uCode

GETTING STARTED GUIDE

UBTECH
EDUCATION

TABLE OF CONTENTS

WHAT IS UCODE?

uCode is a web programming environment that takes programming to the next level. Students of all levels can program physical and virtual robots, create animations and games, and utilize real-time AI tools all within uCode. uCode uses block-based coding and dual block-to-text-based programming in an easy-to-start environment. This guide is intended to get you started with uCode.
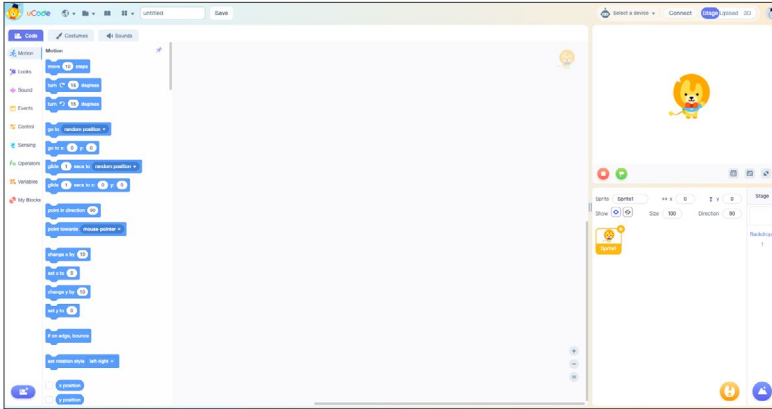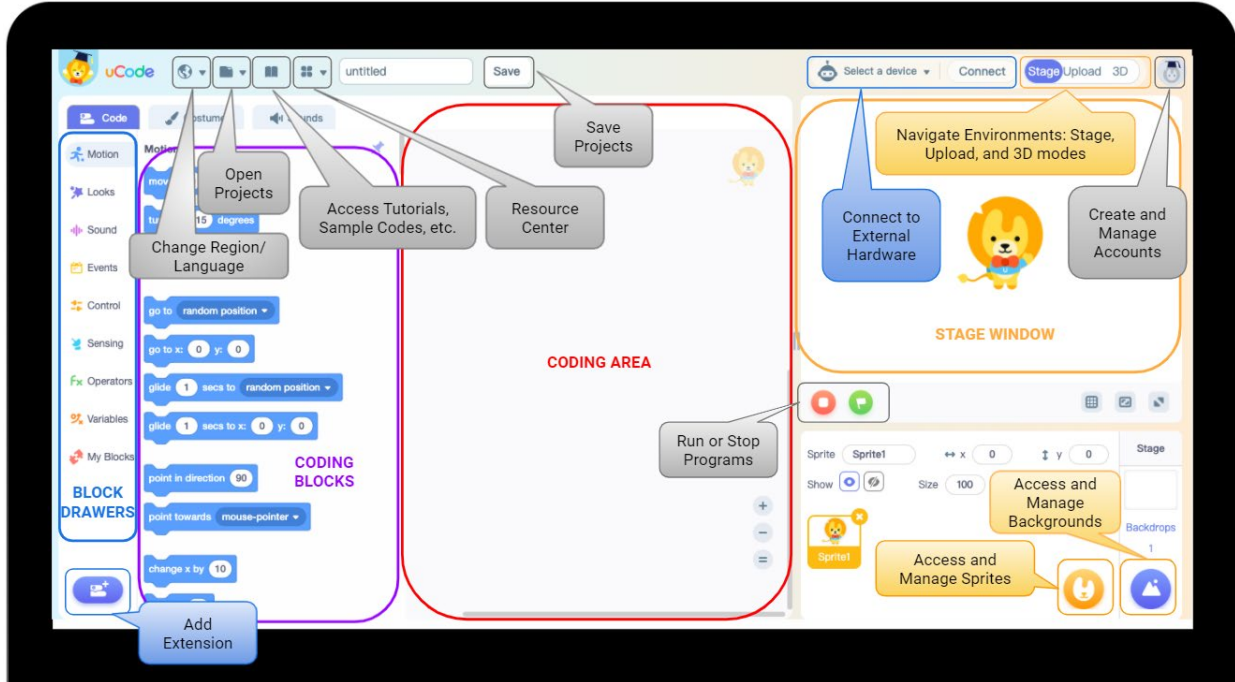

Access uCode at
idena.ubtrobot.com/#/

Note: uCode is a browser-based system compatible with most computers that can access the Internet, including Chromebooks. The recommended browser is Google Chrome. uCode is not mobile compatible.

To access additional resources and activities, visit: ubtecheducation.com/ucode-resources-activities/.

NAVIGATION MAP

STAGE MODE

Stage mode is the default environment for uCode. In Stage mode, you can create different programs like animations and games while also connecting to external hardware like the UKIT Advanced microcontroller (uKit Explore).

To create programs, drag blocks from the drawers on the left and assemble coding sequences in the center of the coding area. All programs can be viewed in the stage window. The stage environment is very versatile as you can change or add sprites, adjust the background, and completely customize the staging space.

To get started, try to add one of the sample programs or take the Beginner's Course, both found in the **Resource Center** pop-up window.

To explore the blocks further, reference the Block Guide.
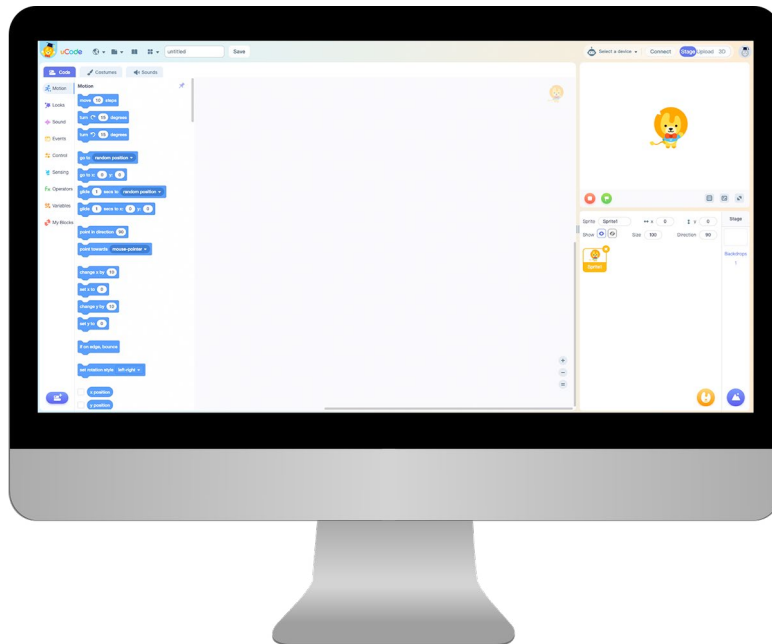
EXTENSIONS

Within Stage mode, you can add various extensions to create more elaborate interactions with hardware and software. Software extensions include AI, Video Sensing, Pen, Text to Speech, Translate, and Music. Hardware extensions include uKit Explore and micro:bit.

To access extensions, click the **Add Extension** button located below the block drawers. Enable the extensions you want to use. When you return to the main screen, those extensions will then be added to the list of block drawers.

For a full list of the extensions and what blocks they use, visit the Block Guide.
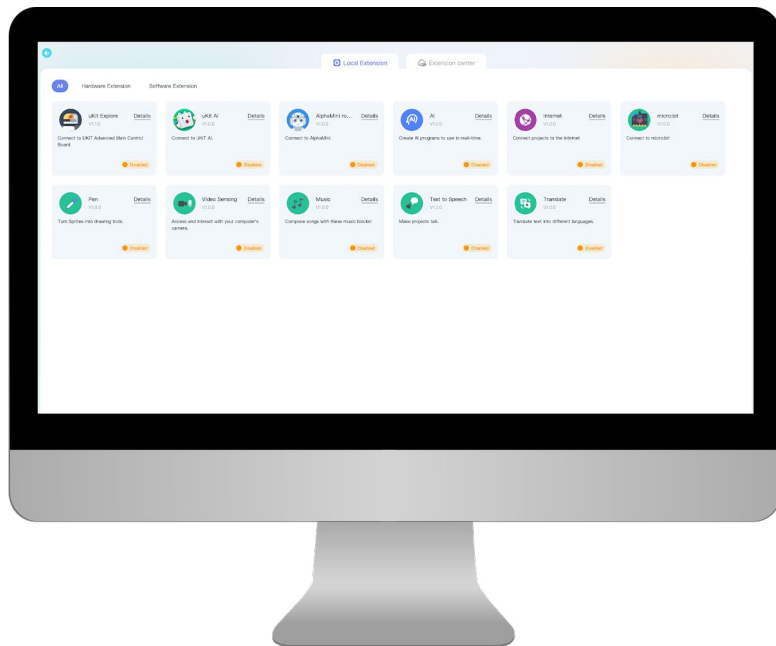
UPLOAD MODE

Upload mode allows you to upload code directly to the UKIT Advanced microcontroller (uKit Explore). This mode enables programs to be sent to the board for use outside of the computer. To access Upload mode, the UKIT Advanced board must be successfully connected first (see Connecting uKit Explore for instructions).

Once in Upload mode, you can drag blocks from the drawers on the left and assemble sequences in the coding space. This mode features dual programming where blocks instantly convert into a text-based language (C++) for viewing. To alter the text-code, you can output your code into Arduino IDE by clicking the **Arduino** button. The first time you do this, you will be prompted to download Arduino IDE onto your device.
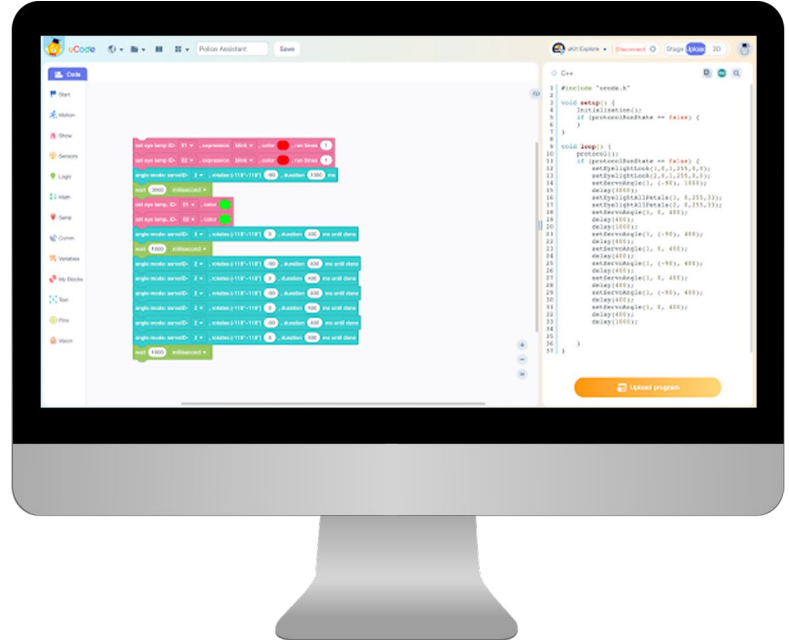
ROBOT MODELS

uCode features 3D, 360-degree robot building instructions. The instructions guide you through step-by-step assembly of UKIT Advanced robots. uCode currently features 38 different robot builds.

To access the build instructions, click the **Resource Center** button in Stage mode or through the 3D environment.

All robot models feature sample codes accessed via the **Sample Code** tab in the **Resource Center** pop-up. These sample codes will work in all applicable environments.

VIRTUAL ROBOTS

uCode features various virtual UKIT robots that can be programmed in a virtual environment. To get started, click **3D** to enter directly into the Fan virtual robot environment or select **Resource Center > UKIT Advanced > Virtual Robots** to access the full list of models and virtual robots.

When you enter the **3D** environment by clicking 3D, the Fan robot is the first to appear. Each robot features a sample code to get you started. You can run the program or alter the code using Stage mode blocks and extensions.
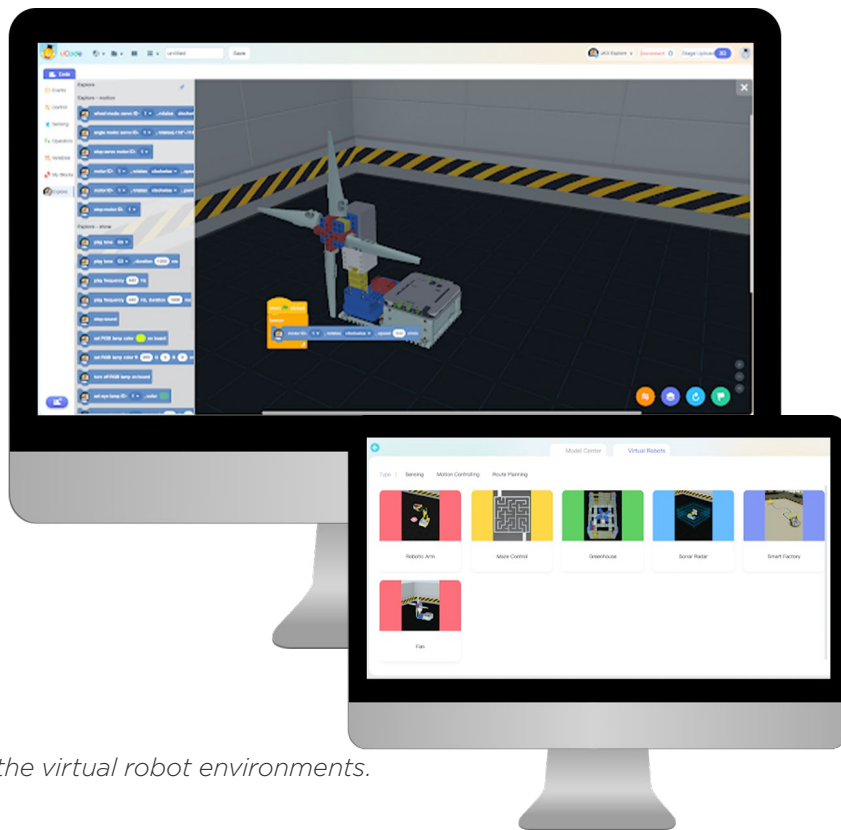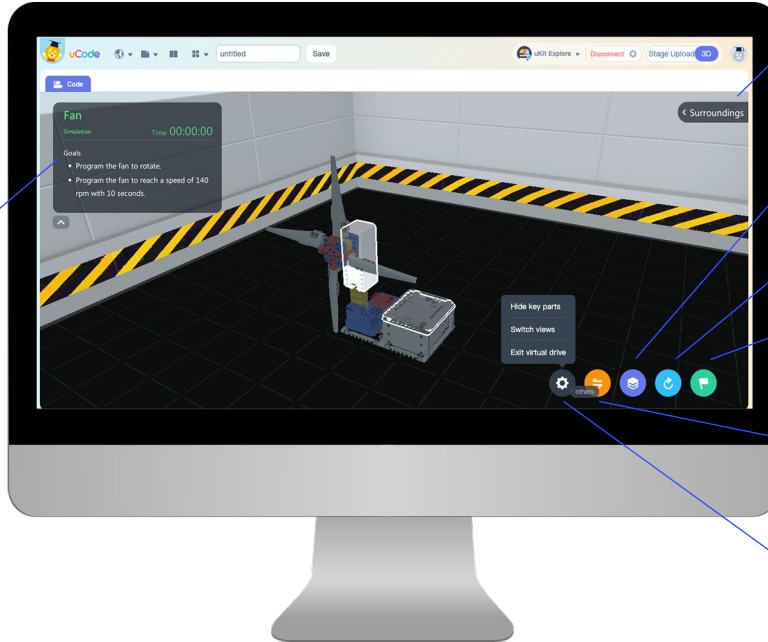

Note: For easier navigation, use a mouse to control the virtual robot environments.

3D ENVIRONMENT

Navigation Map

Expand the Surroundings window to view environmental data when applicable

Click the **Resource Center** button to access other Virtual Robots and the Model Center.

The simulation task window offers various goals. They will change color to green when completed.

To restart the code, click the **Scene reset** button.

To run or stop the program, click the **green flag** button.

To minimize the code and run your program, click the **Switch to stage** button. This will give you a better view of the virtual robot. When activated, the simulation task window and gear button will appear.

This is where you can switch views, highlight components, and exit the environment.

Note: For easier navigation, use a mouse to control the virtual robot environments.

AI INTEGRATION

uCode uses embedded AI to create real-time interactions with artificial intelligence through your projects. You can leverage existing AI blocks or create your own by training a machine learning model.

AI blocks include object recognition, video drawing, image/body segmentation, pose estimation, drawing/object recognition, pose recognition, and video drawing. These blocks create an added layer of interaction to all projects and can be used in Stage mode as well as with the virtual robots.

To access these blocks, add the AI extension drawer through the **Add Extension** button. For a complete list of the AI blocks and uses, consult the Block Guide. For project ideas, visit: ubtecheducation.com/ucode-resources-activities/.
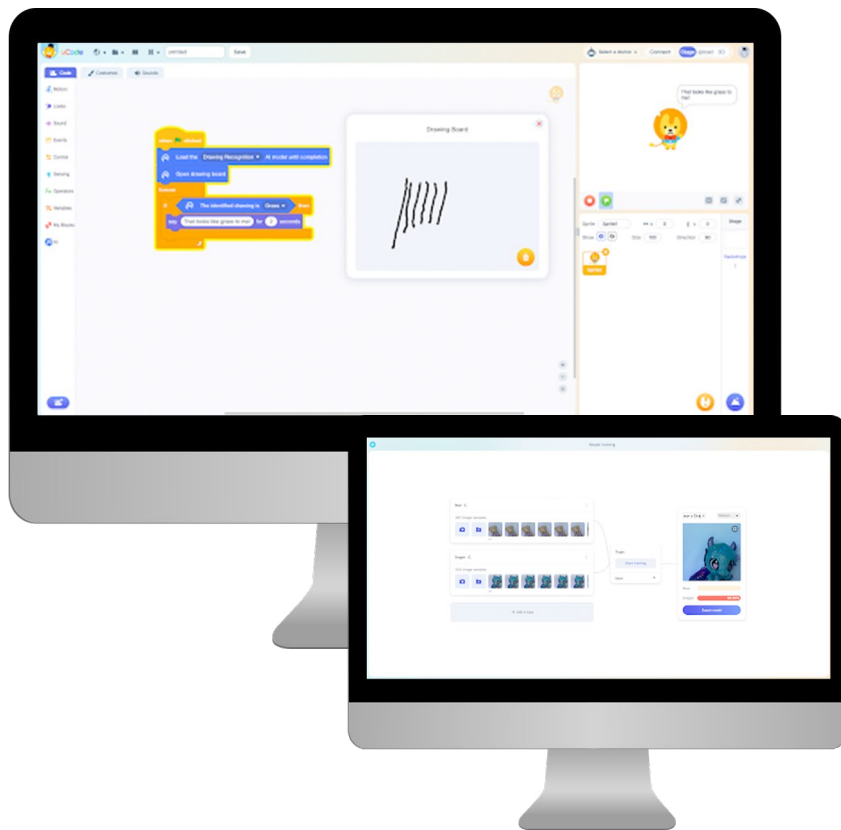
CONNECTING UKIT EXPLORE

The uKit Explore board is the microcontroller included with UKIT Advanced and is considered the brain of the robots. There are two methods to connect the uKit Explore microcontroller to uCode: USB and Bluetooth.

How you want to interact with your robots will dictate the connection method used. For both methods, select **uKit Explore** from the **Select a device** drop-down menu and then click **Connect**. In the pop-up window that appears, you can select how you will connect.
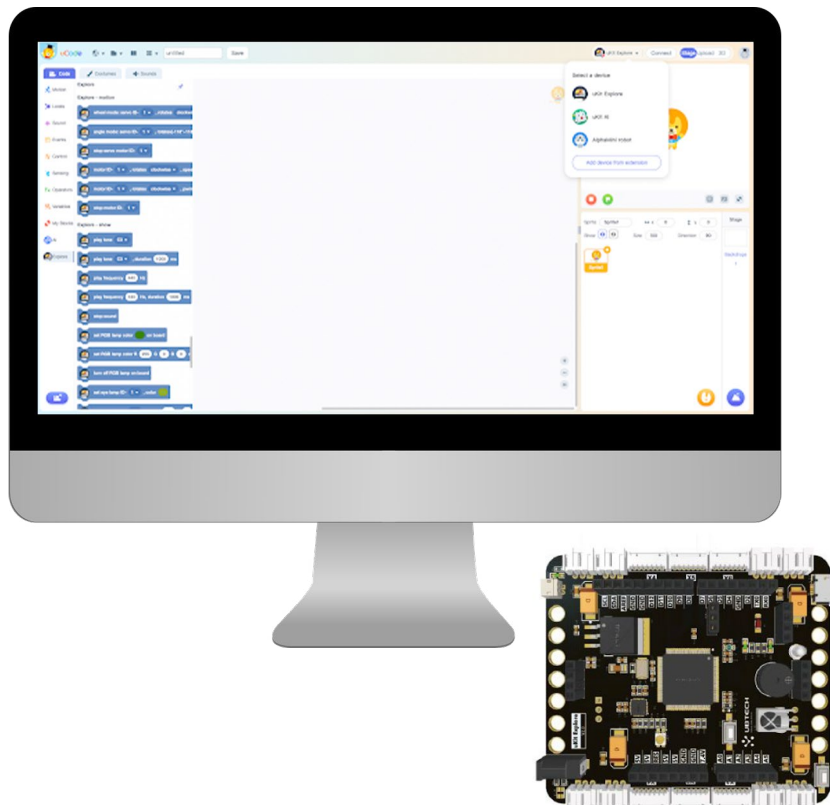
CONNECTING UKIT EXPLORE VIA USB

USB connection is used to interact with the microcontroller in Stage and Upload modes. To use USB, make sure your board is connected and the red power light is on.

The first time you connect, you'll be prompted to download uCodeLink, the connection assistant plugin, for PC and Mac. Click **Download** and uCodeLink will automatically download to your device. If you are using a Chromebook, you will need to add uCodeLink as a Chrome Web Extension.

After downloading, open and follow the prompts to install. This application will run in the background after installation, and you will do this process only once.
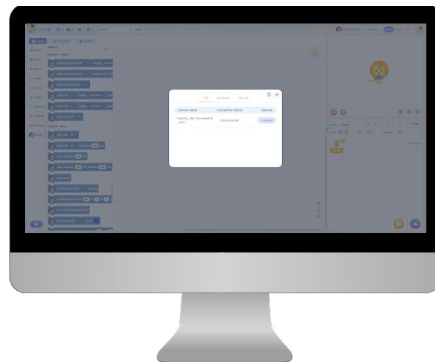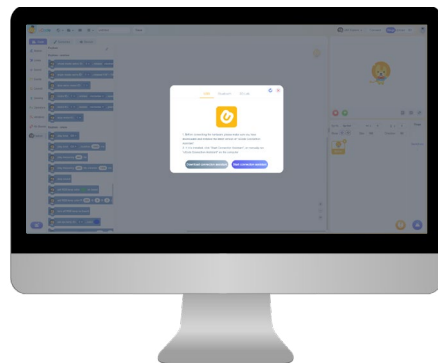
Note: You may need to reload uCode to establish a connection.

Firmware updates are completed only through USB. If prompted, it is suggested you update.

If you experience connection issues, contact customer support at:

education.service@ubtrobot.com
800-276-6137 (M-F 7 a.m. to 4 p.m. PST)

CONNECTING UKIT EXPLORE VIA BLUETOOTH

Bluetooth connection is available only in Stage mode.

To connect, first attach the Bluetooth module to the microcontroller and make sure the pins are fully connected. The board will need power from either the USB cable or the battery pack.

Once it is connected, you will see a blue light. Click **Connect**, and a pop-up window will appear where you can pair your device to the board. You will be prompted to reset the board by pressing the onboard reset button on the uKit Explore board.
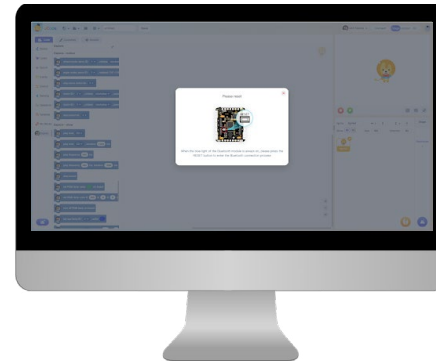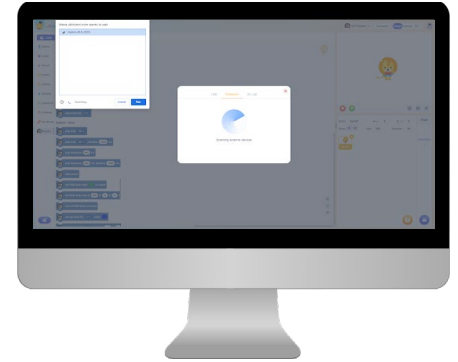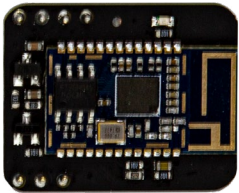
FAQS

ABOUT UCODE

What grade level(s) is uCode for?
uCode can be used by a variety of grade levels, from elementary to high school.

What OS is supported?
uCode is a browser-based system compatible with most computers that can access the Internet, including:

- Windows 10+ (CPU: Core i5+, RAM: 8 G+, Storage: 128 G+)
- Mac OS 10.15+
- Chromebooks specifications TBD

Not mobile compatible.

What can I program on uCode?
Students can program UKIT Advanced, micro:bit, virtual robots, and more. The uCode environment is Arduino-compatible, supports various sensors, and integrates AI and the Internet of Things (IoT) through cutting-edge technology.

What browsers are supported?
uCode is optimized for Google Chrome.

Do I need to purchase any additional hardware or software beyond the UKIT Advanced to get started?
All parts and pieces to build your robots are included in the kit – no additional pieces are required. However, a compatible Mac, PC, or Chromebook device with a Chrome browser is needed to run the uCode web programming environment. The uCode web programming environment is free to use.

What comes with UKIT Advanced?
UKIT Advanced is a comprehensive building kit that includes more than 1,000 pieces, 16 servos, an Arduino-compatible microcontroller, and a complete circuitry kit for limitless opportunities.

Is it possible to use uCode without UKIT Advanced hardware?
Yes, uCode has virtual robots to program within the uCode environment.

Do I need to create a uCode account to use the uCode web programming environment?
Accounts are not necessary to program.

Do I need to download plugin software to run uCode?
No plugin is necessary when programming without hardware. However, a plugin called uCodeLink is required to download when you connect to UKIT Advanced for the first time.

Do I need to download Arduino IDE to run uCode?
No, you can run uCode and connect to UKIT Advanced without downloading the Arduino IDE programming environment.

What are the benefits of downloading Arduino IDE?
UKIT Advanced is compatible with the Arduino IDE programming environment. To program in a text-based language (C++), downloading and installing IDE is required.

GETTING STARTED

Do I need prior coding experience to use uCode?
While prior coding experience is helpful, uCode can be used by students with varying coding experience. The uCode platform includes building instructions, an introduction tutorial, and various sample codes to get started.

How do I access the build instructions provided in uCode?
From the home screen, click **Resource Center** and select the **UKIT Advanced** in **Building Instruction** to access the 3D build instructions for 38 predesigned models in the software.

How do I connect a UKIT Advanced robot to uCode?
You can connect the UKIT Advanced robots using either USB or Bluetooth. For first-time connection via USB, make sure to follow the instructions to download the uCodeLink plugin.

How do I connect my UKIT Advanced Robot to uCode with the USB cable?
Connect your UKIT Advanced board to your device using the USB cable provided. On the top of the screen, click the **Select a device** drop-down menu and select **uKit Explore**. For a first-time connection to a Mac or PC, you will be prompted to download the connection assistant plugin called **uCodeLink**. Follow the directions to install uCodeLink and then refresh the connection search. Chromebooks require adding a Chrome extension. After adding the uCodeLink Chrome extension, refresh uCode and restart the connection process.

How do I connect my UKIT Advanced Robot to uCode via Bluetooth?

Plug your Bluetooth module into your UKIT Advanced board and power the board on. On the top of the screen, click the **Select a device** drop-down menu and select **uKit Explore**. Select the **Bluetooth** tab and then your UKIT board once it is available to pair.

How do I save the codes I programmed on uCode?

You can save the codes you program as a .ucd file directly to your computer with or without an account by clicking the **File** drop-down menu on the top left then selecting **Save**. If you are logged in to an account, you can save codes by clicking **Save** at the top center of the screen.

How do I access my saved codes?

You can open .ucd files you saved locally by clicking the **File** drop-down and selecting **Open**. If you saved codes to your account, you could access them by clicking on your **user** icon at the top-right corner and then **My Projects**.

Where can I find sample codes?

Click **Resource Center** followed by **Sample Code** on the top of the pop-up from the home screen.

How do I access the virtual robots?

From the home screen, click **Resource Center** and then **UKIT Advanced** under **Building Instruction**. From here, click **Virtual Robots** at the top of the pop-up screen.

How do I access the 3D environment?

From the home screen, click **3D** in the top-right corner. This will automatically load the Fan virtual robot.

How do I program with Arduino?

UKIT Advanced boards can be programmed with Arduino. You can check out these getting started guides from Arduino: Arduino Web Editor and Arduino Products.

TECHNICAL SUPPORT

What do I do if my UKIT Advanced is not connected to my PC/Mac?
The first time when you try to connect the uKit Explore board, you will be prompted to download the appropriate connection assistant for your device. Make sure to follow the directions and install correctly. Once installed, the assistant will run in the background, and no additional setup is required.

For technical assistance, please get in touch with our excellent customer support team at education.service@ubtrobot.com or 800-276-6137, M-F 7 a.m. to 4 p.m. PST.

How do I program with Arduino on Chromebook?
You can program the UKIT Advanced board with Arduino on Chromebook. Check out this getting started guide from Arduino: Arduino Web Editor.

What do I do if my UKIT Advanced Robot is not connected to my Chromebook?
Make sure to add the uCodeLink extension to your Chrome browser as this is needed for USB connection. For Bluetooth connection, ensure the Bluetooth module is installed to the board and paired to the Chromebook via uCode.

For technical assistance, please get in touch with our excellent customer support team at education.service@ubtrobot.com or 800-276-6137, M-F 7 a.m. to 4 p.m. PST.

I'm having issues with uCode, who do I contact?
For technical assistance, please get in touch with our excellent customer support team at education.service@ubtrobot.com or 800-276-6137, M-F 7 a.m. to 4 p.m. PST.