Instructions for Robot Alliance

A_2.0.33

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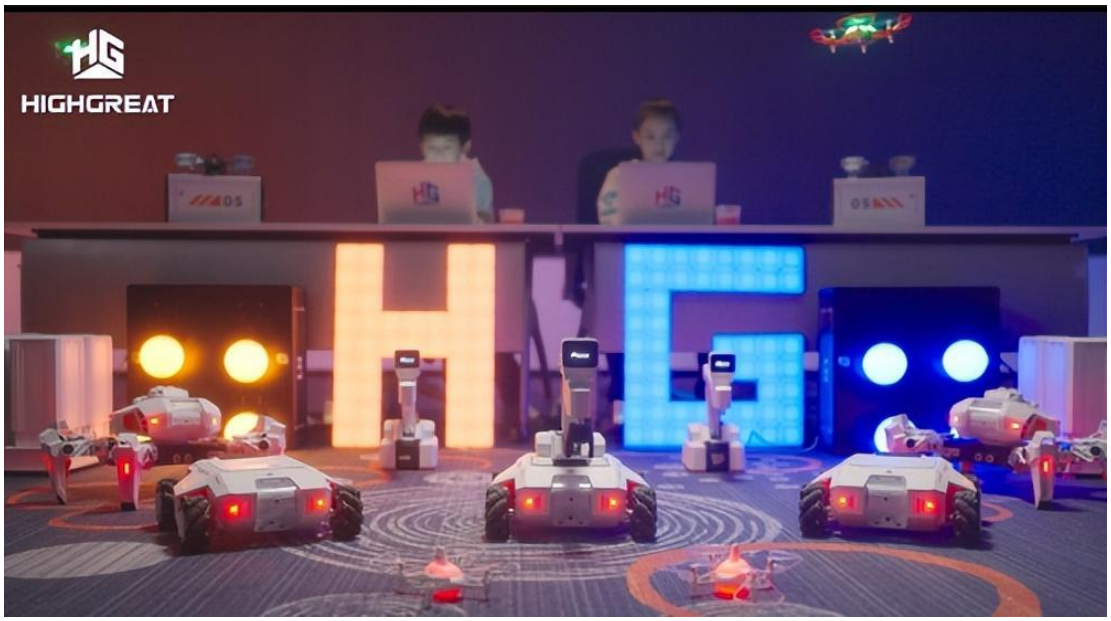
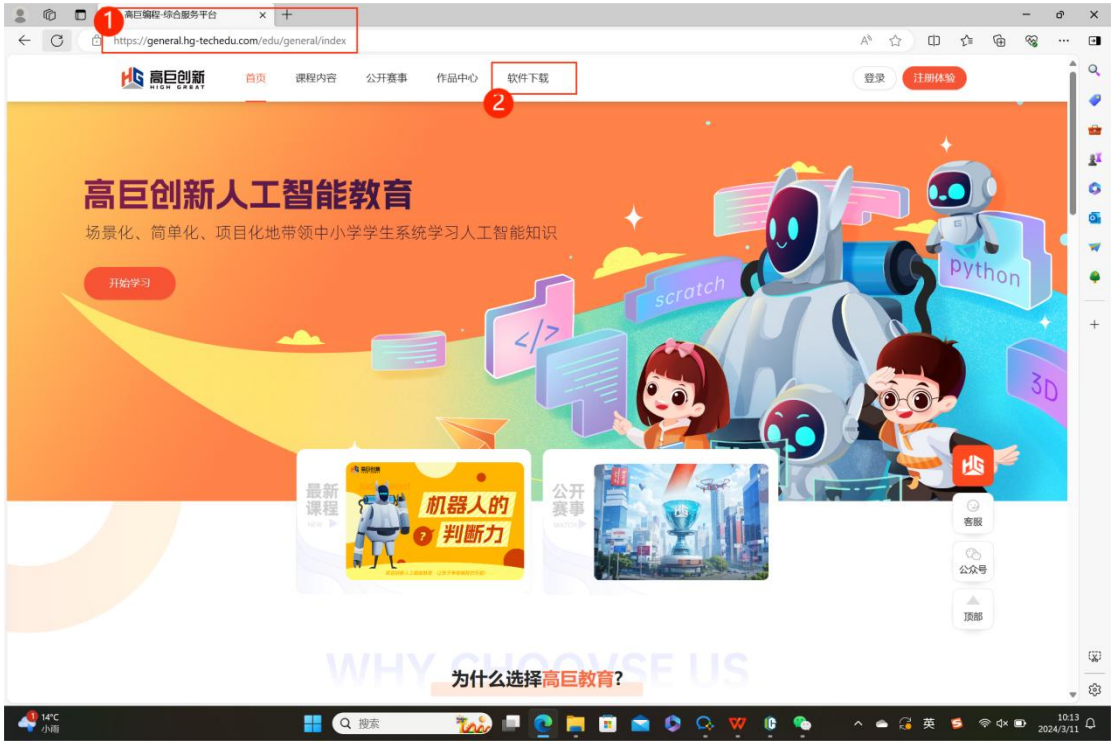
I. Foreword

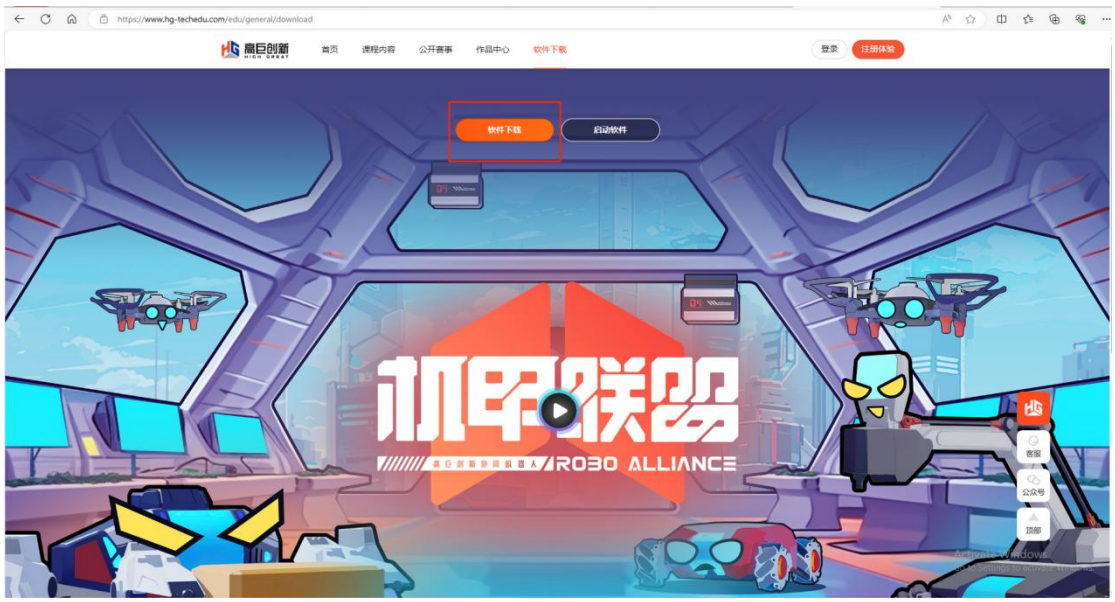
The Robot Alliance educational series products include the Robot Alliance environmental intelligent hardware devices and mimic intelligent hardware devices, Robot Alliance digital laboratories, Robot Alliance standard laboratories, and the Robot Alliance online education platform. Among them, the Robot Alliance mimic intelligent hardware devices include drones, smart cars, robotic arms, and hexapod robots; the environmental intelligent hardware devices include matrix panels, elevating lights, elevating balls, and track robots. The Robot Alliance software also supports modular programming and Python programming for single-device or multiple-device control.



II. Software Download and Startup

1. Downloading software





1) Log in to High Great's **Integrated Service Platform System** (High Great Programming-Integrated Service Platform (hg-techedu.com));

2) Click the "Download" button to download the software installation package.

2. Installing software

(1) Connect your Android phone or computer to your computer, and transfer the installation package to your phone or tablet through your computer.
(2) Locate the installed package in the explorer of your phone or tablet and download the software to your desktop.
Installation tablet configuration requirements:

Performance parameters	Performance Indicator Requirements	Recommended
CPU Frequency	≥2Ghz	Snapdragon 7 Series or 8 Series
Display the screen	2560*1600 resolution and above	2.5k
Screen size	≥8inch	10 inches and above
System memory	≥6GB	8GB
Storage capacity	≥16GB	128GB
Android version	Android 12 and above	Android 12
Hardware support	gyroscope	There are gyroscopes

Whitelist of tablet models:
Mi Pad 5 Pro, Redmi Pad Pro, Mi Pad 5, Honor Pad 9 (in a first-served order)
Not recommended models:
A tablet equipped with Huawei's HarmonyOS system

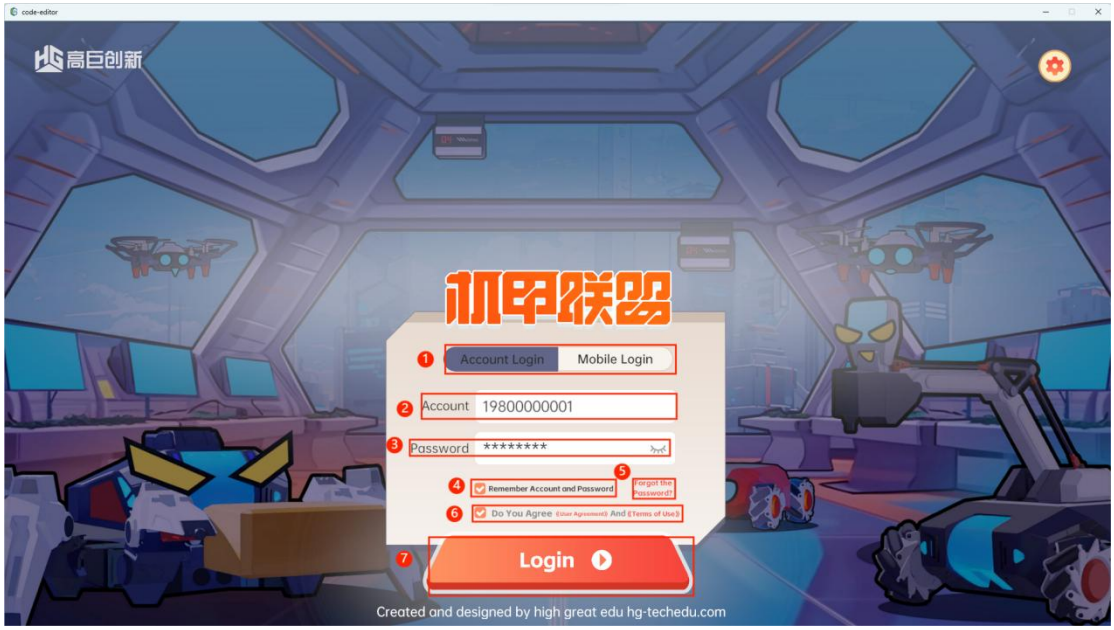
3. Entering software

1) On the computer desktop where the software has been downloaded, directly click the shortcut key of the Robot Alliance to open the software, click the "Start Programming Journey" icon, and enter the programming software.

III. User Registration and Login

1. Logging in with an account

Use a High Great account to log in to the software. Enter the registered account number and password information (which must be consistent with the account number and password used on the teaching website), and click the "Login Account" button to log in to the programming software.



1) Login with an account/mobile phone number: Switch your account or use your mobile phone number to log in;

2) Account number input box: Enter your account number;

3) Password input box: Enter your password;

4) Remember password: When you click this option, the next time you visit the website, the software will automatically log in to the website.

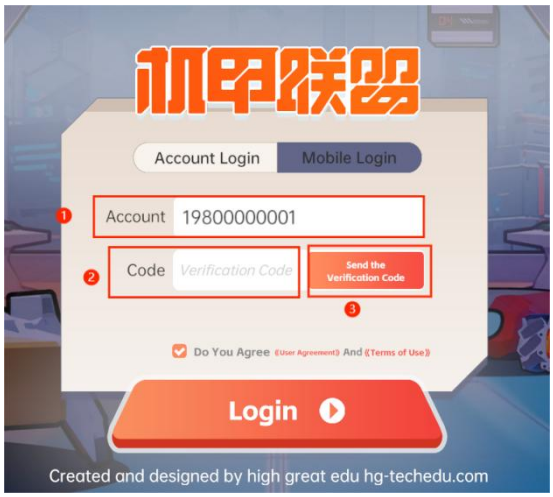
5) Forgot password: The entry for you to retrieve their password;

6) User Agreement and Terms of Use: Redirect to the link interface of User Agreement and Terms of Use;

7) Login button: Click to log in to the software.

2. Logging in with a mobile phone number

Log in to the software with your mobile phone number.



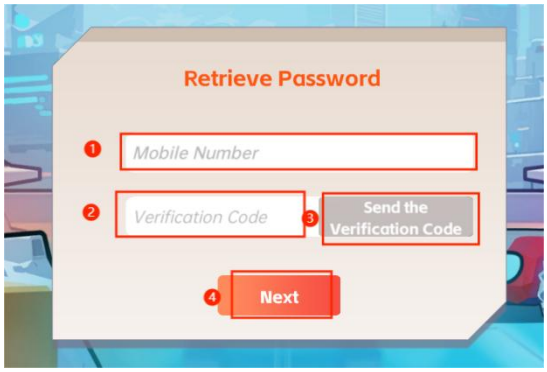
1) Mobile phone number input box: Enter your mobile phone number;

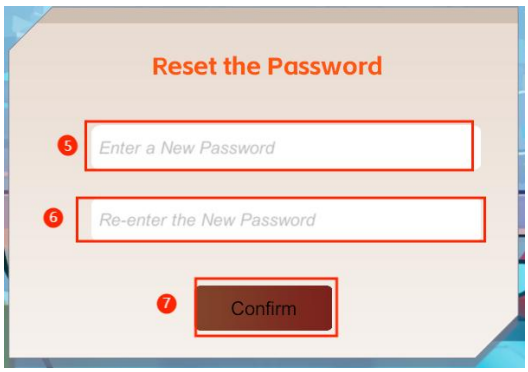
2) Verification code input box: Enter your verification code;

3) Send the verification code: Click to send the verification code to your mobile phone.

3. Retrieving/resetting password

Click the "Forgot Password" button and enter your mobile phone number and verification code to retrieve your password.





1) Mobile phone number input box: Enter your mobile phone number;

2) Verification code input box: Enter your verification code;

3) Send the verification code: Click to send the verification code to your mobile phone;

4) Next step: Click to reset the password

5) Enter a new password: Enter a new password;

6) Repeat password: Enter the new password again;

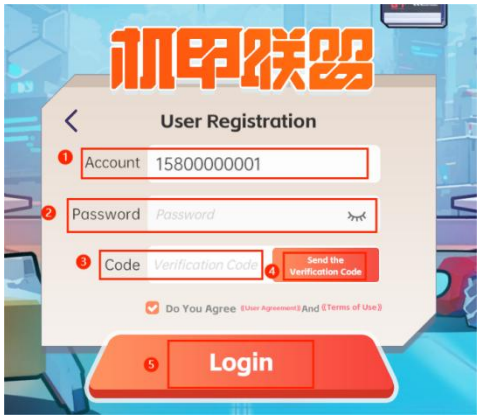
7) Confirm: Click Reset Password Successfully.

4. Registration/login

For the first-time login, enter the mobile phone number and click "Send Verification Code". When the system detects an unregistered mobile phone number, it will automatically redirect to the registration interface.

(Users who register through this channel are considered trial users and enjoy a 30-day trial period. After the expiration, users can log in to High Great's official website to activate their account and

continue using the service.)



1) Account number input box: Enter your account number/mobile phone number;

2) Password input box: Enter your password;

3) Verification code input box: Enter your verification code;

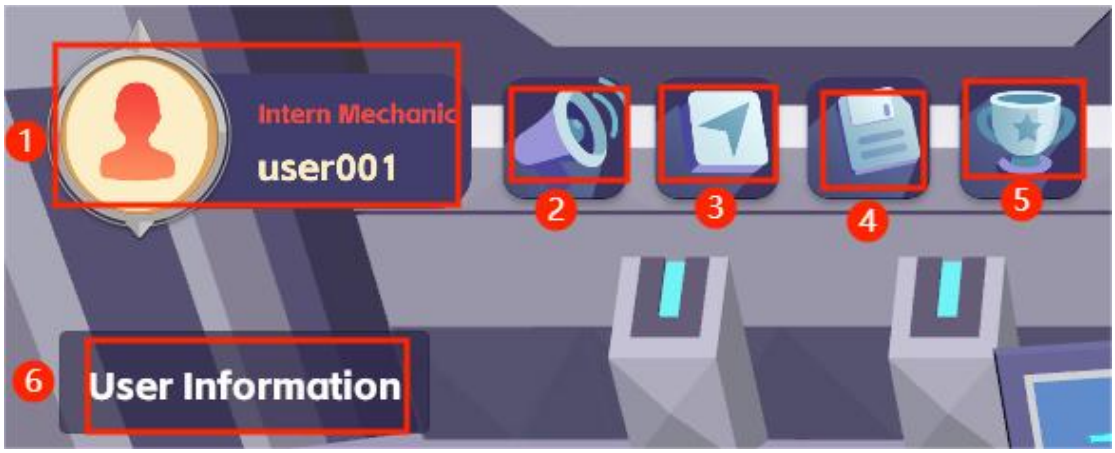
4) Send verification code: Click to send the verification code to your mobile phone;

5) Login button: Click to automatically complete registration and login.

IV. User Information/Announcements/Guidelines

1. User information

The user bar displays user information. When the user mouse hovers over the avatar frame, a folding menu appears, including entry buttons such as announcement information, information panel, loading archive, and achievement system.



1) User information box: Display user avatar, user title, and nickname;

2) Announcement information: System announcements;

3) Information panel: User guidelines include product support, video tutorials, maintenance support, user feedback, forums, and manuals;

4) Load archive: Programming document interface, where you can select the archive file and enter it;

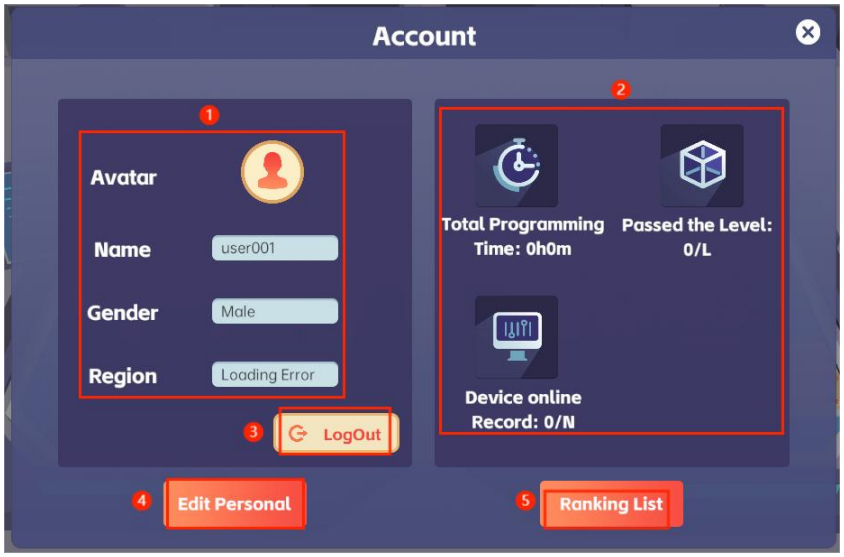
5) Achievement system: System entry for user achievements;

6) Hovering description: When you hover the mouse, a floating box appears, which displays the

introduction of the current function.

2. Personal account

Click the user's avatar, and the personal account panel appears.



1) User information: Display the user avatar, nickname, gender, and region;

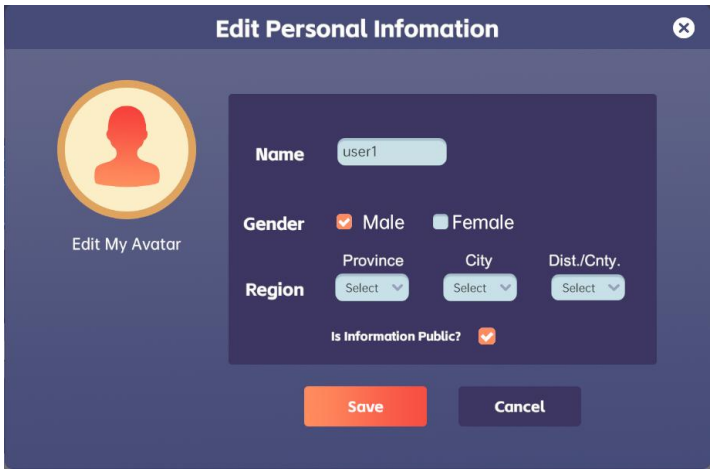
2) User data statistics: Display the total programming time, number of completed tasks, and device online record;

3) Logout: Log out the current account;

4) Edit personal information: Click to edit personal account information;

5) View ranking: Click to enter the ranking interface.

3. Editing personal information



1) User avatar: Display the user's avatar. You can click Modify to change your avatar;

2) Nickname: Enter your nickname;

3) Gender: Check your gender;

4) Region: Select your region;

5) Disclose information or not: Check whether to disclose your personal information;

6) Save/cancel: Click Save or Cancel.

4. System announcement

1) Set as read: Click to set all the announcements as read;

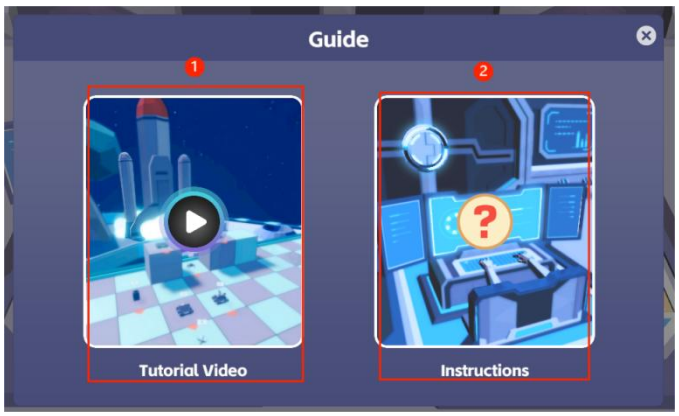
2) Announcement: Announcement content:

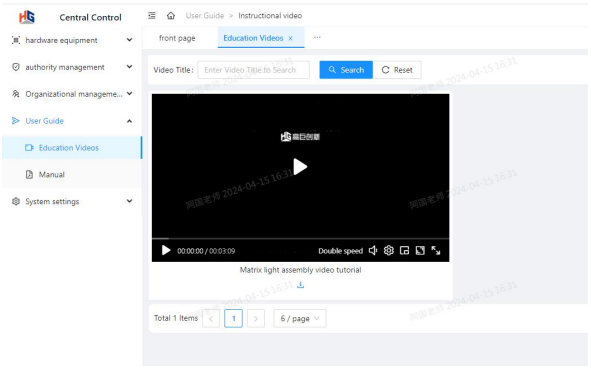
3) Page: Display current page number;

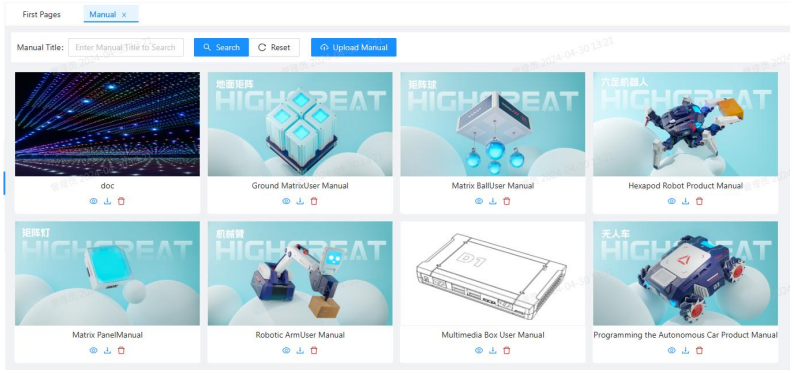
4) Redirect page: Click to redirect to the specified page.

5. Information panel

Click the information panel to go to the central control background management system and view video tutorials and Robot Alliance product manuals.







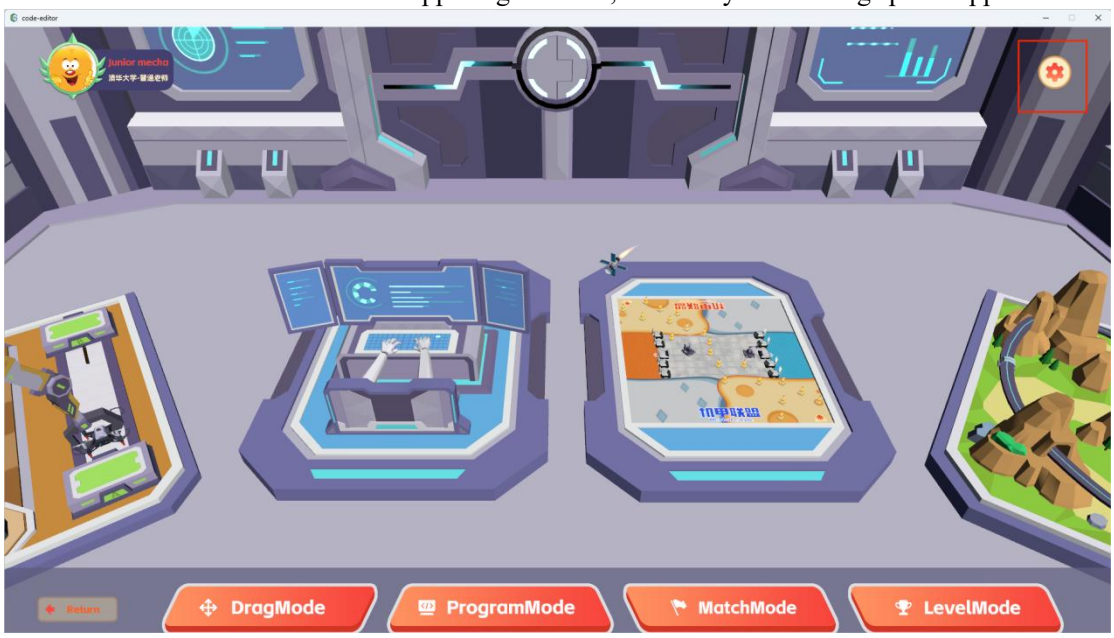
1) Video tutorial: Redirect to video tutorials;

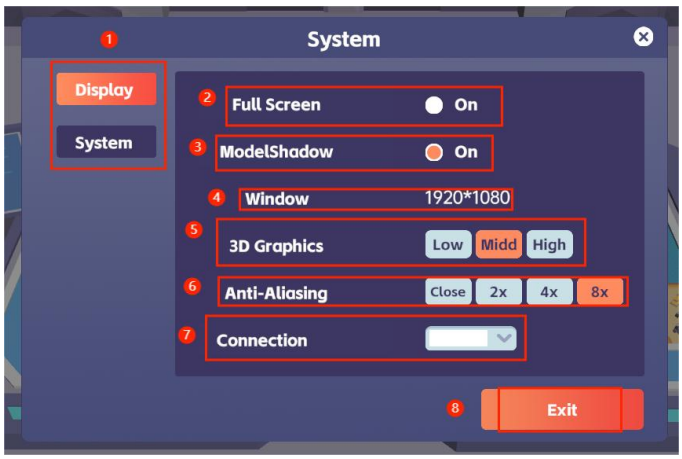
2) Manual: View product manuals.

V. System Settings

1. Display settings

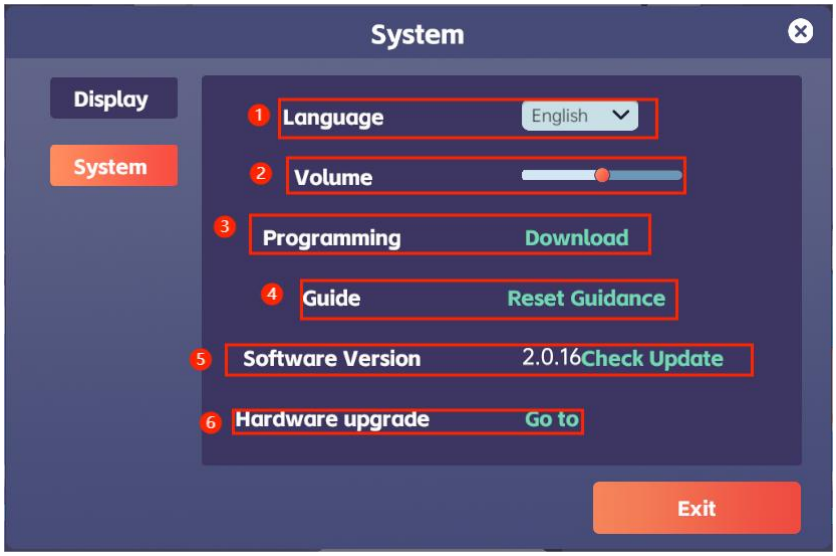
Click the "Set" button in the upper right corner, and the system settings panel appears.





1) Display/system: Switch between the display/system settings;
2) Full-screen mode: Enable/disable the full-screen mode;
3) Model shadow: Enable/disable the model shadow;
4) Window resolution: Select resolution;
5) 3D graphics quality: Select low/medium/high graphics quality;
6) Anti-aliasing: Select the anti-aliasing mode and turn off /2X/4X/8X;
7) Connection indicator color: Select the color of the indicator light;
8) Exit: Exit the system settings.

2. System settings



1) Software language: Choose Chinese/English;
2) Voice volume: Adjust the voice volume;
3) Programming language library: Customize the voice;
4) Guide for beginners: Reset the guide for beginners;
5) Software version: View the current version and check for version updates;
6) Hardware upgrade: Redirect to the central control background management system to view the

latest synchronized firmware.

VI. Mode Selection

1. Selecting mode

After logging in to the Robot Alliance programming software, first select the control mode of the device. You can click the scene mode sand table or the lower mode button, and select dragging mode, programming mode, task mode, and event mode. Note: "Task mode" is typically employed within software applications to facilitate collaborative interactions among scene devices, enhancing the gaming experience. It is generally not associated with physical device operations.

1) Dragging mode sand table: Click to select the dragging mode;

2) Programming mode sand table: Click to select the programming mode;

3) Event mode sand table: Click to select the event mode;

4) Task mode sand table: Click to select the task mode;

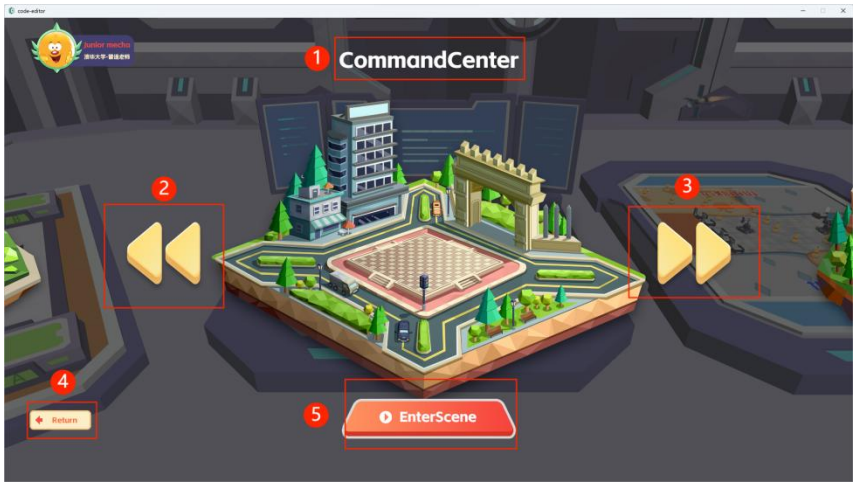
5) Return to the previous level: After selecting any mode, return and continue to select other modes;

6) Mode button: Click to select the mode directly.

2. Selecting preset/customized scene

[Preset scene]

After selecting the mode, you can continue to select the stage scene. The scene selection interface defaults to the "Command Center" scene. Click the "Enter Scene" button to enter directly. You can also click the left and right arrows to switch scenes among the "Command Center", "Sky Floating Island", "Space Base" and "Custom Scene" scenes. After selecting the scene, click the "Enter Scene" button below to enter the scene, including three preset scenes and one custom scene; the default size of the preset scene is 15×15.



1) Scene name: Display the name of the currently selected scene;

2) Left switch button: Switch to other scenes on the left;

3) Right switch button: Switch to other scenes on the right;

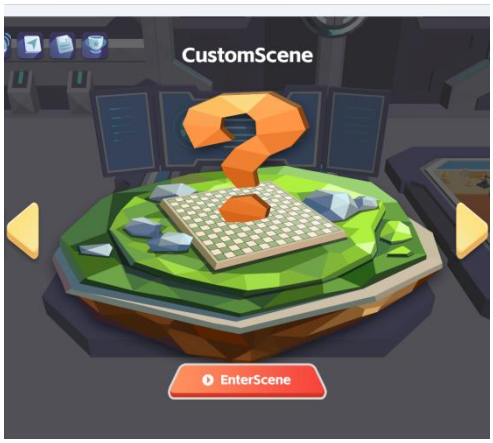
4) Return to the previous level: Return to the selection mode initial state;

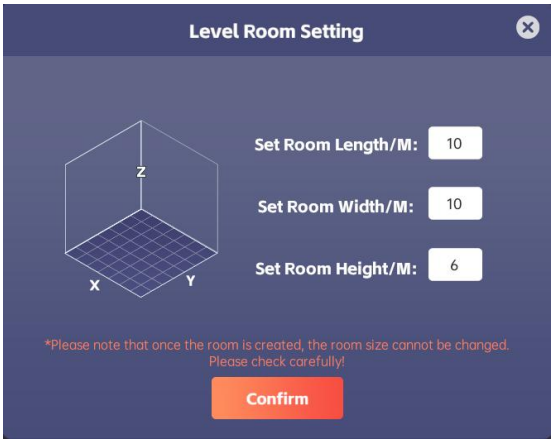
5) Enter scene: Click the button to enter the scene.

[Customized scene]

For the customized scene, you can set the scene size freely. The minimum scene

length/width/height size is: 6×6×6, max: 20×20×10





VII. Scene Device and Layout

1. Device list and shortcut keys

Enter the dragging mode. The left side of the screen displays a list of devices, and you can drop and drag the device from the list to the scene for placement and building.

1) Device list: Contain nine types of preset devices in four categories.

[Ground Device]: Hexapod robot, smart car, servo robotic arm, and combined robot;

[Aerial Device]: Drone;

[Matrix Device]: Matrix light, matrix ball, and ground matrix;

[Track Device]: Track robot;

[Other Device]: Individual conveyor belts

[Tools]: April code squares, color squares, shape squares, traffic lights, QR code squares;

2) Start Programming button: After the scene is built, click Start Programming;

3) Tablet touch screen mode: two fingers swipe outward at the same time to enlarge the viewing angle, swipe inward to narrow the viewing angle, fingers directly touch the screen to swipe up and down, left and right, the screen can be swiped up and down and left and right correspondingly, one finger touch and hold press to drag the device, in addition, there is a joystick button in the lower left corner, as shown in the picture above, 1: ↑ (raise the viewing angle), ↓ (pull down the

viewing angle), 2 in the picture: up and down, left and right directions correspond to forward, backward, left, right, and move right.

4) Keyboard shortcuts: W/↑ (Adjust the perspective forward)

S/↓ (Adjust the perspective backward)

A/← (Adjust the perspective to left)

D/→ (Adjust the perspective to right)

Q (Lift up the perspective)

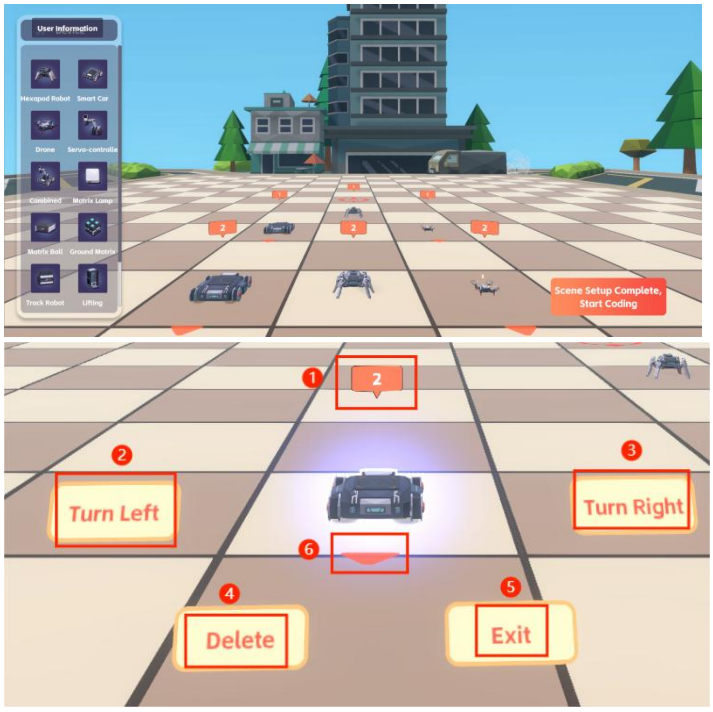
E (Pull down the perspective)

Alt + Enter (Quick access to full screen)

Right-click and drag (Change the perspective)

2. Scene device layout

Press and hold the left mouse button and drag the icon to the right, and the virtual device corresponding to the icon will be generated in the stage. Generate a virtual device on the stage, and the device will be automatically numbered; You can set the parameters such as the spatial position and orientation of the smart car on the stage; the selected virtual device will have a highlighted white color around it. The user can place the device in the scene and click the device to set its initial state.



1) Device number: Display the device number;

2) Turn left: Rotate the device 90 degrees to the left;

3) Turn right: Rotate the device 90 degrees to the right;

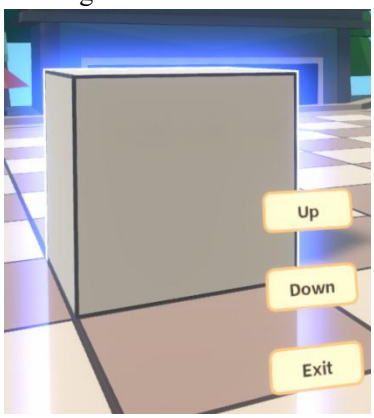
4) Delete: Delete the current device;

5) Exit editing: Exit the device editing state;

6) Orientation arrow: The arrow displays the orientation of the current device.

3. Building terrain

The scene stage checkerboard consists of 15×15 blocks. You can click any ground to customize the height of the block terrain.



1) Up: Move the currently selected terrain up by one grid, with a maximum height of 5;

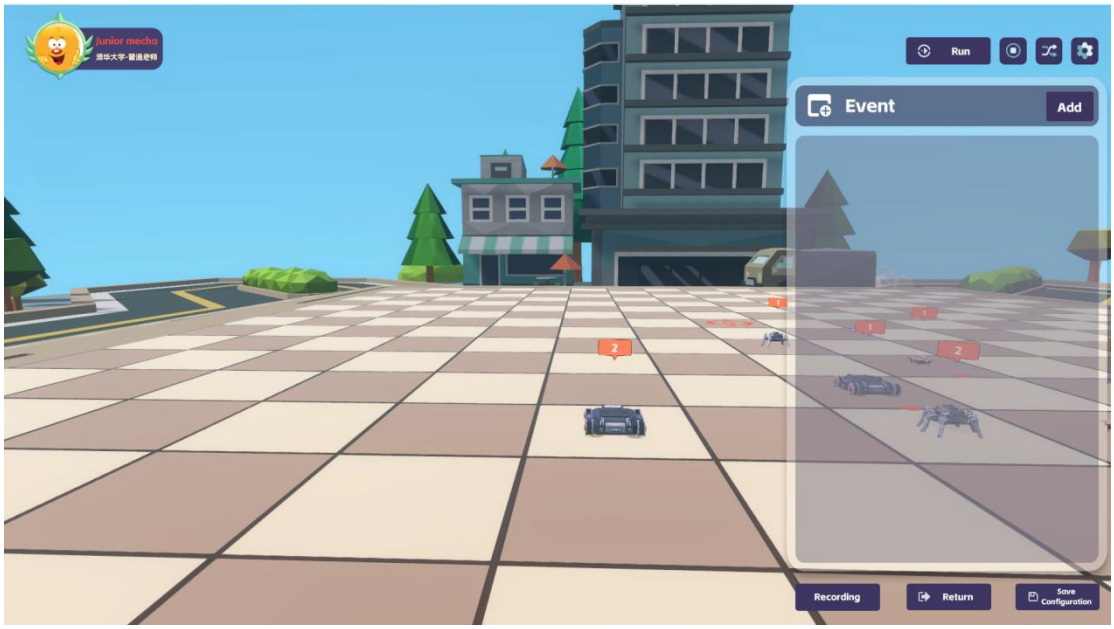
2) Down: Move the raised terrain up, with a minimum height of 0;

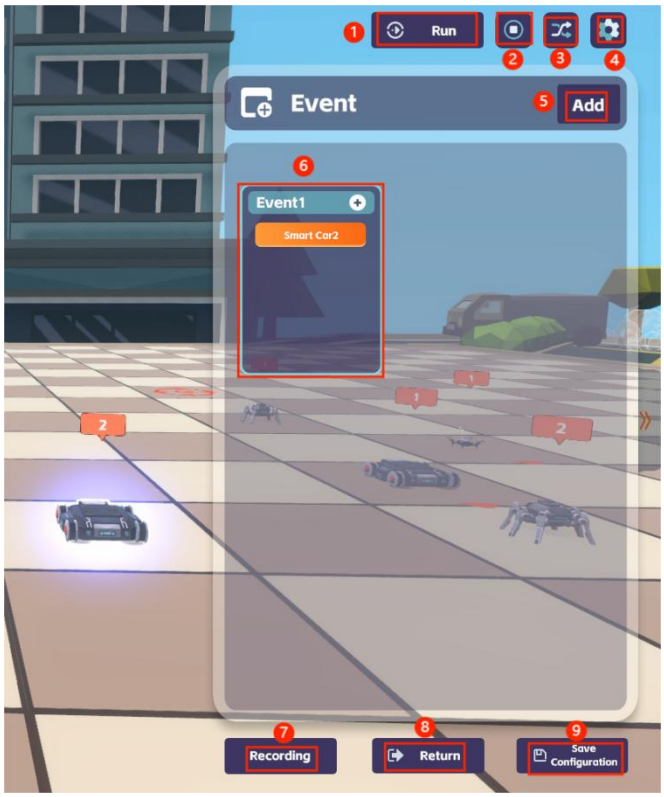
3) Exit editing: Exit the editing state of the currently selected terrain.

VIII. Dragging Mode

1. Dragging mode operation panel

After the scene device is arranged, click the "Complete scene building and start programming" button to start the programming experience. The most central red target position represents the origin position. The device running in the dragging mode consists of user-edited behavior events.





1) Simulation run: Click to run the edited behavior event, and click again to pause the running;

2) Stop: Stop running event;

3) Connect physical device: Connect to a physical device;

4) Settings: Click to call the Settings panel;

5) Add: Add a behavior event;

6) Event: Add a device to the event and set their behavior;

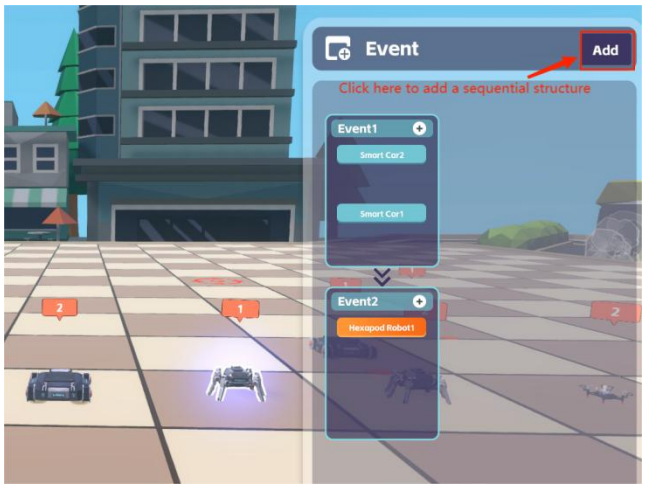
7) Screen recording: Record the current screen;

8) Return to edit: Return to the scene terrain editing state;

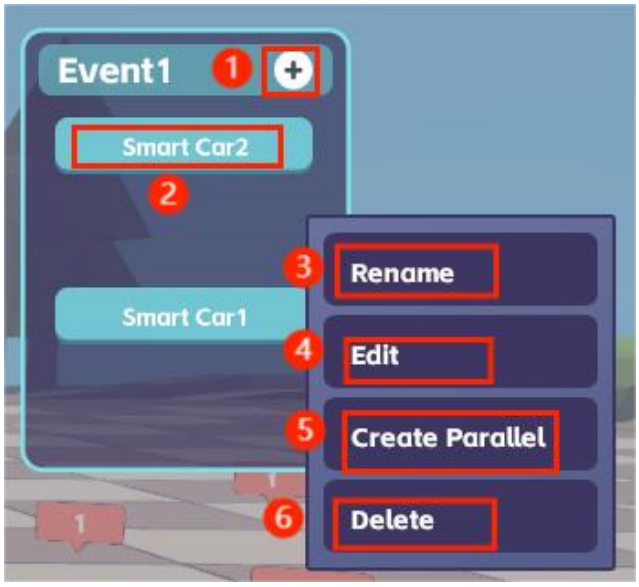
9) Save configuration: Save the configuration of the current terrain and behavior events to an archive file.

2. Adding and editing events

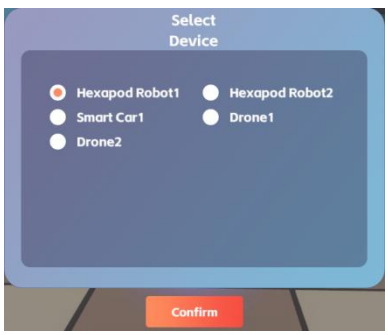
Click the "Add" button in the operation panel to create a behavior event. There are two event sequences: Sequential structure (by default, when one event is complete, run the next event, and so on) and branching structure (run the events in the same event box synchronously). Right click the Event panel to perform additional configurations of events.

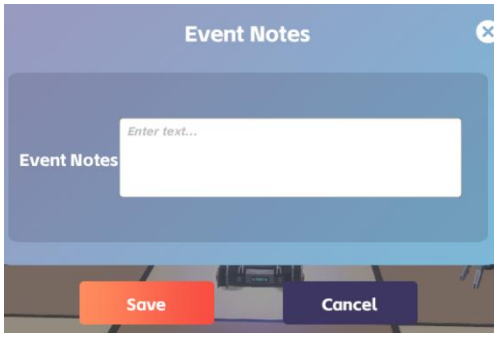


Branching structure



Sequential structure





1) Add device: Click the button, and the "Select Device" panel appears. Check the device and add it to the event;

2) Device: The added device;

3) Right menu-Rename: Rename the current event;

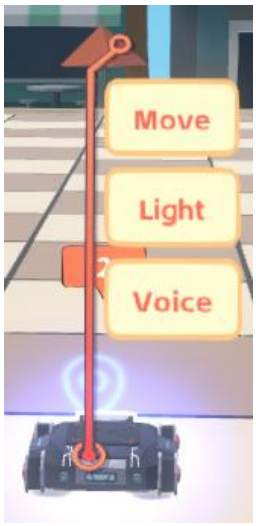
4) Right menu-Edit: Add comments for the current event, and configure the number of loops;

5) Right menu-Create parallel event: Create a parallel event with the current event;

6) Right menu-Delete: Delete the current event.

3. Editing device behavior

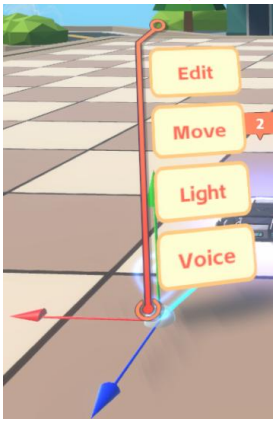
Select the name of the device in the event, and click the device in the scene again. When the command bar appears, you can set its running track, lighting, and sound.

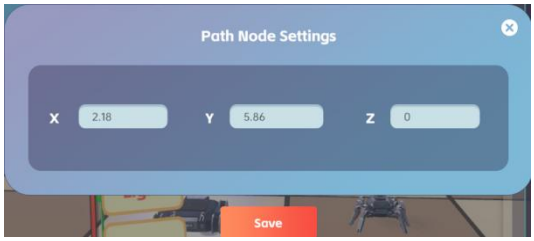


[Movement]

Drag and drop the track dots on the scene, and the device will move according to the set waypoint. Click the "Edit" button for the waypoint to manually enter the coordinates.

Note: The drone path must move upwards before moving forward, backward, left, or right.



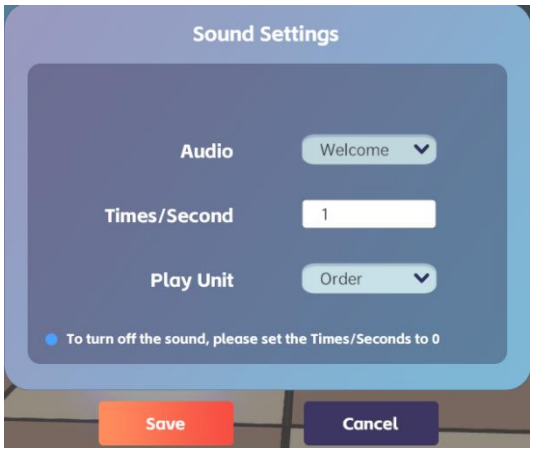


[Light]

Set the position, lighting effect, and lighting color of the device light;

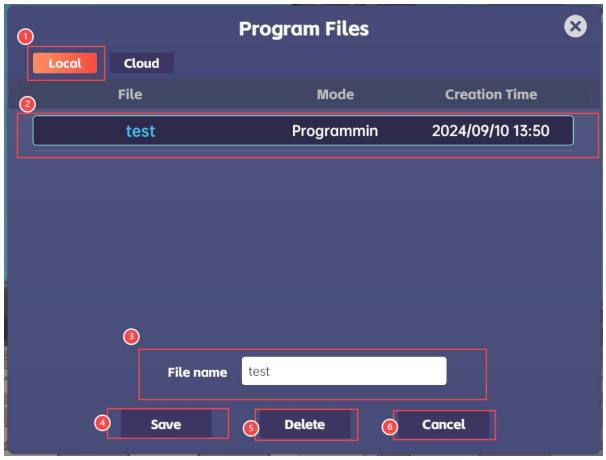
[Sound]

Set the sound and sound effects played by the device;



4. Saving scene configuration

Click the "Save Configuration" button in the operation panel, and the programming document panel will pop up to save the current scene configuration.



1)Choose between a local archive or a cloud archive;

2)Archive information: Display the name, mode, and time information of the archive file;

3) Set the filename: Name the selected archive file;

4) Save: Save the current archive file;

5) Delete: Delete the current archive file;

6) Cancel: Close the programming document panel.

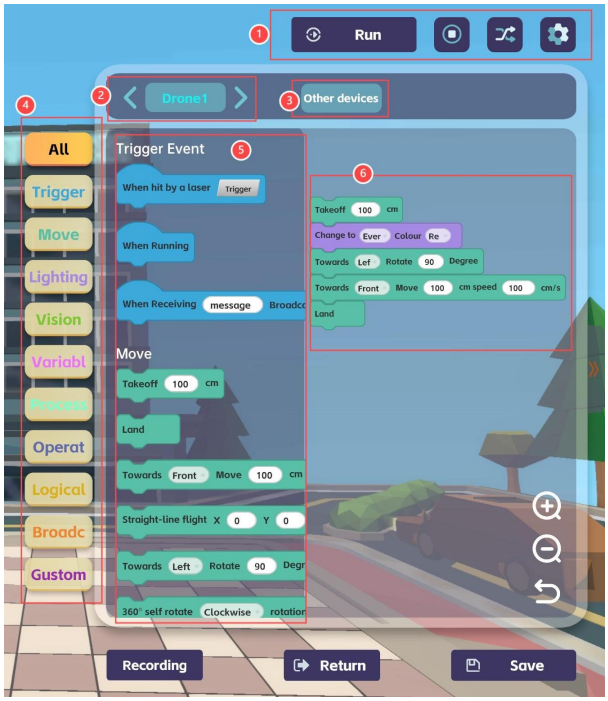
5. Comprehensive case for drag-and-drop scenario

Case description: In the case depicted above, when you click "Simulation run", two smart cars in Event 1 execute their commands before the hexapod robot in Event 2 begins its execution. After the hexapod robot in Event 2 executes its command, the drone in Event 3 begins its execution, and so on. In this way, events are added. In this process, two drones in Event 1 run the commands simultaneously.

IX. Programming Mode

1. Programming mode operation panel

Enter the programming mode, and the programming operation panel appears on the right side of the screen. You can use the visual code blocks or Python language to program the device. Note: To delete the visual code when dragging it, you can drag it directly to the left off the screen.



1) Top command bar: Simulation running, pausing, connecting physical devices, and setting;

2) Device bar: The name and switch button of the currently selected device;

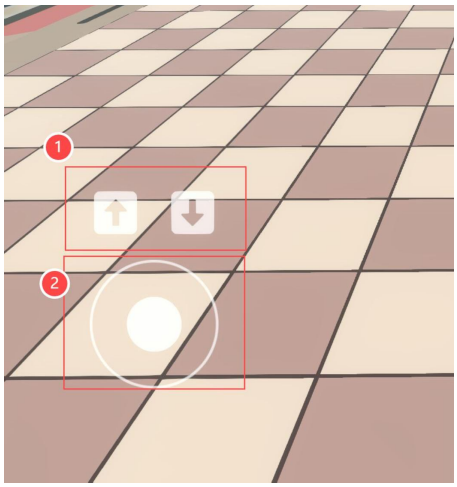
3) Display other devices: Display the programming of all devices in the current scene;

4) Code base: Display all code blocks under the currently selected type;

5) Programming area: User link code blocks, which form the behavior logic;

6) Bottom command bar: Screen recording, return to edit, and save configuration.

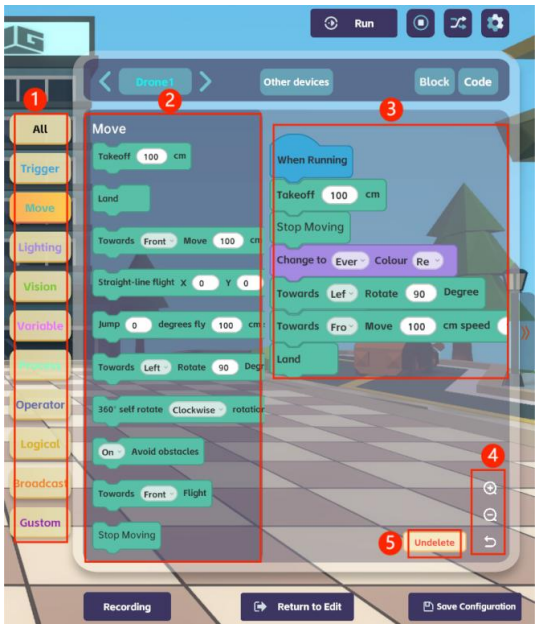
7)Operate:



Tablet touch screen mode: two fingers swipe outward at the same time to enlarge the viewing angle, swipe inward to narrow the viewing angle, fingers directly touch the screen to swipe up and down, left and right, the screen can be swiped up and down, left and right, one finger touch and hold press to drag the device, in addition, there is a joystick button in the lower left corner, as shown in the picture above, 1: ↑ (raise the viewing angle), ↓ (pull down the viewing angle), 2 in the picture: up and down, left and right directions correspond to forward, backward, left, right, and move right. In the programming area, one finger and long press and hold the code block for two seconds to appear "repeat", "copy", "paste", "delete" and "cancel" buttons, one finger touch and long press to drag the tile code into the programming area, one finger touch and long press to remove the tile code out of the programming area to delete the tile code.

2. Visual code programming

In the programming mode, the visual code is used for programming by default. The user can drag a code block from the code base to the right execution area. After concatenating the code blocks, click "Simulation run", and the device automatically executes the code block behavior.



1) Code block type: Trigger event, basic movement, lighting effect, vision, variable, process control, operator, logical judgment, and broadcast messages;

2) Code base: All code block commands under the current code type;

3) Code block execution area: During simulation running, execute the concatenated code blocks;

4) Zoom in/out/restore: Zoom in/out/restore the code block size.

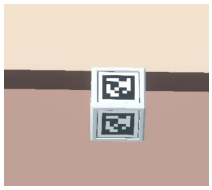
5)Undo deletion: You can restore the visual code module that was deleted in the previous step

3. Editing of programming prop behaviors

The types of props in the device list in programming mode and drag-and-drop mode: April code square, color square, shape square, traffic light, QR code square.

1) April yard squares

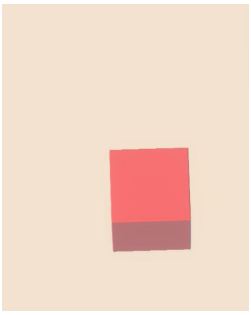
①The number of April blocks can be set, starting from 0, and there is no limit

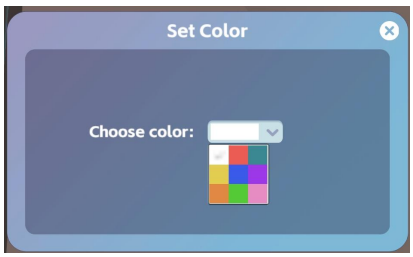


②April Code Square Programming Case

2) Color squares

①You can set the color selection of the color square



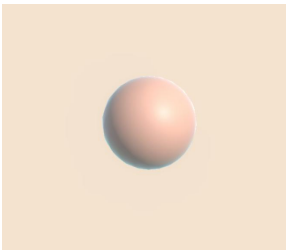


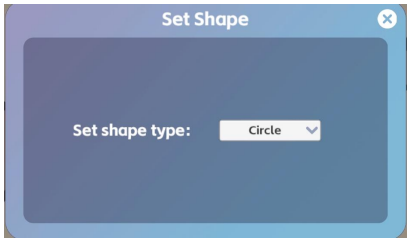
②Color Square Programming Case

Note: The result of the identified color variable should be written in English of the color, and the first letter should be capitalized, such as identifying red, the variable recognition result should be Red, blue should be Blue, etc.

3) Shape the square

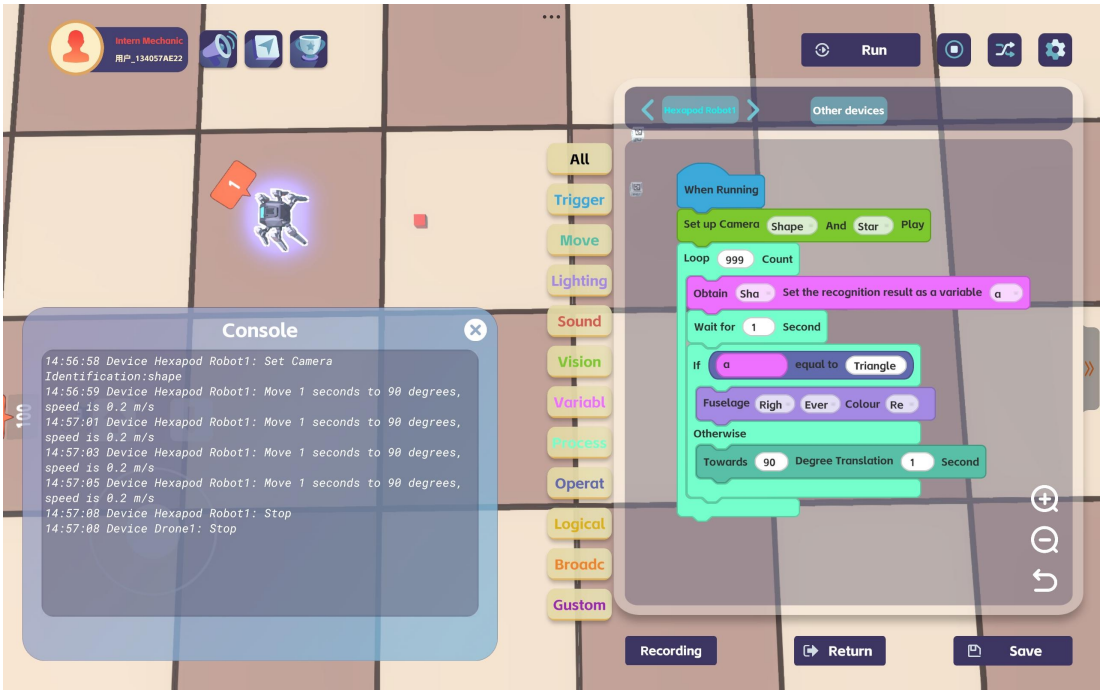
①The choice of block shape can be set, and there are three shapes of triangle/circle/rectangle





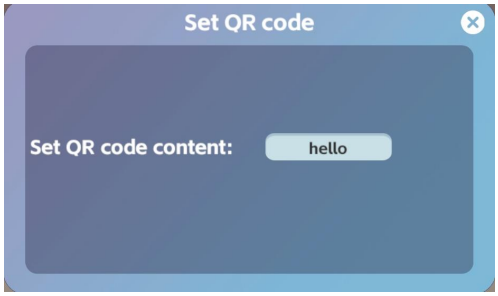
②Shape Square Programming Case

Note: The recognized shape result should be written in English of the shape, and the first letter should be capitalized, such as identifying triangles, variable recognition results should be Triangle, circles should be Circle, etc.

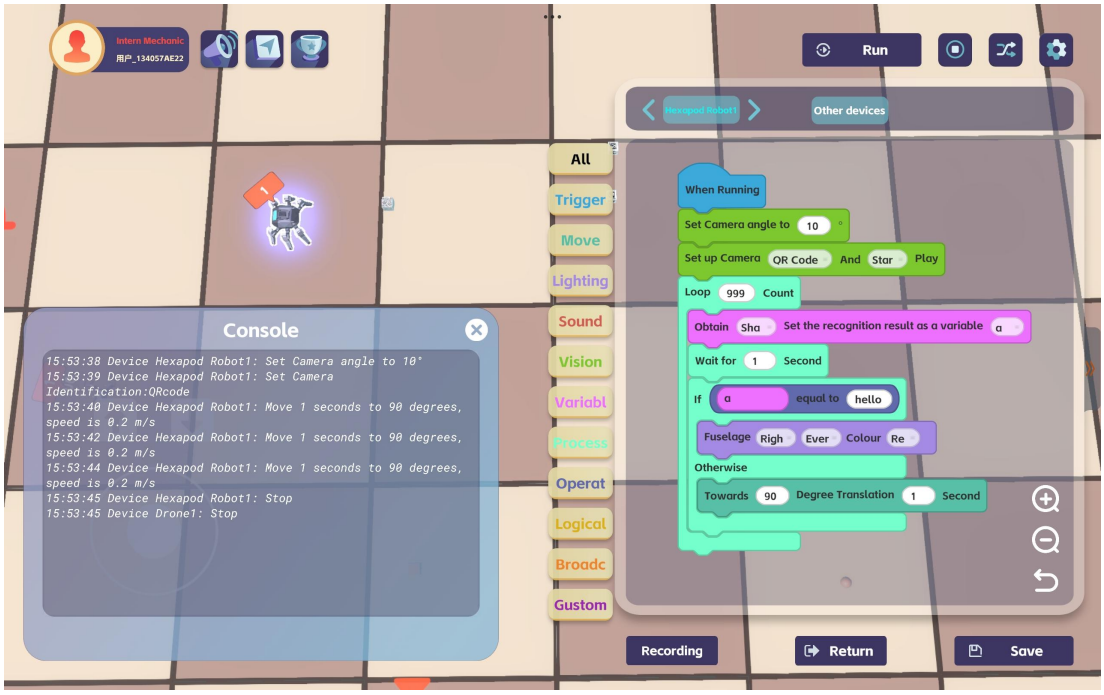


4) QR code squares

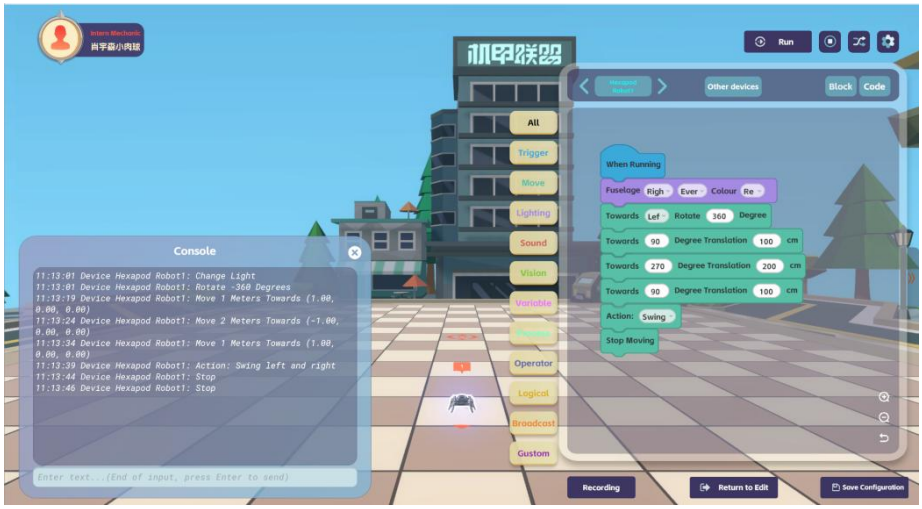
①You can set the content of the QR code, and after setting it, the content will be displayed when you move the mouse over the QR code



②QR code programming examples



4. Comprehensive case of visual code programming

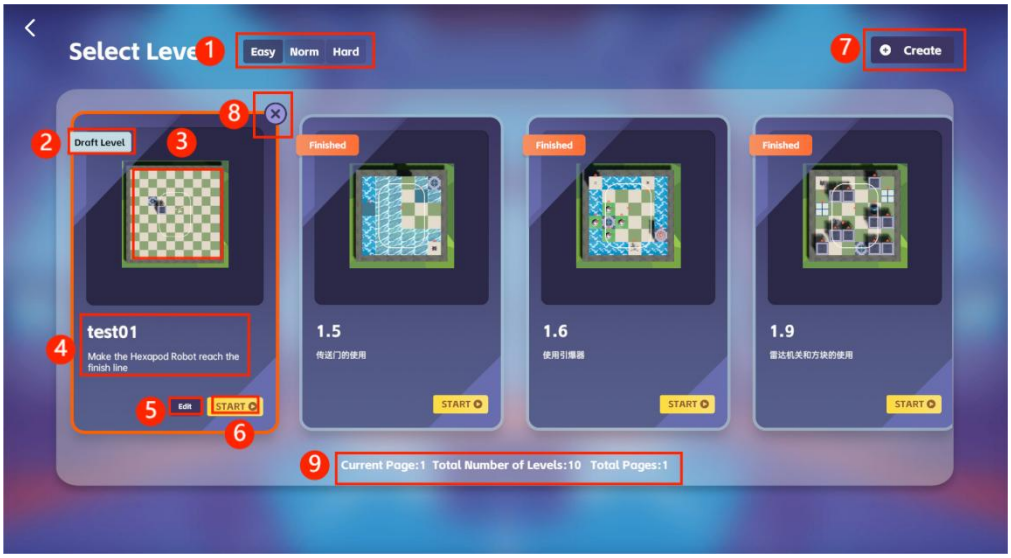


Case description: In the case depicted above, when you click "Run", the fuselage indicator of the hexapod robot is solid red (with the nose forward). After the drone rotates to left for one cycle, move it to the right by 100 cm (with the nose forward), move it to the left by 200 cm, and then move it to the right by 100 cm, and go back to the original position. Next, make a left-right swing action, and finally stop.

X. Task Mode

1. Selecting task

The task mode has preset a variety of challenge tasks, and users can clear the stage after completing the task tasks. Advanced users can create and release it to the platform.



1) Task type: The task is divided into three types: primary, intermediate, and advanced according to the degree of difficulty;

2) Task tag: Task type, which is divided into: Draft task (**the draft task created by the advanced users is only visible to themselves**), semi-finished task (**created by advanced users and visible to all paid teachers in the campus network**), and finished task **(released by teachers and visible to all paid students in the campus network, but invisible to teachers of the same school);**

3) Task thumbnail: The thumbnail of task map details;

4) Introduction to task name: The task name and the brief introduction of the content;

5) Edit: Advanced users can edit the custom tasks;

6) Start challenging: Click the button to enter the task;

7) Create task: Advanced users can create their own exclusive tasks, save, and release them to the platform for other users to challenge;

8) Delete: Advanced users can delete their own created tasks;

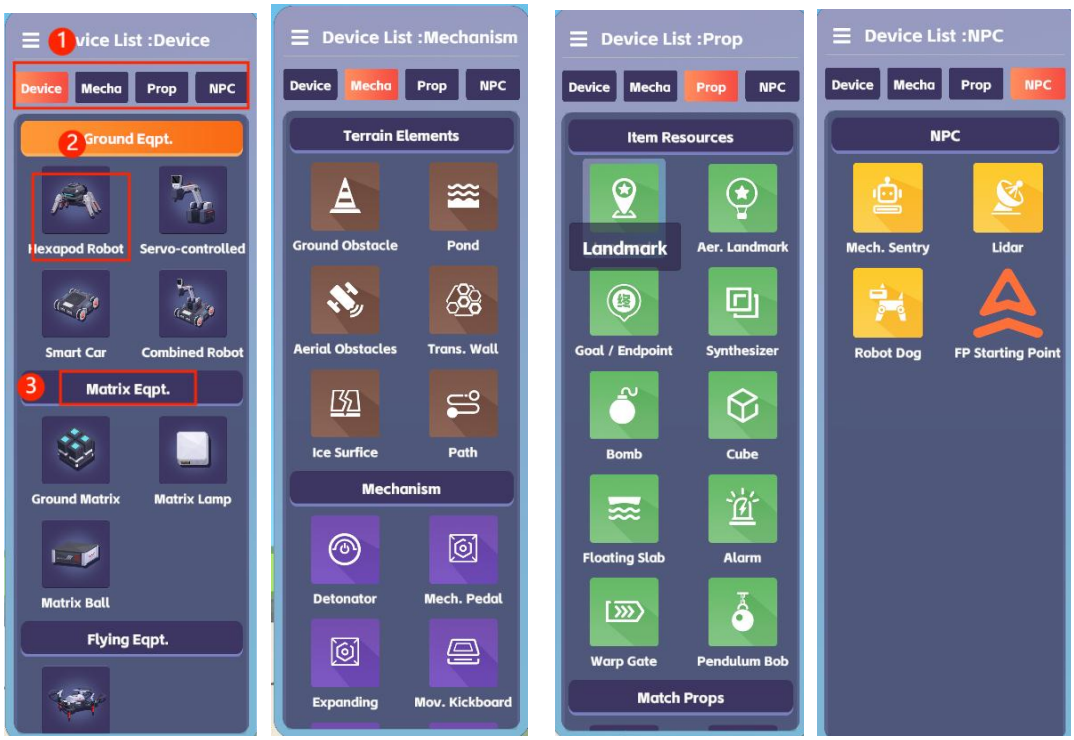
9) Page: Page number of task list.

2. Brief introduction to tasks

Click the task thumbnail in the task list, and the task introduction panel appears. Include the details of the current task and an introduction to the tasks.

3. Task mode device list

In the task mode, add various mechanism, props, and enemy NPCs. In the device list on the left side of the screen, you can select devices, mechanisms, props, and NPC, and drag and drop them to the scene.



1) Device type switch button: Switch the current device list type;

2) Device: The currently selected device name;

3) Device category title bar: Click Unfold/fold device category.

[Device]
Ground device: Hexapod robot, servo robotic arm, smart car, and combined robot;
Matrix device: Ground matrix, matrix light, and matrix ball;
Flight device: Drone;
Other devices: Track robot;

[Mechanism]
Terrain element: Ground obstacle, water pool, air obstacle, transparent wall, ice surface, and path;
Mechanism: Detonator, mechanism pedal, telescopic mechanism, movable floating plate, movable floating bridge, and upgrade platform;
[Prop]
Prop material: Landmark, air landmark, endpoint, synthesizer, bomb, square, floating plate, siren, portal, and pendulum;
Note: In the "task mode", you must set the associated endpoint trigger condition to complete the task mode.

[NPC]
NPC: Machine sentinel, LiDAR, mechanical dog, and main perspective initial point;

4. Building task mode scene

In the task mode, you can select devices, mechanisms, props, and NPC, and drag and drop them to the scene for building.

1) Device list: List of devices, mechanisms, props, and NPCs in the task mode;

2) Exit: Exit the stage building and return to the task selection interface;

3) Reset scene: Reset the current scene to the initial state;

4) Preview: In the preview state, you can edit the behavior logic of the device;

5) Save scene: Save the built stage scene and device configuration information (In the task mode, you can only save the scene building and device configuration, and cannot save the device operation logic in the preview state).

5. Editing challenging prop behavior

1) In the task mode, you can customize and edit the triggering and associated behaviors of various scene props, mechanisms, and enemy NPCs.

If you encounter pools, ice surfaces, transparent walls, ground obstacles, air obstacles, etc., you can directly set the device to bypass;

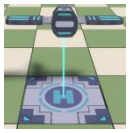
However, for props like endpoints, paths, portals, sirens, detonators, landmarks, etc., youneed to trigger the related devices/mechanisms/props.

/NPC; Note: One task must have at least two portals, and the portals must be linked mutually.

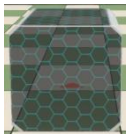
The robot dog can collide with the device, causing the task failure; the LiDAR can emit the laser to destroy the device; and the machine sentinel can destroy the device within radar attack range and so on. The following provides a detailed supplement to the existing terrains, mechanisms, props, and NPCs in the task mode:

Ground obstacle: Serve as an obstacle, which will collide with the device and can be destructed by a bomb

Pool: Serve as an obstacle, which will sink the device



Air obstacle: Serve as an obstacle (with an adjustable height), which will collide with the device and can be destructed by a bomb

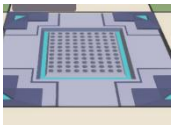


Transparent wall: Serve as an obstacle, which will collide with the device and can be destructed by a bomb

Ice surface: The ice surface will crack when the device passes over it. The device will not sink during the first traversal; however, if the device traverses the ice surface again, it will fall through.

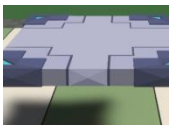
Path: Select the movable direction of the path, including forward/left/right/retract [checkable].
The direction of the yellow arrow indicates the direction in which the device can be moved

Detonator: The trigger condition can be associated with some ground devices [smart car/combined robot/hexapod robot] and the flight device [drone] [checkable]; but the touching behavior can only be associated with the boom [checkable].



Mechanism pedal: The trigger condition can be associated with some ground devices [smart car/combined robot/hexapod robot], the flight device [drone], and the mechanical dog [checkable]; and the touching behavior can be associated with some mechanism devices [elevating platform/movable floating bridge/movable floating plate/telescopic mechanism] [checkable]. For these mechanisms, the associated behavior will occur only when the trigger condition is triggered.

Telescopic mechanism: It can serve as the touching behavior of the mechanism pedal, and the angle can be rotated. When triggered, it will appear in the direction pointed by the arrow.



Movable floating plate: It can serve as the touching behavior of the mechanism pedal. Set the position of the waypoints x and y. You need to click the + in the small white box next to it before adding. Note: The values of x and y here represent the number of moving lattices. The axes x and y axes here are also axes in the scene space; If you add more than one waypoint position, you need to touch the mechanism pedal many times. Each time, you start moving from the starting point of the movable floating bridge.

Movable floating bridge: It can serve as the touching behavior of the mechanism pedal. Set the position of the waypoints x and y. You need to click the + in the small white box next to it before adding. You can also set the length and width of the model. Note: The values of x and y here represent the number of moving lattices. The axes x and y axes here are also axes in the scene space; If you add more than one waypoint position, you need to touch the mechanism pedal many times. Each time, you start moving from the starting point of the movable floating bridge.

Elevating platform: It can serve as the touching behavior of the mechanism pedal, and the height of its movement can be set. The device can be directly carried on the platform. When triggered, the elevating platform will bounce up.

Landmark: The trigger condition can be associated with the ground device [smart car/six-group robot/servo robotic arm/combined robot] or the flight device [drone] [checkable];
The touch behaviors can be associated with the ground device [smart car/hexapod robot/servo robotic arm/combined robot], matrix device [ground matrix/matrix light/matrix ball], flight device [drone], track robot, and some props [pendulum/portal/siren/floating plate/cube/synthesizer/air landmark] [checkable]. The associated behavior will occur only when these mechanisms are triggered.

Air landmark: The trigger condition can be associated with the track robot/drone [checkable]; the touching behavior can be associated with ground devices [smart car/hexapod robot/servo robotic arm/combined robot], flight device [drone], matrix device [ground matrix/matrix light/matrix ball], track robot, and some props [pendulum/portal/siren/floating plate/cube/synthesizer/landmark] [checkable]. The movement height can be set. The associated behavior will occur only when these mechanisms are properly triggered.

Endpoint: The trigger condition can be associated with the ground device [smart car/six-group robot/servo robotic arm/combined robot] and the flight device [drone] [checkable]. The endpoint is essential in the task mode. Only by setting the endpoint trigger conditions can be task be completed.

Synthesizer: The synthesizer is used with the combined robot. When the combined robot is selected, it becomes the shape of a smart car and synthesizes with the synthesizer. After becoming a combined robot, it can absorb floating plate/cube/pendulum.

Bomb: Serve as the touching behavior of the detonator, which can destroy the ground device [smart car/hexapod robot/servo robotic arm/combined robot], drone, ground matrix, mechanical dog, LiDAR, transparent wall, ground obstacle, air obstacle, pendulum, and bomb; its attack range is within a nine grid surrounded by bombs.

Cube: Serve as the touching behavior of a landmark/air landmark, which will collide with the device; after combination, the
combined robot and the synthesizer can pick up and transport the cube to other places.

Floating plate: Serve as the touching behavior of a landmark/air landmark; after combination, the combined robot and synthesizer can pick up and transport the floating plate to other places.

Siren: The trigger condition can be associated with the ground device [smart car/hexapod robot/servo robotic arm/combined robot], the flight device, and the track robot [checkable]; and the touch behavior can be associated with the machine sentinel [checkable]. When these mechanisms are triggered, the [machine sentinel] associated with its selected behavior will move towards the siren direction, attack and destroy the device.

Portal: The portal touching behavior can only be associated with the portal, and one task must have at least two portals.

Pendulum: Serve as the touching behavior of a landmark/air landmark, which will collide with the device and can be destructed by a bomb; It can be attacked by the combined robot and synthesizer.

Machine sentinel: It can attack the device. The radar attack range can be set with a minimum radius of 1 m and a maximum radius of 3 m.

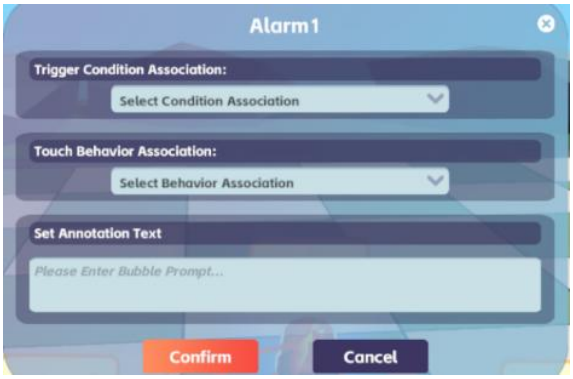
LiDAR: It can destroy the device. The laser length can be set with a minimum length of 1 m.

Main perspective initial point: Equivalent to the starting point, it can be used to specify the beginning of the task route when created by advanced users. The player can learn the direction of the task route from this perspect

Mechanical dog: The trigger condition can be associated with some ground device [smart car/hexapod robot/combined robot]; you can choose its movement trajectory [front and rear/leftward circle/rightward circle] with the movement distance of 1 m/time. When the device approaches within one meter of the mechanical dog, the mechanical dog will move and collide with the device; But when the mechanical dog itself has a trigger condition, the trigger condition must keep moving so that the mechanical dog can follow the movement.

If the mechanical dog encounters an obstacle such as [wall/mechanism/prop/NPC] in front or left/right during movement, it will not collide, but instead opt to avoid or alter its direction. For instance, during its back-and-forth movement, if an obstacle obstructs its path ahead, the mechanical dog will retreat until it encounters an obstacle, such as a wall, before changing direction. If obstacles appear to the right or left while the mechanical dog is performing a rightward/leftward circle, the mechanical dog will advance one meter forward to evade the obstacle before resuming its circular trajectory. However, if it attempts to move forward/backward or performs a leftward circle/rightward circle while facing obstacles both ahead and behind, or to the front-right or front-left, it will come to a halt.

2) Click the device list in the scene, call out the command bar, and click "Edit behavior" to configure the device trigger conditions and behavior association;



1) Trigger condition association: Select the associated device that triggers the current mechanism;

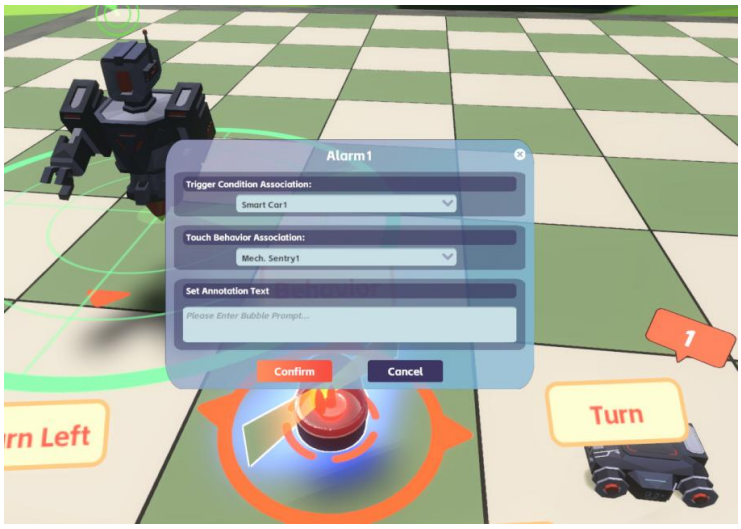
2) Touch behavior association: Selects the associated device triggered by the current mechanism;

3) Set noting information: Prepare the noting information for the current mechanism;

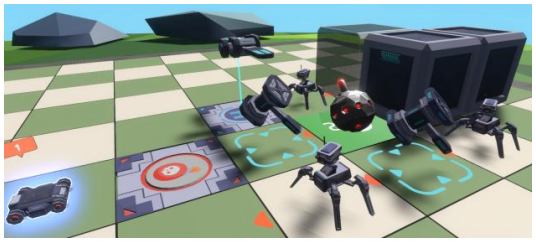
4)Confirm/cancel: Confirm/cancel the current configuration.

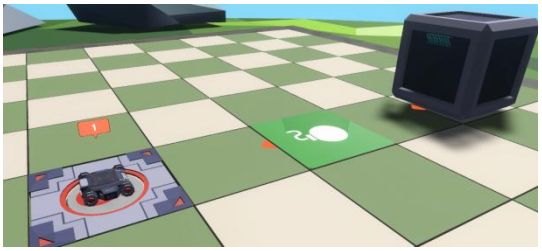
6. Comprehensive case of some triggering conditions and associated conditions in "behavioral editing"

1) Siren and machine sentinel: Trigger the siren and associate the enemy NPC machine sentinel;



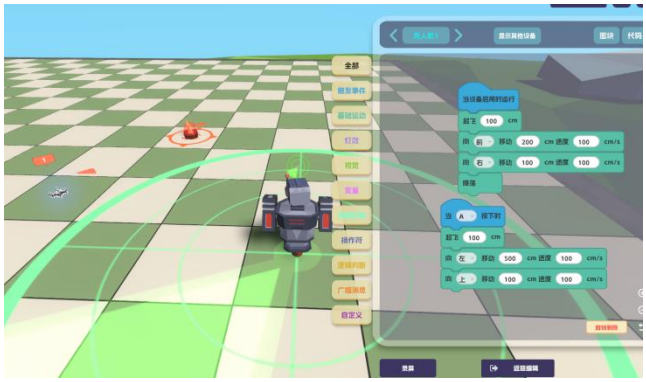
2) Detonator and bomb: Triggering the detonator and associating it with the bomb can blow up some mechanisms/props/NPCs and can eliminate some obstacles in a large area;

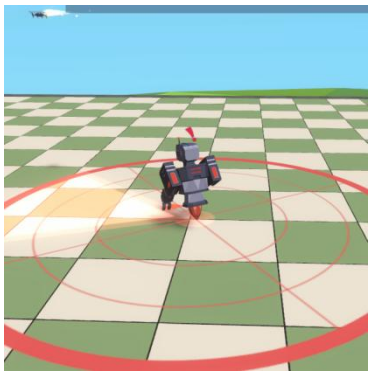




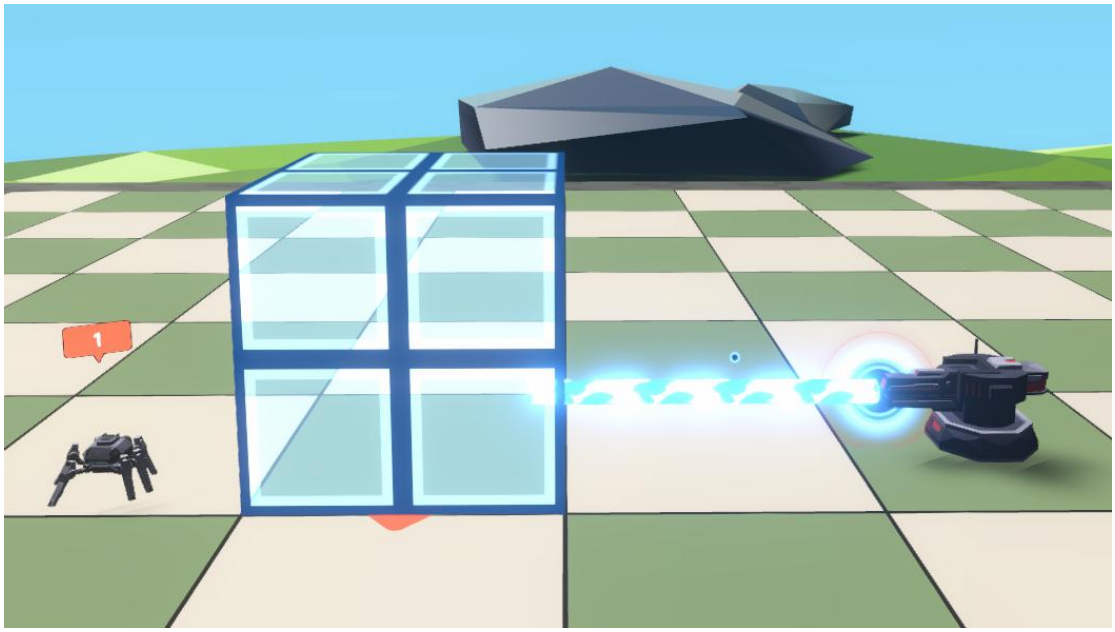
3) Association of drone, machine sentinel, and siren: The drone can be used to trigger the siren and attract the machine sentinel to leave.

Note: To ensure successful triggering, make sure that the siren triggered by the drone must land on the siren position.

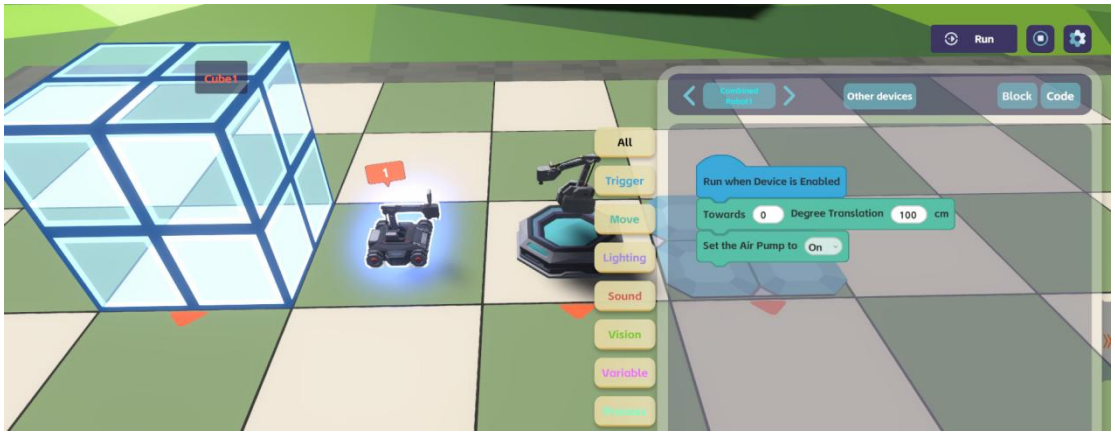


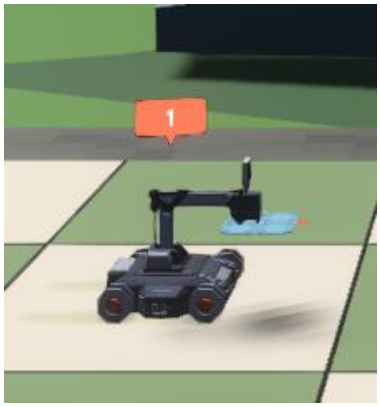


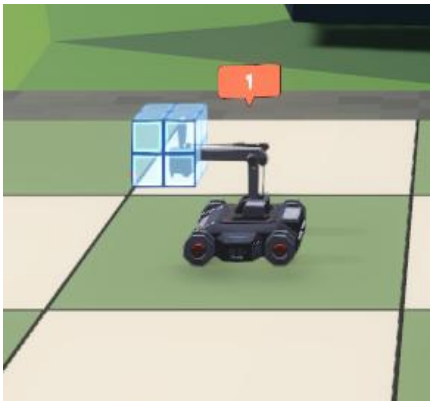
4) Mechanical dogs can help the device block the attack of LiDAR. The ground obstacle, telescopic mechanism, transparent wall, and cube can also block LiDAR;



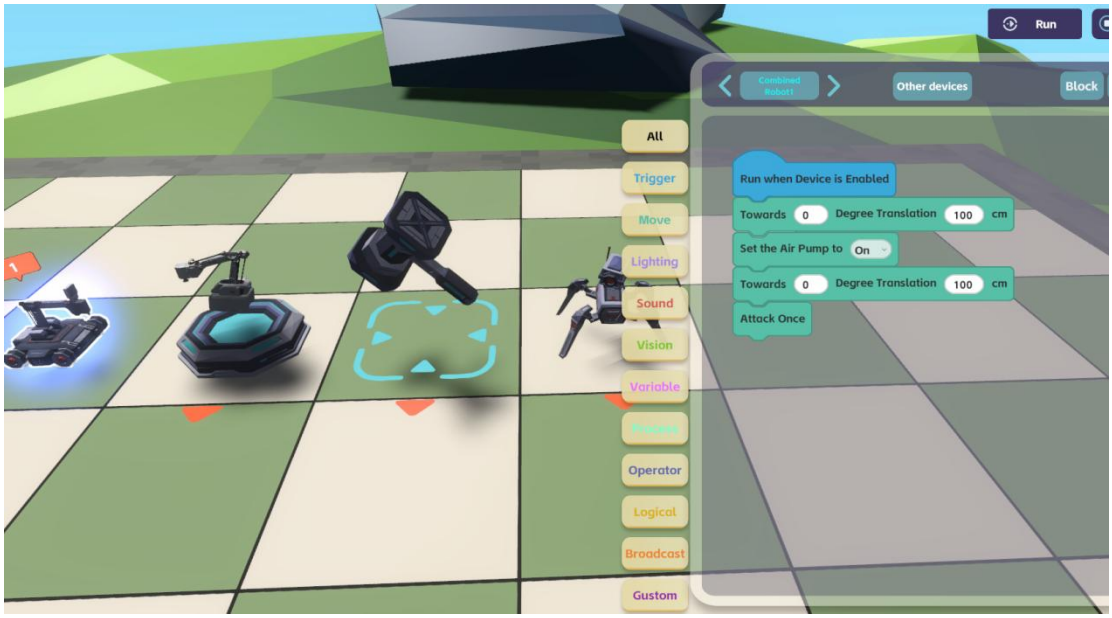
5) Association of the synthesizer and combined robot: After the synthesizer and combined robot are combined, they can pick up the floating plate/cube and transport it to other places.

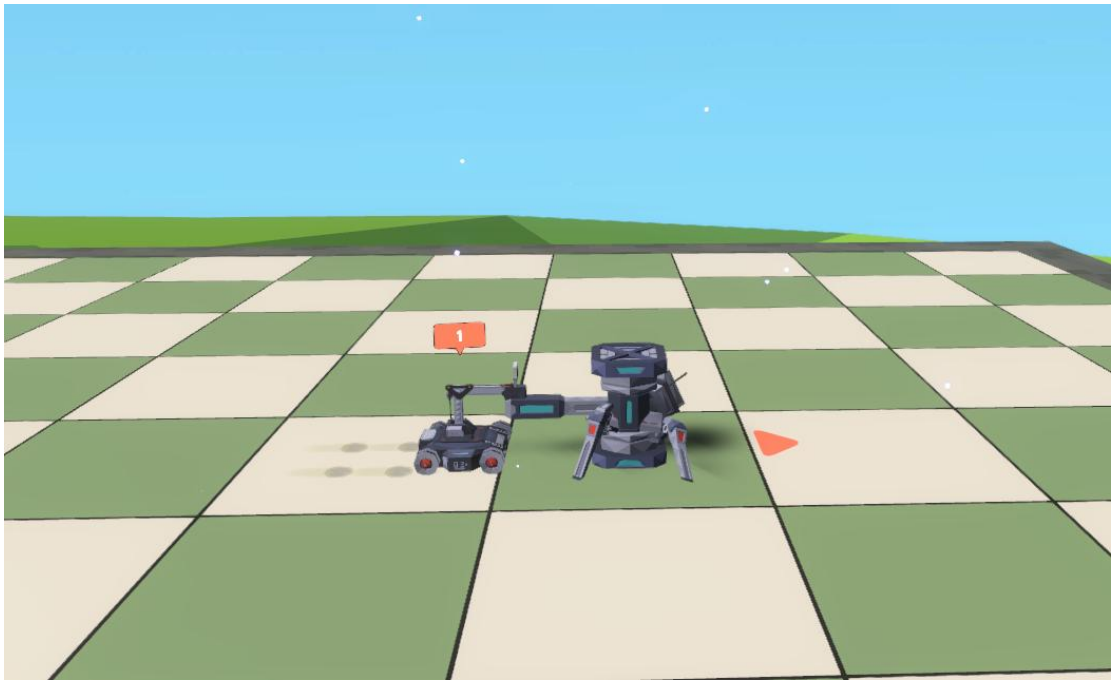




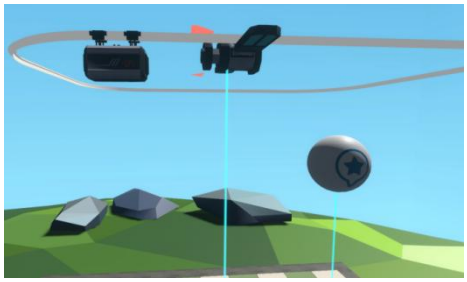


6) Loading pendulum after the association of the synthesizer and the combined robot: After the association of the synthesizer and the combined robot, they can load the pendulum and attack the mechanical dog;

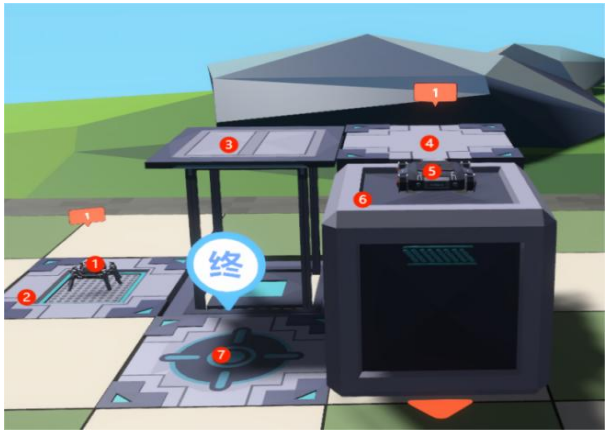




7) Association of the track robot, air obstacle, and air landmark: After such an association, the drone/track robot can trigger the air landmark, allowing the track robot/drone to avoid air obstacles;

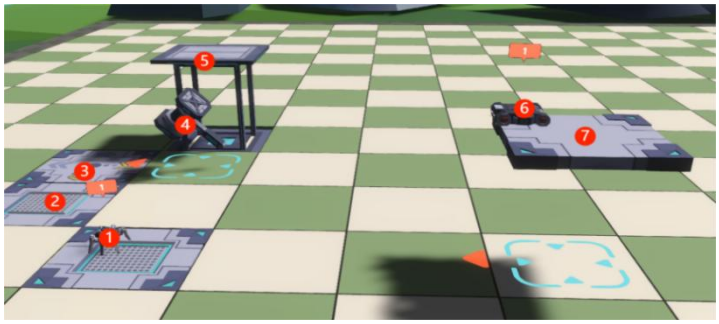


8) Association of the mechanism pedal, movable floating bridge, and elevating platform: Such an association allows the ground device to move in the air and avoid higher obstacles on the ground;



1）Hexapod robot
2）Mechanism pedal
3）Elevating platform
4）Movable floating plate
5）Smart car
6）Ground obstacle
7）Endpoint

9) Associations of the mechanism pedal, movable floating bridge, path, etc.: Trigger the mechanism pedal, associate the movable floating bridge, and learn to set the waypoints x and y of the movable floating bridge/floating plate; Note the trajectory limitations of the path;



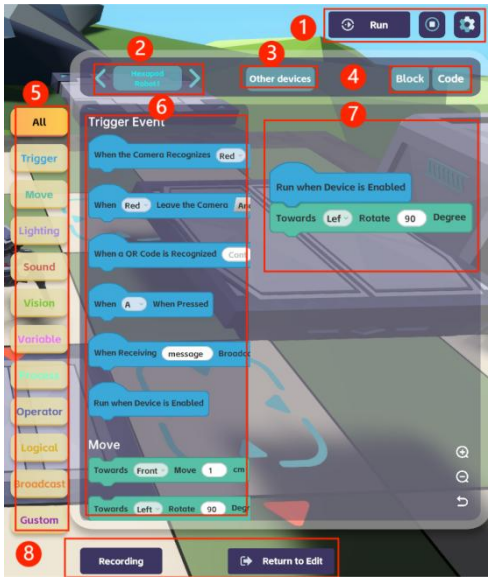
1）Hexapod robot
2）Mechanism pedal
3）Path
4）Pendulum
5）Elevating platform
6）Smart car
7）Movable floating bridge

10) Association of the mechanism pedal, telescopic mechanism, portal, and mechanical dog: Trigger the mechanism pedal and portal and associate the telescopic mechanism and the mechanical dog. By doing so, various devices can associated to help the smart car reach the endpoint.

1）Hexapod robot
2）Telescopic mechanism
3）Smart car
4）Portal
5）Mechanism pedal
6）Mechanical dog
7）Endpoint

7. Preview operation panel in the task mode

In the preview state of the task mode, the user can edit the behavior logic of the device to preview. This can check whether the stage scene built can meet the task expectations. The operation panel is the same as the programming mode. You can use the visual code blocks or Python language to program the device.



1) Top command bar: Simulation running, stopping, and setting; (No device connection symbol is available as the physical devices cannot be connected in "task mode");

2) Device bar: The name and switch button of the currently selected device;

3) Display other devices: Display the programming of all devices in the current scene;

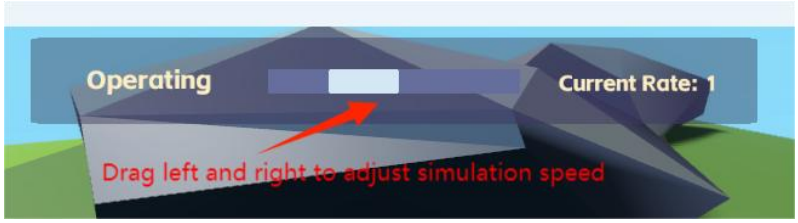
4) Tile/code: Visual code/python code switch button;

5) Code block type: Visual code block type button;

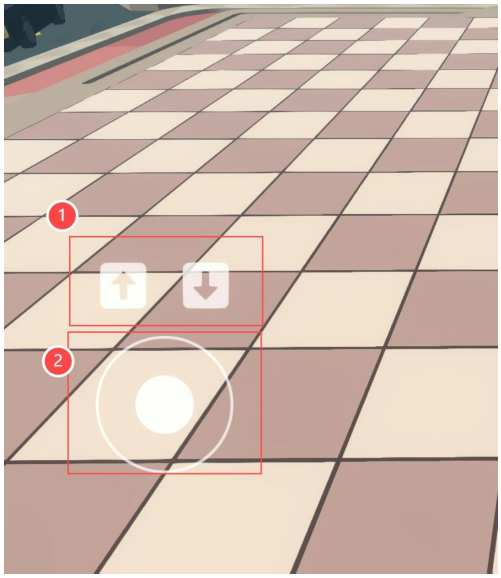
6) Code base: Display all code blocks under the currently selected type;

7) Programming area: User link code blocks, which form the behavior logic;

8) Bottom command bar: Screen recording, and return to edit.



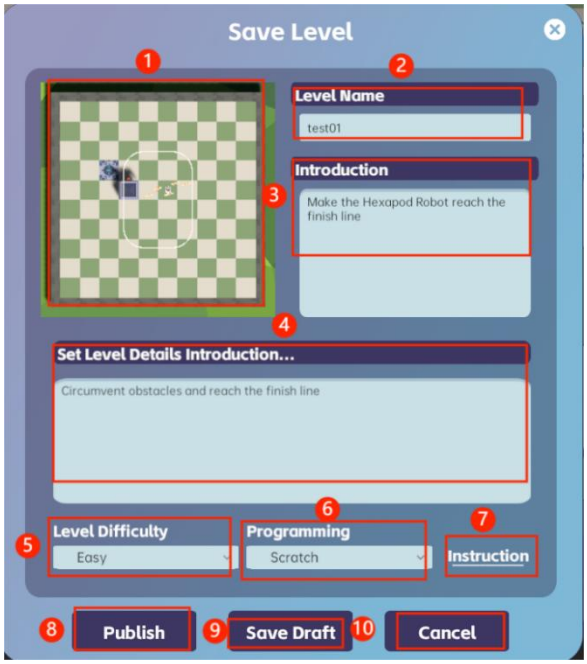
9) Operate:



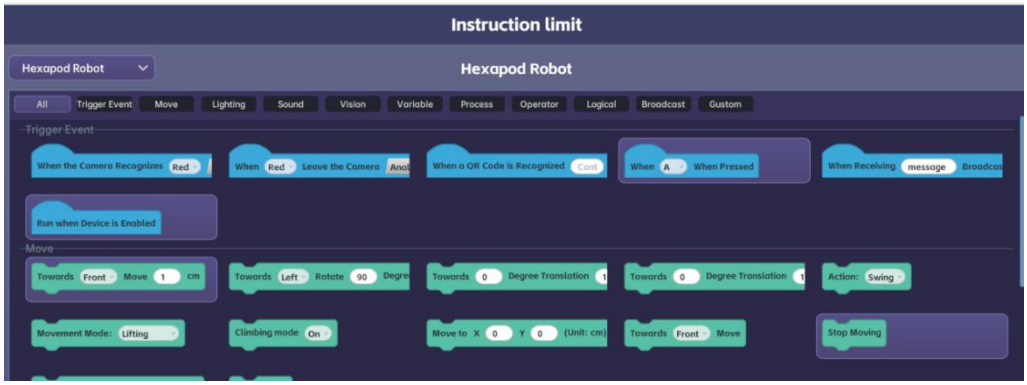
Tablet touch screen mode: two fingers swipe outward at the same time to enlarge the viewing angle, swipe inward to narrow the viewing angle, fingers directly touch the screen to swipe up and down, left and right, the screen can be swiped up and down, left and right, one finger touch and hold press to drag the device, in addition, there is a joystick button in the lower left corner, as shown in the picture above, 1: ↑ (raise the viewing angle), ↓ (pull down the viewing angle), 2 in the picture: up and down, left and right directions correspond to forward, backward, left, right, and move right. In the programming area, one finger and long press and hold the code block for two seconds to appear "repeat", "copy", "paste", "delete" and "cancel" buttons, one finger touch and long press to drag the tile code into the programming area, one finger touch and long press to remove the tile code out of the programming area to delete the tile code.

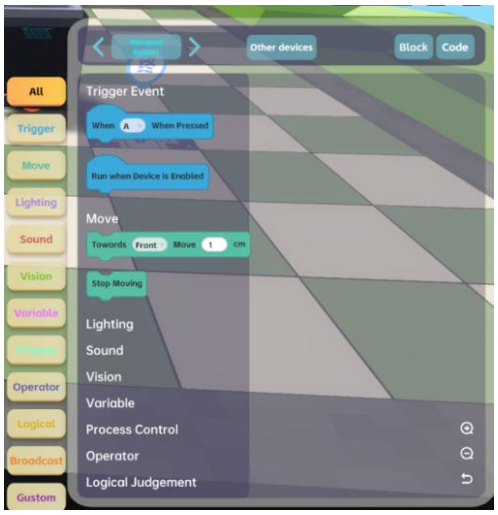
8. Saving and release of tasks

After the scene editing is completed in the task mode, click Save Scene, and the panel for saving the task will appear. Supplement the task information as prompted, and save and release the task.



Command restrictions





1) Task thumbnail: Thumbnails of tasks;

2) Set task name: Edit the task name;

3) Introduction to setting task: Introduction to the edited task;

4) Details of setting task: Detailed introduction of the edited task;

5) Task difficulty: Select the beginner/intermediate/advanced level;

6) Command restrictions: Click to enter to limit the use of some command modules in the challenging process, and only the selected modules can be used;

7) Release: Release the current task to the platform;

8) Save: Save the current task to the platform;

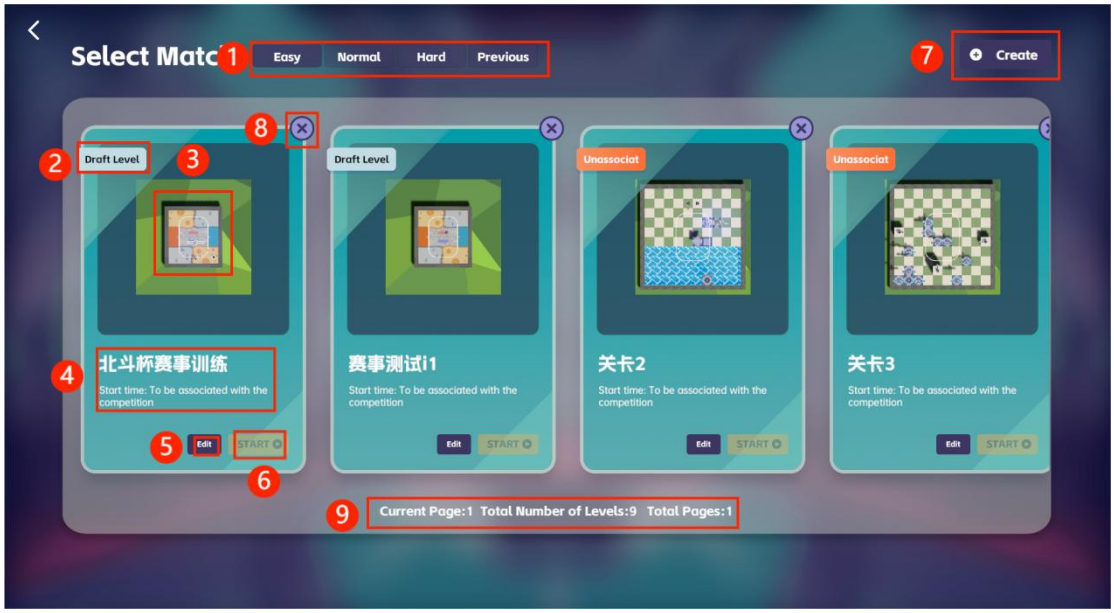
10) Cancel: Close and save the task panel.

XI. Event Mode

1. Selecting event mode

Click "Event Mode" at the mode selection entrance or directly click the event map. Then, click "Enter" to enter the event mode. (Only campus network users can enter the event mode for participation and viewing).

2. Selecting event task



1) Task type: The event tasks are divided into four types: primary events, intermediate events, advanced events, and previous events (once the completed map is made public, the event becomes a previous event);

2) Task tag: The event tasks are divided into unrelated event tasks, non-started event tasks, started event tasks, ended event tasks (divided by game time), and draft tasks (only background administrators can use the event map, and the event map only supports two states: release finished product and draft, while semi-finished state is not supported);

3) Task thumbnail: The thumbnail of event task map details;

4) Introduction to task name: The name of the task and the start/end time of the event;

5) Edit: Only the background administrator can edit the event map;

6) Start challenging: Click the button to enter the event task;

7) Create task: Only background administrators have the authority to create event tasks, save them, and release them to the platform for other users to challenge;

8) Delete: The background administrators can delete the tasks created by themselves;

9) Page: Page number of the event task list.

3. Event state

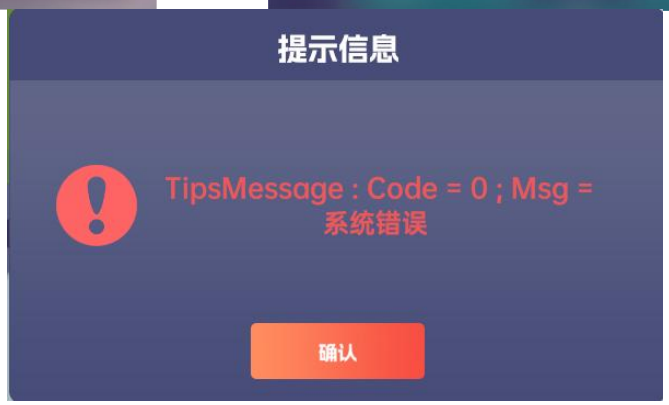
Operations corresponding to different event states;

1) Non-associated event task: The event task that has not been associated with an event. The background administrator can re-edit or delete the event task by clicking the "Edit" or "Delete" button, or by clicking the "Edit" or "Delete" button on the task introduction part of the task thumbnail, but the "Start Challenging" button cannot be clicked;

2) Non-started event task: The task that has been associated with an event but the competition time has not begun. The background administrator can re-edit or delete the event task by clicking the "Edit" or "Delete" button, or by clicking the "Edit" or "Delete" button on the task introduction part of the task thumbnail, but the "Start Challenging" button cannot be clicked;

3) Started event task: The task that has been associated with an event and the competition time has begun. The background administrator can delete the task, or start challenging by clicking the "Start Challenging", or "Delete" button, or by clicking the "Start Challenging" or "Delete" button on the task introduction part of the task thumbnail;

Note: About the "Edit" button, the background administrator can click in to operate, but it cannot save the release level again after modification. Click the Save release level will display the system error.



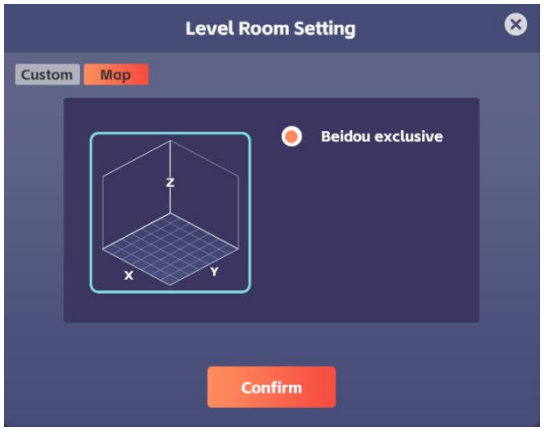
4) Ended event task: The task for which the game time is over. The background administrator can re-edit or delete the event task by clicking the "Edit" or "Delete" button, or by clicking the "Edit", "Delete", or “Publish Map" button on the task introduction part of the task thumbnail. After the game is ended, the background administrator can publish the map and can cancel such a publishing operation after the map is published. Once the map is made public, the event becomes a previous event; but the "Start Challenging" button cannot be clicked;

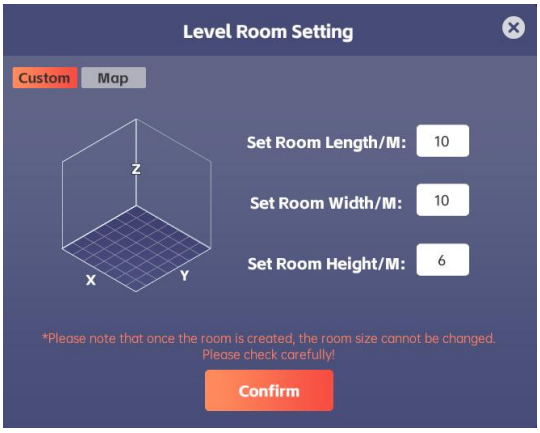
5) Draft task: The event task that has not been associated with an event. The background administrator can re-edit or delete the event task by clicking the "Edit" or "Delete" button, or by clicking the "Edit" or "Delete" button on the task introduction part of the task thumbnail, but the "Start Challenging" button cannot be clicked.

4. Creating tasks

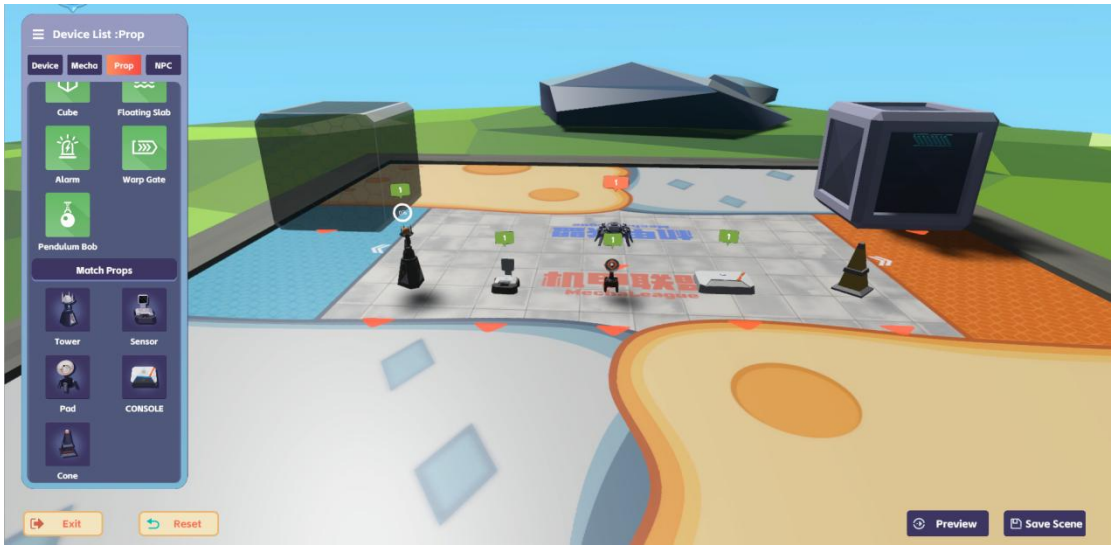
1) Select "Create Room"

Click the "Create Task" button in the upper right corner to enter the event task creation room (only background administrators can create event tasks, and this button is only visible to background administrators). By default, there are two event task maps: Special maps for Beidou events and custom maps. For special maps for Beidou events, the room specification is set by default; for custom maps, you can customize the room specification (max. height: 20 m, max. width: 20 m, and max. height: 10 m).

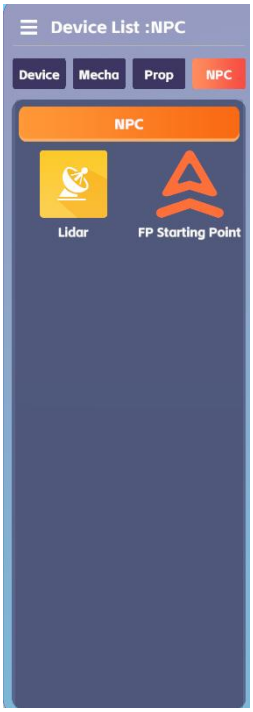




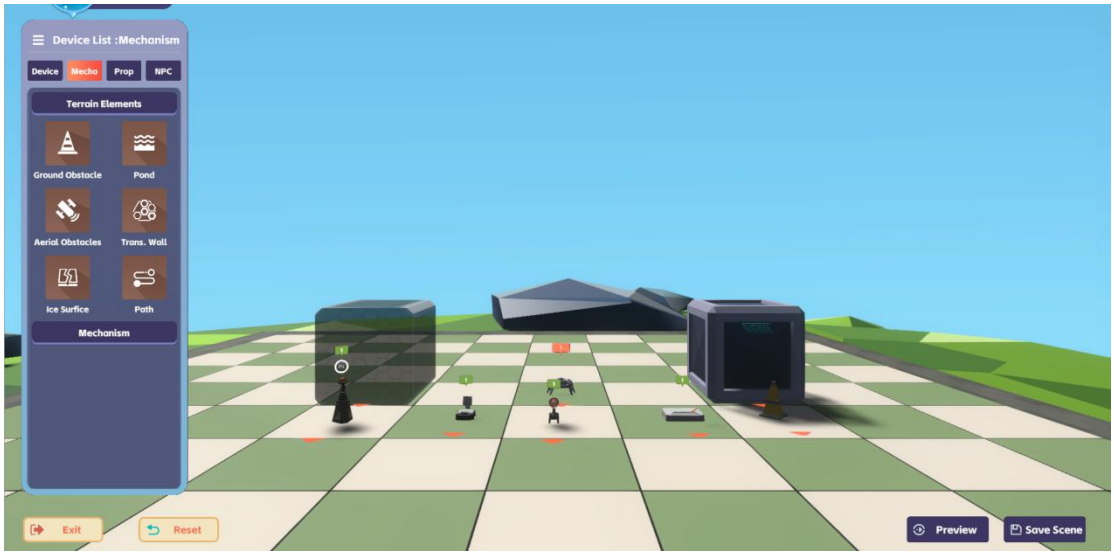
2) Operation panel for Beidou event maps



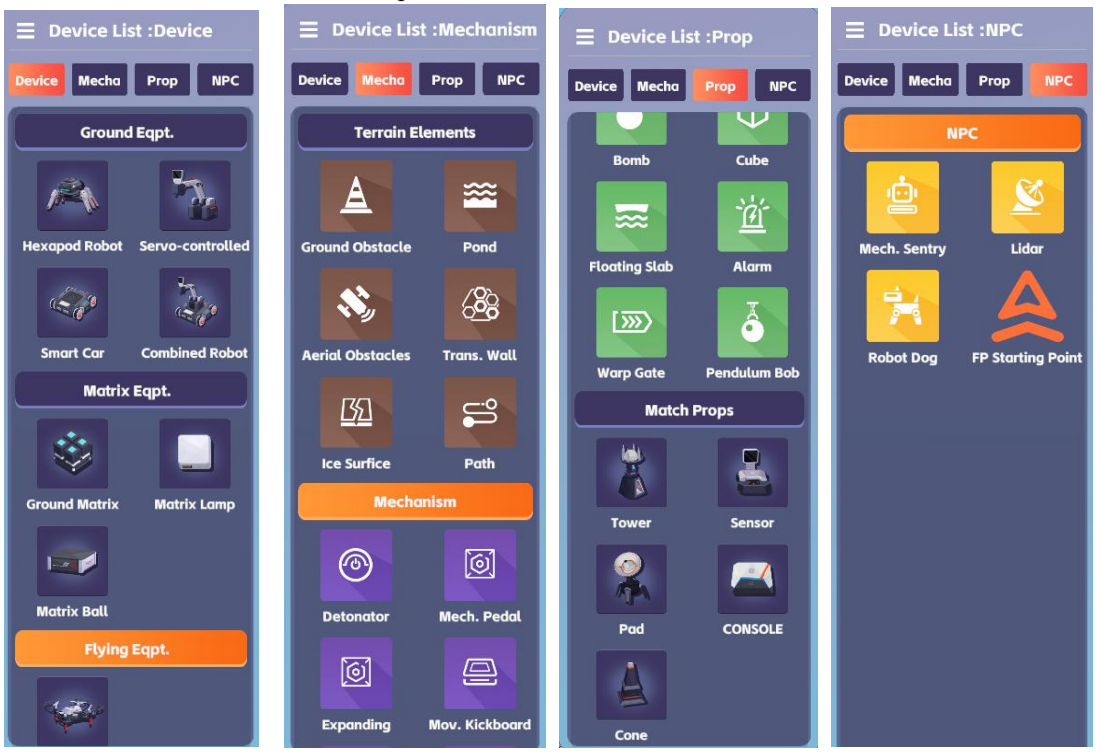
Device list of Beidou event map. On the Beidou event special map, some event props are added, but some mechanisms and NPCs are removed.



3) Operation panel for customized event maps

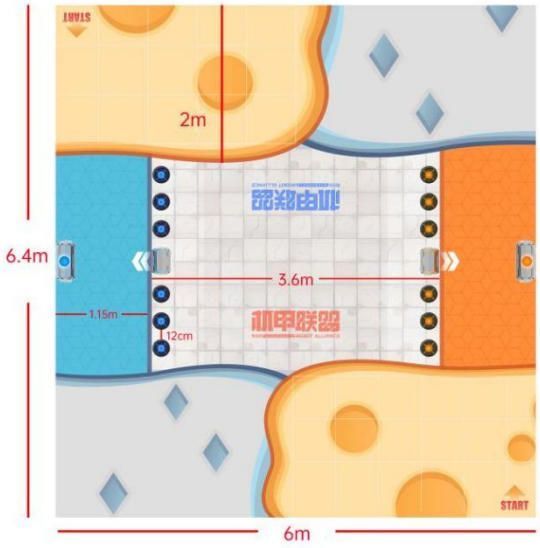


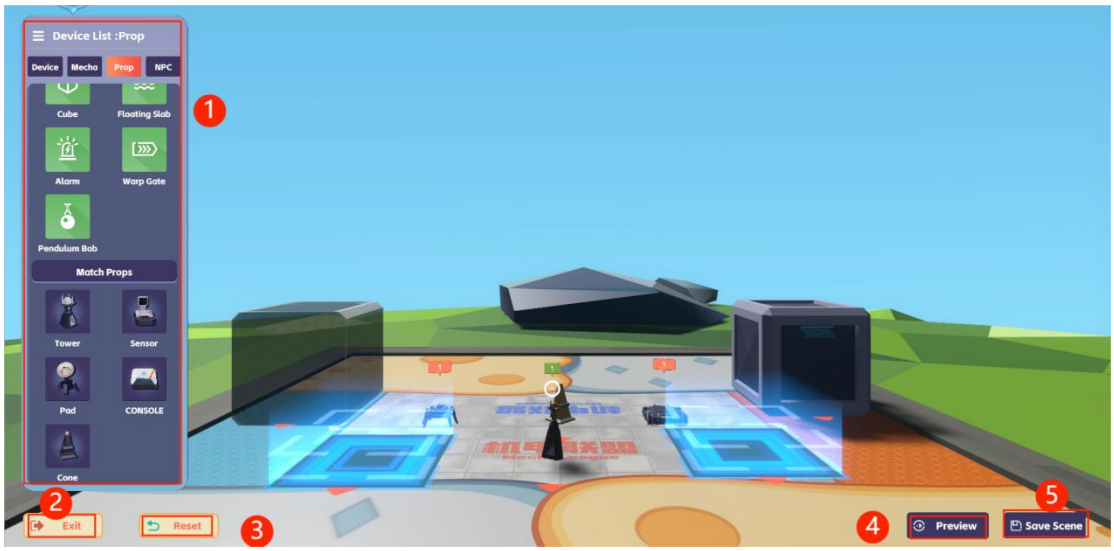
Device list of customized event maps:

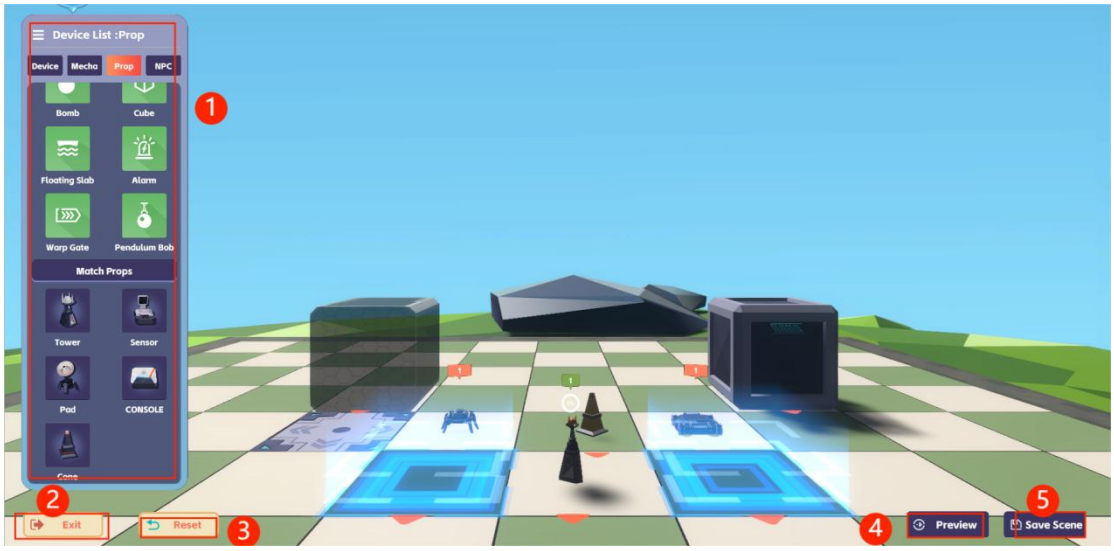


5. Building event mode scenes

In the event mode, the user selects four types of items: device, mechanism, props, and NPC and drags them to the scene for building.The special map for Beidou events is the room specification set by default, which is a two-dimensional plane space with no ups and downs.







1) Device list: Event mode device, mechanism, prop, and NPC list;

2) Exit: Exit the stage building and return to the task selection interface;

3) Reset scene: Reset the current scene to the initial state;

4) Preview: In the preview state, you can edit the behavior logic of the device;

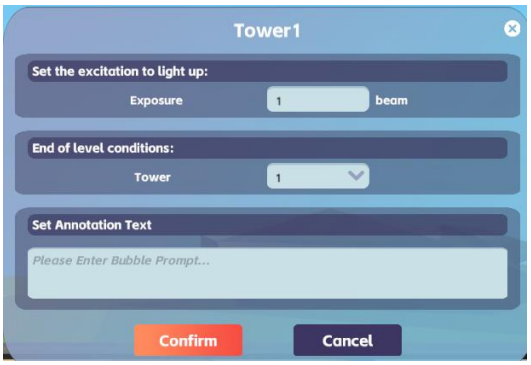
5) Save scene: Save the built stage scene and device configuration information (the event mode only saves the scene building and device configuration, and cannot save the device operation logic in the preview state).

6. Match Prop Behavior Editing

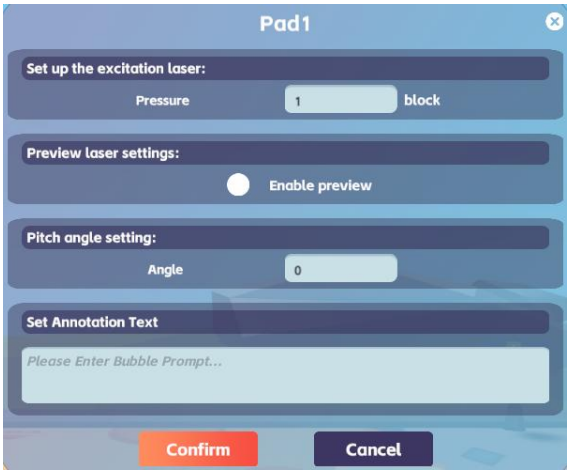
（1）Match Props：Tower、Sensor、Pad、Console、Cone

（2）Match props description

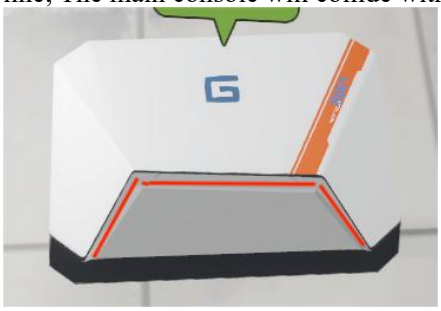
①Tower： The laser received from the launch pad is placed on the left and right sides of the Beidou event scene map. The luminous part of the receiving tower is in the upper part of the top hemisphere. The luminous condition is that the upper part of the hemisphere receives the beam irradiation and reaches the beam irradiation intensity (/ beam);The end of the conditions need to set several receiving towers at the same time, which represents the success of the pass (/); the tower will collide with the equipment.



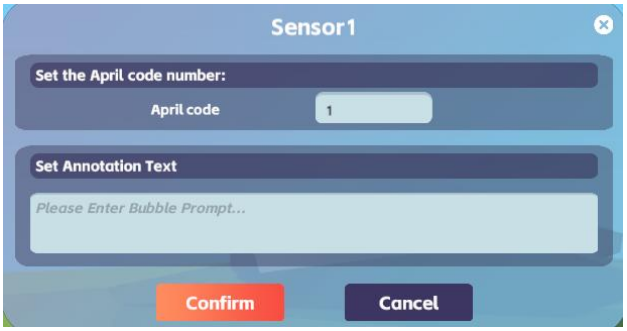
②Pad： The associated main console receives the pressure signal of several pressure sensitive sensors (/ blocks), and continuously emits the red laser at or above the corresponding value (visible), and the red laser beam (visible) illuminating the top hemisphere of the receiving tower lights the receiving tower. The emitting part of the pad is red laser requiring six or more sensors to trigger the pressure induction at the same time; the pitch angle of the pad is adjustable (0-180), and the end point of laser beam in 3d scene (pitch angle setting, preview laser); the pad will collide with the equipment.



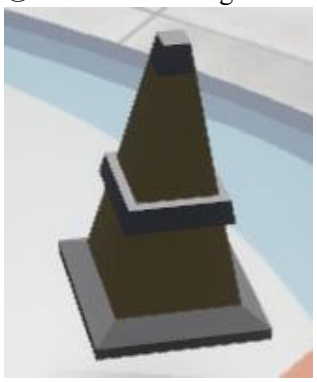
③Console： Connect the transmitting pad and the induction table, The main console can be illuminated, The luminous part is the red marked part; When placing the main console and the induction table, As long as the spacing between the two items is less than 50cm, Connecconnector are automatically generated in two items (as shown on the right), The luminous part of the connector is the white color block part, Boot on can shine; Connections can be connected to the left and right sides of the main console, Connections need not be placed, And not in the item list, In practice, a main console can be connected to up to 16 induction stations, Left side is less than or equal to 8, Right side is less than or equal to 8; The launch tower is connected behind the main console, Connect with a power cord, The spacing is less than 20cm for the automatic adsorption line; The main console will collide with the equipment.



④Sensor： When connecting with the main console, the sensor table can be connected with the light in the main console; the induction table automatically generates the April code in the front, and the corresponding April code can be placed in the green box; the induction table will collide with the equipment.

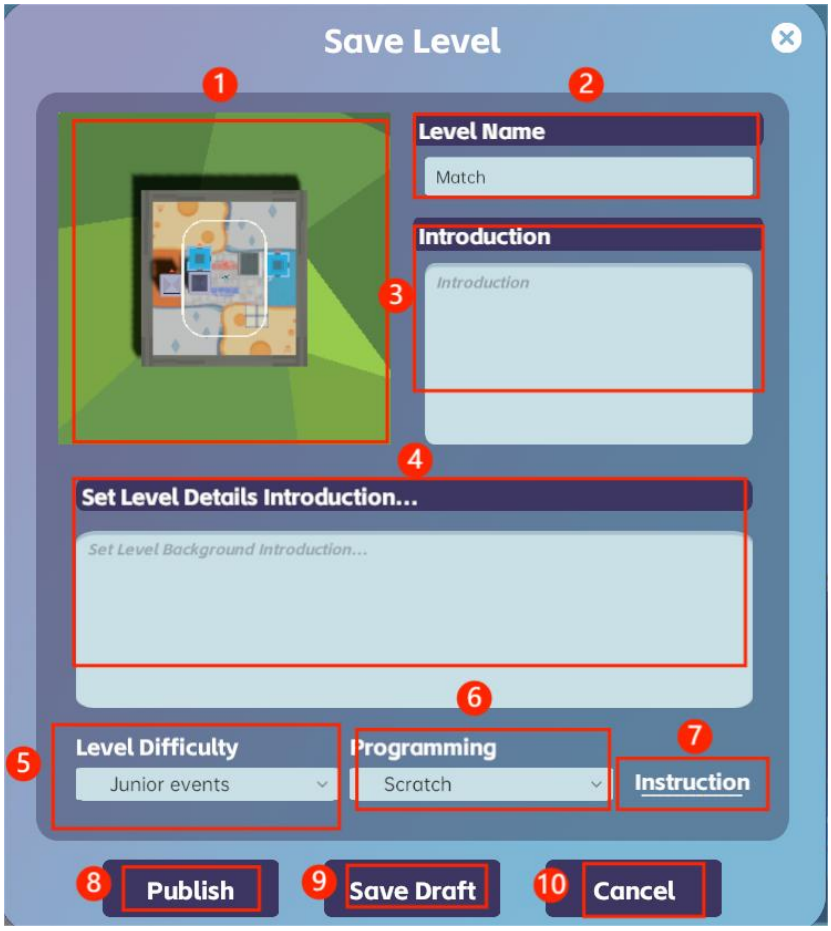


⑤Cone：Use as a ground obstacle, it will collide with the equipment.



7. Event task saving and release

After the scene editing is completed in the event mode, click "Save Scene", and the panel for saving the task will appear. Supplement the task information as prompted, and save and release the task.



1) Task thumbnail: Thumbnails of tasks;

2) Set task name: Edit the task name;

3) Set task introduction: Introduction to the edited task;

4) Details of setting task: Detailed introduction of the edited task;

5) Task difficulty: Select beginner/intermediate/advanced event;

6)Programming mode: Select the programming language used to break the level, and select the instruction block (visual code)/python/all used

7) Command restrictions: Click to enter to limit the use of some command modules in the challenging process, and only the selected modules can be used;

8) Release: Release the current task to the platform (the released event task is in the associated state);

9) Save: Save the current task to the platform (the released event task is the draft task);

10) Cancel: Close and save the task panel.

8. Event User Status

There are three types of users for event registration: campus network users, trial users, and regular users. However, there are only two categories of event status: campus network users and non-campus network users.

(1) Campus Network Users: Users who have successfully joined the school's campus network

(including school administrators, teachers, and students). After successfully registering for the event and passing the verification (or without verification), the server will mark the users as event participants. Campus network users can directly log in with their student status to access the software and view the practice sessions. However, the competition maps are not available for viewing until the competition time. After the competition ends, the users will revert to their original campus network user status.

(2) Trial Users: Users whose accounts are registered on the 3D software, enjoying a 30-day free trial period to operate the software. After successfully registering for the event and passing the verification (or without verification), the server will mark the users as event participants. They can log in to the software with a non-campus network user status to view the practice sessions. However, the competition maps are not available for viewing until the competition time. After the competition ends, the users will revert to their original trial user status and can log in to the software within the 30-day validity period. After 30 days, they can activate their accounts on the Gaoju official website.

(3) Regular Users: Users whose accounts are registered on a general website and cannot normally log in to the 3D software for operation. However, after successfully registering for the event, the server will mark the verified users (or those without the need for verification) as event participants. This means that regular users can log in to the 3D software with a non-campus network user status. This status is valid from the time of successful registration until the end of the competition. However, the competition maps are not available for viewing until the competition time. If the registration fails, the users cannot log in to the software. After the competition ends, the users will revert to their regular user status and will not be able to log in to the software.

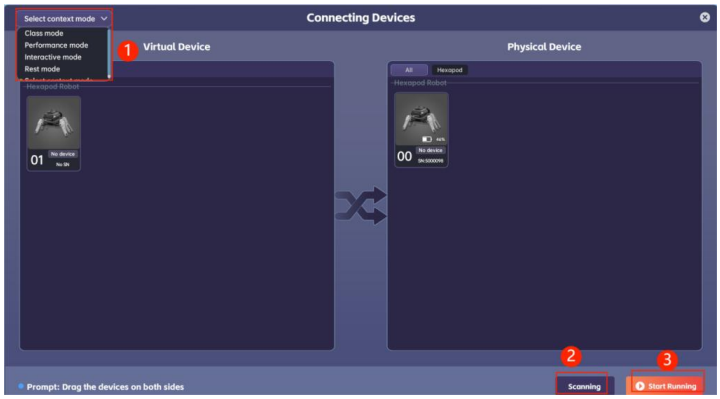
XII. Device Connection and Control

1. Connecting/disconnecting device

You can click the "Connect/Disconnect Physical Device" button above the programming area to connect the
scene device with the simulation running reaching the ideal effect to the physical device for control. (No device connection symbol is available as the physical devices cannot be connected in "task mode").

2. Scanning device

After clicking the "Connect/Disconnect Physical Device" button, the connection device window appears. Click the "Scan Device" button at the bottom right of the window, all virtual devices and physical devices will be automatically scanned. Check the SN number of the device. You only need to drag and drop the virtual device to the physical device for associated connection. After the connection is successful, the indicator lights at the upper sides of the connected physical device will become solid white. Click the "Start Running" button to complete the control of the physical device.



1）Select context mode:Choose class mode/performance mode/interaction mode/rest mode;

2) Scanning:Scan the same type of device within the scanning area, which can display the device's connection status, SN number, and battery level;

3) Start Running:Can view the operation log output, device monitoring, and operation status of the device;

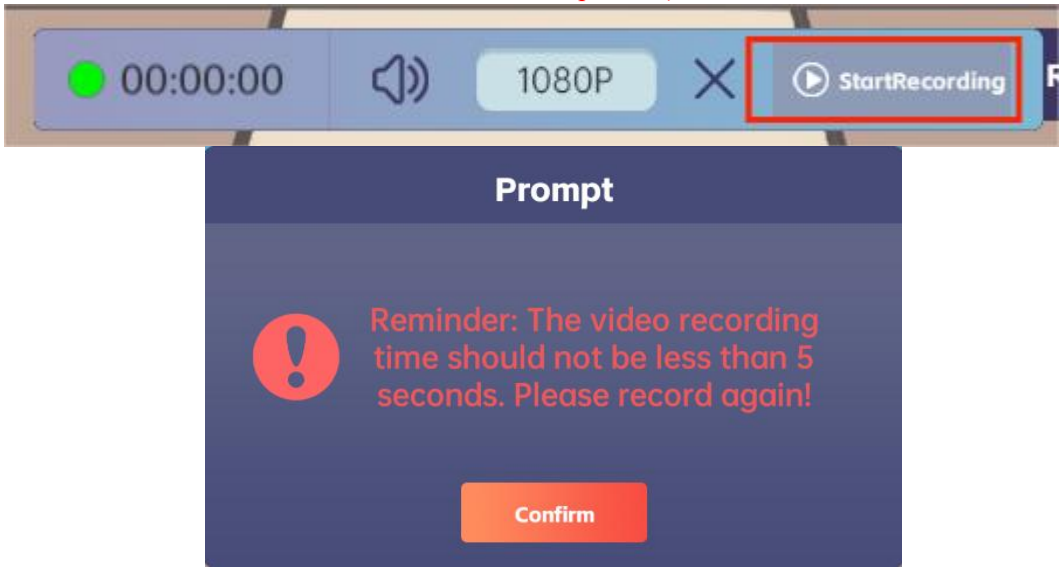
XIII. Other System Interfaces

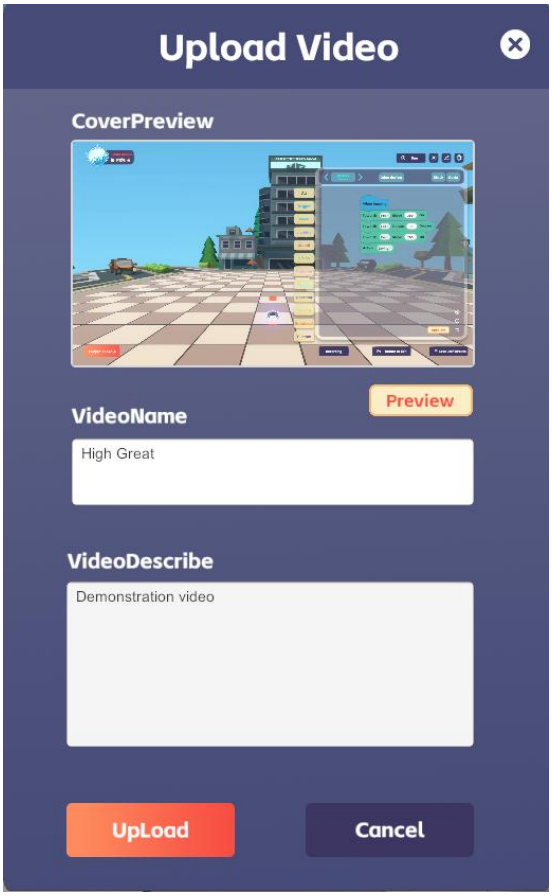
1. Program saving and work release

In the "Programming Documents" window that appears, enter the name of the file to save.

You can record the screen by clicking the "Record Screen" button below the programming area.

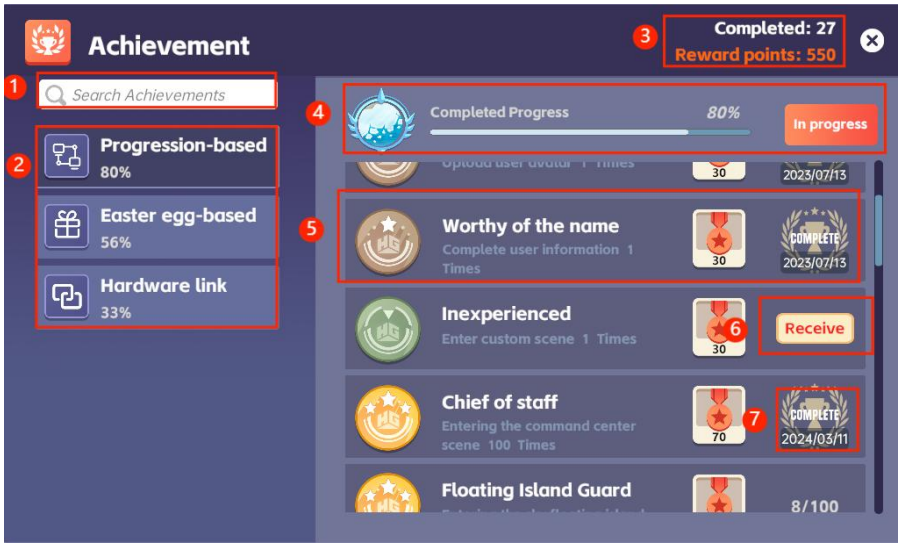
After the screen recording is ended, the "Upload Video" window will appear, where you can preview and name the video, and edit the video introduction text. After clicking the "Upload" button, the video work will be uploaded to the "Work Center" module of the High Great Innovation Integrated Service Platform for users to learn and communicate.(Note: The video must be recorded for at least 5 seconds before it can be uploaded)





2. Achievements

When users complete various challenges and meet the fulfillment conditions of achievements during the game, they can obtain the corresponding achievements and get corresponding points. Points are accumulated to the player ranking list for ranking.



1) Search achievements: You can enter the achievement keyword to search for your achievements;

2) Achievement type: Process type, Easter egg type, and hardware linkage;

3) Number of achievements/points: The number of achievements currently completed and points obtained;

4) Achievement progress: The progress of achievements completed under the current type;

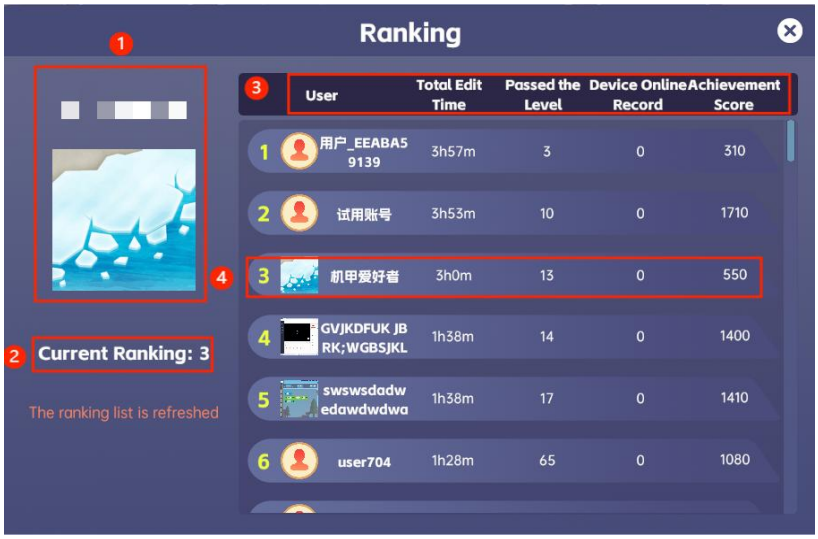
5) Achievement detail: Achievement name, fulfillment conditions, and corresponding points;

6) Claim For completed achievements, click the button to claim achievement points;

7) Achievement mark: Display "completed" for completed achievements.

3. Ranking list

The editing time, task clearance, and achievement points of users during the game will be automatically recorded and accumulated into the ranking list.



1) User information: User nickname and avatar;

2) Ranking information: Current ranking;

3) Ranking classification: Total editing duration, number of completed tasks, device online record, and achievement point;

4) User ranking information: Display various ranking list information of current users.

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