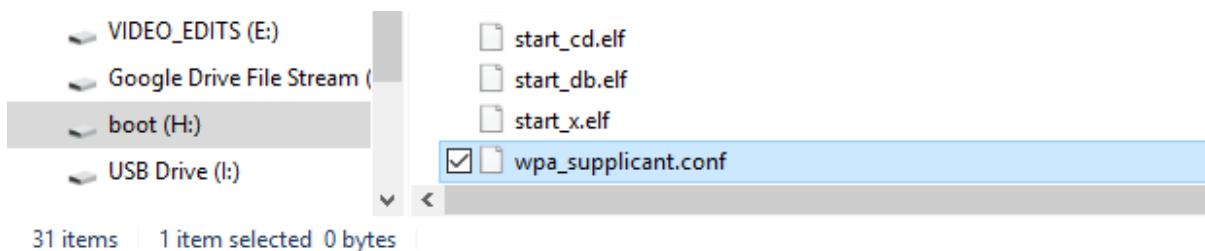
This chapter is used to set up Raspberry Pi, from configure the Raspberry Pi environment to download the sample python code of PiSloth.

NOTE: First, you must burn the Ezblock system. If you use the Raspian system, the sample python we provide for PiSloth will not be available.

Connect the Raspberry Pi to the Internet.

You need to modify a Wi-Fi configuration file `wpa_supplicant.conf` in the Micro SD card by your PC that is located in the directory `/etc/wpa_supplicant/`.

If your personal computer is working on a linux system, you can access the directory directly to modify the configuration file; however, if your PC use Windows system, then you can't access the directory and what you need next is to go to the directory, `/boot/` to create a new file with the same name, `wpa_supplicant.conf`.



Input the following content in the file:

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=GB
network={
ssid="Wi-Fi-A"
psk="Sunfounder"
key_mgmt=WPA-PSK
priority=1
}
```

You need to replace "Wi-Fi-A" with your custom name of Wi-Fi and "Sunfounder" with your password.

By doing these, the Raspbian system will move this file to the target directory automatically to overwrite the original Wi-Fi configuration file when it runs next time.

Now, the Raspbian system is configured. When the Micro SD card is inserted into the Raspberry Pi, you can use it immediately.

Get the IP Address

After the Raspberry Pi is connected to Wi-Fi, we need to get the IP address of it. There are many ways to know the IP address, and two of them are listed as follows.

★ Checking via Router

If you have permission to log in the router (such as a home network), you can check the addresses assigned to Raspberry Pi on the admin interface of router.

The default hostname of the system, Raspbian is raspberrypi, and you need to find it. (If you are using ArchLinuxARM system, please find alarmpi.)

★ Network Segment Scanning

You can also use network scanning to look up the IP address of Raspberry Pi. You can apply the software, **Advanced IP scanner** and so on.

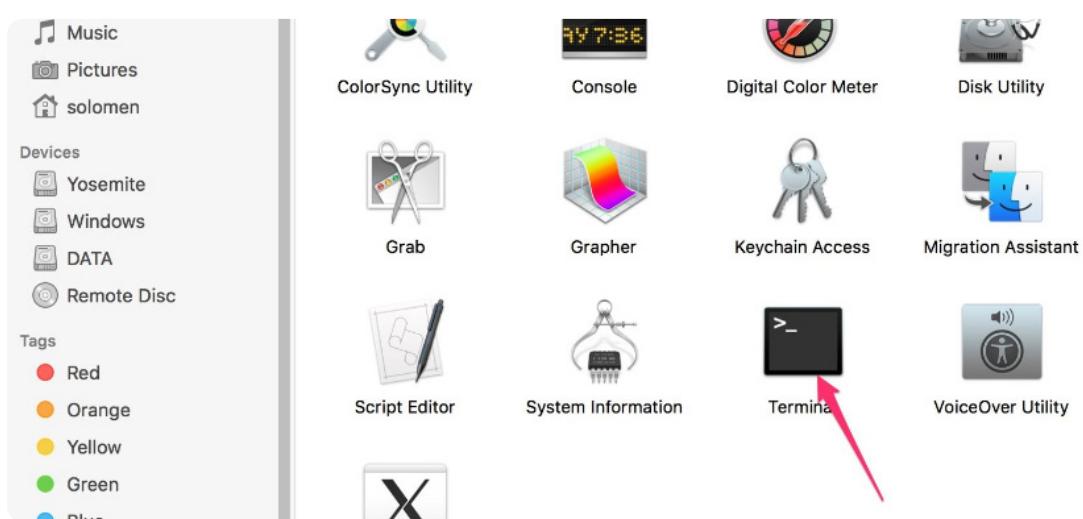
Scan the IP range set, and the name of all connected devices will be displayed. Similarly, the default hostname of the Raspbian system is raspberrypi, now you need to find the hostname.

Remote Control

We can open the Bash Shell of Raspberry Pi by applying SSH. Bash is the standard default shell of Linux. The Shell itself is a program written in C that is the bridge linking the customers and Unix/Linux. Moreover, it can help to complete most of the work needed.

★ For Linux or/Mac OS X Users

1. Go to Applications->Utilities, find the Terminal, and open it.



- Type in ssh pi@ip_address. "pi" is your username and "ip_address" is your IP address. For example:

```
ssh pi@192.168.18.197
```

- Input "yes".

```
Last login: Fri Apr 12 16:56:20 on ttys000
# hang_chen @ hang-chendeMacBook-Pro in ~ [17:09:55]
$ ssh pi@192.168.18.197
The authenticity of host '192.168.18.197 (192.168.18.197)' can't be established.
ECDSA key fingerprint is SHA256:60tKKQtCCRvUCohWmvVcbp7tBHTQL0f8/0kusPjVsEU.
Are you sure you want to continue connecting (yes/no)?
```

- Input the passcode and the default password is "raspberry".

```
# hang_chen @ hang-chendeMacBook-Pro in ~ [17:09:55]
$ ssh pi@192.168.18.197
The authenticity of host '192.168.18.197 (192.168.18.197)' can't be established.
ECDSA key fingerprint is SHA256:60tKKQtCCRvUCohWmvVcbp7tBHTQL0f8/0kusPjVsEU.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.18.197' (ECDSA) to the list of known hosts.
pi@192.168.18.197's password:
```

When you input the password, the characters do not display on window accordingly, which is normal. What you need is to input the correct passcode.

- We now get the Raspberry Pi connected and are ready to go to the next step.

```
1. pi@raspberrypi: ~ (ssh)
Last login: Fri Apr 12 16:56:20 on ttys000
# hang_chen @ hang-chendeMacBook-Pro in ~ [17:09:55]
$ ssh pi@raspberrypi
The authenticity of host '192.168.18.197 (192.168.18.197)' can't be established.
ECDSA key fingerprint is SHA256:60tKKQtCCRvUCohWmvVcbp7tBHTQL0f8/0kusPjVsEU.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.18.197' (ECDSA) to the list of known hosts.
pi@192.168.18.197's password:
Linux raspberrypi 4.9.80-v7+ #1098 SMP Fri Mar 9 19:11:42 GMT 2018 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Tue May 21 07:29:46 2019 from 192.168.18.126

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

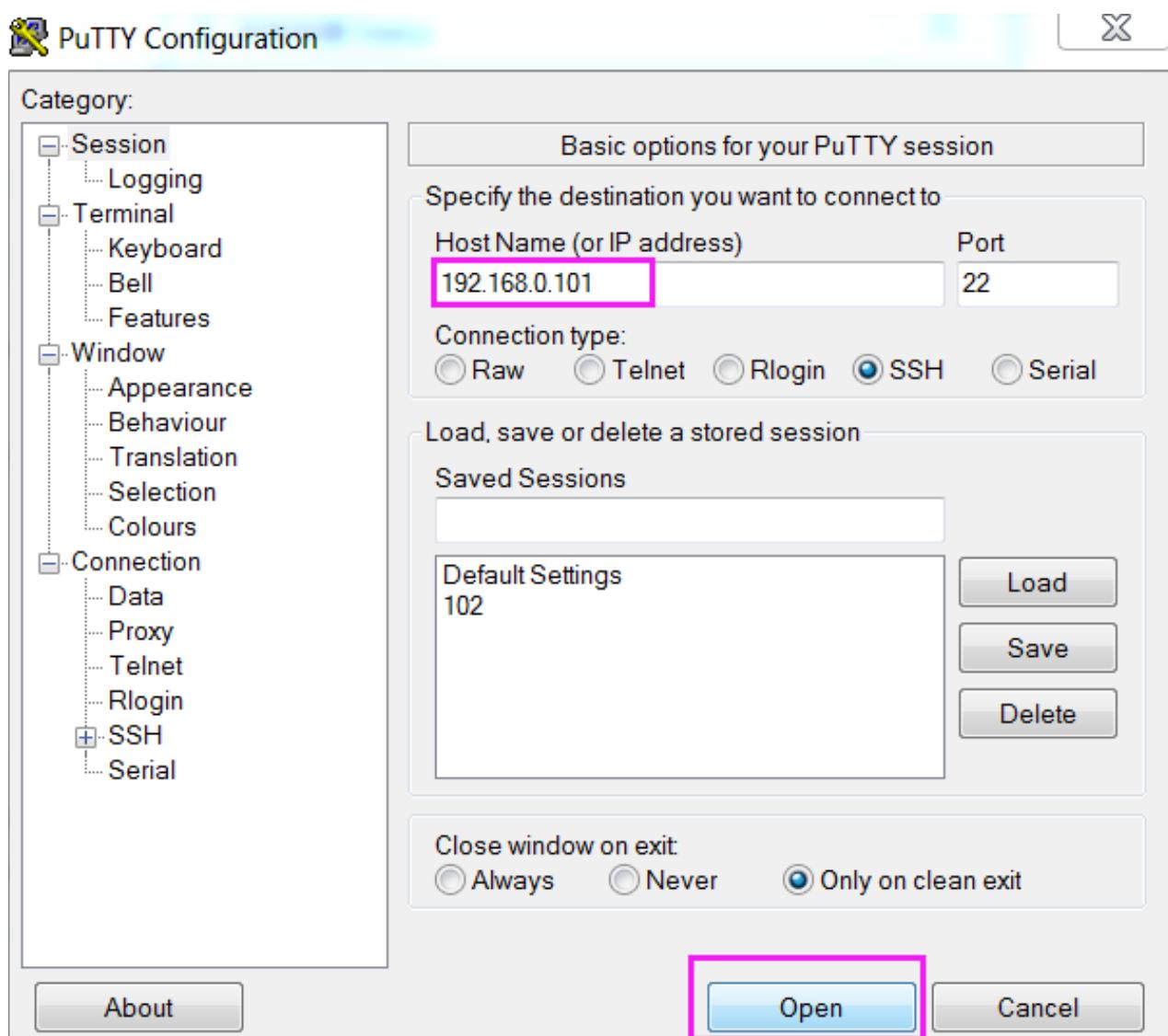
pi@raspberrypi:~ $
```

★ For Windows Users

If you're a Windows user, you can use SSH with the application of some software. Here, we recommend PuTTY.

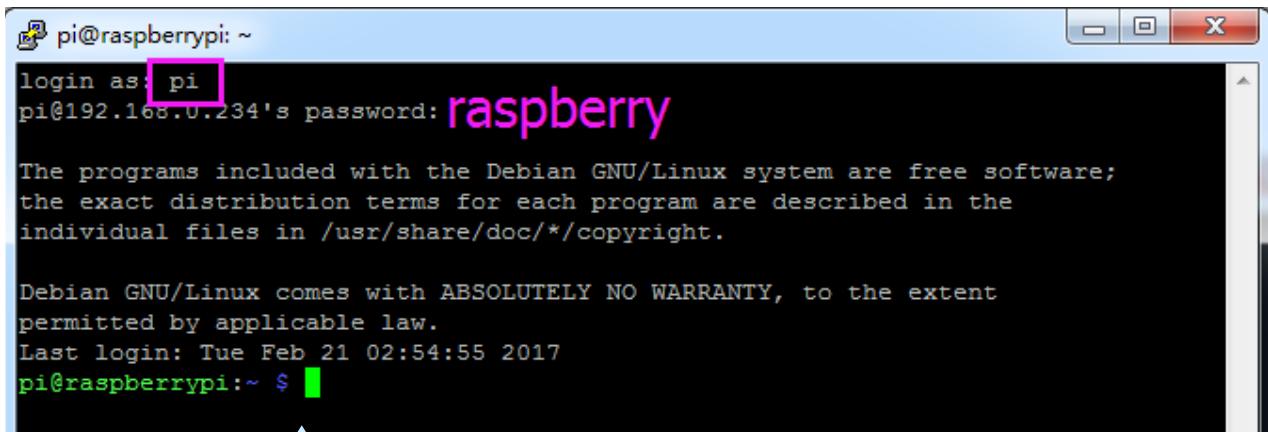
1) Download PuTTY.

2) Open PuTTY and click Session on the left tree-alike structure. Enter the IP address of the RPi in the text box under Host Name (or IP address) and 22 under Port (by default it is 22). Click Open.



When you first log in to the Raspberry Pi with the IP address, there prompts a security reminder. Just click Yes.

3) When the PuTTY window prompts “login as:”, type in “pi” (the user name of the RPi), and password: “raspberry” (the default one, if you haven’t changed it).



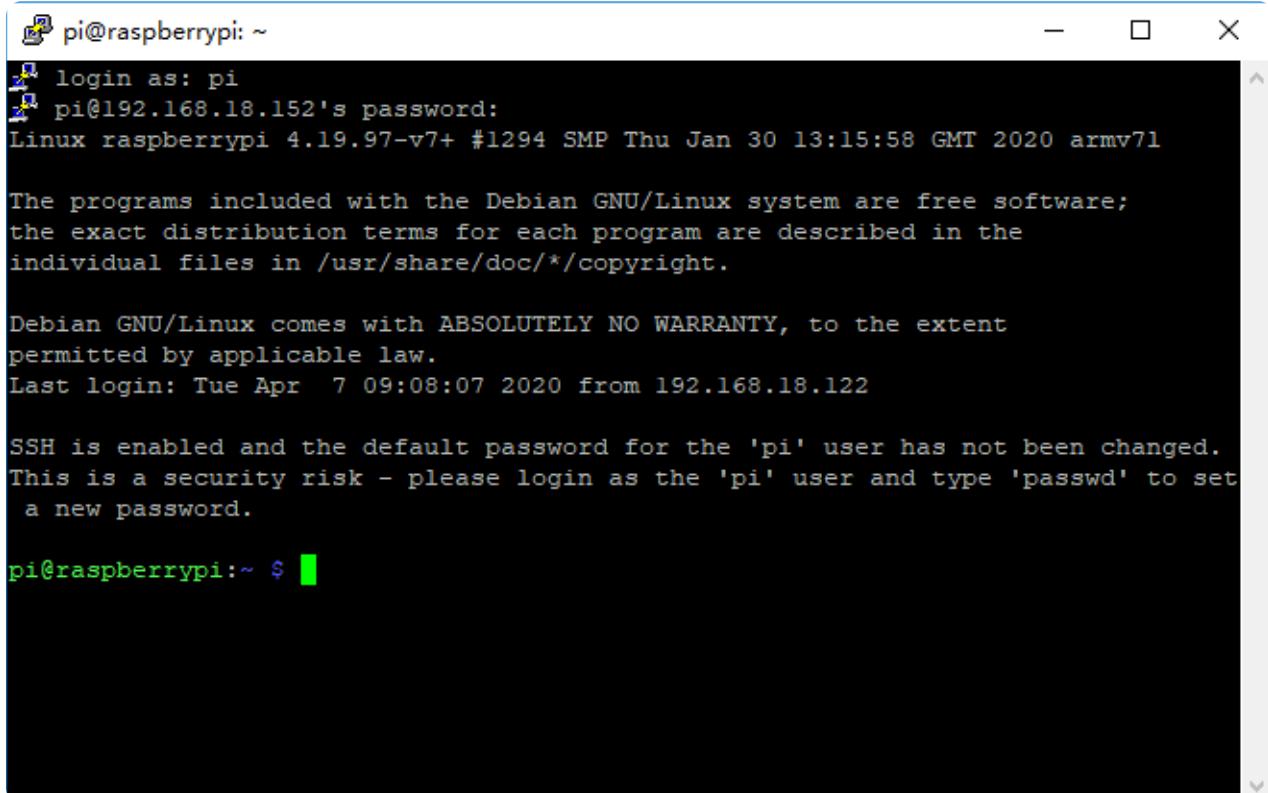
A screenshot of a PuTTY terminal window. The title bar says "pi@raspberrypi: ~". The window shows the following text:

```
login as: pi
pi@192.168.0.234's password: raspberry
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Tue Feb 21 02:54:55 2017
pi@raspberrypi:~ $
```

When you input the password, the characters do not display on window accordingly, which is normal. What you need is to input the correct passcode.

4) Here, we get the Raspberry Pi connected and it is time to conduct the next steps.



A screenshot of a PuTTY terminal window. The title bar says "pi@raspberrypi: ~". The window shows the following text:

```
login as: pi
pi@192.168.18.152's password:
Linux raspberrypi 4.19.97-v7+ #1294 SMP Thu Jan 30 13:15:58 GMT 2020 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Tue Apr  7 09:08:07 2020 from 192.168.18.122

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $
```

Download the Code

We can download the example codes by using git clone in the Raspberry Pi.

- ① Change directory to /home/pi.

```
cd /home/pi/
```

cd, short for change directory is to change from the current path to the intended directory. Informally, here is to go to the path /home/pi/.

- ② Clone the repository from github.

```
git clone https://github.com/sunfounder/pisloth.git
```

Stop Ezblock Service

The running of codes is based on Ezblock Studio. Please stop Ezblock at first.

```
sudo service ezblock stop
```

If you want to restart Ezblock, please run:

```
sudo service ezblock start
```

Ezblock is a startup program, and you can select the different commands to decide whether the program runs at startup or not:

```
sudo service ezblock-rest stop
```

```
sudo service ezblock-rest start
```

Python Code Control

In this kit, two different kinds of python methods are provided for you to play PiSloth: **python code control** and **web control**.

Input the command to open the **examples** folder, and you will see there are 8 python codes and a **web_control** folder in it.

```
cd /home/pi/pisloth/examples
```

You can run the python codes by the following command:

```
sudo python3 1.move.py
```

★ **1.move.py**

The example of move has three basic actions, including forward, turn right, turn left that can make the PiSloth move back and forth.

By the way, you can also provide compensation for the angle of a servo by using set offset.

★ **2.dance.py**

The example of ance has several funny basic actions which, if executed one by one, will drive PiSloth to gaily dance.

★ **3.obstacle_avoidance.py**

In the example of bstacle avoidance, the ultrasonic module is used to detect the distance to obstacles ahead. With code run, PiSloth goes forward, and if there is an obstacle in front of it, it will firstly take a step back and then adjust to an appropriate direction.

★ **4.wander.py**

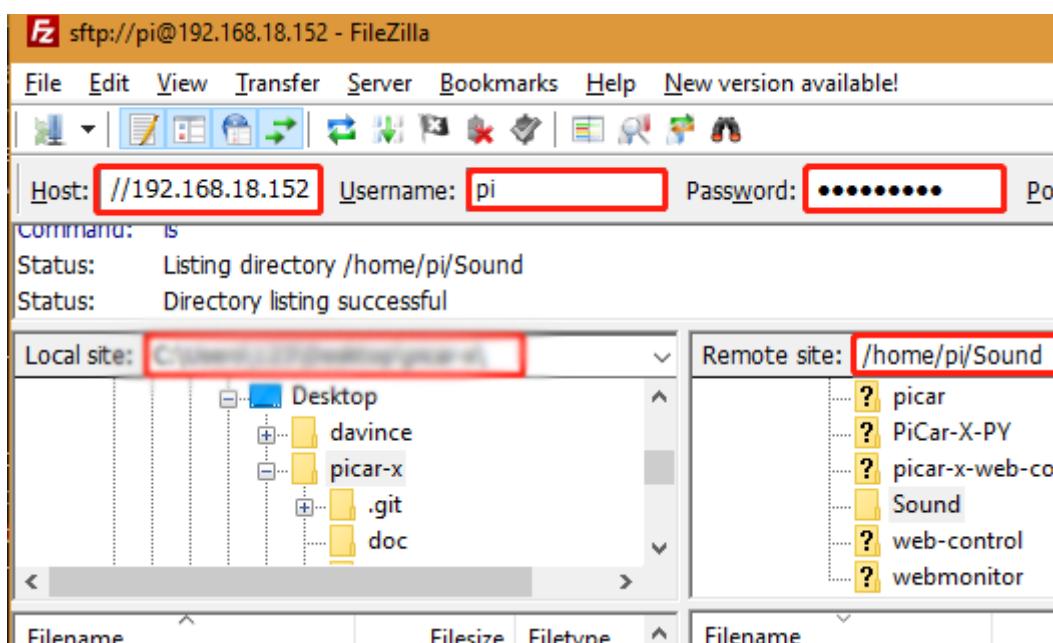
The wander example uses the two kinds of functions: list and random and it can get your PiSloth wandering. By revising the structure and numerical value of them, you can make your PiSloth wander much more freely.

★ 5.sound_effect.py

PiSloth can make voice. You can type text to make it speak, or make specific sound effects. Let us fire a gun as soon as a 3s countdown stops.

If you want to manually add some sound effects, you can upload your sound effects to the path /home/pi/Sound/ via FTP. Steps are:

- 1) Download desired sound effects to your PC and then download a **FileZilla** software.
- 2) Start FileZilla then enter **Host**: 192.168.18.152, **Username**: pi, **Password**: raspberry, **Port**: 22 and click **Quickconnect**. Copy the desired sound effects to /home/pi/Sound/.
- 3) Modify the function: sound_effect_play('Weapon_Continue_Shooting.wav',50) the sound effect file in the **5.sound_effect.py**.



★ 6.background_music.py

In addition to having PiSloth play sound effects or speak on specific occasions, you can also add background music to it.

To add music, you can try to upload your music to the path /home/pi/Music/ via FTP. Rename the music file in the function background_music('spry.mp3').

★ 7.diy_action.py

In this example, the angles of the four servos of PiSloth can be controlled by your code.

If you get the proper angle, you can add it into the custom action list to realize more interesting effects.

★ 8.diy_action_2.py

In the last experiment, we modified the code to control PiSloth to put out the STEP we wanted. Now, what you need to do is to record these STEP and combine them into a complete Action to use.

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