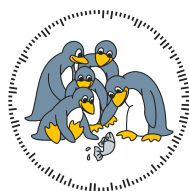


Arduino IDE installation and configuration guide

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Chapter 1

Introduction

1.1 Notes

In the following sections you'll find guides for Windows, MacOS and most of the well-known GNU/Linux distros (that we recommend).

You can start with [Ubuntu](#), it's a pretty easy and accessible one; the only hard thing about the switch is getting used to the new OS.

You will need the following things to get started:

- Preparing a USB stick: [Create a bootable USB stick on Windows](#)
- Installing Ubuntu: [Installation guide](#)

1.2 Synopsis

In this guide you'll understand how to install Arduino IDE, an open source platform used to develop and load programs on compatible boards.

In the previous editions of this course we used **Arduino Uno** and **Arduino Leonardo** boards, however, for this workshop we are going to use the **ESP32** board.

1.3 IDE version history

- [Arduino IDE 1.8.19](#) - May 13, 2022
- [Arduino IDE 2.0.0](#) - September 17, 2022
- [Arduino IDE 2.2.1](#) - September 25, 2023

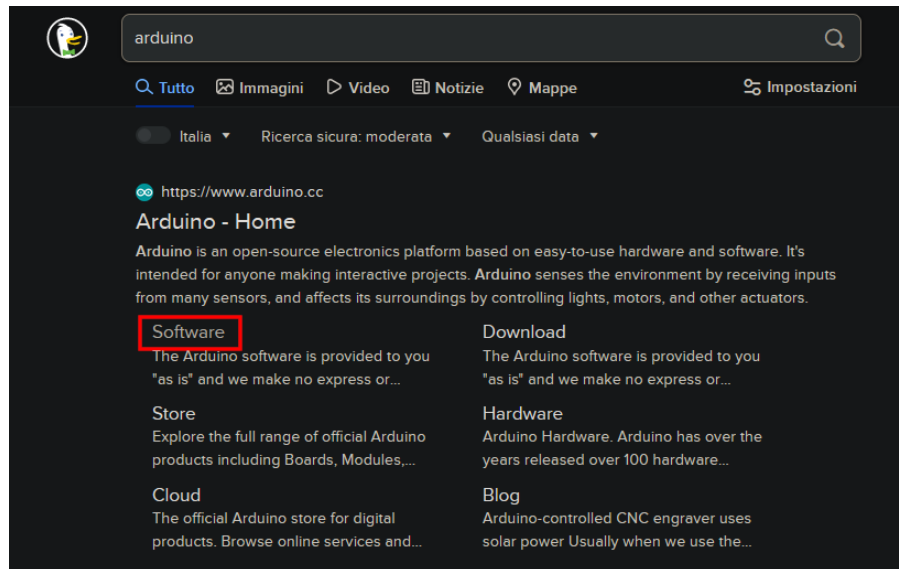
N.B. (Windows & MacOS) If the version of the OS of your computer isn't compatible with the current installation of Arduino IDE it's always possible to try and proceed with the installation following the procedure in the most recent guide anyways; in the event that the application doesn't work or it's impossible to install, it might be necessary to install a previous version of Arduino IDE following the past guides. (**BEWARE:** only the most recent guide is kept updated in parallel with the courses, therefore, no guarantees are given on the correctness of previous versions)

Chapter 2

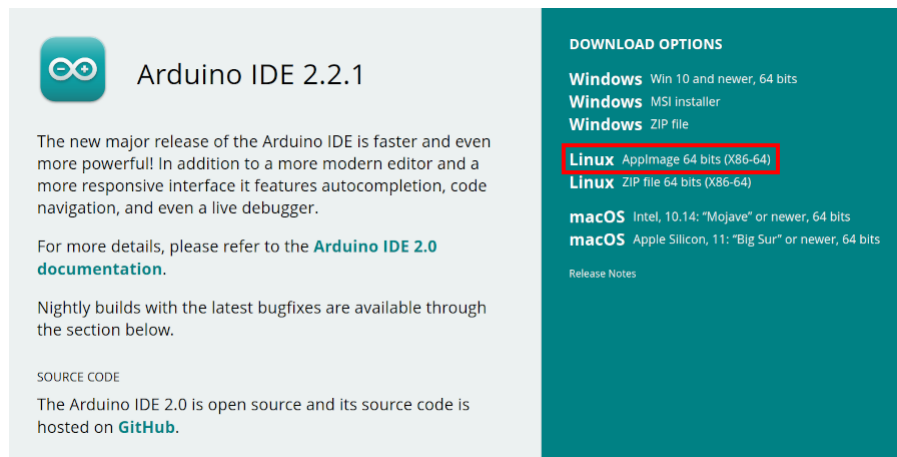
GNU/Linux

2.1 Download

Use your browser to search for the term "Arduino" and, in the first result, select the **Software** section; alternatively you can go directly to <https://www.arduino.cc/en/software>.

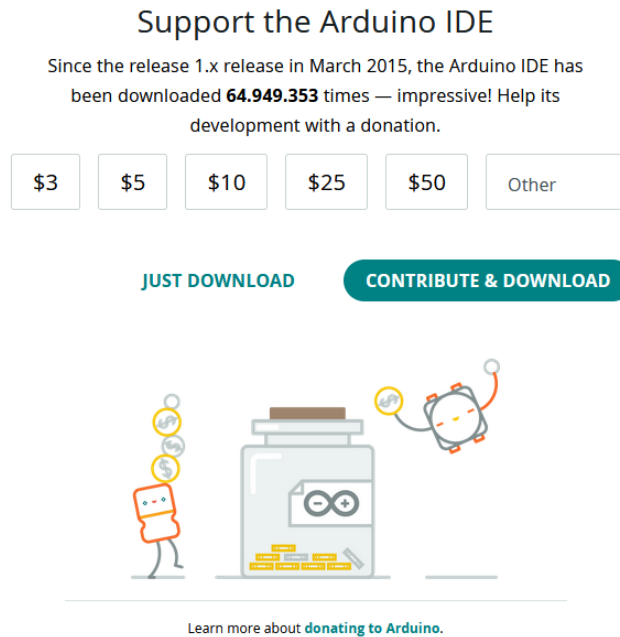


In the **Downloads** section of the web page, choose the *Linux AppImage 64 bits (X86-64)* option for the Arduino IDE 2.x.x version as shown in the image.



Support

The website will prompt you with the choice for a donation, if you don't want to support the project you can just continue with the option **Just Download**.



2.2 Installation

The downloaded file will have the **.AppImage** extension and it will be placed in the downloads folder. In order to execute the file it must be actually made executable via the command:

```
chmod a+x [filename].AppImage
# [filename] must correspond to the file name
# (it should be arduino-ide_2.x.x_Linux_64bit)
```

Finally, the application can be executed utilizing the command:

```
./[filename].AppImage
```

2.3 Troubleshooting

2.3.1 Serial communication permissions

In order to establish a serial connection to the board, it may be necessary to set the correct read and write permissions for the serial device.

Debian-based (Ubuntu, Pop!_OS, Debian, Linux Mint, etc.)



Arch-based (Arch Linux, Manjaro)

```
sudo usermod -aG uucp [username]
# Replace [username] with your username
```

N.B. It may be necessary to reboot the system after executing the command for the changes to take effect.

Other distros

```
sudo chmod a+rw [serial device]
# Replace [serial device] with the reference to the device utilized for the
# communication (in most cases it's /dev/ttyACM0)
```

2.3.2 FUSE

If, after executing the `.AppImage` file, you are met with error messages similar to *failed to exec fusermount* or which mention the *FUSE* acronym, then it may mean that the FUSE interface is missing; it is possible to solve this problem by installing it using the package manager of your own Linux distro.

Nowadays, most distributions come with *FUSE3* already installed, however, we need the previous version (*FUSE2*) in order to run the application.

Debian-based (Ubuntu, Pop!_OS, Debian, Linux Mint, etc.)

```
sudo apt update
sudo apt install fuse
```

Arch-based (Arch Linux, Manjaro)

In some Arch-based distros, a problem tied to incorrect permissions for the `fusermount` binary may arise. In this case, it is sufficient to run the following command after making sure that the correct version of FUSE is installed.

```
sudo chmod u+s "$(which fusermount)"
```

Fedora

```
sudo dnf -y install fuse
```

OpenSUSE

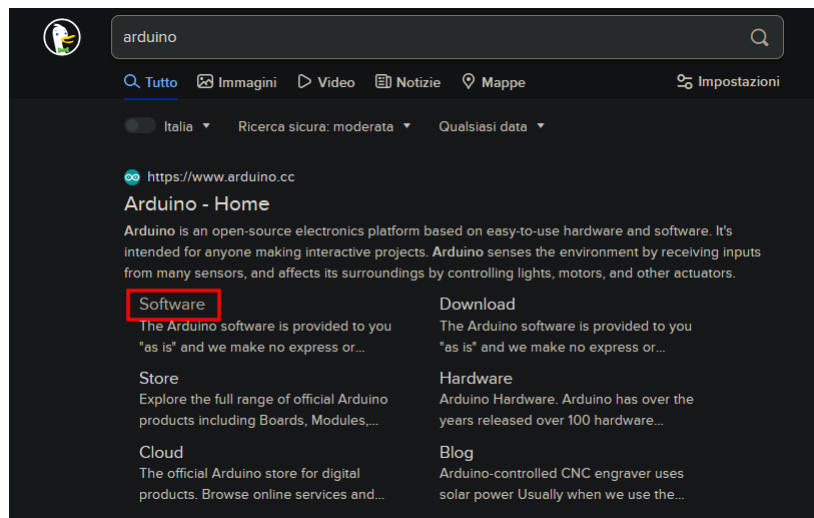
```
sudo zypper install fuse libfuse2
```

Chapter 3

Windows & MacOS

3.1 Download

Use your browser to search for the term "Arduino" and, in the first result, select the **Software** section; alternatively you can go directly to <https://www.arduino.cc/en/software>.



Windows

In the **Downloads** section of the web page, choose the *Windows 10 and newer, 64 bits* option for the Arduino IDE 2.x.x version as shown in the image. The other Windows installation choices are equivalent.



MacOS

In the **Downloads** section of the web page, choose one of the options for Arduino IDE 2.x.x according to the version of your operating system, as shown in the image.



Arduino IDE 2.2.1

The new major release of the Arduino IDE is faster and even more powerful! In addition to a more modern editor and a more responsive interface it features autocompletion, code navigation, and even a live debugger.

For more details, please refer to the [Arduino IDE 2.0 documentation](#).

Nightly builds with the latest bugfixes are available through the section below.

SOURCE CODE

The Arduino IDE 2.0 is open source and its source code is hosted on [GitHub](#).

DOWNLOAD OPTIONS

Windows Win 10 and newer, 64 bits
Windows MSI installer
Windows ZIP file

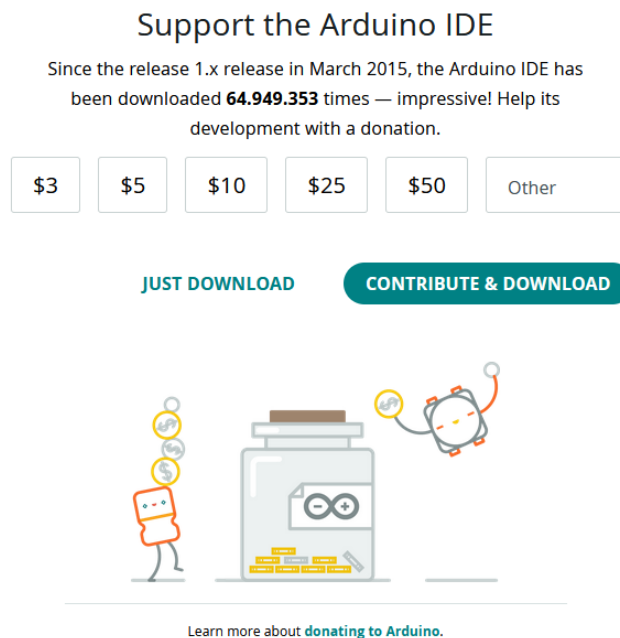
Linux Applimage 64 bits (X86-64)
Linux ZIP file 64 bits (X86-64)

macOS Intel, 10.14: "Mojave" or newer, 64 bits
macOS Apple Silicon, 11: "Big Sur" or newer, 64 bits

[Release Notes](#)

Support


The website will prompt you with the choice for a donation, if you don't want to support the project you can just continue with the option **Just Download**.



Support the Arduino IDE

Since the release 1.x release in March 2015, the Arduino IDE has been downloaded **64.949.353** times — impressive! Help its development with a donation.


[JUST DOWNLOAD](#) [CONTRIBUTE & DOWNLOAD](#)



[Learn more about donating to Arduino.](#)

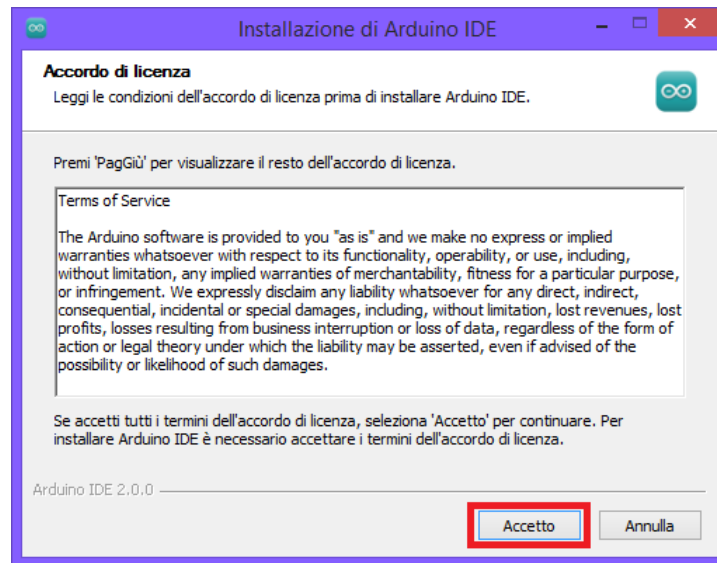
3.2 Windows installation

When downloading, if the browser asks for it, select the download folder (if you don't know where the folder is click **Win+R** and type "**C:\Users\[username]\Downloads**", where [username] is your Windows username) and open the executable file shown in the picture.

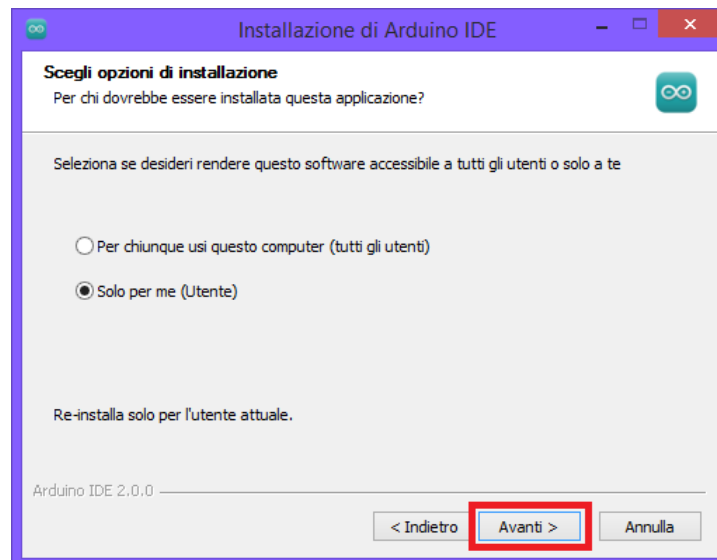
Nome	Ultima modifica	Tipo	Dimensione
 arduino-ide_2.0.0_Windows_64bit.exe	17/09/2022 01:10	Applicazione	161.148 KB

Now the installation procedure has started.

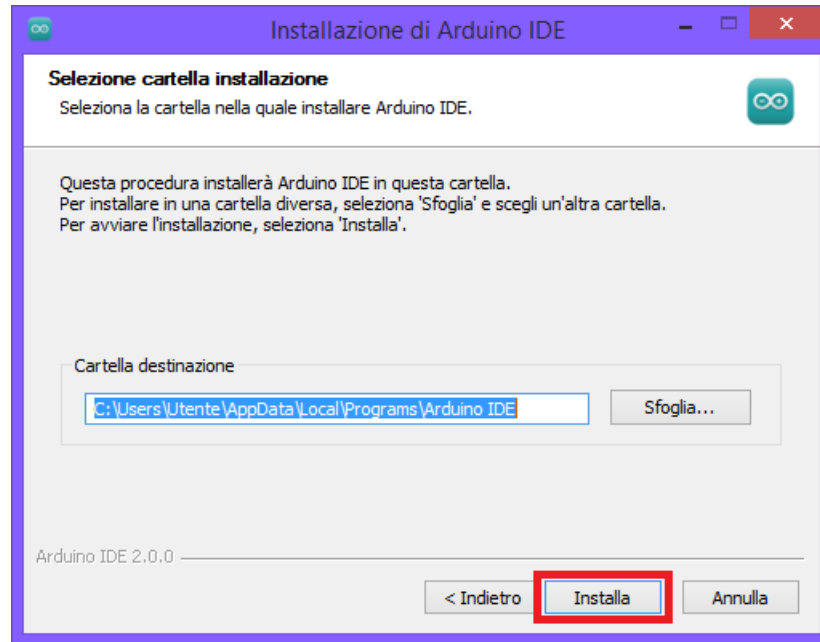
The first thing to do is to accept the terms & conditions by clicking on **I Agree**.



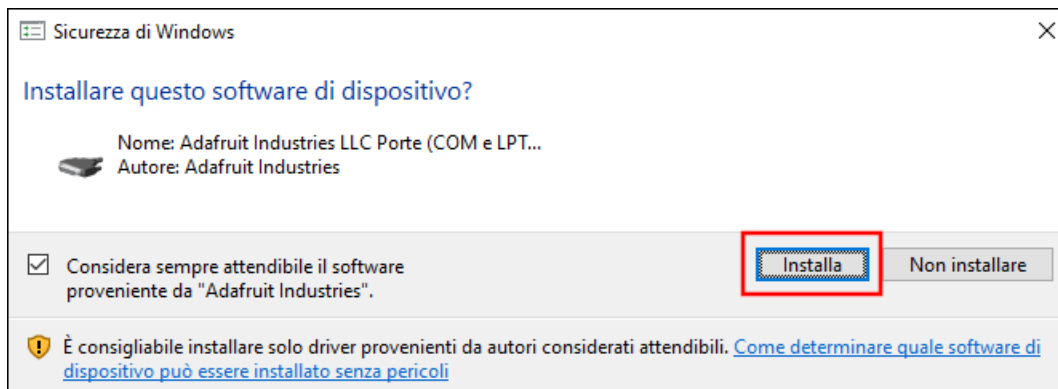
After that select for which users do you want to install the application (you can leave the default option if you don't have any particular preference) and click on **Next**:



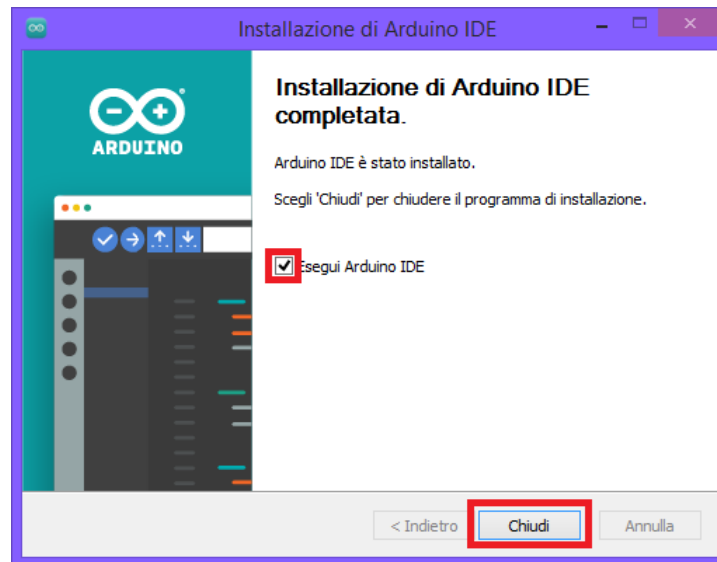
The installer gives you the possibility of choosing the installation path (keep the default one if you don't know what you are doing).
Finally, click on **Install** and wait for the program to end.



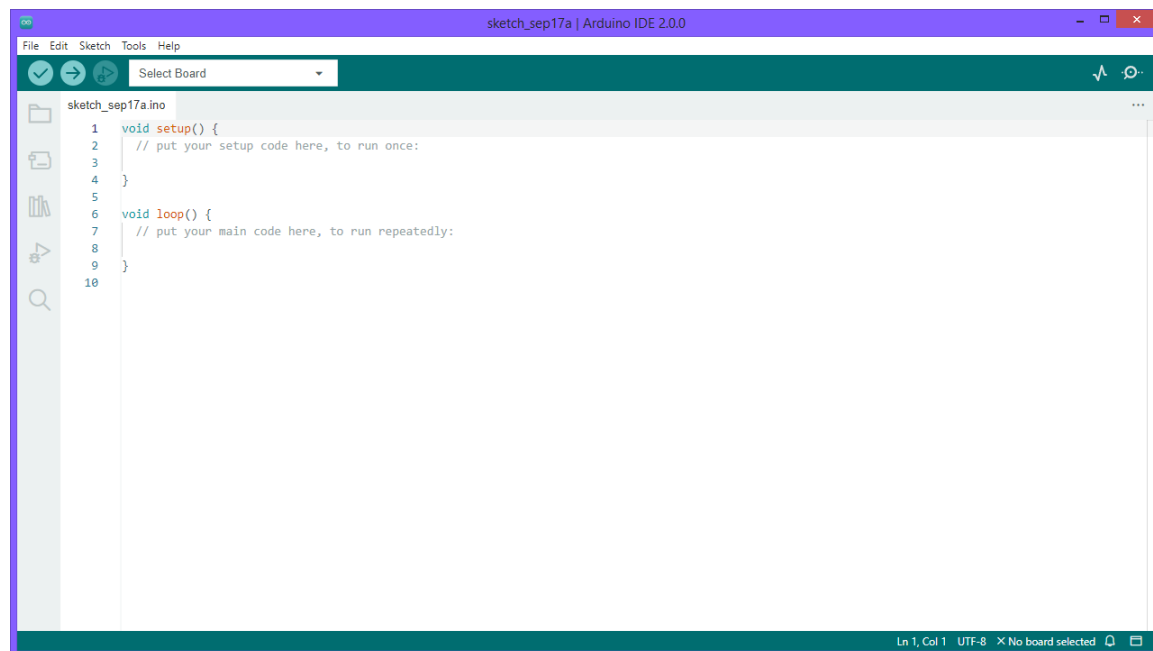
If you get the prompt shown in the next picture, you can continue the installation by pressing the **Install** button.



Now you can finish the installation procedure by clicking on **Finish**, if you want to execute immediately Arduino IDE you can tick the checkbox shown in the next image and skip the last step.



Now you should have a shortcut of Arduino IDE on your desktop, and by clicking it you can open the Arduino IDE.

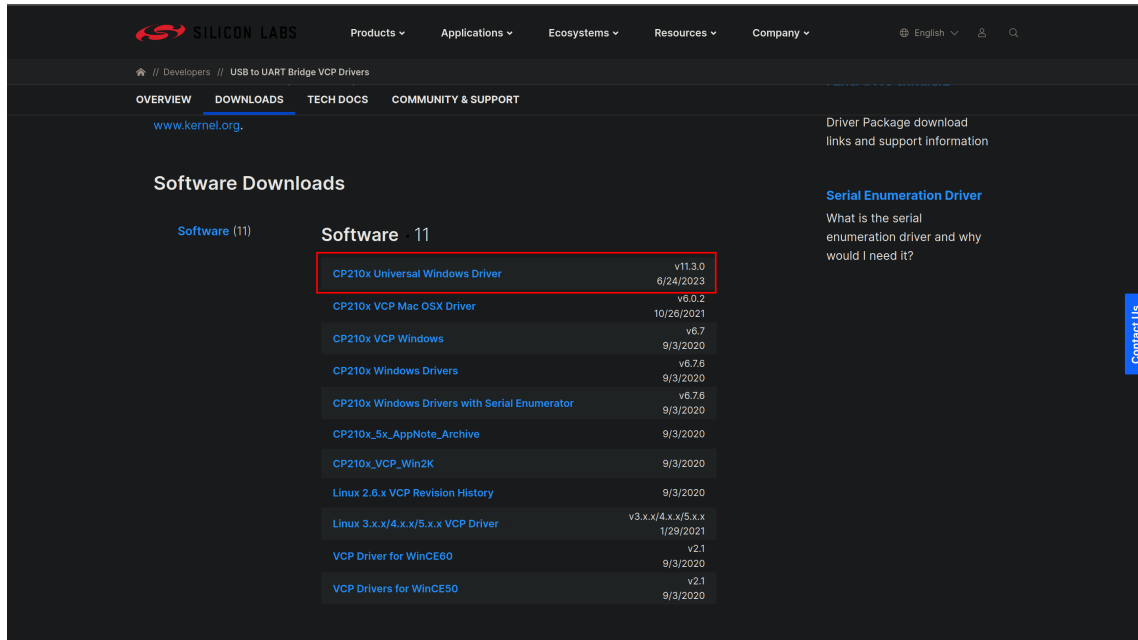


3.2.1 Additional Drivers

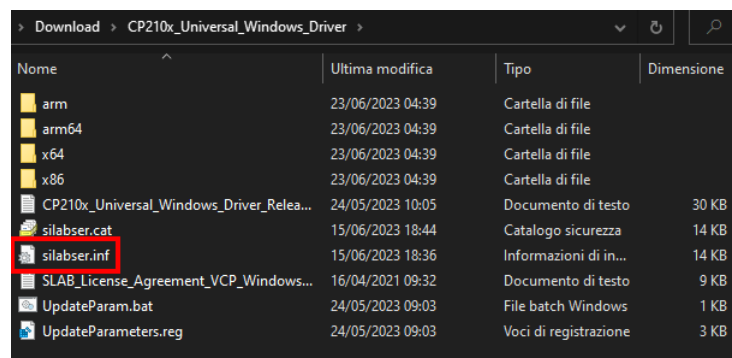
As mentioned in the introduction we are going to use the *ESP32* board, which usually makes use of the *CP210x* family USB2UART bridge chips.

To download the drivers visit [this dedicated page in the Silicon Labs website](#) and choose the *CP210x Universal Windows Driver* option as shown in the following screenshot.

NOTE: their site is a bit weird and it might give you an *Access Denied* error, in that case just wait a couple of minutes and try again.



After the drivers have been downloaded, locate them in the download folder (as you did before with the IDE installer) and you should see a *.zip* with a name similar to *CP210x_Universal_Windows_Driver*. Extract the zip archive using dedicated software ([7-zip](#) is an open source option) and you should obtain a folder with the following contents:



Locate the *silabser.inf* file (highlighted in the previous screenshot), right-click it and choose the *Install* option from the menu.

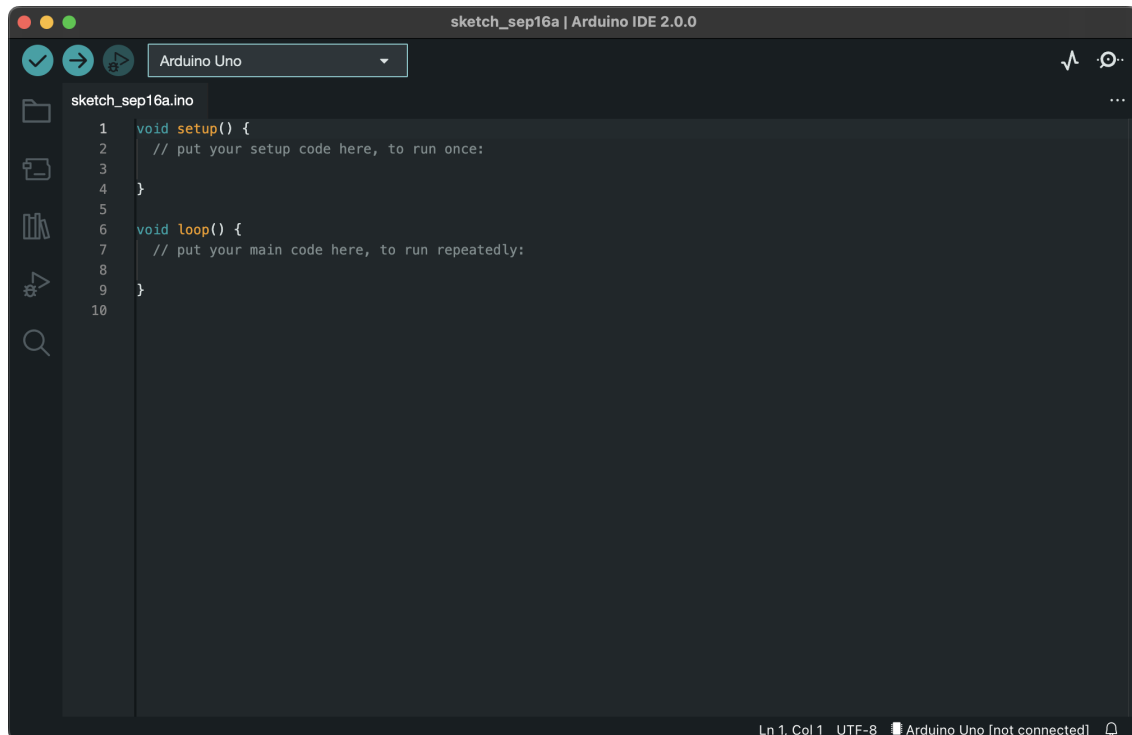
At this point the system should confirm the installation with a dialog box.

3.3 MacOS installation

Once the file has been downloaded, unzip it using the appropriate tools and drag it inside the Applications folder in order to install it.



Now you can access the Arduino IDE.



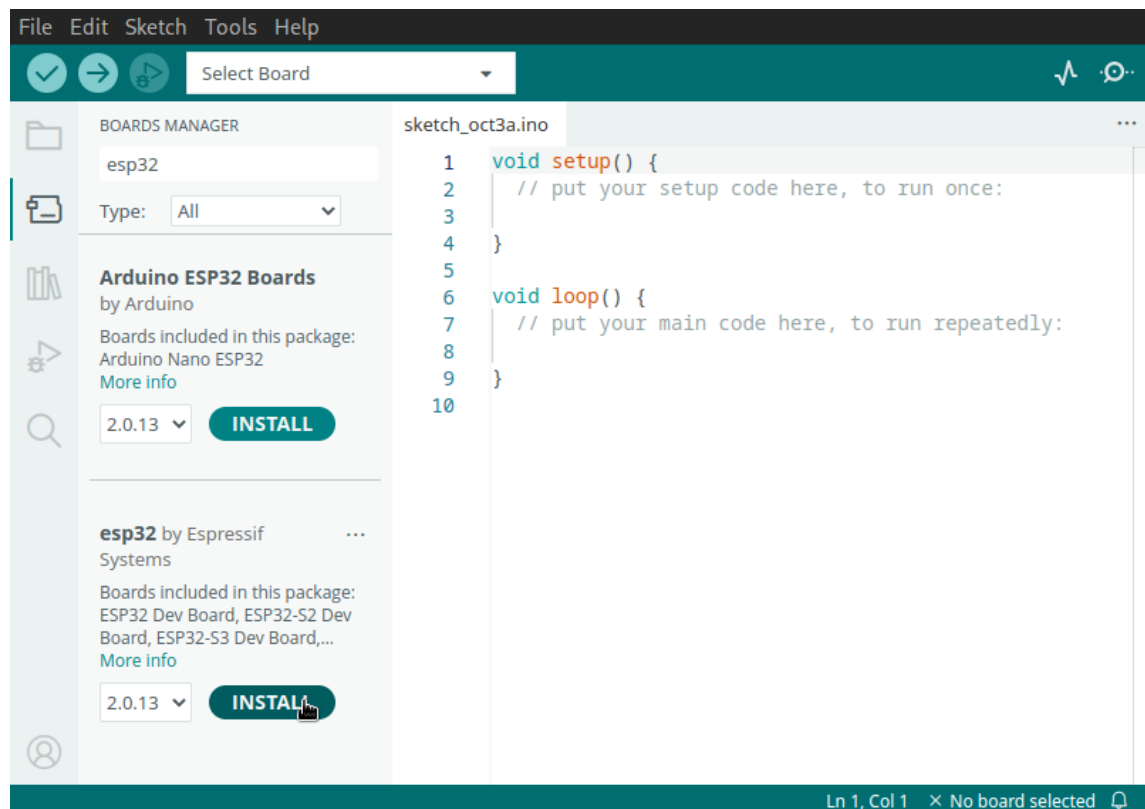
Chapter 4

Installing the ESP32 Toolchain

This step is **mandatory** to be able to compile and upload our code to the boards we will be using in this workshop.

Because the download size of the toolchain is *quite big*, please, download it *before* the beginning of the workshop.

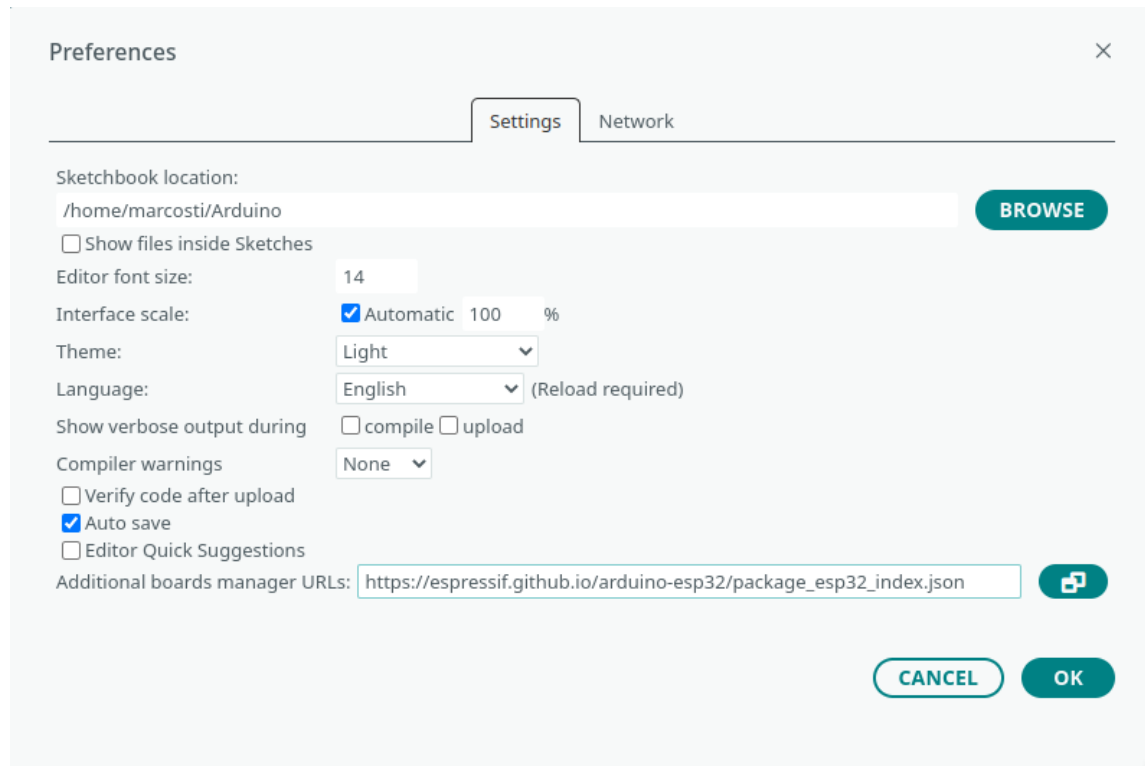
Open the Arduino IDE and open the *Board Manager* (the second icon from the top), search for esp32 and install esp32 by Espressif (pay attention to the package you are downloading, because the Arduino ESP32 Boards package **won't work** for our boards).



If you are unable to find it, you might have to add the Espressif repository in the IDE settings.

Go to **File > Preferences**, and paste the following link

https://espressif.github.io/arduino-esp32/package_esp32_index.json
into the **Additional boards manager URLs** box.



Now you can try again to download the toolchain from the Board Manager.