



ACEBOTT

Smart Home Starter Kit For ESP32

Perface

Our Company

ACEBOTT STEM Education Tech Co.,Ltd

Founded in China's Silicon Valley in 2013, ACEBOTT is a STEM education solution leader. We have a team of 150 individuals, including members from research and development, sales, and logistics. Our goal is to provide high-quality STEM education products and services to our customers. We are working together with STEM education experts and our business partners to produce successful STE products together. Our self-owned factory also provides CEM services for our clients including logo customization on product packaging and PCB.

Our Tutorial

This course and smart home learning kit is designed for 8+ children and teenagers to learn more about ESP32 board and smart home knowledge, sensors and circuit components. If you like to learn ESP32 smart home knowledge, this kit could provide you the knowledge and steps to build your own smart home together with Dr.Lumi.

Through this kit, you can:

1. Gain a deep understanding of the features of the ESP32 development board and learn how to effectively utilize it. Also, learn how to program in ACECode and upload code.
2. Build a solid foundation in the Blockly Programming language, as the ESP32 uses Blockly Code to control circuits and sensors.
3. Explore various electronic components such as LED lights, sensors, and motors, and understand how they collaborate in practical smart home projects.
4. Gradually build your own smart home using the ACEBOTT kit following tutorials, enhancing your maker skills.
5. Implement basic functions such as automatic response, app control, and voice control in smart home projects.
6. Strengthen your comprehensive understanding of smart home technology to prepare for future advanced learning.

In summary, the ACEBOTT smart home learning kit is specifically designed to introduce beginners to the world of ESP32-based smart home development. With this

kit, users can gain a comprehensive understanding of how controller boards and sensors function within the context of a smart home. By following the provided tutorials, individuals of all ages can acquire valuable knowledge about smart home technology and successfully build their own smart home projects.

Customer service

ACEBOTT is a dynamic and fast-growing STEM education technology company that strives to offer excellent products and quality services that meet your expectations. We value your feedback and encourage you to drop us a line at support@acebott.com with any comments or suggestions you may have.

Our experienced engineers are dedicated to promptly addressing any problems or questions you may have about our products. We guarantee a response within 24 hours during business days.

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We have a very large community that is very helpful for troubleshooting and we also have a support team at the ready to answer any questions.



ACEBOTT FB Group QR Code



YouTube QR Code

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Lumi's Adventure to Save the Lost City

In 3023, science and technology are highly developed, and humans have found a special substance on Jupiter and named it "Jupiter II".

Using "Jupiter II", Dr.Lumi has created a "Time Mirror Light ". Just stand in front of this mirror and start the machine to travel in time.

September 29, 3023, is an ordinary day for most people, But that day was the beginning of Dr.Lumi's adventure. On this day, Dr.Lumi, who is trying to build a portable Time Mirror Light. Dr.Lumi is resting on a recliner with his eyes closed. Dr.Lumi's cat slips out of her cage to play, and pats her paw at the glowing start button on the portable time mirror. After a flash of light, Dr.Lumi is sucked into the time mirror, and through a dazzling time tunnel, Dr.Lumi appears on an unknown planet.

Perhaps unaccustomed to the air, Dr.Lumi felt dizzy.

When he woke up, Dr.Lumi found himself in a hospital with equipment that looked decrepit.

When the nurse saw that Dr.Lumi was awake, she excitedly ran out the door. "Mayor Johnny, Dr.Lumi is awake!"

At this time, an old panda with glasses came in. The old man looked at Dr.Lumi and said, "Dr.Lumi, long time no see, I'm Johnny, now the mayor of the lost city, did you come back to save us?"

Dr.Lumi looked at the old man quizzically, but with a sense of familiarity. "Mayor Johnny, we seem to know each other."

The old man looked at Dr.Lumi and said, "Dr.Lumi, when I was young, I went on adventures with you.

Now the situation is urgent. When you were found, a huge meteorite appeared in the sky at the same time. After 24 hours of observation by astronomers, the meteorite will fall and the entire lost city will be destroyed."

Lumi listened in amazement. A meteorite colliding with a planet would destroy all living things in a city.

"Mayor Johnny, is the technology on this planet capable of destroying meteorites ahead of time?"

Mayor Johnny shook his head. "The Lost City has long relied on the shield you built to keep everyone safe.

Three days ago, the Guardian Shield system of the Lumi's Smart Home suddenly failed to activate. We conducted a field check, and it seems that the Lumi's Smart Home has disintegrated. If the Lumi's Smart Home were intact, it would create a shield that

could cover the entire Lost City, easily defending against meteorites."

Dr.Lumi searched his brain for memories. There was no memory of Lumi's Smart Home. "What do I need to do?"

Mayor Johnny says to the door, "Please come in," as you walk in, carrying a Smart Home Kit.

"Dr.Lumi, this warrior will work with you to rebuild the Lumi's Smart Home and restore the shield system."

You stand up and say, "Good morning, Dr.Lumi, I'm going to be your assistant to help you with this work."

Dr.Lumi walked out of the hospital and accompanied by you--the warrior, went to Lumi's Smart Home. Dr.Lumi looked at the sky, eclipsed by the sun, and dark as evening.

"Time travel always brings unexpected experiences," Dr.Lumi thought. "I hope everything goes well."

Dr.Lumi lifted his hand and open the scanner watch and found that the planet's air was almost identical to Earth's, and that the entire planet was a vast steppe, with water from melting snow and ice in the mountains meandering through the land.

However, the current level of science and technology is in the third stage of scientific and technological civilization, mainly using electronic devices to make scientific and technological products.

Not far from the horizon, there is a small hill. On the top of the hill is the location of Lumi's Smart Home.

When the meteorite appeared, the sky was like a display screen, and there was a 24-hour countdown. Dr.Lumi looked up. The red digital clock in the sky was ticking away, like a time limit given in a game.

Dr.Lumi then asked, "Is there anything special about the Lumi's Home?"

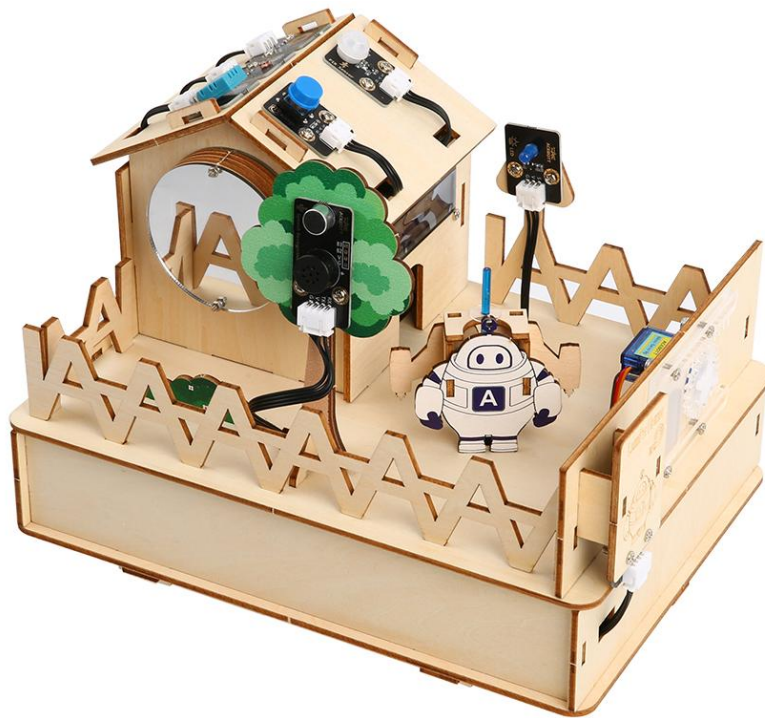
After talking, I learned that Lumi's Home uses a smart system, which can communicate by voice, WiFi control and other magical functions. In addition to Dr.Lumi, others temporarily do not have the corresponding knowledge to enter the maintenance. When Lumi's Smart Home returns to normal, the Lost City's protective shield will once again cover the entire Lost city, and the people will be saved from the meteor threat.

Come on Warriors, help Dr.Lumi rebuild the Lumi's Smart Home as soon as possible!

You take Dr.Lumi to the Lumi's Smart Home. Dr.Lumi looks at the broken walls in front of him. Fortunately, the materials used are relatively strong, and the walls are crumbling but not damaged.

Suddenly you spot the neatly arranged wooden boxes in the rubble and ask, "What is this?"

Dr.Lumi takes the wooden box and opens it. After a flash of blue light, Dr.Lumi is instantly informed of all the information of the Lumi's Smart Home. At the same time, the 3D projection device on his arm automatically opens to show the information of the Lumi's Smart Home. Dr.Lumi is surprised to find that the Lumi's Smart Home has a portable Time Mirror Light, and a secret device hidden inside it.



Holding back his excitement, Dr.Lumi switched the screen with his hand and said: Here are the drawings for the Lumi's Smart Home.

Now, help Dr.Lumi rebuild the Lumi's Smart Home, Open the file ["Assemble Lumi's Home V1.1.pdf"](#) in

"English\ACECode(Blockly Code)\2.Assemble Lumi's Home" to obtain the construction drawings.

Follow the wiring to build the Lumi's Smart Home, and then go on the adventure below.

Note: The connection of the DuPont line should be careful, or it may damage the Lumi's Smart Home.

After continuous restoration, the Lumi's Smart Home was restored.

"Well," Dr.Lumi says appreciatively, "the facade of the Lumi's Smart Home is restored and the wiring is restored."

You look at the restored Lumi's Home and say, "Is it possible to unlock the Guardian Shield now?"

Dr Lumi shook his head and said: "The repair of the Guardian Shield is a step by step process. The first step is to restore control of the electronic circuit."

If you want the electronic circuit to obey to you, you need a tool that can talk to the electronic circuit - ACECode.

Open the "English\ACECode(Blockly Programming-Recomm and for Beginner)\3.ACECode usage tutorial" folder to get the ACECode Tutorial.

[To install ACECode on Windows click here.](#)

[To install ACECode for Mac OS click here.](#)

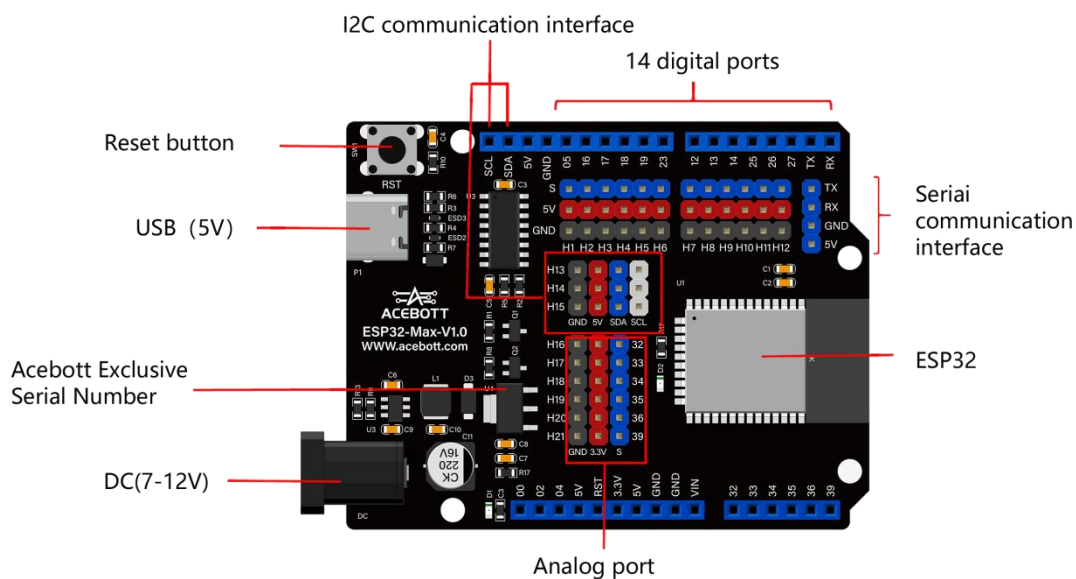
Note:

1. This tutorial is applicable to ACECode version 2.0 and above. You can check the software version number in the upper left corner of the ACECode software. Please make sure that the software version you are using meets the requirements;

2. If you need to update the ACECode software version, you can go to the ACEBOTT official website: <https://www.acebott.com/pages/software> to download the latest ACECode software version.

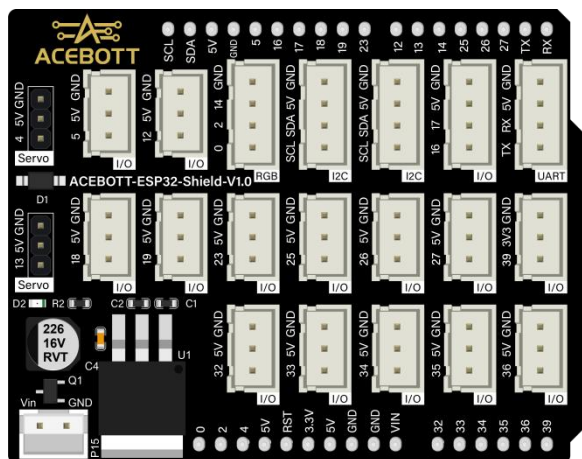
Install the ACECode software on the computer and complete the connection between the ACECode software and the ESP32 control board.

"Let's meet the brain of Lumi's Smart Home, the ESP32 controller board."



"To make the use of ESP32 more convenient, Lumi's Smart Home also provides an ESP32 expansion board. The design of the expansion board's wiring interface is clearer, making operation more convenient. Combined with the use of quick connectors, it can greatly reduce wiring errors and effectively avoid problems such as polarity reversal," Dr.Lumi pats you on the shoulder and says.

You excitedly respond, "That's great, then I don't have to worry about reversing the connections!"



Dr.Lumi looked up at the sky and could already see the meteorite hanging in the sky, with only 18 hours left before it fell.

Dr.Lumi says to you: "We have to hurry up....."

THE COUNTDOWN: 18 HOURS

Task 1: Repair the street lights to illuminate the yard

"I will teach you all the knowledge and skills you need to build the Lumi's Smart Home. Then you can guard the Lost City alone."

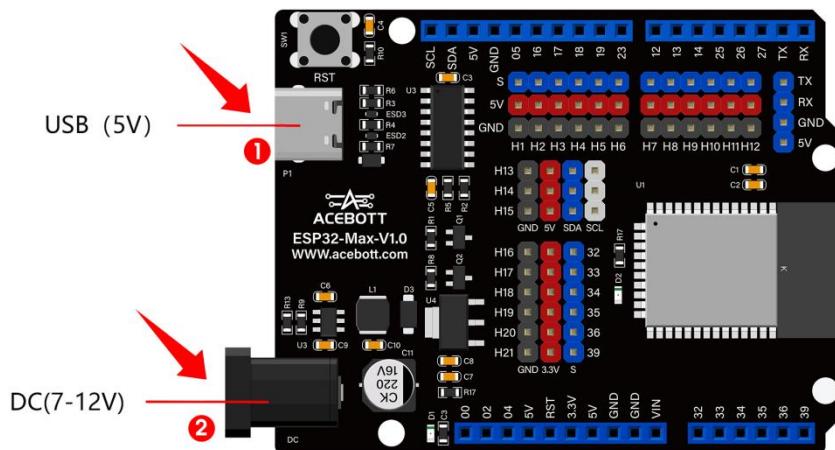
"Says Dr.Lumi, patting you on the shoulder.

You nod and say, "Okay, Dr.Lumi, where do we start?"

Dr.Lumi said: 'The sky is now darkening as if there was a solar eclipse because of the meteorites. You and Dr.Lumi look up at the sky, thinking.

"We started by lighting up the Lumi hut to see if the energy could be used," says Dr.Lumi.

The doctor pointed to the intact power supply and said, "You see, the power supply only needs to be plugged into any of the following ports."



Note: Due to the access of electronic modules, USB may be insufficient power supply, please try to use external power supply (DC).

"Dr.Lumi, I know that a power source can provide current and voltage."

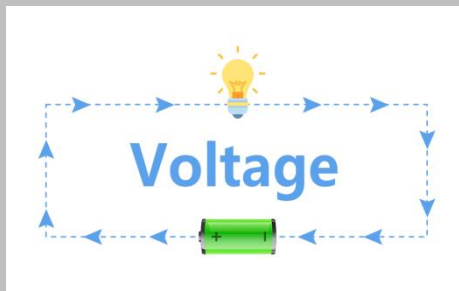
"I will introduce current and voltage for you in detail," says Dr.Lumi, pointing to a picture.

Current and voltage

Current: It represents the movement of electrons in a wire or circuit, much like water molecules flowing in a pipe.

Voltage: It represents the "driving force" of the current, like the water pressure in the flow of water.

The direction of the current: from the positive (high voltage end) of the power supply to the negative (low voltage end) of the power supply, like water flowing from high to low.



When an electric current flows through a light bulb, it lights up. In the same circuit, when the voltage is higher (higher pressure), the current is higher (faster water flow), the bulb will be brighter.

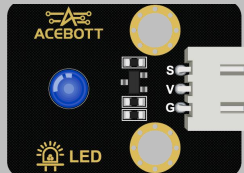
Then Dr.Lumi pointed to the street lamp and said, "Next, let's learn to light the street lamp together and light up the entire yard."

LED Module

LED module is a component that integrates LED lamp beads, drive circuits, and shell to provide lighting, indicating, or display functions. According to the specific application requirements, the LED module can be a wide variety of shapes, sizes and colors, and its color depends on the material and the light emitting principle.

A high level output to the LED module means to turn on the LED light, and a low level output to the LED module means to turn off the LED light.

The LED module can also be controlled by analog signals, the larger the input signal value, the brighter the LED light.



"Dr.Lumi, now that the circuit is connected, how do we power the LED?"

"Next, you need to write commands in the ACECode software to make the wires behave and power up the leds." Dr.Lumi opened the projection screen on his arm and said. "You can refer to this for instructions."

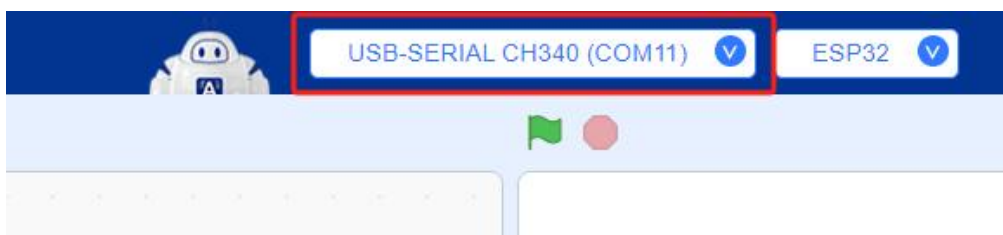


"Of course, I will also provide you with the easiest way to open the "1_LED.sb3" file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

After the program is completed, you can view the running effect of the program in "Online mode". Online mode can reduce the time you wait for the program to be uploaded.

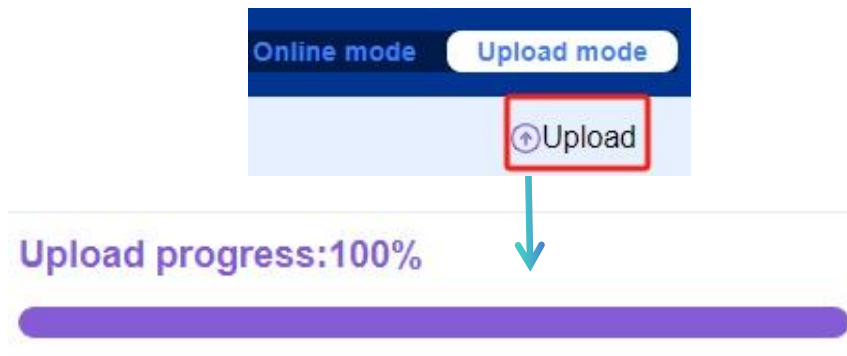
You can also follow the steps below to debug and upload the program:

1.Connect ACECode and ESP32 development board



Note:For detailed upload steps, please refer to the ACECode tutorial.

2. In "Upload Mode", click the "Upload" button to upload the program. When the upload progress reaches 100%, it is considered successful.



After uploading the program, the following effects will appear: the LED module will light up for one second and go off for one second.



"Well done, the street lights are on." You and Dr.Lumi look at the lights and know that you are one step closer to saving the lost city.

THE COUNTDOWN: 17 HOURS

Task 2: Give the street lamp wisdom - Let the street lamp learn to breathe

Dr.Lumi looks at you and says, "Next, we're going to try to make streetlights smart."

You look at Dr.Lumi with anticipation. "How? Dr.Lumi."

"We can learn to breathe from the human movement, so that the street lamp also learns to breathe."

"How can street lights achieve the effect of breathing?"

"Design a specific breathing rhythm of the light, so that the brightness of the light changes according to a certain frequency. The lighting system can be programmed to set the rhythm and frequency of breathing to achieve the effect of light breathing," said Dr.Lumi, looking at the street lamp.

"How do we do that?"


"To achieve the breathing light effect, the brightness of the LED needs to be gradually increased and decreased over a certain time horizon. This can be achieved by varying the duty cycle of the PWM. For example, in the exhalation phase, the duty cycle decreases gradually and the brightness of the LED decreases

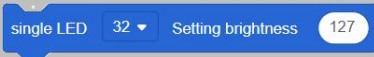
gradually; During the inspiratory phase, the duty cycle is gradually increased and the brightness of the LED is gradually enhanced."

"What is PWM? That sounds complicated." You're scratching your head. Dr.Lumi opens the projection screen to project the relevant knowledge.

PWM

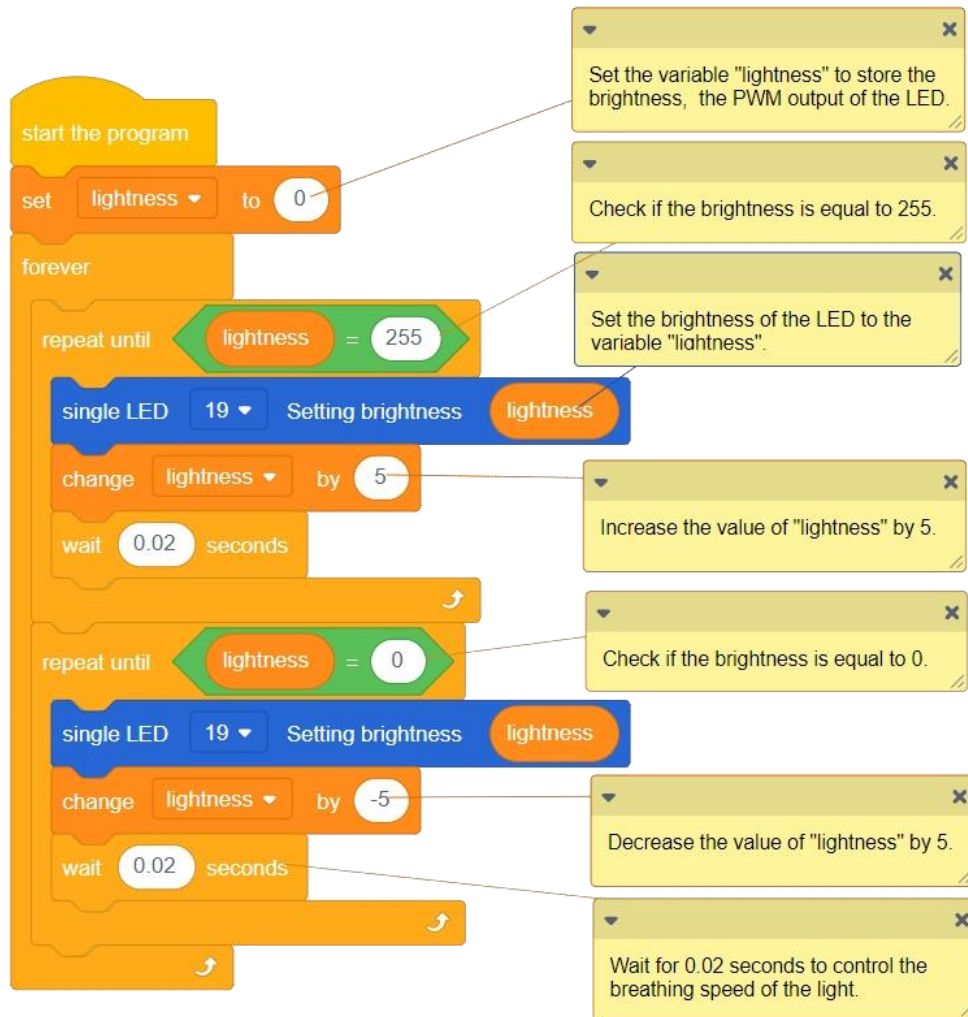
PWM is the abbreviation for "Pulse Width Modulation" . Use different duty cycle to simulate the "analog output". The duty cycle is the proportion of time in a pulse cycle that is high to the total cycle time, the unit is % (0%-100%). By changing the duty cycle of the PWM, the average voltage of the output signal can be changed to realize the output of the analog voltage.

LED module can use the statement  to implement a PWM with a specified duty cycle, In the drop-down box, you can select the pin of the control board to which the LED is connected. The value in the input box is between 0 and 255. 0 means the duty cycle is 0%, and 255 means the duty cycle is 100%.

For example, the statement  has a duty cycle of 50%, which means that if you plug in 5V, it is equivalent to only putting in 2.5V.

"Ok, but how do we code?"

"You can refer to this program," Dr.Lumi said, opening a projection screen on his arm.



"Of course, I will also provide you with the easiest way to open the ["2_Breathing_Light.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

After uploading the program, the following effect will appear: the LED module will gradually light up and then gradually extinguish.



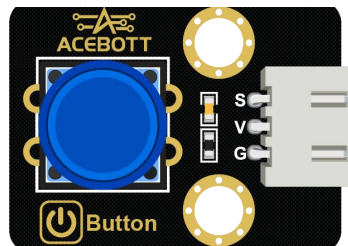
Dr.Lumi looked at the street lamp, which seemed to come to life. "Well done," he said. "The brightness of the street lamp gradually increased and then gradually decreased."

THE COUNTDOWN: 16 HOURS

Task 3: Save energy! Let's add a switch to control the light

"Dr.Lumi, the street light keeps flashing. How can I turn it off?"

"It's easy. You can put a button in the circuit then you can turn the light on and off," says Dr.Lumi, pointing to a button.



"Dr.Lumi, I've seen it, but I don't know how to use it." You look at the button module and feel confused.

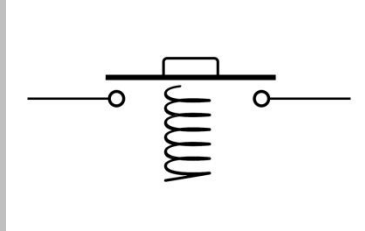
Dr.Lumi opened the projection screen on his arm and said, "Let's see what we know about the button module."

Button Module

Button module is a common electronic component used to implement push-button switch operation in electronic devices.

The button module is composed of two electrode pieces and a spring button, the button is located between the two electrode pieces.

When the button is not pressed, the two electrodes of the button are disconnected, and the circuit is in the disconnected state; When the button is pressed, the two electrode pieces touch, forming a closed circuit.



"What's the difference between the button module and the LED module?"

Input module and output module

1. Input module: it refers to the signal transmitted to the control board through digital or analog pins from external devices (such as buttons, switches, sensors, etc.), and the control board can obtain the state information of the external environment according to these signals, such as key modules, various sensor modules, etc. The pin on the control board used to get external information should be set to pinMode (pin, INPUT).

2. Output module: refers to the process of sending signals or control information from the control board to external devices, and these output signals can be used to control LED lights, RGB lights, etc.

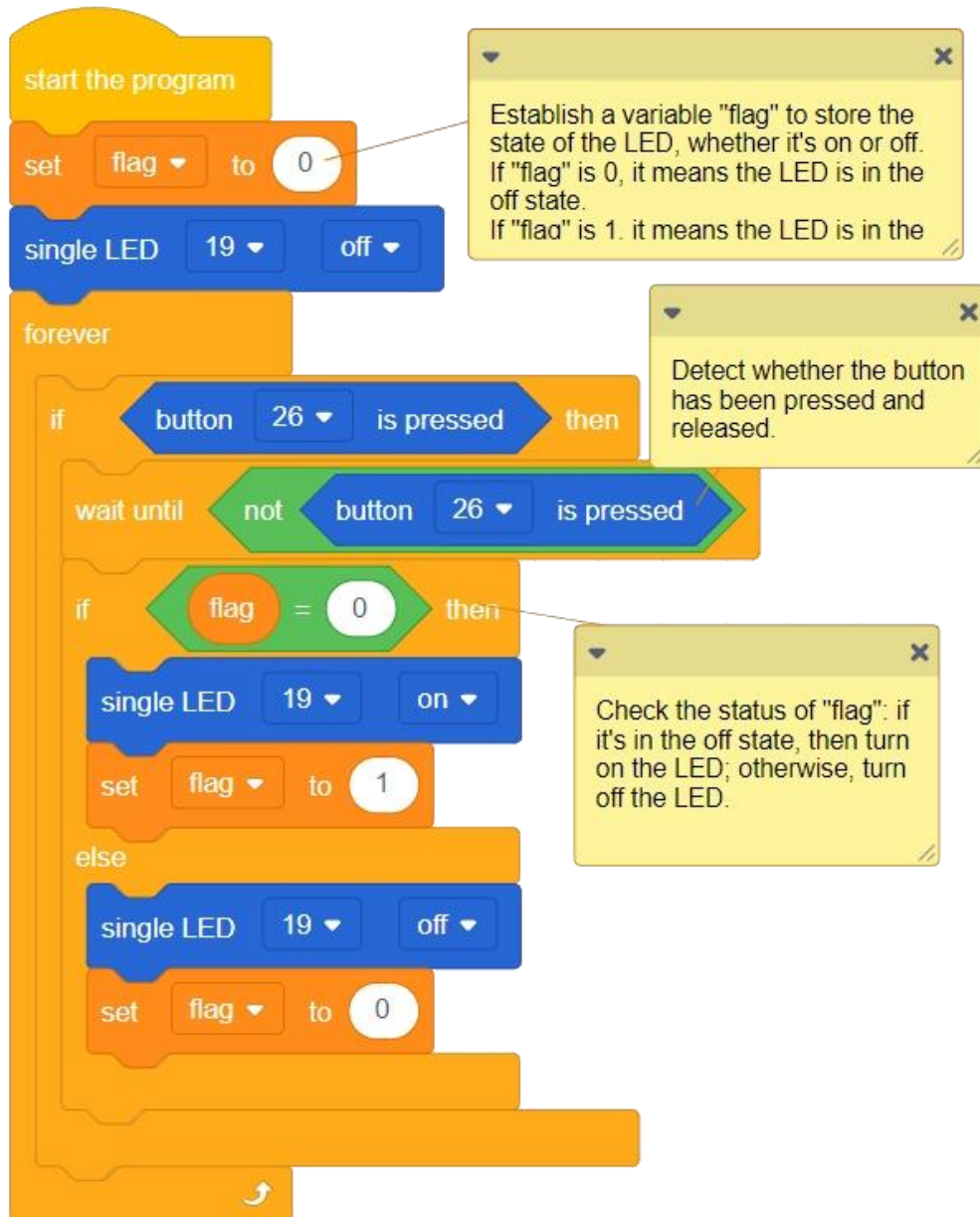
"So the button module is the input module, how to control the LED light through the button module?"

"You can get the switch signal through the main control system, and then make a judgment to control whether the light is on or off."

Dr.Lumi glances at his arm and opens the 3D projection screen.

"It's going to be more and more to learn, but it's also going to be more fun. Be prepared."

"Ok, Dr.Lumi, I'm ready."



"Of course, I will also provide you with the easiest way to open the ["3 Switch Light.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

After uploading the program, the following effects will appear:
press the button module for the first time, and the LED module will
light up; Press it again, and the LED module goes out.



"It works. Press the switch and the street light will come on,
Dr.Lumi." "You say happily.

THE COUNTDOWN: 15 HOURS

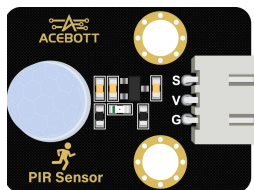
Task 4: Add eyes to the street lamp

"Dr.Lumi, have you finished the repair of the street lamp?" It looks like a normal LED lamp.

Dr.Lumi, shaking his head, said, "We haven't finished the repair of the street lights yet. For a smart home, the lighting system needs to be more intelligent, such as when we approach, it will automatically light up, when we move away, it will automatically turn off."

"How do we do that? Dr.Lumi." You look at the component in front of you, trying to figure out that particular component.

"It's easy. Use it." Dr.Lumi holds up a human infrared sensor(PIR sensor).



PIR sensor

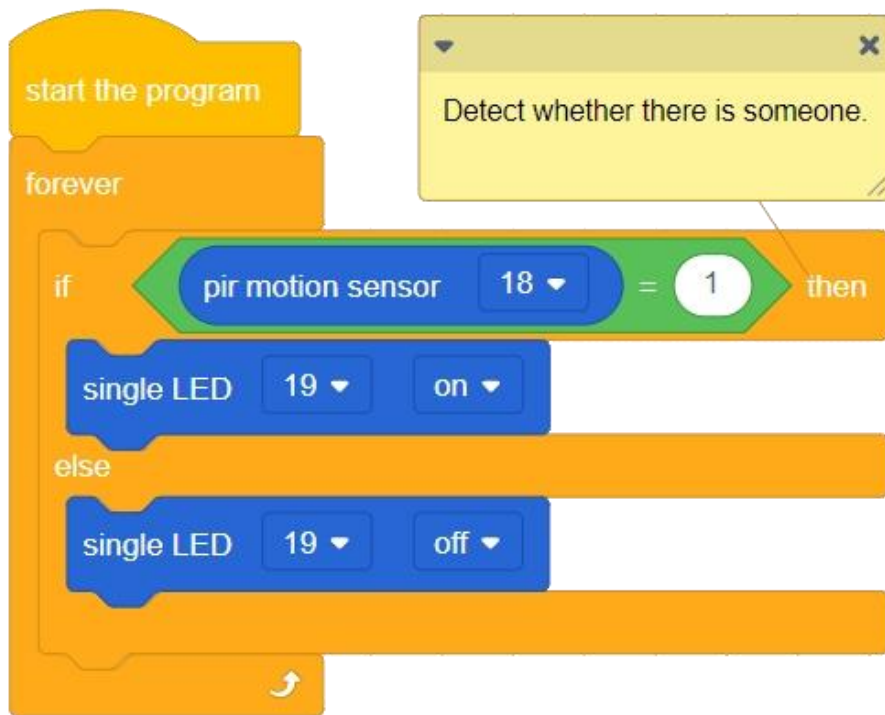
The PIR sensor is a device that detects human motion based on infrared radiation. When a person or another heat-emitting object enters the sensor's detection range, it causes a change in infrared radiation, which the sensor then detects.

The key characteristic of this sensor is that it only outputs a corresponding electrical signal when external radiation causes a change in the sensor's own temperature. When the temperature change stabilizes, it no longer generates signal output. Therefore, it is sensitive only to moving human bodies.

Additionally, when a human body is sensed, the sensor outputs a high-voltage signal and has a certain delay time. If the human body remains within the sensor's range, it will continue to output a high-voltage signal. Only when the human body leaves and the delay ends will the sensor signal switch to a low voltage.

"How do we control it?" You inquire, looking at the PIR sensor.

"The coding approach is similar to that of a button module. Through the main control system, we'll gather information from the PIR sensor, detecting whether there's someone nearby. If there is, the light will turn on; if not, it will turn off." Dr.Lumi explains while opening the projection screen.



"Of course, I will also provide you with the easiest way to open the ["4_PIR_Light.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

When the program is uploaded, the following effect will appear: when someone approaches and shakes, the LED lights up.



"Dr.Lumi, I made it," you say excitedly, looking at the streetlight. "It turns out these electronic modules are so interesting."

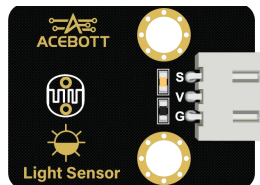
THE COUNTDOWN: 14 HOURS

Task 5: The Secret in the Light

"Now the street lights can see if someone is passing by, but there is no way to tell how bright or dark the surroundings are. Next, I'm going to introduce you to an amazing sensor, the light sensor."

You look at the light sensor in your hand and ask, "Dr.Lumi, what is a light sensor?"

"A light sensor is a device that determines whether the environment is light or dark," says Dr.Lumi, looking at his surroundings.



Light sensor

A light sensor is a sensor used to detect the intensity of ambient light, which is used to measure the characteristics of light in various scenes.

The light sensor uses the resistance value of the light sensor to change with the change of light intensity. When the light shines on the photoresistor, the resistance value decreases. In low light or dark environments, the resistance value increases. By measuring the change in the resistance value, the intensity of the light can be determined.

"But the intensity of light is not just light and dark, it is a continuous state," says Dr.Lumi cheerfully.

"I don't really understand how it compares to the signal characteristics of the button module," you ask in doubt.

Digital signals and analog signals

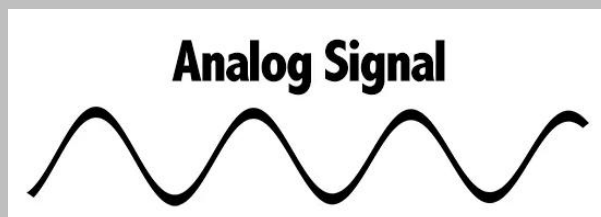
1. Digital signal

A digital signal is a discrete signal that can only take a finite number of discrete values. In digital signals, the value of the signal is determined at different points in time and is usually expressed in binary form, mean 0 and 1. In simple terms, a digital signal is a signal with only two opposing states.



2. Analog signal

Analog signal is a kind of continuous signal, which can take any continuous value in time and amplitude. In analog signals, the value of the signal can be at any amplitude level at any time and can be represented as a continuous waveform. Analog signals are characterized by continuity and infinite accuracy, and are suitable for applications with continuous changes in audio, video, sensor signals, etc.




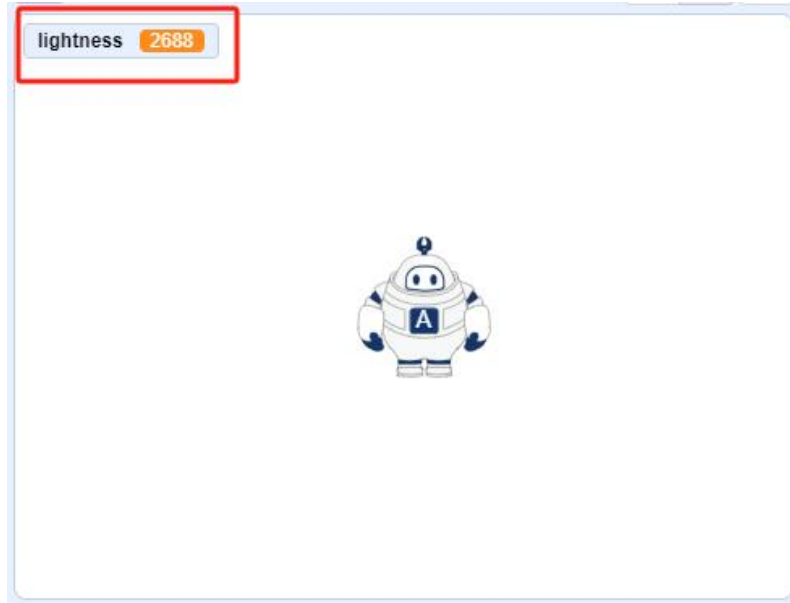
"So how can you see the change in the input data of the light sensor?" "You ask in puzzled.

"In online mode, you can store the input values from the light sensor into a variable and then display the variable on the stage. This way, you can see the changes in the light sensor data on the stage," Dr.Lumi opened the projection on his arm, displaying the code.



"Of course, I will also provide you with the easiest way to open the ["5 Lightsensor.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

"Now, in the 'Variables' command module, check the box next to the variable 'lightness', and it will appear on the stage. Simply click on the code block to run the program, or click the  button on the stage to run the program and see real-time information gathered by the sensor on the stage."



If there is light shining on the light sensor, the value of the variable "lightness" will decrease; conversely, it will increase if there is no light shining on the sensor.

"Dr.Lumi, I have observed the change in the input data of the light sensor after the light irradiation, and what can the light sensor be used for?" you ask puzzled, "the street lamp can already light up when people are passing by."

"The street lights also come on during the daytime when people are passing by, but using light sensors allows the lights to come on when it's dark and there are people around." Dr.Lumi explains.

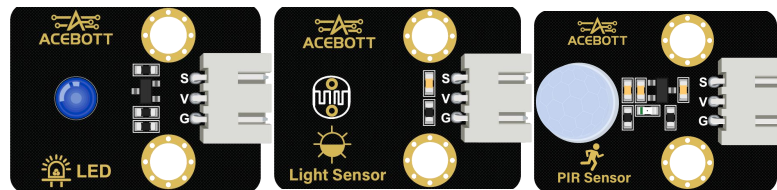
"I see, Dr.Lumi, and next, shall we plug the light sensor into the circuit of the street lamp?"

"Yes, let's improve the function of smart street lights."

THE COUNTDOWN: 13 HOURS

Task 6: It's dark and someone please light up

Dr.Lumi raised his arm and turned on the projection device, revealing the items needed for a smart street lamp.



Dr.Lumi went on to say: "The so-called intelligence is to make the robot's behavior more realistic logic, by the control system independent judgment, such as the guardian shield, it can be manually opened, but this is only to confirm whether the function can be used, the real open way need to use voice to communicate with the control board, controlled by the control board self-opening, in order to really open the guardian shield."

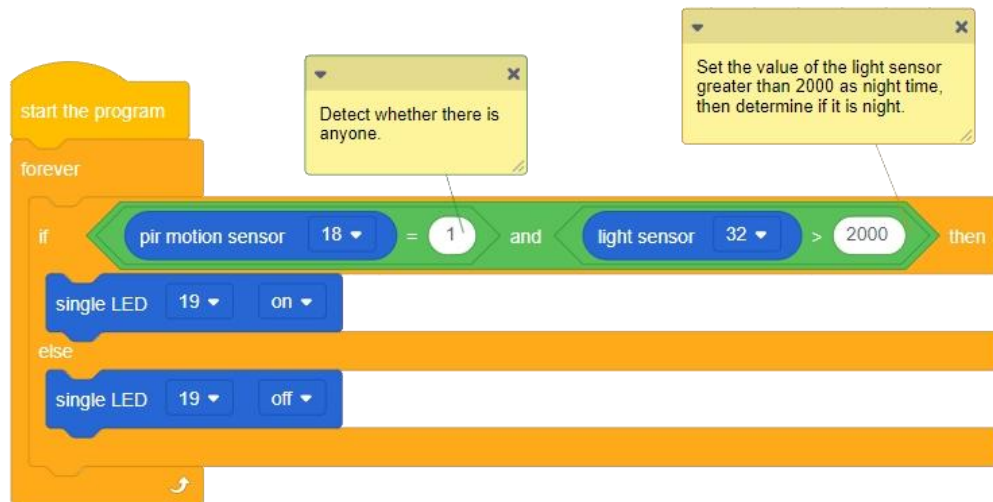
"Repairing the Shield is so complicated," you say with a bit of frustration.

Dr.Lumi touches your head and says reassuringly, "It sounds complicated now, but you'll learn to master it, find it fun, and even create your own work if you want."

"I'll try, Dr.Lumi."

Then you asked, "What kind of code instructions should be given to the main control system for this smart street lamp?"

Dr.Lumi switched the projection's display to reveal the current instructions.



"Of course, I will also provide you with the easiest way to open the "6 Human Sensing Stair Light.sb3" file in "English\ACECode(Blockly Code)\4.Program file" and get the program."



The following effect will appear when the program is uploaded:
When it is dark and someone passes by, the LED light will turn on,
otherwise the LED light will go out.

"The smart street light is finished", you test and find only the
sensor can detect external environmental conditions

"great, you have discovered the mystery, the sensor is like our
human senses."

"But a sensor can only pick up one type of signal."

Dr.Lumi looks at you with relief and says, "That's why we need
to understand so many different kinds of sensors, because each
one does something different."

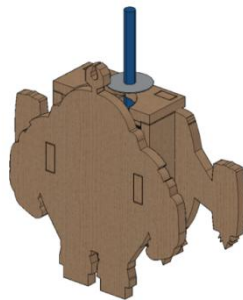
THE COUNTDOWN: 12 HOURS

Task 7: Test whether the Shield works properly

Dr.Lumi looked at the bright courtyard and said, "Is it time to see if the shield is working?"

"Doctor, where is the shield?" you look at the yard.

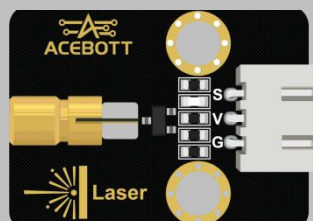
"Here," says Dr.Lumi, pointing to a model. Dr.Lumi turns on the projector in his hand to reveal the pattern of the components.



Laser Module

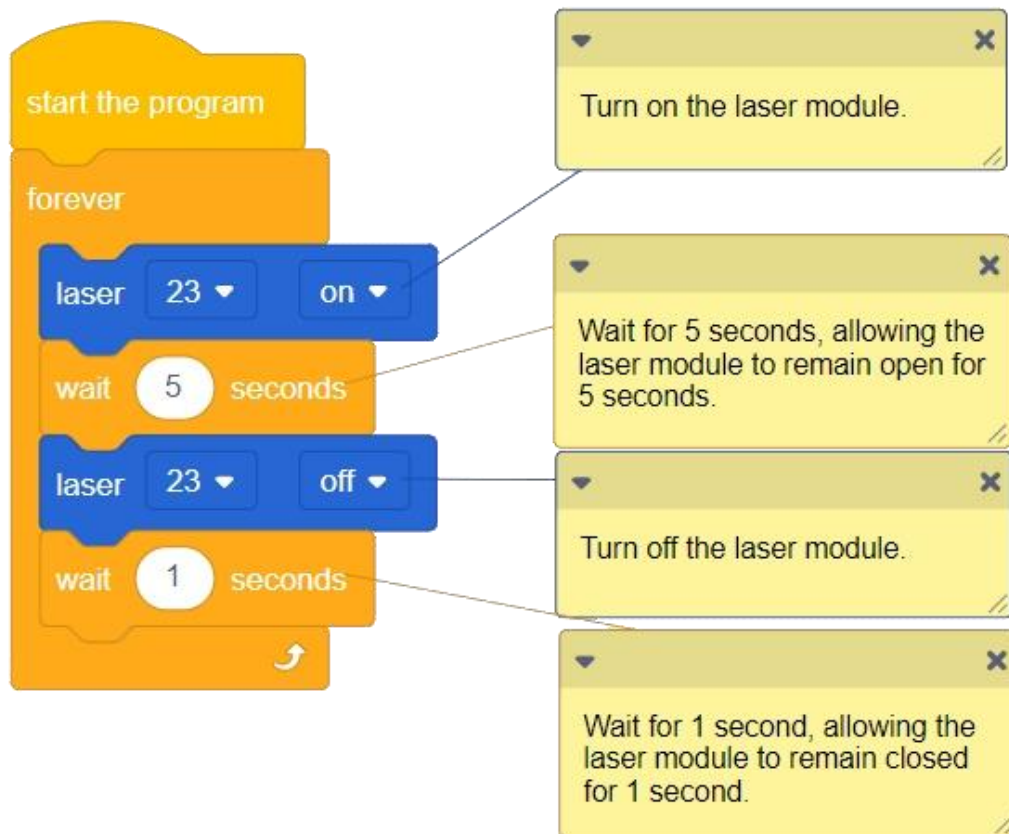
The laser module is composed of a 650nm red laser diode head, a drive circuit and three male pins, whose role is to produce a red dot laser beam. It should be noted that the laser has a powerful energy and a highly concentrated beam, the laser beam will cause damage to the human eye, do not direct laser eyes.

The control board can light the laser by output a high level to the laser transmitter module, and a low level means that the laser is turned off.



"How do you test if the Shield works?"

"We need to give it instructions," Dr.Lumi said, switching the projection. "You can refer to this code."



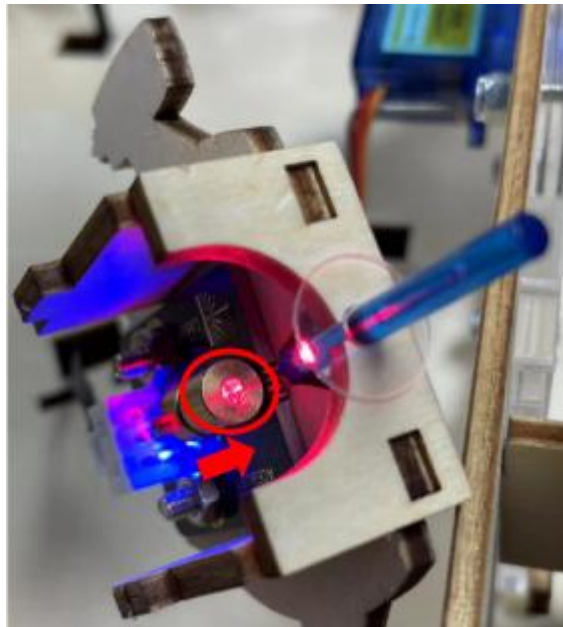
"Of course, I will also provide you with the easiest way to open the ["7_Laser.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

Note: The Guardian Shield emits strong energy, do not let the red energy light directly into your eyes.

The following effect will appear when the program is uploaded:
The laser module will light up.



Note: If your laser module cannot display the above pattern, try gently pressing the laser emitter towards the PCB board to increase the contact area between the emitted laser and the grating.



You happily say: "Success, the shield is not damaged and can be used."

"If you turn the plate and look up, you can see different shapes of the shield," says Dr.Lumi, pointing to the small transparent plate.

Dr.Lumi said: 'Now that we have confirmed that the Shield works, the next step is to repair the Mirror.

THE COUNTDOWN: 11 HOURS

Task 8: The secrets of the Time Mirror Light

You come to the other side of Lumi's Smart Home, where a huge device is placed that looks like a mirror.



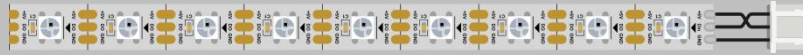
Curious, you ask, "Is this the time mirror?" It looks like a normal mirror."

Dr.Lumi nodded, "Yes, this is the time mirror. We now need to repair it , and now I will show you the split image of the Time Mirror, the core of the Time mirror is the RGB strip and the round lens."

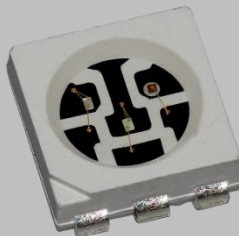


RGB LED Strip

The RGB LED strip usually consists of multiple RGB lights arranged at certain spacing and connected to the circuit board.



The internal structure of the RGB lamp is as follows. Each lamp contains red, green and blue three different colors of the small lamp beads. When the internal three small lamp beads are matched with different brightness, it is similar to mixing the three colors in different proportions, and the final external display is the mixed light color.




You look at the ribbon and feel confused. You ask Dr.Lumi, "It seems difficult to fix the mirror. I don't know how to mix the colors I want."

The principle of optical primary colors

The principle of optical primary colors is that in optics, red, green, and blue light are considered the basic colors that blend out all other colors. This principle is based on the perception mechanism of the human eye. There are three different types of cone cells in the human retina, which have different relative sensitivities to red, green and blue light respectively. Therefore, we can produce various colors of light by controlling the intensity ratio of red, green and blue light, thus showing a variety of color sensations.



"Do we need to control each bead to control the color?" I asked, confused.

Dr.Lumi smiled, "We have a block 

for controlling the RGB LED strip. Using it, you can easily control the color of the RGB LED strip. Inputting 0 in the first box represents all the LEDs on the strip, while entering a specific number represents a particular LED on the strip. The next three input boxes are for entering the proportion of RGB colors, allowing you to mix colors by adjusting the color proportions."

You said with relief, "That sounds simple. If we set the parameters like this 

, it means setting

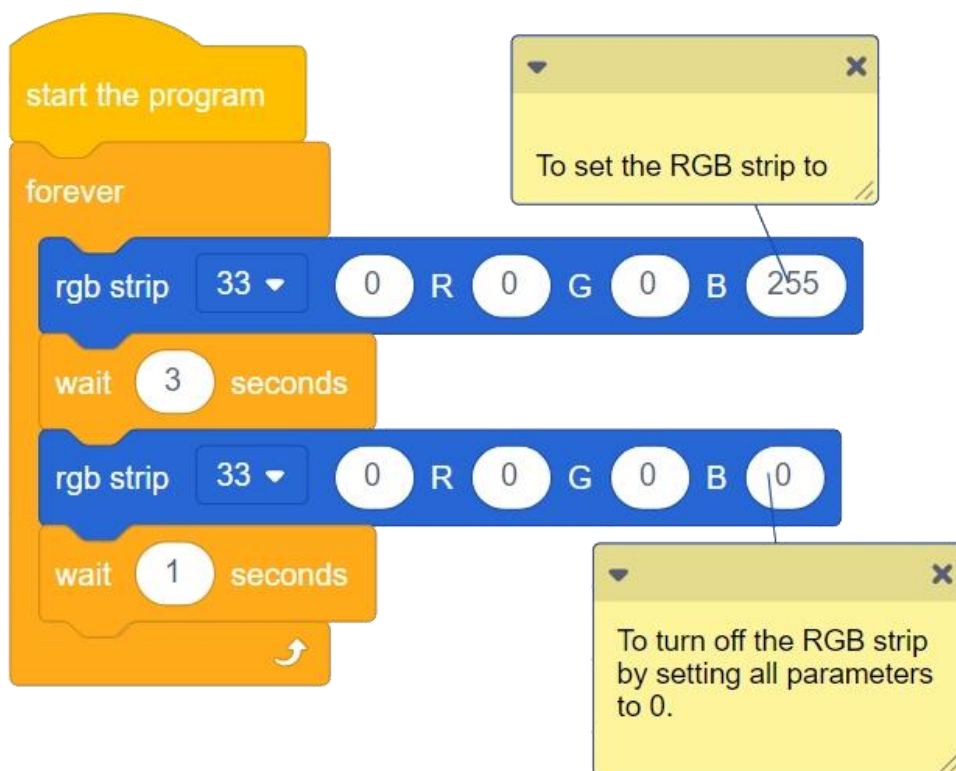
all the LEDs on the strip to red; and setting the parameters like this



means setting the third LED on the strip to green."

Dr.Lumi nodded approvingly and said, "It seems like you have a good understanding."

Then Dr.Lumi pointed to the screen that had been switched and said, "Now you can enter the command to activate the Mirror of Time and Space. You can refer to this command."



"Of course, I will also provide you with the easiest way to open the ["8 Chrono Cross.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

When the program is uploaded, the following effect will appear:
The mirror of Time Mirror Light will glow blue.



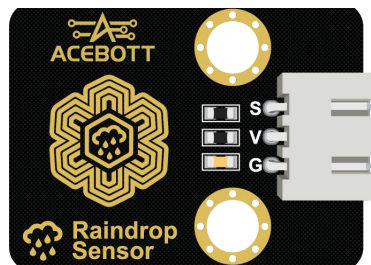
Dr.Lumi said with satisfaction, "Great! Time Mirror restored."

THE COUNTDOWN: 10 HOURS

Task 9: It's starting to rain. Come in!

"It's raining, Dr.Lumi."

Dr.Lumi hears your warning and looks up at the sky. "It's raining," he said. "Come in. Time to test out our raindrop sensor! It helps us monitor rain conditions."



"Dr.Lumi, how does a raindrop sensor detect rain?"

Dr.Lumi presses a button on the robotic arm, and the screen immediately displays information about the raindrop sensor.

Raindrop Sensor

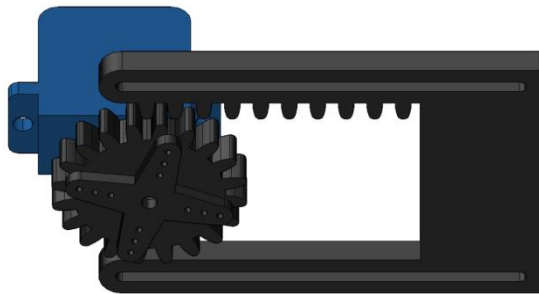
Raindrop sensor is a device used to detect the falling of raindrops, which is often used in automotive, smart home, and meteorological fields. It is able to sense the presence of precipitation and trigger the corresponding action or feedback.

The working principle of the raindrop sensor is to sense the landing of raindrops through the resistance between two electrodes. When the raindrops land between the electrodes to form a conductive path, the resistance value will change accordingly, and the sensor determines whether there is a raindrop by measuring the resistance change.

Dr.Lumi explained: 'When a raindrop hits the sensing area of the raindrop sensor, the main control system determines that there is rain and closes the window automatically.'

"What tools do you need to close Windows automatically?"

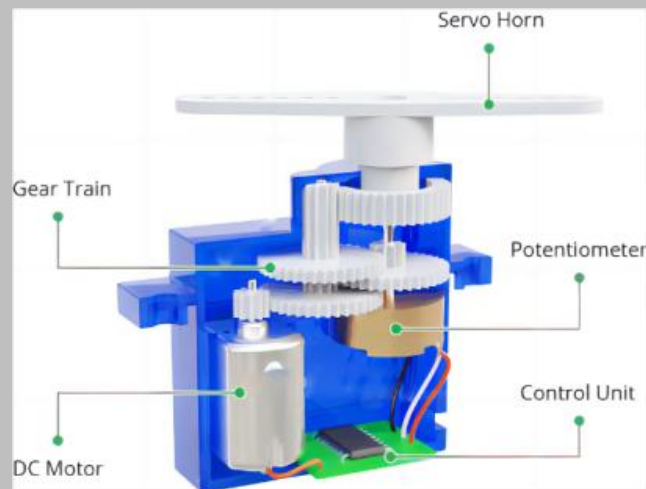
"You need servo motor module," says Dr.Lumi, pointing to the blue device. "You can do it with a simple rack and pinion structure."



Micro Servo motor

The main structure of the servo is shown in the following figure, which mainly has several parts: shell, variable speed gear set, motor, adjustable potentiometer, control board, and steering wheel.

Its working principle is that the control board receives the control signal from the signal source and drives the motor to rotate; The gear set reduces the speed of the motor by many times, and magnifies the output torque of the motor by corresponding times, and then outputs; The potentiometer and the last stage of the gear group rotate together to measure the rotation Angle of the servo shaft; The circuit board detects and judges the steering gear rotation Angle according to the potentiometer, and then controls the steering gear to rotate to the target Angle or stay at the target Angle.



The workflow is as follows: control signal → control board → motor rotation → gear set deceleration → steering wheel rotation → position feedback potentiometer → control circuit board feedback.

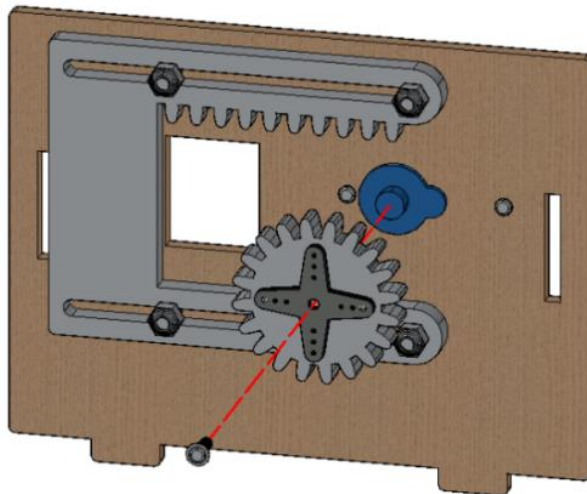
"Got it, Dr.Lumi, what kind of code will close the window when it rains?"

Dr.Lumi gestures, and the screen immediately switches to show the code: "You can refer to this code."

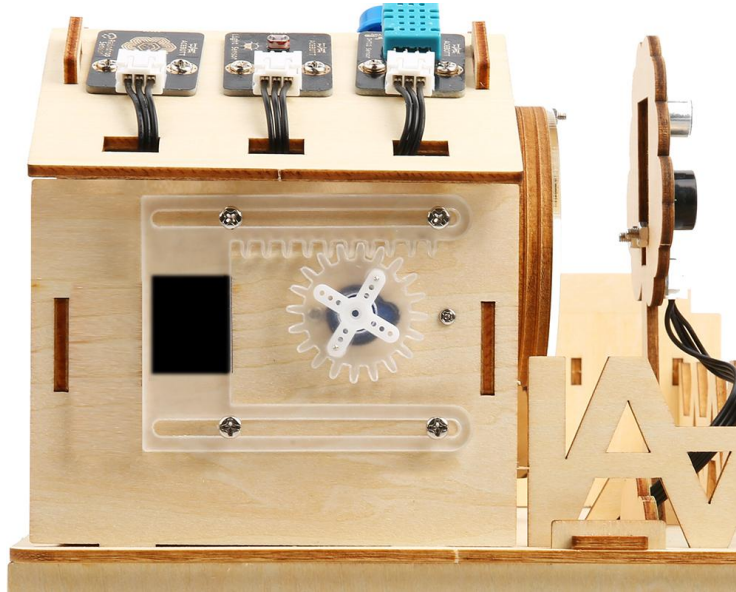


"Of course, I will also provide you with the easiest way to open the "[9_Raindrop_Window.sb3](#)" file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

After the program upload is completed, the servo will be calibrated first. After calibration, the servo will be in a static state. At this time, the acrylic window should be open (the far left end), and then manually install the acrylic gear on the servo.



When a raindrop falls (which can be simulated using a drop of water or a wet hand), the window that would have been open closes.



THE COUNTDOWN: 9 HOURS

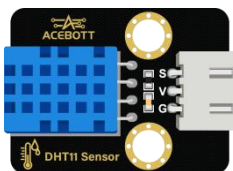
Task 10: The most important part of the Smart Home

Dr.Lumi looked at the roof and asked, "Do you know what the most important part of the Lumi's Smart Home is?"

"Dr.Lumi, I think it's living conditions." You fantasize about lying on a big, fluffy bed.

Dr.Lumi hears your answer and nods in agreement: "Yes, the right living environment is important, especially temperature and humidity, so we need to monitor the temperature and humidity of the living environment."

"This is the temperature and humidity sensor," says Dr.Lumi, pointing to the blue module.



DHT11 sensor

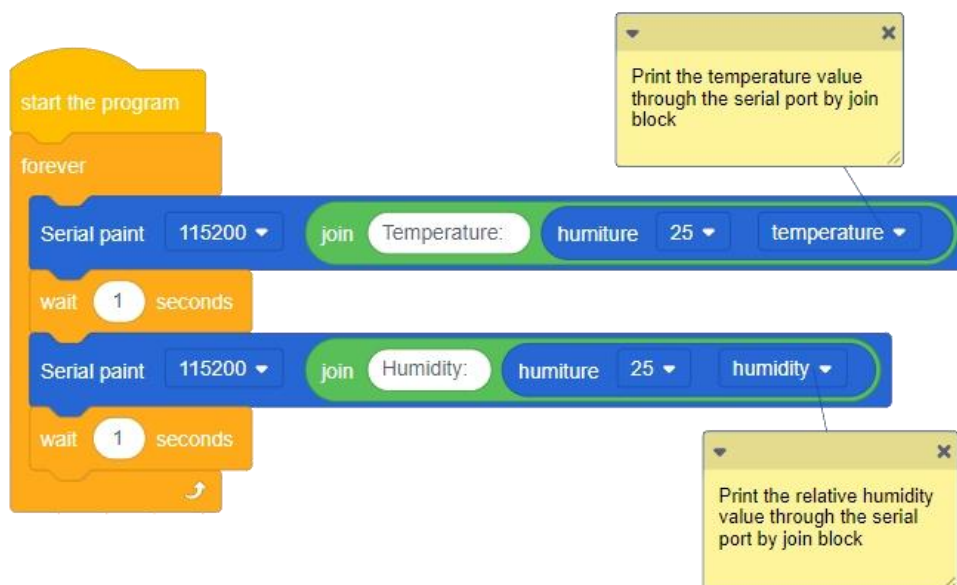
DHT11 sensor is a sensor based on the digital temperature and humidity sensor DHT11, it is a combination of temperature and humidity sensor, it converts the physical temperature and humidity through the temperature, humidity sensor and the corresponding circuit into a digital quantity that can be directly read by the data acquisition equipment. The temperature range is 0°C ~ 50°C. The accuracy is $\pm 2.0^{\circ}\text{C}$, the humidity range is 20% ~ 80%, and the accuracy is 5%.

"Dr.Lumi, temperature and humidity can't be seen with the naked eye, so how do you know?" You asked Dr.Lumi curiously.

"Do you still remember our method of observing data by passing the sensor's value to a variable and then displaying the variable's value on the stage?" Dr.Lumi responded.

"I do, but this sensor seems to have a complicated usage," you replied with some concern.

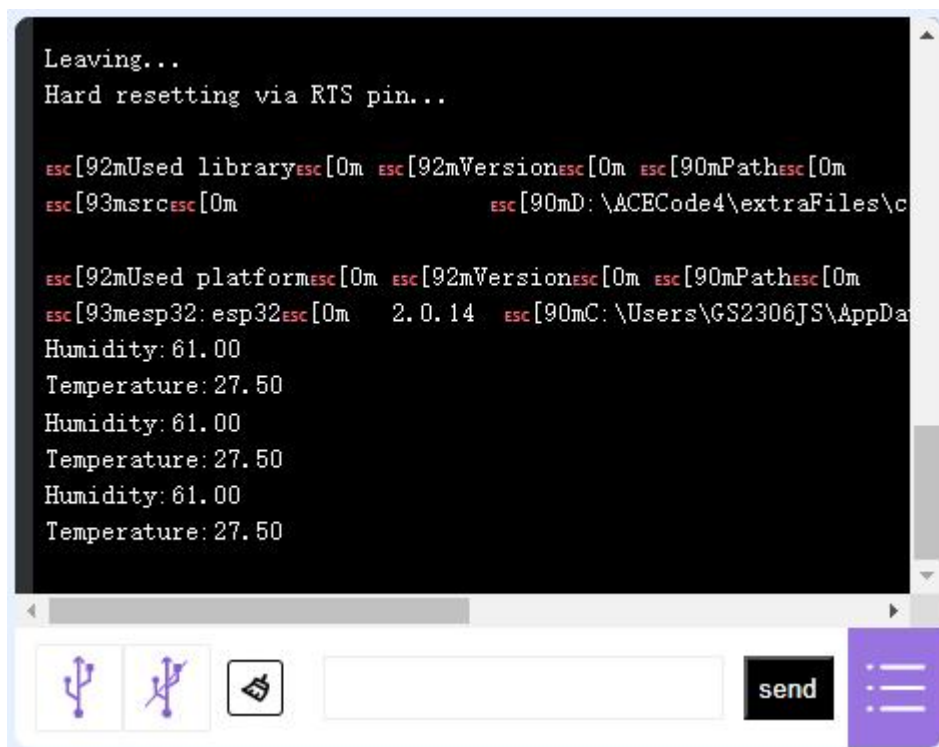
"Actually, it's quite simple. In ACECode, you can also print the sensor values using the serial monitor in "upload mode."" Dr.Lumi said, opening the projection screen.



"Of course, I will also provide you with the easiest way to open the "10_TEMP_HUMI.sb3" file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

"Now, upload this program, and you'll be able to see the temperature and humidity information in the serial monitor located in the bottom right corner of ACECode." Dr.Lumi said.

You noticed that the current temperature and humidity data of the environment were displayed on the serial monitor.



```
Leaving...
Hard resetting via RTS pin...

ESC[92mUsed libraryESC[0m ESC[92mVersionESC[0m ESC[90mPathESC[0m
ESC[93msrcESC[0m ESC[90mD:\ACECode4\extraFiles\c

ESC[92mUsed platformESC[0m ESC[92mVersionESC[0m ESC[90mPathESC[0m
ESC[93mesp32: esp32ESC[0m 2.0.14 ESC[90mC:\Users\GS2306JS\AppData

Humidity: 61.00
Temperature: 27.50
Humidity: 61.00
Temperature: 27.50
Humidity: 61.00
Temperature: 27.50
```

You look at the data and say, "Dr.Lumi, it looks like the Lumi's Smart Home is in a very livable environment right now."

Dr.Lumi smiled and said, "Yes!"

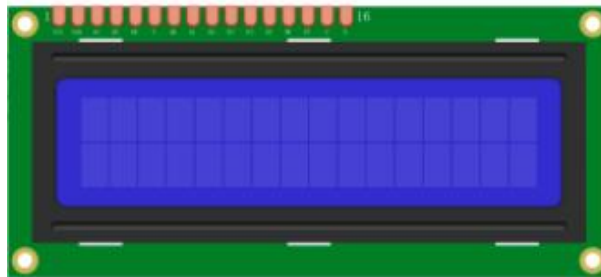
In the midst of the intense repair work, you can't help but wonder what the Lumi's Smart Home will look like when it's resumed and running.

THE COUNTDOWN: 8 HOURS

Task 11: Make the temperature and humidity values visible

"Dr.Lumi, is there any other way to quickly view the temperature and humidity data without having to rely on the serial monitor every time?"

Dr.Lumi nodded in agreement and pointed to the large screen on the cabin, saying, "Your idea is excellent. Visualizing temperature and humidity data in upload mode, an LCD screen is a great choice. We can display the temperature and humidity values on the LCD screen through code."



LCD 1602 I2C Module

LCD (Liquid Crystal Display), a passive display, that is, the liquid crystal itself does not emit light, it needs a backlight source to provide background light brightness, the use of electric field to control the arrangement of liquid crystal molecules, so as to change the light through and block, realize image display.

LCD 1602 I2C Module just as its name implies, this module is consist of 16 characters x2 lines LCD display module (can display 32 ASCII characters), and a module with I2C communication interface, default I2C address 0x27, with a blue potentiometer on the back, Can be used to adjust the backlight (when the character display is not clear, need to adjust the backlight, let the character display clearly).

"The LCD screen sounds very convenient and smart, how to use it?" you ask.

"The operation of the LCD is also very simple. You can refer to this for the code." Dr.Lumi said as he opened the screen.



"Of course, I will also provide you with the easiest way to open the ["11_LCD_TEMP_HUMI.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

After uploading the program, the following effect will appear:
The LCD screen will display the temperature and humidity data.



Dr.Lumi patiently explains: "When the LCD screen is not displaying information, you can turn the blue knob behind the LCD screen with a screwdriver and adjust the brightness of the LCD screen to display information."

You feel happy because the LCD screen will add more intelligent and convenient functions to the Lumi's Smart Home.

THE COUNTDOWN: 7 HOURS

Task 12: The rain has stopped. Start repairing the Gate!

The rain stopped, and the air outside reeked of fresh grass and rain. You took a greedy breath and felt my fatigue disappear.

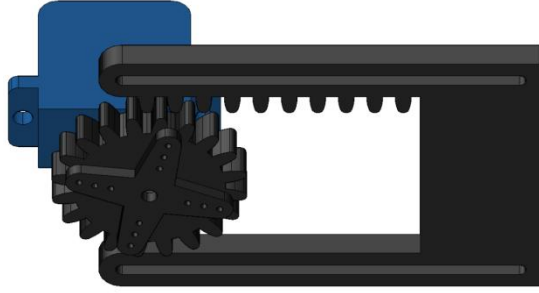
You and Dr.Lumi walk out of the cabin and toward the gate of the guard.

The gate is an important part of the Lumi's Smart Home. It not only guarantees the safety of the Lumi's Smart Home, but also symbolizes the solemnity and power of the Lumi's Home.

You and Dr.Lumi watch the gate carefully.

"Dr.Lumi, repairing the Guardian Gate mission is crucial, and I am determined to solve its problems perfectly!" you express to Dr.Lumi with determination.

"Fantastic! Let me show you the structure of the Guardian Gate first," Dr.Lumi says, opening the projection screen to display the relevant design blueprints of the gate.



"I see, this door has the same design as the window." You look at the door with a sudden understanding.

"Yes, mechanical structures can be applied to different objects. In the meantime, I will give you the key to the Gate of the Guard, and you will be free to enter the Lumi's Smart Home."

"How do I use the key?" you take the blue keychain and think about how to use it.

"The key needs to be used with the RFID hidden behind the sign of the Lumi's Smart Home."



Dr.Lumi used hand gestures to toggle the display, revealing the relevant RFID information.

RC522 RFID I2C Module

Radio-Frequency Identification (RFID) is a technology for wireless identification and tracking of objects. It is based on the principle of wireless communication by using RFID tags and RFID readers to communicate.

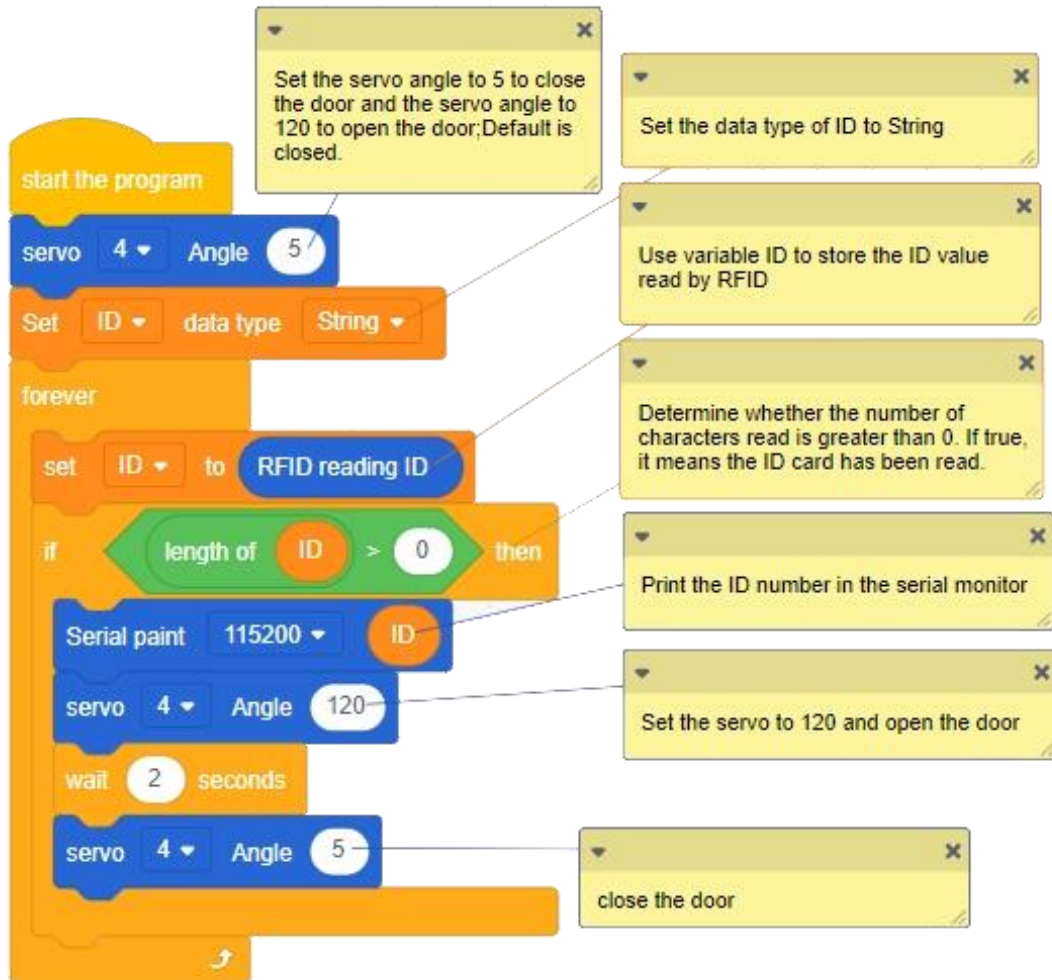
RFID Tag: An RFID tag is a small chip that contains a unique identifier UID (usually a numerical code) as well as some memory for storing additional information. These tags are usually composed of RFID chips and an antenna.

RFID Reader: An RFID reader is an electronic device that generates radio frequency signals and sends them to nearby RFID tags. The reader is also responsible for receiving the response signal from the tag and decoding the tag's information.

Rf communication: When an RFID reader sends an RF signal, it activates nearby RFID tags. The passive RFID tag obtains energy from the reader's signal as well as the operation command and uses it to send its own response signal. Active RFID tags have their own power supply, so they can actively send signals.

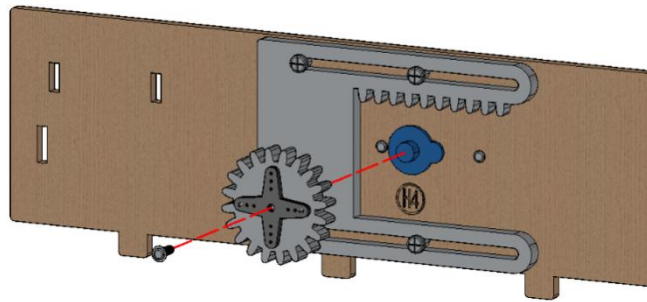
"I see. When the RFID senses the blue keychain, it opens the door."

Dr.Lumi nodded in satisfaction. "That's it," he said. "You can refer to that for this code."

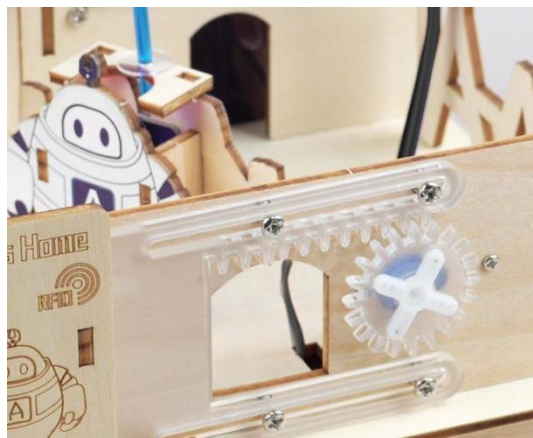


"Of course, I will also provide you with the easiest way to open the ["12_RFID_Door.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

After the program upload is completed, the servo will be calibrated first. After calibration, the servo will be in a static state. At this time, the acrylic door should be closed (the far right end), and then manually install the acrylic gear on the servo.



When the card is swiped, the closed door opens and closes again after a few seconds.



Unconsciously, the door took on a new look. When the final process is done, you and Dr.Lumi stand in front of the gate, proudly admiring your work.

The gate reasserted its majesty and power, like a guardian, firmly guarding the safety of the wisdom Home.

Now that all the devices have been repaired and activated, it's time to test the smart Master voice interaction system.

THE COUNTDOWN: 6 HOURS

Task 13: The Guardian's Shield has been launched

"We have finished all the function repair and testing, the next thing is to hand over all the functions to the main control system, and use the voice recognition module to tell the main control system which function to activate." Said Dr.Lumi, standing in front of a large tree and looking up at the top of tree.



"Can it understand me?"

"Sure," Dr.Lumi said, turning on the projection screen. "Let's take a closer look at this amazing module."

Voice Recognition Module

The voice recognition module is an AI offline speech recognition product.

Voice recognition It can understand our words and convert them into words or commands. First it needs to record our words with a microphone, then these recordings are processed, and then these processed recordings are converted into a series of special digital signals.

Next, the trained model is used by the machine - it has learned how to associate different sounds with corresponding words or commands, and when we speak, the machine uses this model to guess what we are saying.

It should be noted that the accuracy of voice recognition can be affected by many factors, such as the accent of the speaker, the speaking rate, and the surrounding noise, among others.

"This is wonderful! It looks complicated, but it's easy to use, you say happily.

"Yes, make it easy for everyone.

You shout, "Hi Lumi."

Suddenly from the canopy, a voice said, "Hi, what can I help you."

"Smart Voice has another wake-up response -- Hi, I am here. Keep in mind that the smart voice stays awake for 30 seconds, after which it goes into sleep mode and needs to be reawakened with 'Hi Lumi', "says. Dr.Lumi.

As you and Dr.Lumi stand in the middle of the yard, ready to officially open the Guardian's Shield, you feel a mixture of tension and excitement.

Before we start interacting with the speech recognition module, we need to know the data it converts our words into so that we can control it.

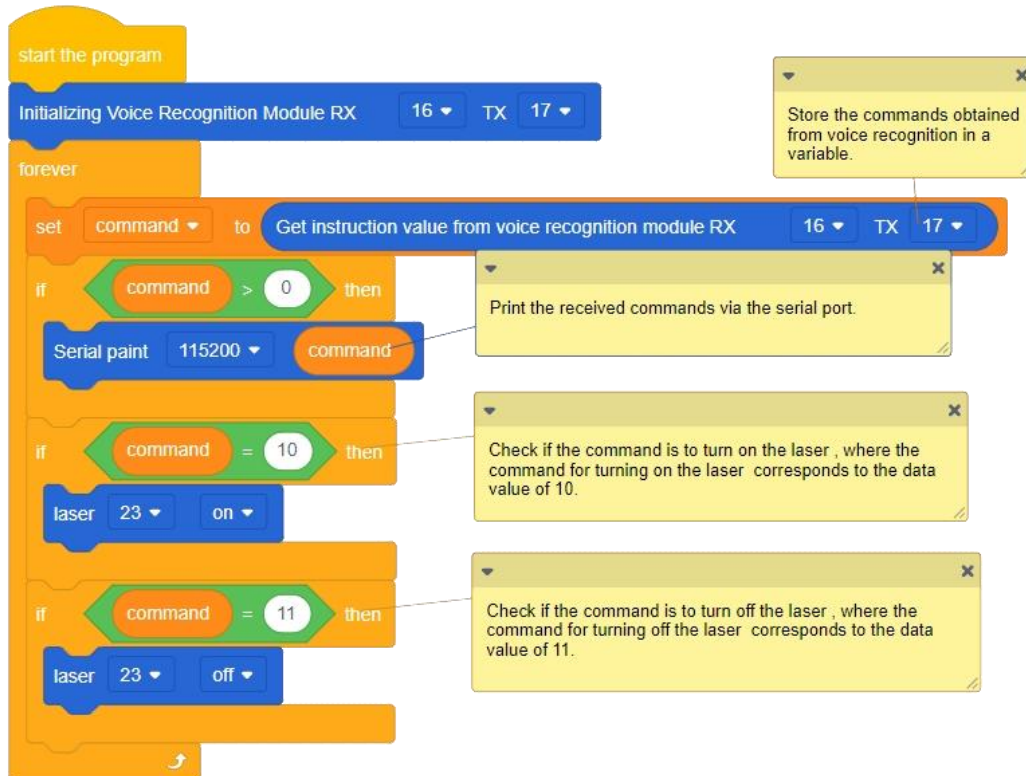
Data corresponding to speech recognition commands

In the speech recognition module, we have burned the instructions in advance, and the corresponding data is shown in the following table:

open the door	2
close the door	3
open the window	4
close the window	5
turn on the light	8
turn off the light	9
turn on the laser	10
turn off the laser	11
turn on the color light	12
turn off the color light	13

Note: If "turn on/off" does not work, try using "open/close". For example, "turn on the light" can be replaced with "open the light".

Dr.Lumi walks to the center of the smart home and tells you that he needs your help to type a special instruction.



"Of course, I will also provide you with the easiest way to open the "13 Audio Laser.sb3" file in "English\ACECode(Blockly Code)\4.Program file" and get the program."

Dr.Lumi said: 'The smart voice system needs to wake up the smart assistant and then speak the corresponding voice command before it can be used.

"Hi, Lumi (wake up command). " The Guardian's Shield is now open! Instruction -- "turn on the laser, "Dr.Lumi announced solemnly.

With his words, the entire smart home began to emit a mysterious wave of energy. You feel an invisible force flowing

through the House of Wisdom, like an invisible shield around the Lost city.

You and Dr.Lumi look up at this spectacular sight with pride and joy. The opening of the Guardian's shield signals that the Lost City is safe.

"It's safe," says Dr.Lumi enthusiastically.

Then the communications device in the box rings. It's Mayor Johnny on the phone.

"Dr.Lumi, you have succeeded in activating the Shield. On behalf of the people of the Lost City, I thank you, and we will host a great feast for you and the warriors."

Dr.Lumi looked up at you and tried to talk, but he hung up. Dr.Lumi looked up at you and said, "But it's safe."

You look up at the sky, take a deep breath, and say, "Yeah, it's safe."

THE COUNTDOWN: 5 HOURS

Task 14: Try something new

"Dr.Lumi, since you can open and close the Guardian shield by voice, why not try to open and close the doors and Windows by voice?" your nervous tension is relaxed, and you can't wait to try to design a new feature.

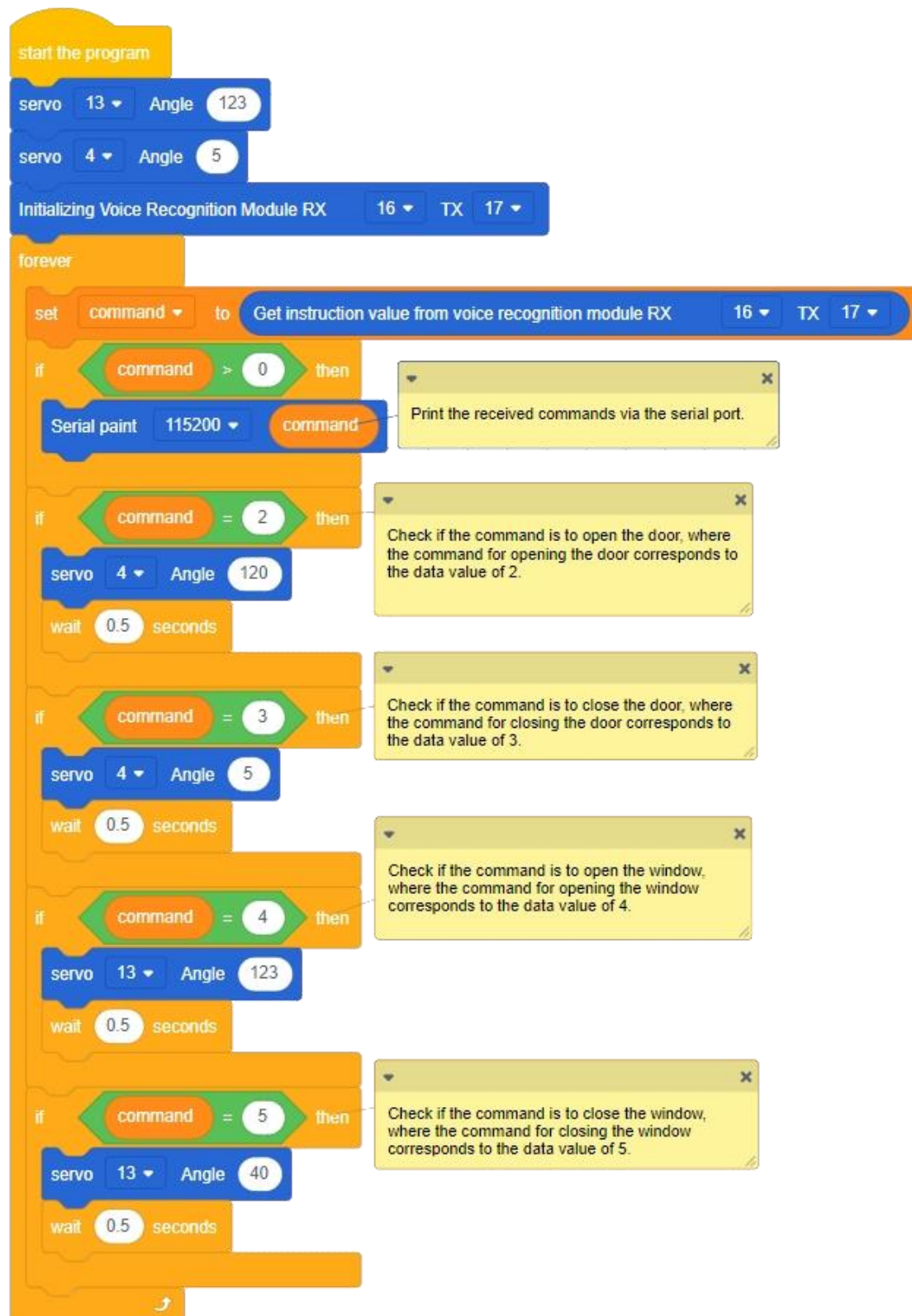
"Yes," Dr.Lumi replied. "We can add instructions for opening and closing doors to the speech recognition module."

You're excited to imagine that with a simple voice command you can make a window automatically open, allowing fresh air to flow in, or a door automatically open to welcome guests.

"When you give the corresponding voice command, the voice recognition module will interpret the command and send a signal to the smart master system, and then the smart master system will control the corresponding window or door to open or close the command," Dr.Lumi continued.

You can't wait to say, "Dr.Lumi, can I see the instructions?" "Sure," Dr.Lumi said with a smile.

Dr.Lumi raised his arm to open the projection screen and showed the voice control commands of the window and door control modules.



"Of course, I will also provide you with the easiest way to open
the "14 Audio Door Window.sb3" file in

"English\ACECode(Blockly Code)\4.Program file" and get the program."

You study the instructions carefully. "This is amazing!" After you upload the program, you say excitedly, "I can't wait to try out the new features, can I?"

Dr.Lumi nodded and smiled. "Sure."

You cheerfully walk to a window or door to be tested. You clear your throat and say, "Hi Lumi."

"Hi, what can I help you?"

When the intelligent voice answers, you speak the command: "open the door."

With your command, the door immediately opens, showing the intelligent control effect. You cheer with excitement and feel the convenience and fun that technology brings.

Dr.Lumi nodded in satisfaction. "Everything looks fine. the command to close the door is' close the door, 'the command to open the window is' open the window,' and the command to close the window is' close the window. 'You can try it yourself."

THE COUNTDOWN: 4 HOURS

Task 15: A magical communication method--WIFI

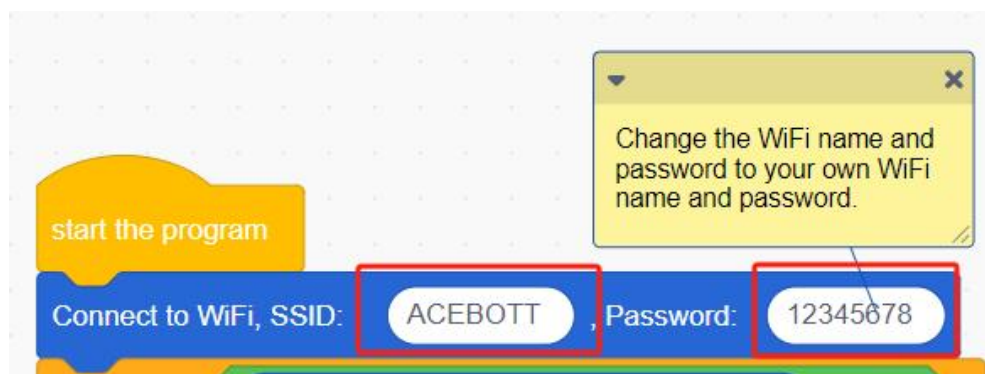
You stand in the doorway and call for the Smart Voice. When there is no response, you turn to Dr.Lumi, who is standing under the tree. You ask, "Dr.Lumi, if we are too far away from the smart voice, is there any other way for the master to receive our commands?"

"There is a way, people in order to solve this problem, invented the method of wireless communication -WIFI. The computer/laptop need to connect WIFI, and then connect the ESP32 control board to the same WIFI as the computer/laptop through the program."



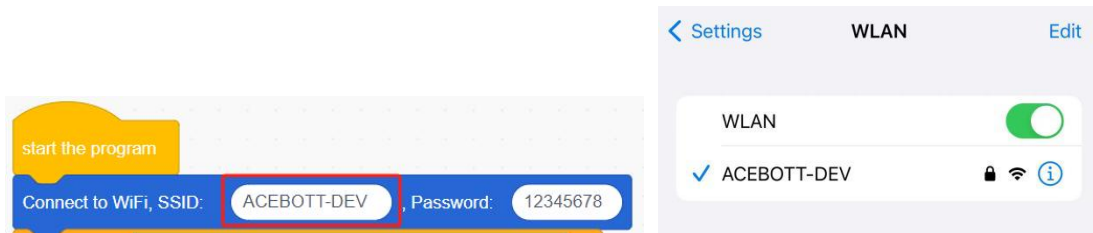
"The computer can connect to WIFI with a passcode," you ask incredulously. "How can I connect to WIFI with an ESP32?"

"Just change the ssid and password in the program below," Dr.Lumi said, showing part of the code.

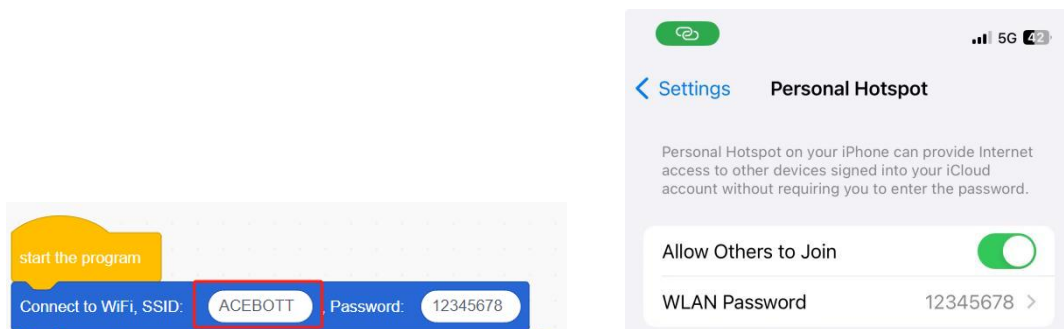


Note: There are two ways to connect the ESP32 to the same network as your phone or computer.

1. Connect both the phone (or computer) and the ESP32 to the same WiFi network.



2. Set up a hotspot on your phone or computer with a specific name and password. Modify the ssid and password in the ESP32 program to match the name and password of the hotspot. Turn on the hotspot, upload the ESP32 program, and let the ESP32 connect to the hotspot on your phone or computer.



"That is to change the ssid(WIFI name) and password (WIFI password) into the same WIFI as the computer or mobile phone", you understand later replied, "Let the computer communicate with the ESP32 master through WIFI, and then enter instructions in the browser's web page to control the ESP32 control board."

"Yes, you understand exactly. Just like writing a letter to someone, you need to write the address, and the computer needs

to give the address to receive the instruction. The format is: [192.168.0.26/Test](#), where [192.168.0.26](#) is the address (IP address will change depending on WIFI network), "/" is the interval symbol, and Test is the instruction."



test ok

"Looks a bit complicated, how to get the IP address."

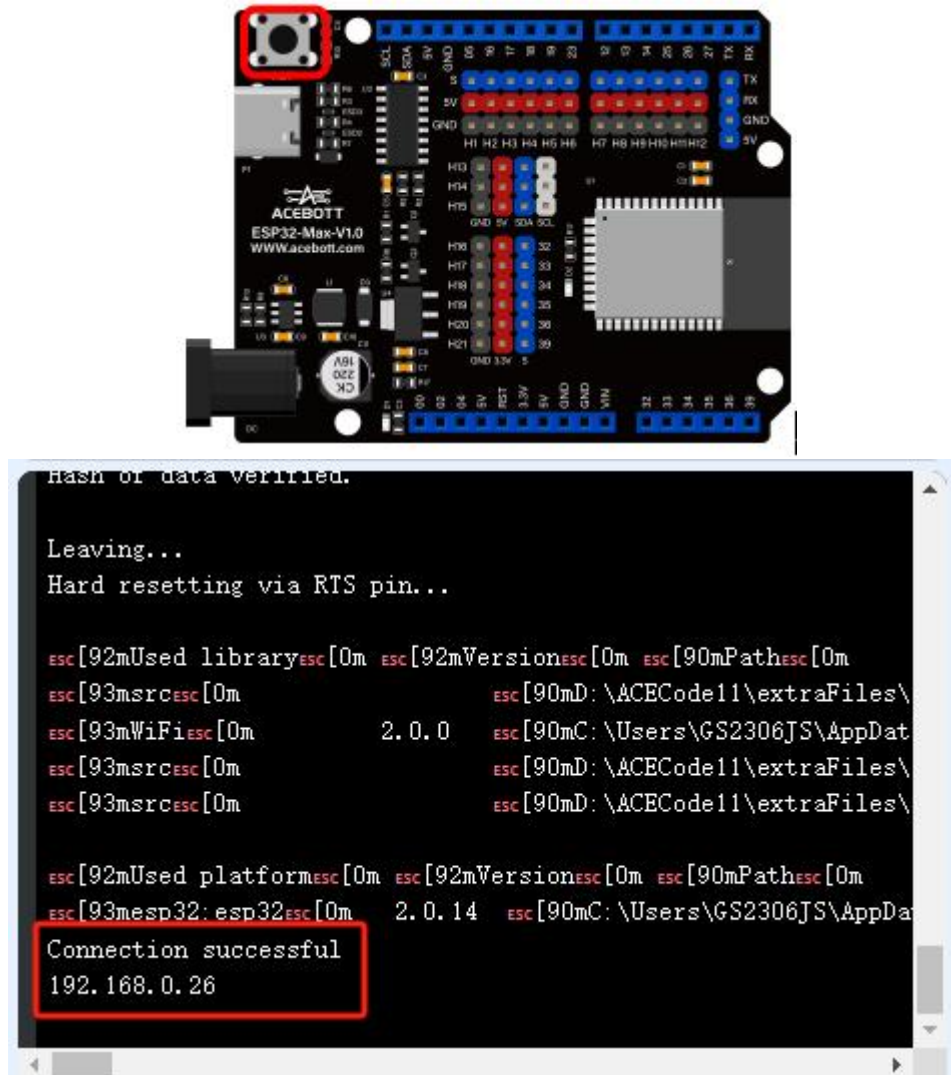
"The IP address will be fetched from the code and displayed on the serial monitor," Dr.Lumi reassuringly said.

"Let's try it out. Let's start by controlling street lights." "First let's open the program and change the ssid(WIFI name) and password(WIFI password)."

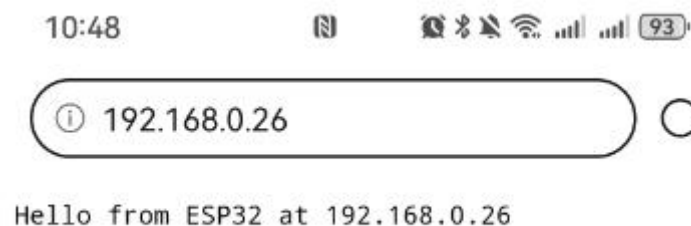
Open the ["15_WIFI_LED.sb3"](#) file in "English\ACECode(Blockly Code)\4.Program file" and get the program.

"Of course, the first you use is difficult, follow the steps strictly, you will understand gradually."

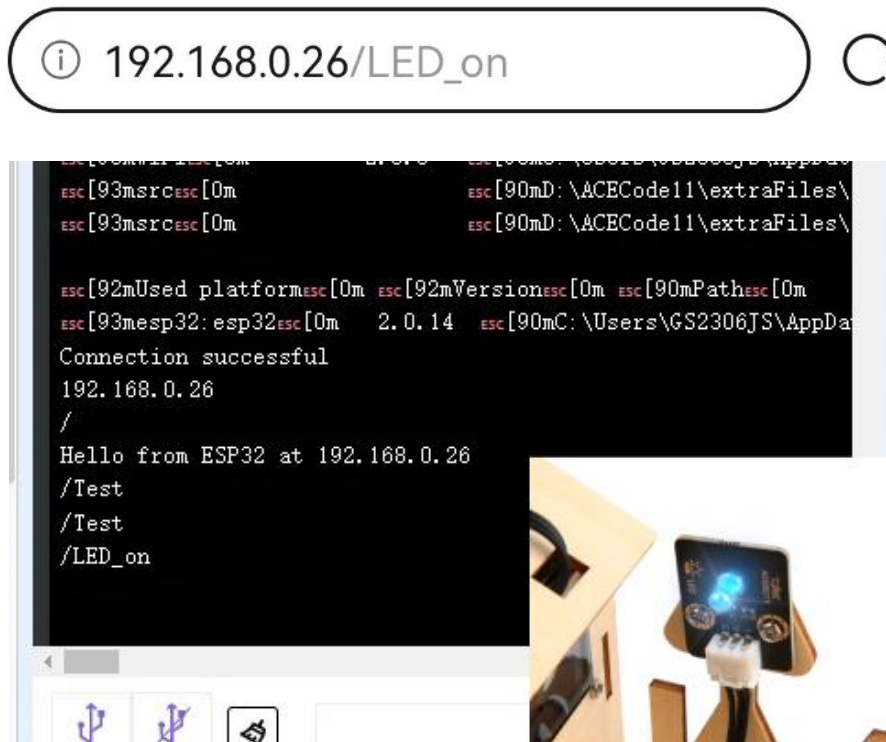
After uploading the program, view the serial port monitor, press the reset key of the control board, and the results are shown as follows:



When you type: 192.168.0.26 in your browser's address bar (connected to the same network), it will show:

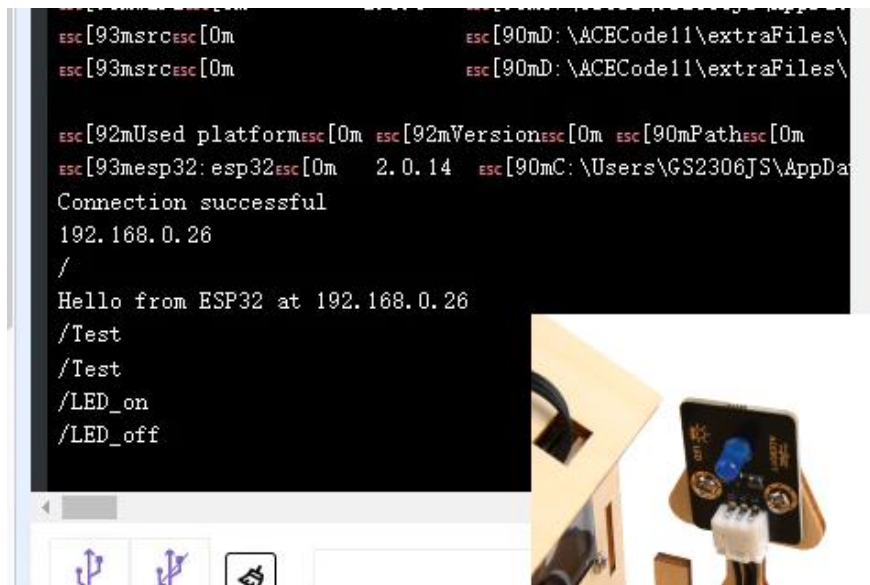


When you enter: 192.168.0.26/LED_on in the browser address bar and confirm, the serial port monitor will display as follows, and the LED light will turn on.



When you enter: 192.168.0.26/LED_off in the browser address bar and confirm, the serial monitor will display as follows, and the LED light will turn off.





After carefully following the steps to control the LED light in the browser, you have mastered the use of WIFI to control the LED. You have always thought that WIFI is a magical technology, and now you can master it.

THE COUNTDOWN: 3 HOURS

Task 16: WIFI can also control doors and windows

Dr.Lumi looked at the sky countdown and felt he had to hurry up and teach the knowledges.

"Next we'll try to use WiFi to control the doors and Windows," says Dr.Lumi, removing a projector from his arm and handing it to you. "From today, this device is here for you. It contains knowledge and instructions.

You take the device and suddenly feel the responsibility: "Thank you, Dr.Lumi. I will study hard and take care of the Lost City."

Under the guidance of Dr.Lumi, you learned how to operate the device and successfully call the WIFI command to control the door and window.

Open the "16 Wifi Window Door.sb3" file in "English\ACECode(Blockly Code)\4.Program file" and get the program.

After uploading the program, open the serial port monitor, and the results are shown as follows:

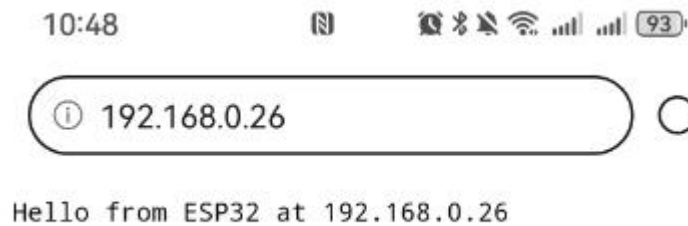
```
Hash of data verified.

Leaving...
Hard resetting via RTS pin...

ESC[92mUsed libraryESC[0m ESC[92mVersionESC[0m ESC[90mPathESC[0m
ESC[93msrcESC[0m          ESC[90mD:\ACECode11\extraFiles\
ESC[93mWiFiESC[0m          2.0.0 ESC[90mC:\Users\GS2306JS\AppData
ESC[93msrcESC[0m          ESC[90mD:\ACECode11\extraFiles\
ESC[93msrcESC[0m          ESC[90mD:\ACECode11\extraFiles\

ESC[92mUsed platformESC[0m ESC[92mVersionESC[0m ESC[90mPathESC[0m
ESC[93mesp32: esp32ESC[0m 2.0.14 ESC[90mC:\Users\GS2306JS\AppData
Connection successful
192.168.0.26
```

When you type: 192.168.0.26 into your browser's address bar, it will show as follows:



When you type: 192.168.0.26/door_on and 192.168.0.26/door_off in your browser's address bar, it will show as follows:



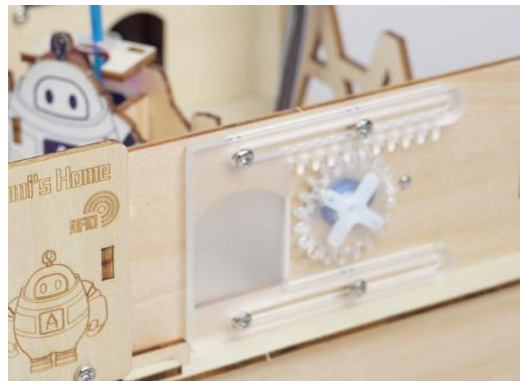
Remember to click "go" on your phone or "enter" on your computer, then the serial monitor will show as follows:

```
Hard resetting via KIS pin...
esc[92mUsed libraryesc[0m esc[92mVersionesc[0m esc[90mPathesc[0m
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mWiFiesc[0m 2.0.0 esc[90mC:\Users\GS2306JS\AppData
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mESP32_Servoesc[0m esc[90mC:\Users\GS2306JS\Docume

esc[92mUsed platformesc[0m esc[92mVersionesc[0m esc[90mPathesc[0m
esc[93mesp32: esp32esc[0m 2.0.14 esc[90mC:\Users\GS2306JS\AppData
Connection successful
192.168.0.26
Hello from ESP32 at 192.168.0.26
/door_on

esc[92mUsed libraryesc[0m esc[92mVersionesc[0m esc[90mPathesc[0m
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mWiFiesc[0m 2.0.0 esc[90mC:\Users\GS2306JS\AppData
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mESP32_Servoesc[0m esc[90mC:\Users\GS2306JS\Docume

esc[92mUsed platformesc[0m esc[92mVersionesc[0m esc[90mPathesc[0m
esc[93mesp32: esp32esc[0m 2.0.14 esc[90mC:\Users\GS2306JS\AppData
Connection successful
192.168.0.26
Hello from ESP32 at 192.168.0.26
/door_on
/door_off
```



When you type: 192.168.0.26/window_on or 192.168.0.26/window_off in your browser's address bar, you get the following:



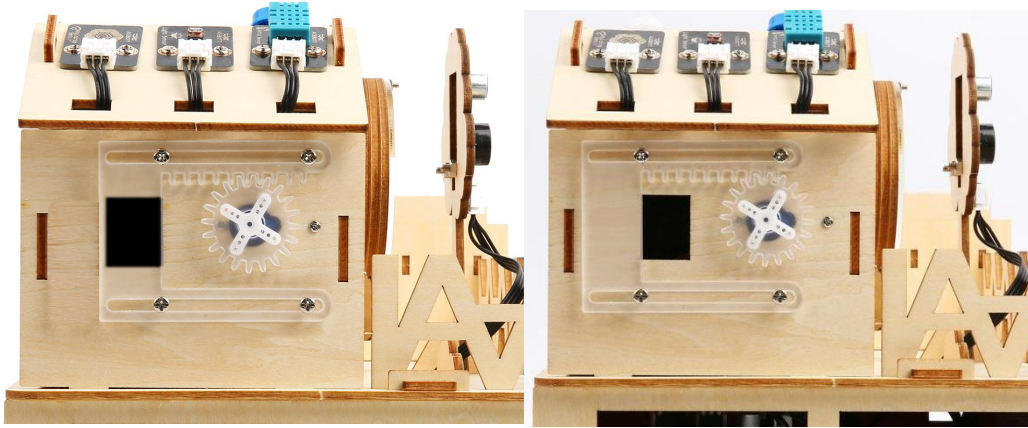
Remember to click "go" on your phone or "enter" on your computer, then the serial monitor will show as follows:

```
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mWiFiesc[0m 2.0.0 esc[90mC:\Users\GS2306JS\AppData
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mESP32_Servoesc[0m esc[90mC:\Users\GS2306JS\Docume

esc[92mUsed platformesc[0m esc[92mVersionesc[0m esc[90mPathesc[0m
esc[93mesp32: esp32esc[0m 2.0.14 esc[90mC:\Users\GS2306JS\AppData
Connection successful
192.168.0.26
Hello from ESP32 at 192.168.0.26
/door_on
/door_off
/window_on
/window_off

esc[92mUsed libraryesc[0m esc[92mVersionesc[0m esc[90mPathesc[0m
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mWiFiesc[0m 2.0.0 esc[90mC:\Users\GS2306JS\AppData
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93msrccesc[0m esc[90mD:\ACECode11\extraFiles\
esc[93mESP32_Servoesc[0m esc[90mC:\Users\GS2306JS\Docume

esc[92mUsed platformesc[0m esc[92mVersionesc[0m esc[90mPathesc[0m
esc[93mesp32: esp32esc[0m 2.0.14 esc[90mC:\Users\GS2306JS\AppData
Connection successful
192.168.0.26
Hello from ESP32 at 192.168.0.26
/door_on
/door_off
/window_on
```



Lumi looks at you as you experiment with the doors and Windows, and reminds you, "You can use your browser to enter the corresponding IP address, send the instructions written in the program, and you can control the doors and Windows to switch."

You reply, "I see, Dr.Lumi, I will follow the procedure carefully."

THE COUNTDOWN: 2 HOURS

Task 17: A new interactive control

"Dr.Lumi, if the computer isn't around, is there any other way to control it?"

"Good, that's a great question," Dr.Lumi looks at you with pleasure. "Putting the control system in the phone solves this problem. I prepared an APP that can be installed on my mobile phone, so that you can control the smart home anytime and anywhere."

"How do I install it?"

"You can search for 'ACEBOTT' on your phone's app store, download and install it, this is the ACEBOTT icon." says Dr.Lumi.



"ACEBOTT app is installed, can you directly control the smart home?"

Dr.Lumi shook his head and said, "No, you need to write the control program to the ESP32 control board first, and then the APP

can be used. Notice that the phone and the ESP32 need to be connected to the same WIFI."

You adjust the projection equipment and find the relevant program. Open the "17 Wifi All.sb3" file in "English\ACECode(Blockly Code)\4.Program file" and get the program.

"You need to change the SSID(WIFI name) and PASSWORD(WIFI password) in the program to your own SSID(WIFI name) and PASSWORD(WIFI password)," Dr.Lumi warns.

When you're done, upload the program to the ESP32 motherboard.

Then Dr.Lumi said, "Now it's time to download proprietary apps. If you have an IOS phone, you have to search for ACEBOTT in the APP Store and download it.

"How do I download it for Android?"

"If you have an Android phone, you need to search the Google Play Store for ACEBOTT and download it."

Follow this method to download and install the program.

Note:

1. This tutorial is applicable to ACEBOTT APP version 2.0 and above. You can click the settings button in the upper left corner of

the APP to view the software version number. Please make sure that the software version you are using meets the requirements;

2. If you need to update the ACEBOTT software version, you can refer to the method prompted in this tutorial to download the latest APP version.

3.Note: If you need to watch the APP operation video, please click the link below.

https://youtu.be/QM2_AyFk1aU

"Dr.Lumi explained, pointing to an icon on the phone's screen.

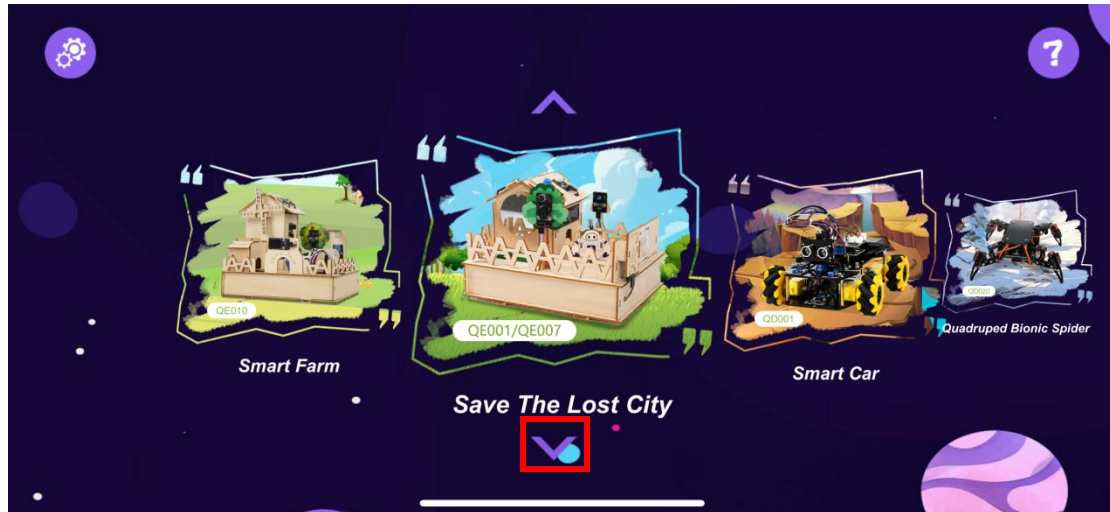
"You just tap the icon and it will open the app."



"Then you will see is this open screen interface."



"Next, you will enter the product selection interface. Find the 'Save The Lost City' series and use the arrows to choose different models. For this tutorial, select the 'QE001/QE007' model."



"Once you enter, you will enter the smart home function control screen, and then click the 'ip' icon to connect to the ESP32."

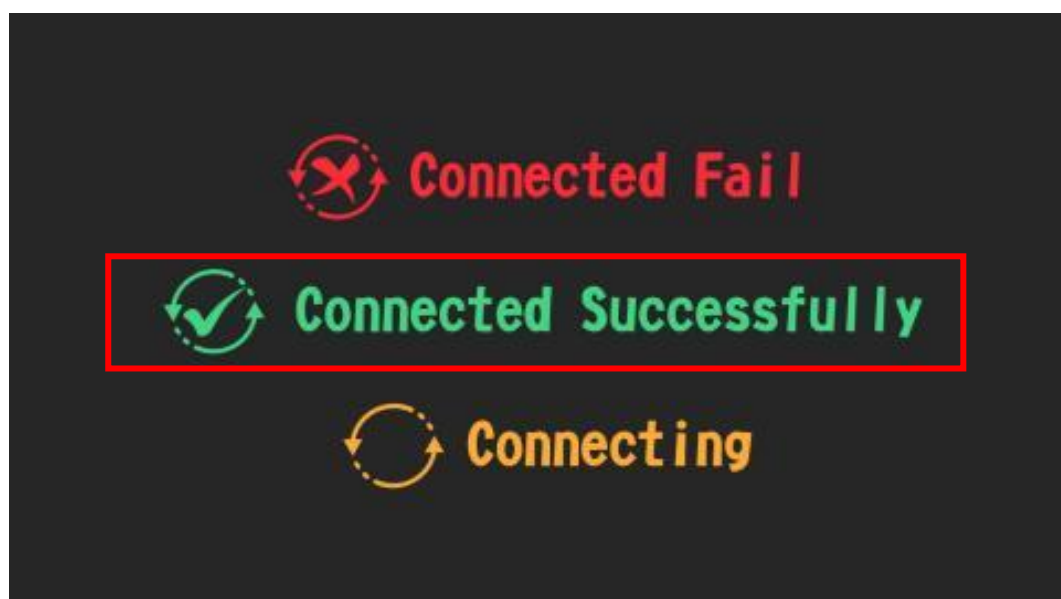
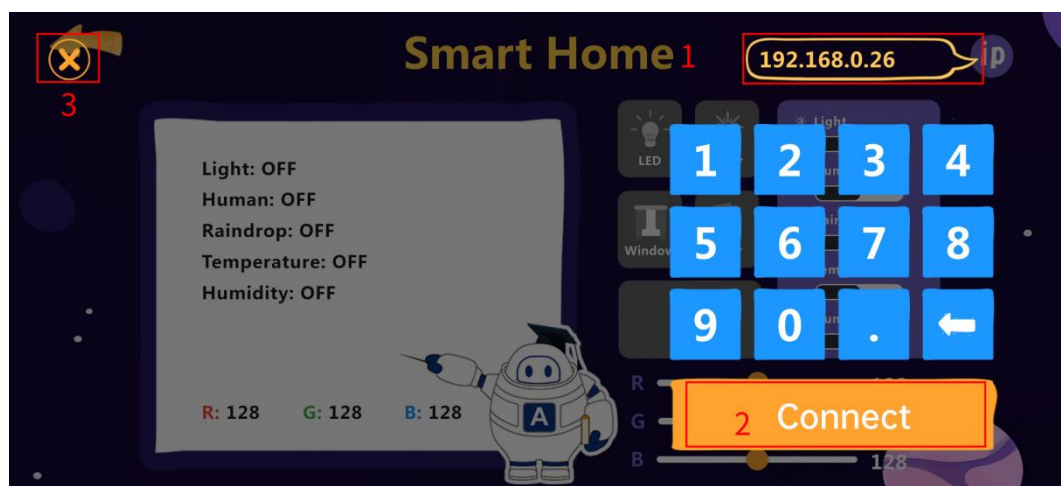


You can enter the IP address in the APP according to the IP address displayed in the serial port monitor and click "connect". When you see the 'Connected Successfully' prompt, you need to click the cross(X) in the top left corner to get back to the smart home interface."

```
Hash of data verified.
Leaving...
Hard resetting via RTS pin...

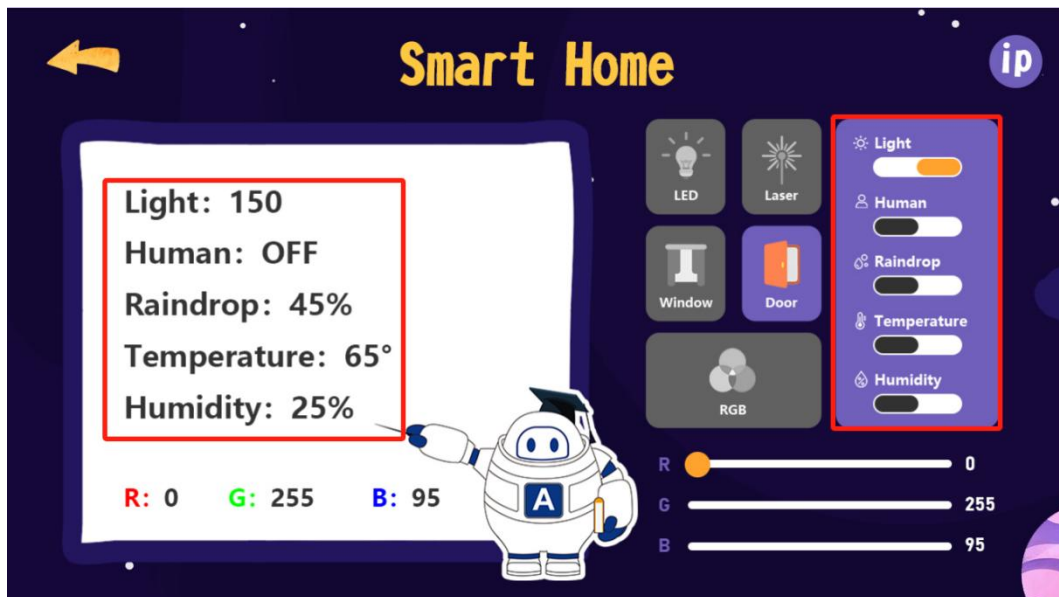
ESC[92mUsed libraryESC[0m ESC[92mVersionESC[0m ESC[90mPathESC[0m
ESC[93msrcESC[0m ESC[90mD:\ACECode11\extraFiles\
ESC[93mWiFiESC[0m 2.0.0 ESC[90mC:\Users\GS2306JS\AppData
ESC[93msrcESC[0m ESC[90mD:\ACECode11\extraFiles\
ESC[93msrcESC[0m ESC[90mD:\ACECode11\extraFiles\

ESC[92mUsed platformESC[0m ESC[92mVersionESC[0m ESC[90mPathESC[0m
ESC[93mesp32: esp32ESC[0m 2.0.14 ESC[90mC:\Users\GS2306JS\AppData
Connection successful
192.168.0.26
```

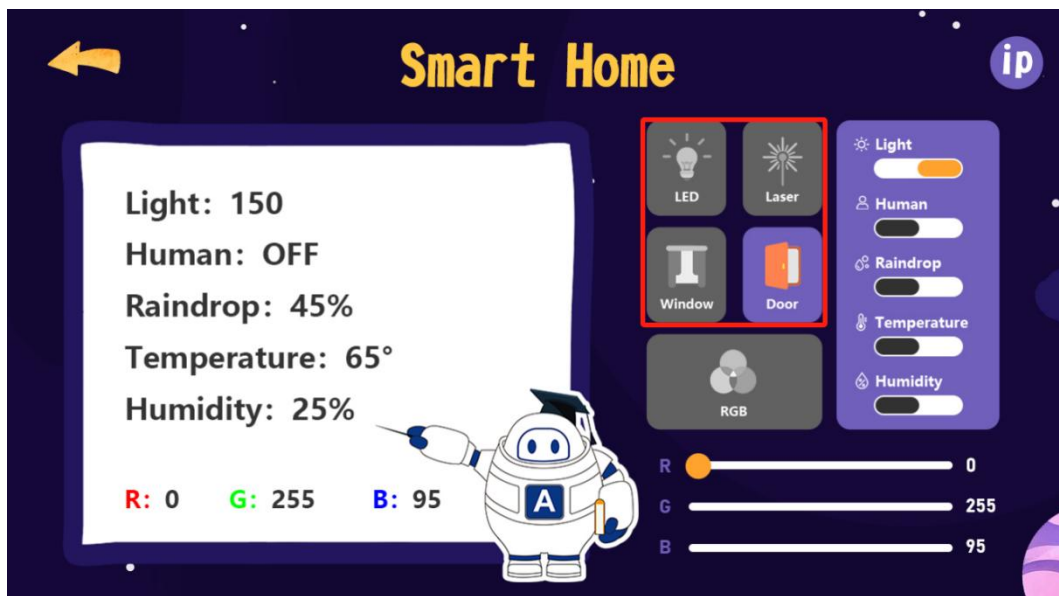


After a successful connection, clicking on the corresponding icon will activate the respective function. The far right is the sensor

switch; once it's turned on, you can view the data detected by the sensor on the data panel.

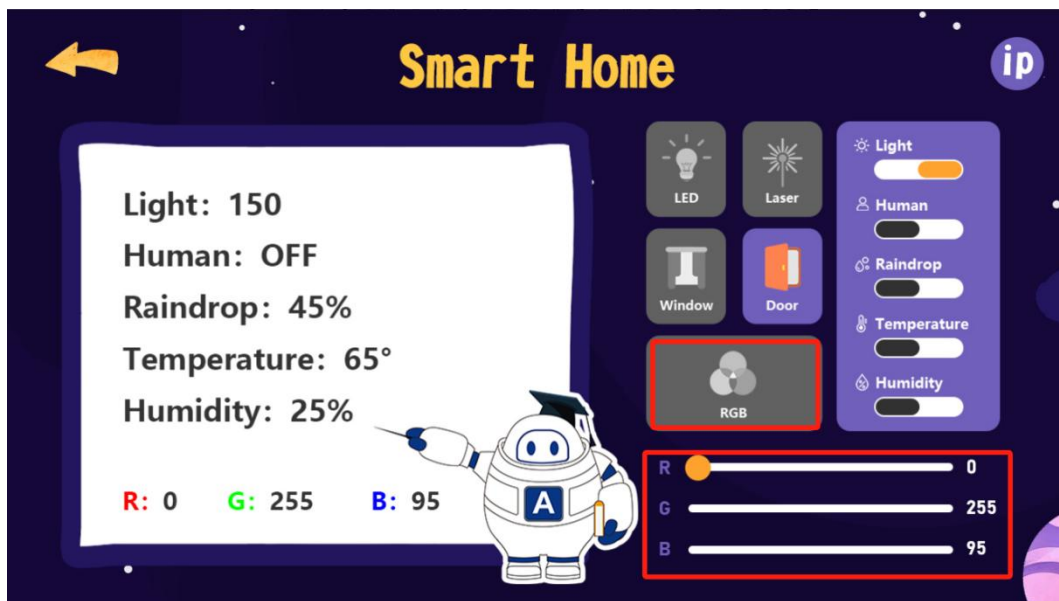


The middle buttons control the following: LED lights, laser, window, and door. You can turn on or off the corresponding module by clicking the respective buttons.



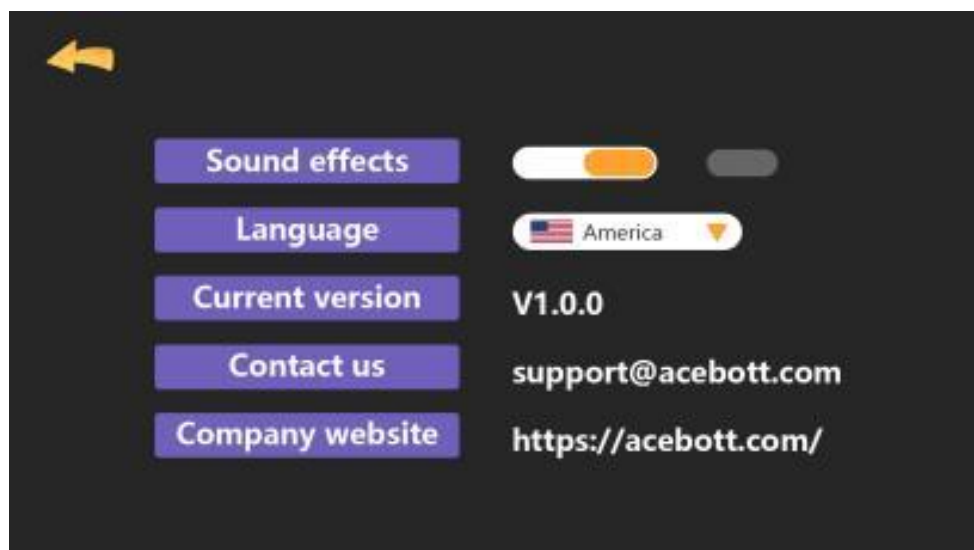
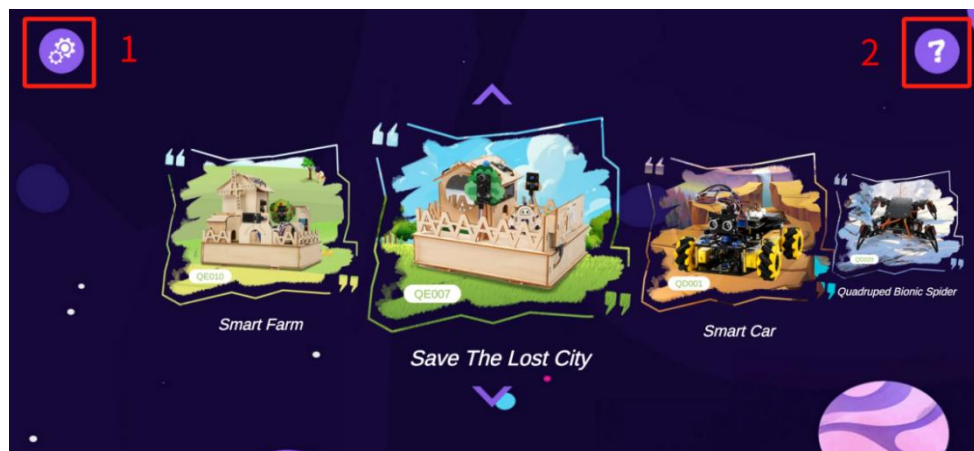
If you need to open the Time Mirror Light, you can select the function button :RGB. You will see the Time Mirror Light light up as shown below.

If you need to change the color of the Mirror, you can also drag the feature sliders R, G, B.



You look closely at the phone screen and see a simple and intuitive interface. Each device has an on-off button, and by clicking the button, you can control the state of the device. In addition, there

are some additional options such as background music selection, language selection, About us and other functions.



You are very excited and satisfied with the application. This means that no matter where you are, with your phone in hand, you can easily control the main control system via WiFi. Because with this application, you don't need to rely on the computer to control the main control system, but you can operate it anytime and anywhere.

"This is so convenient," you say excitedly, looking gratefully at Dr.Lumi. "Thanks for your guidance and help, Dr.Lumi!"

Dr.Lumi smiles and nods. "You're welcome," he says. "Remember, it's important to think creatively when you're facing a problem."

You pick up your phone with confidence, ready to explore and use this portable control system.

THE COUNTDOWN: 1 HOURS

Task 18: Leave a gift

"Dr.Lumi, now that the Lumi's smart home is fully functional and has added many convenient features, it feels like you can finally rest." You breathe a sigh of relief.

Dr.Lumi nodded with satisfaction. "Yes, now we can finally enjoy the rising sun together under the tree."

Then Mayor Jonnhy led the crowd: "Cheers for Dr.Lumi and our warriors!"

Cheers came from the crowd on all sides. Soon, Lumi's smart home is decorated to beautiful and unique -- you can paint it by yourself if you like. Colorful lights twinkle on the walls, and the table is filled with food and drinks.

People gathered happily, and laughter and cheers filled the space. In the laughter, the sun gradually rises, you gather in the courtyard, looking up at the direction of the sun rising, watching the meteorite fall and touch the shield of the moment of fragmentation, people's hanging heart is also put down.

At this moment, the Time Mirror Light suddenly lit up and gave off a dazzling light. Everyone stared in amazement at the entrance full of mysterious power.

The crowd exclaims and asks, "Dr.Lumi, what happened?"

"Well, I must go, The Lost City. Good-bye. Thank you, my warrior, for a thrilling and unforgettable day. Of course I have a little surprise for you. When you think of me, shout out: Adventure Begin."

You look up and see that the countdown to the sky is over and Dr.Lumi is gone, as if it never happened.

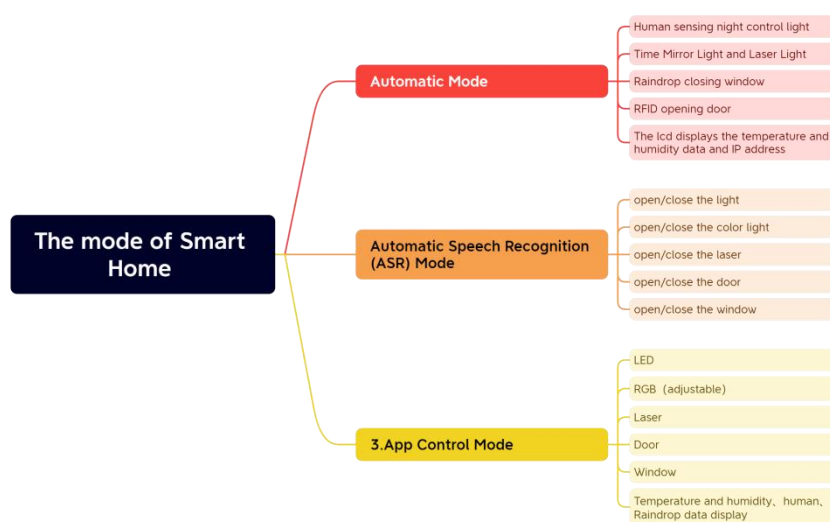
Suddenly you remember what Dr.Lumi told you before the party. You run to the tree in the yard. You find a blue wooden box under the tree. When it was opened, a string of code appeared on the wall.

It is Dr.Lumi put it all the function together in a code.Open the "[18 Complete.sb3](#)" file in "English\ACECode(Blockly Code)\4.Program file" and get the program.

After uploading the program and testing, it is found that the automatic function, WIFI function, voice function and APP function can be complete in a code.

Note: After enabling the APP control mode or voice mode, if there is no related operation within 5 seconds, it will switch to the automatic mode. For example, if the LED light is turned on through the APP, and there is no operation on the APP after 5 seconds, it will enter the automatic control mode. If it detects that the light is

not needed at the moment, it will automatically turn off the LED light.



You've also discovered that "Adventure Begin" is actually an instruction.

You pack up your gear, stand in the yard, awaken the Smart Voice, and shout out "Adventure Begin", and suddenly the Time Mirror Light lights up and absorbs you.

What's the next adventure story? What kind of adventure will there be? Stay tuned!

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ACEBOTT FB Group QR Code



YouTube QR Code