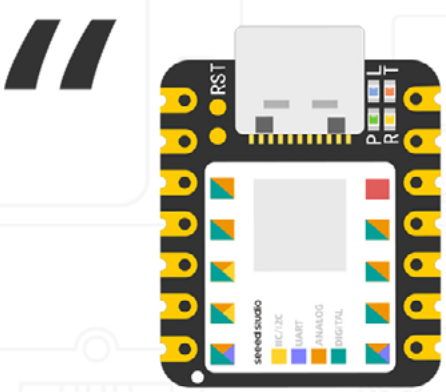
XIAO: Big Power, Small Board

Mastering Arduino and TinyML



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seeed studio ARDUINO EDGE IMPULSE

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1.1
First Arduino program with Seeed Studio XIAO: Blink

Arduino is a globally popular open-source electronic prototyping platform, including various models of Arduino development boards and the Arduino IDE software platform. Because of its open, convenient, and easy-to-start characteristics, it has become the first choice for many software and hardware beginners.

With it, you can quickly complete project development and implement your ideas. To date, Arduino has introduced various models of controllers and numerous peripheral modules, such as sensors, actuators, expansion boards, etc. These modules can implement various exciting and practical projects when used with Arduino.

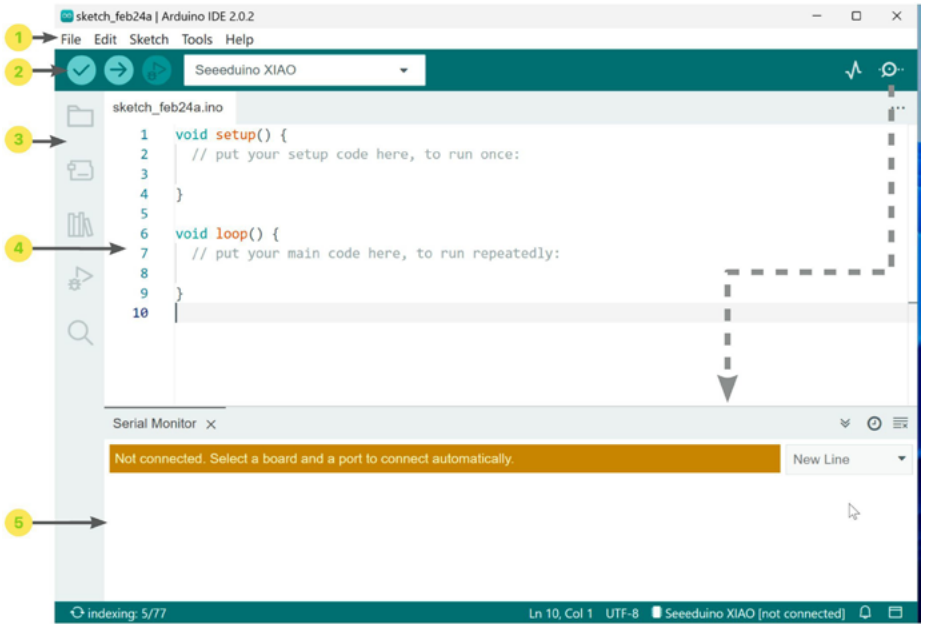
The Seeed Studio XIAO series products we are learning about today are development boards derived from Arduino. They belong to the Seeeduino series and are the smallest members of this series.

1.1.1 Arduino IDE Text Editor

We need to program the hardware through the Arduino IDE text editor. If you have not installed the Arduino IDE, go to the download page to install it: Software. The Arduino IDE (Integrated Development Environment) is a programming software designed explicitly for Arduino. Through it, we can write and upload different programs for Arduino hardware. When we open the Arduino IDE software, it will create a new file named Sketch, which we can rename.

For Windows Users

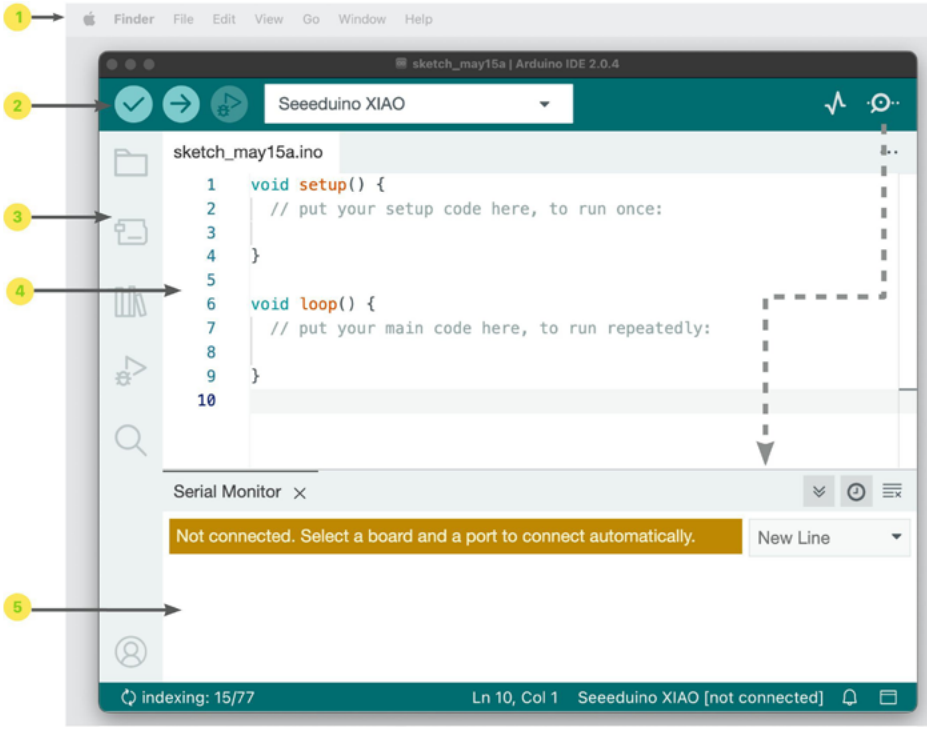
The interface of the Arduino IDE is spotless, and can be divided into four parts: menu bar, toolbar, editing area, and debug window.



1. Menu bar: Includes files, edit, sketch, tools, and help, such as new, save, example programs, select serial port, etc.
2. Horizontal toolbar: Contains several commonly used function buttons: verify, upload, debug, board selection, serial plotter, and serial monitor selection.
3. Vertical toolbar: Contains shortcuts to the project folder, board manager, library manager, debug, and search.
4. Code editing area: This is where you write program code, just as we usually type text in a Word window. Write the program code in this area.
5. Serial monitor, output window: On the right side of the horizontal toolbar, you can open or close the serial monitor window.

For MAC Users

Except for the location of the menu bar (at the top), which is slightly different from Windows users, all other tools and experiences are the same.



1.1.2 Adding Seeed Studio XIAO to Arduino IDE

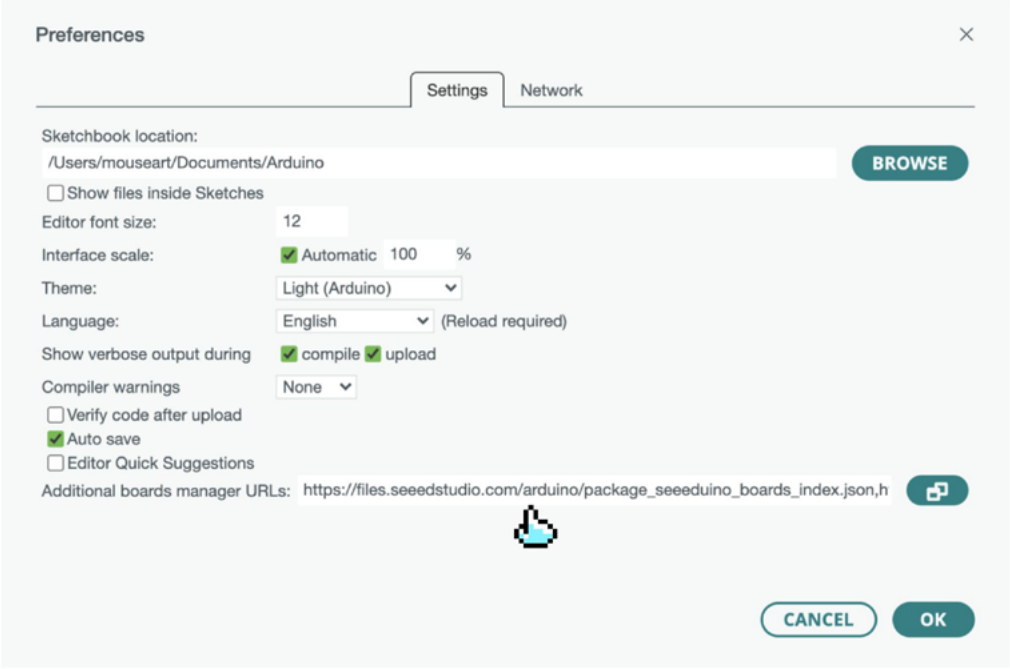
- Attention -

Due to space limitations, all parts of this course's program code and hardware connection are based on Seeed Studio XIAO SAMD21. Most of the code in the book can be applied to all products in the Seeed Studio XIAO series. If there are exceptions, they will be additionally marked or explained for applicable hardware. If not marked, they apply to multiple products.

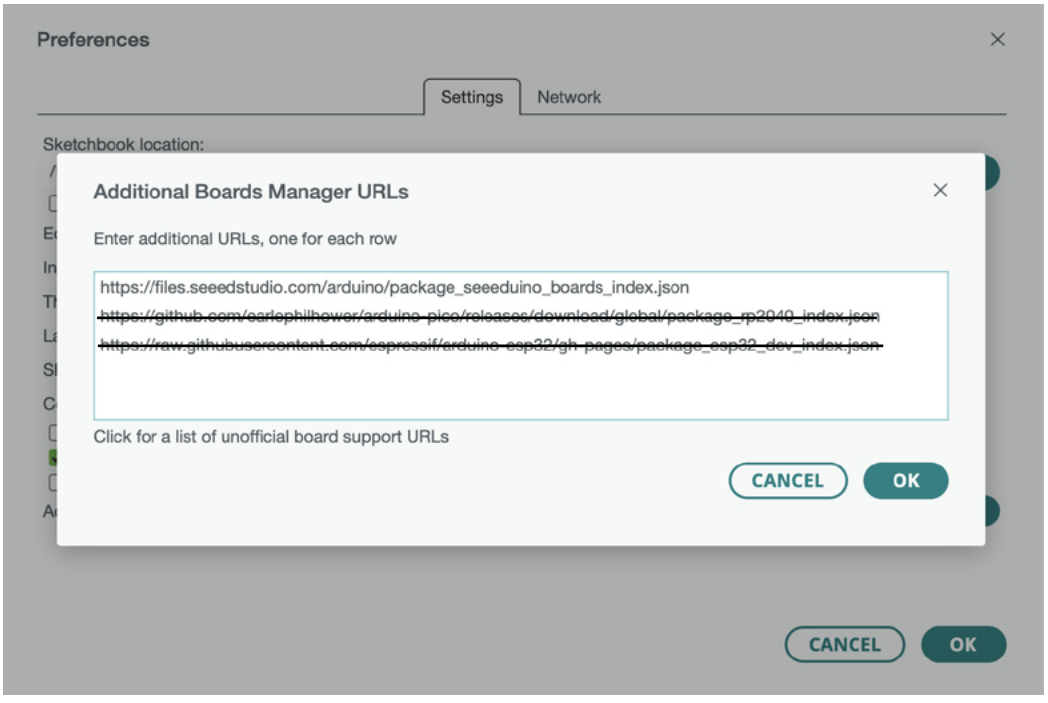
We must add the Seeed Studio XIAO series products to the Arduino IDE to start our learning journey.

- For Windows users, first, open your Arduino IDE, click "File→Preferences" in the top menu bar, as shown in the figure, and copy the following URL into "Additional Boards Manager URLs."
- For Mac users, first, open your Arduino IDE, click "Arduino IDE→Preferences" in the top menu bar, as shown in the figure, and copy the following URL into "Additional Boards Manager URLs."

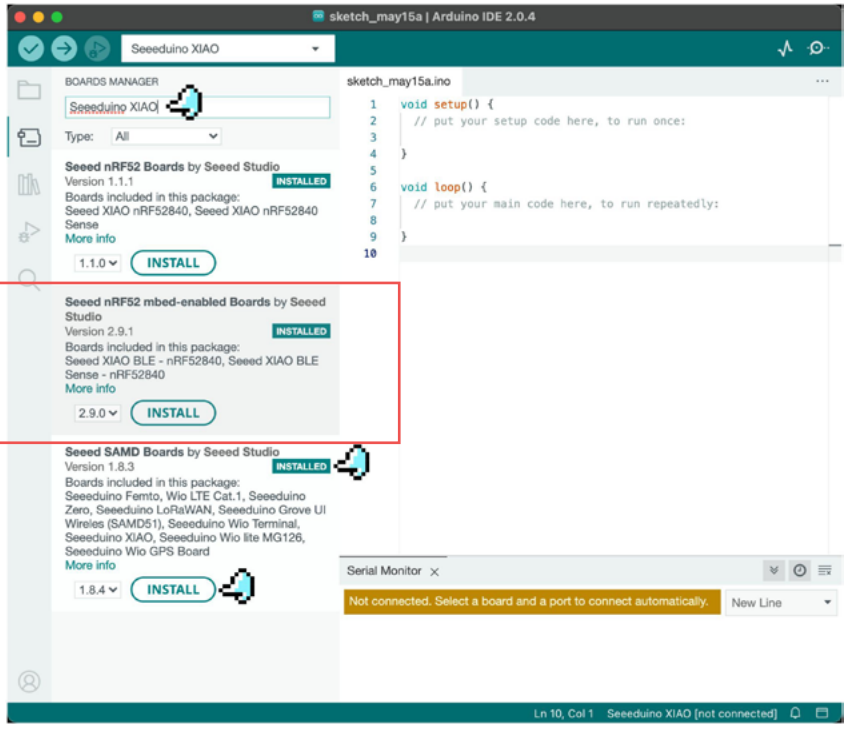
- For Seeed Studio XIAO SAMD21, XIAO nRF52840, and XIAO nRF52840 Sense, copy the link address below: https://files.seeedstudio.com/arduino/package_seeeduino_boards_index.json
- For Seeed Studio XIAO RP2040, copy the link address below: https://github.com/earlephilhower/arduino-pico/releases/download/global/package_rp2040_index.json
- For Seeed Studio XIAO ESP32C3, XIAO ESP32S3, copy the link address below: https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_dev_index.json



If you frequently use multiple different models of XIAO at the same time, you can click on the icon on the right side of the address bar and add all three addresses above to the board manager, as shown in the figure below.



Next, click on "Tools → Board → Board Manager", enter the keyword `Seeeduino XIAO` in the search bar, find `Seeed SAMD Boards` in the appeared entries, and click `INSTALL`.



When the installation starts, you will see an output pop-up window. After the installation is complete, an “INSTALLED” option will appear.

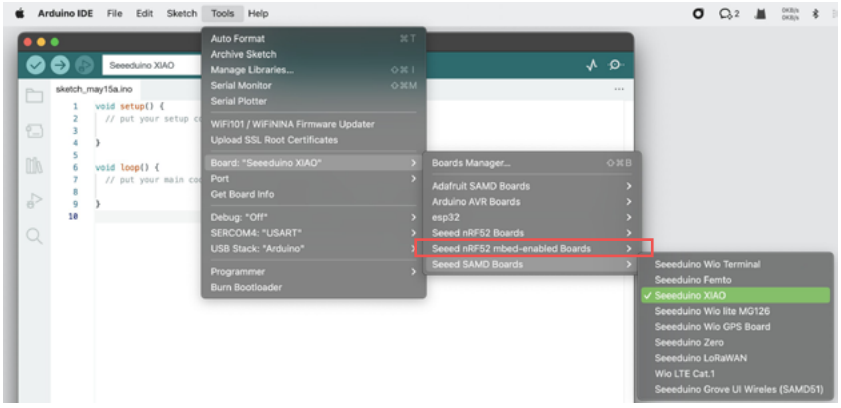
- Attention -

- *Enter “RP2040” in the search bar to find the installation package for Seeed XIAO RP2040.*
- *Enter “XIAO nrf52840” to find two installation packages: Seeed nRF52 Boards (for low-power projects) and Seeed nRF52 mbed-enabled Boards (for higher-power TinyML projects).*
- *Enter “ESP32” to find the installation package for ESP32 by Espressif Systems.*

Connecting Seeed Studio XIAO to Arduino IDE

Connect XIAO to the computer with a data cable, as shown in the figure below:

Next, click on "Tools → Board", find "Seeeduino XIAO" and select it, as shown in the figure below.



- Attention -

- *If your development board is XIAO nRF52840, please select Seeed XIAO nrf52840.*
- *If your development board is XIAO nRF52840 Sense, please select Seeed XIAO nrf52840 Sense.*
- *If your development board is XIAO RP2040, please select Seeed XIAO RP2040.*
- *If your development board is XIAO ESP32C3, please select XIAO_ESP32C3.*
- *If your development board is XIAO ESP32S3, please select XIAO_ESP32S3.*

Check if the port connection is correct; if not, select it manually.

- The serial port on Windows systems is displayed as “COM+number,” as shown in the figure below.
- The serial port name on Mac or Linux systems is generally /dev/tty.usbmodem+number or /dev/cu.usbmodem+number, as shown in the figure below.

Now, we can start programming XIAO through the software.

- Attention -

XIAO ESP32C3 may not be adequately recognized in Arduino IDE 2, and you need to specify the development board and port manually.