Arduino IDE installation and configuration guide

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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

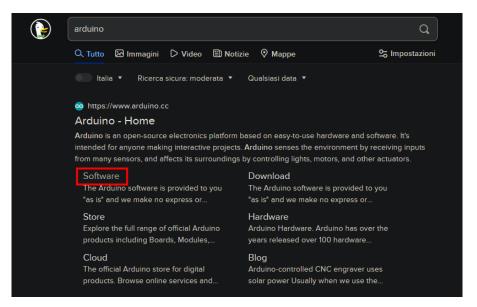
- Arduino IDE 1.8.19 May 13, 2022
- Arduino IDE 2.0.0 September 17, 2022
- Arduino IDE 2.2.1 September 25, 2023

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)

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.

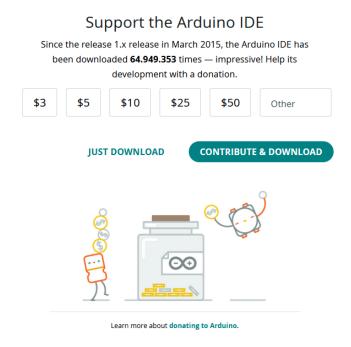


In the Downloads section of the web page, choose the *Linux AppImage 64 bits (X86-64)* option for the Arduino IDE 2.x.x version as shown in the image.



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 exectued 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/ttyACMO)
```

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
```

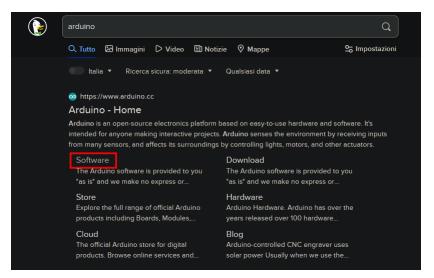
OpenSUSE

```
sudo zypper install fuse libfuse2
```

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.



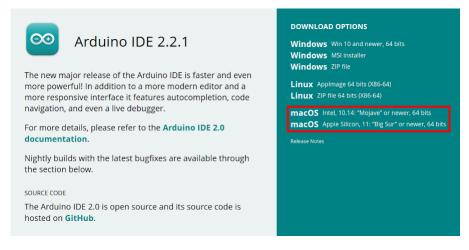
Windows

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.



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.



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	Тіро	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.

😇 Installazione di Arduino IDE – 🗆 🗙			
Accordo di licenza Leggi le condizioni dell'accordo di licenza prima di installare Arduino IDE. Premi 'PagGiù' per visualizzare il resto dell'accordo di licenza. Terms of Service The Arduino software is provided to you "as is" and we make no express or implied warranties whatsoever with respect to its functionality, operability, or use, including, without limitation, any implied warranties of merchantability, fitness for a particular purpose, or infringement. We expressly disdaim any liability whatsoever for any direct, indirect, consequential, incidental or special damages, including, without limitation, loss trevenues, lost profits, losses resulting from business interruption or loss of data, regardless of the form of action or legal theory under which the liability may be asserted, even if advised of the possibility or likelihood of such damages.			
Premi 'PagGiù' per visualizzare il resto dell'accordo di licenza.			
Premi 'PagGiù' per visualizzare il resto dell'accordo di licenza. Terms of Service The Arduino software is provided to you "as is" and we make no express or implied warranties whatsoever with respect to its functionality, operability, or use, including, without limitation, any implied warranties of merchantability, fitness for a particular purpose, or infringement. We expressly disclaim any liability whatsoever for any direct, indirect, consequential, incidental or special damages, including, without limitation, lost revenues, lost profits, losses resulting from business interruption or loss of data, regardless of the form of action or legal theory under which the liability may be asserted, even if advised of the possibility or likelihood of such damages. Se accetti tutti i termini dell'accordo di licenza, seleziona 'Accetto' per continuare. Per installare Arduino IDE è necessario accettare i termini dell'accordo di licenza.			
Arduino IDE 2.0.0 Accetto Annulla			

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:

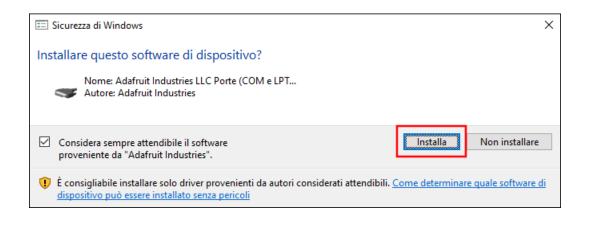
🔤 Installazione di Arduino IDE 🛛 – 🗖 🗙				
Scegli opzioni di installazione Per chi dovrebbe essere installata questa applicazione?				
Seleziona se desideri rendere questo software accessibile a tutti gli utenti o solo a te				
O Per chiunque usi questo computer (tutti gli utenti)				
(●) Solo per me (Utente)				
Re-installa solo per l'utente attuale.				
Arduino IDE 2.0.0				
< Indietro Avanti > Annulla				

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.

2	Installazione di Arduino IDE 🛛 🗖 🗙			
Selezione cartell Seleziona la cartel	a installazione la nella quale installare Arduino IDE.			
Questa procedura installerà Arduino IDE in questa cartella. Per installare in una cartella diversa, seleziona 'Sfoglia' e scegli un'altra cartella. Per avviare l'installazione, seleziona 'Installa'.				
Cartella destinazione C:\Users\Utente\AppData\Local\Programs\Arduino IDE Sfoglia				
Arduino IDE 2.0.0 —	< Indietro Installa Annulla			

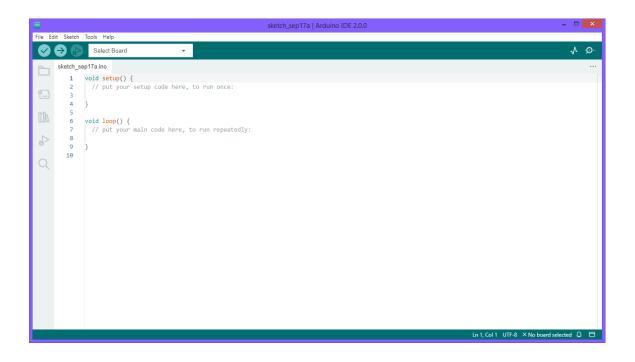
If you get the prompt shown in the next picture, you can continue the installation by pressing the **Install** button.



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 CP210xUniversal 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.

SILICON LABS	Products - Applications - Ecosystem	ns • Resources •	Company ~	⊕ English ∨ & Q	
	VCP Drivers				
OVERVIEW DOWNLOADS TH www.kernel.org.	CH DOCS COMMUNITY & SUPPORT			Driver Package download links and support information	
Software Downloa Software (11)	ads Software 11			Serial Enumeration Driver What is the serial enumeration driver and why	
		v11.3.0 6/24/2023		would I need it?	
	CP210x VCP Mac OSX Driver	v6.0.2 10/26/2021			S
		v6.7 9/3/2020			Contact Us
		v6.7.6 9/3/2020			<mark>č</mark>
		v6.7.6 9/3/2020			
		9/3/2020			
		9/3/2020			
		9/3/2020			
		v3.x.x/4.x.x/5.x.x 1/29/2021			
		v2.1 9/3/2020			
		v2.1 9/3/2020			

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:

> Download > CP210x_Universal_Windows_D	*	ۍ م ۱	
Nome	Ultima modifica	Тіро	Dimensione
arm	23/06/2023 04:39	Cartella di file	
🔜 arm64	23/06/2023 04:39	Cartella di file	
x64	23/06/2023 04:39	Cartella di file	
- <mark></mark> x86	23/06/2023 04:39	Cartella di file	
CP210x_Universal_Windows_Driver_Relea	24/05/2023 10:05	Documento di testo	30 KB
🥏 silabser.cat	15/06/2023 18:44	Catalogo sicurezza	14 KB
👼 silabser.inf	15/06/2023 18:36	Informazioni di in	14 KB
SLAB_License_Agreement_VCP_Windows	16/04/2021 09:32	Documento di testo	9 KB
💿 UpdateParam.bat	24/05/2023 09:03	File batch Windows	1 KB
📓 UpdateParameters.reg	24/05/2023 09:03	Voci di registrazione	3 KB

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

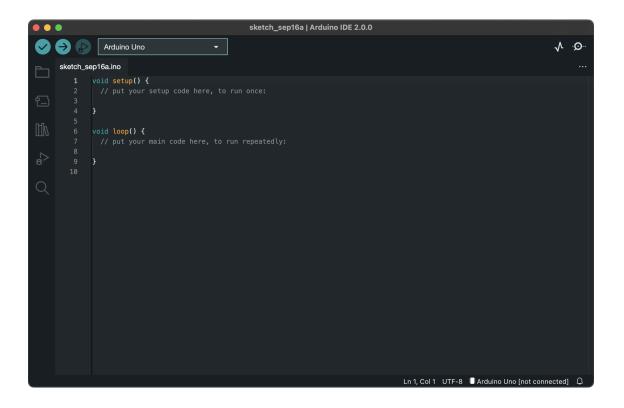
At this point the system should confirm the installation with a dialog box.

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.

🛑 🍈 🌑 /Volumes/Arduino IDE 2.0.0			
×	2 items		
Arduino IDE.app	D Application		
🔤 Arduino IDE 2.0.0			

Now you can access the Arduino IDE.

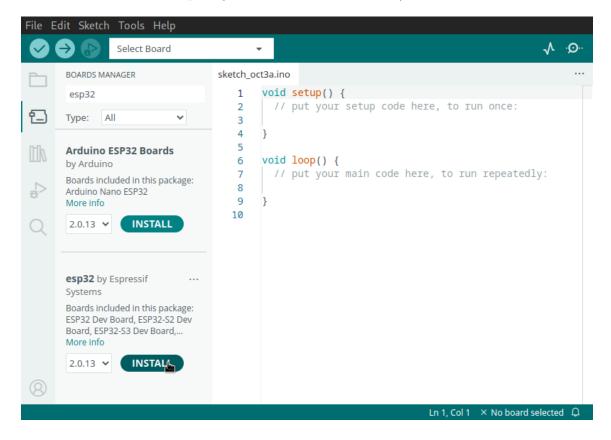


Installing the ESP32 Toolchain

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.

Preferences		\times
	Settings Network	
Sketchbook location:		
/home/marcosti/Arduino	BROWSE	D
Show files inside Sketches		
Editor font size:	14	
Interface scale:	✔ Automatic 100 %	
Theme:	Light 🗸	
Language:	English 🗸 (Reload required)	
Show verbose output during	🗌 compile 🗌 upload	
Compiler warnings	None 🗸	
 ○ Verify code after upload ✓ Auto save ○ Editor Quick Suggestions 		
Additional boards manager URL	s: https://espressif.github.io/arduino-esp32/package_esp32_index.json	
	CANCELOK	

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