EDUDEMOS

EDUcating through **S**ustainable **DEMO**nstrators

Workshop requirements

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EduDemoS Workshop

During the **EduDemoS Workshop** we will develop three different **Sustainable Demonstrators**:

1. **Turtle**
2. **3x1 Modular Demonstrator**
3. **Sun-Tracker (Sunflower)**

To know more about these demonstrators and the EduDemoS Project, visit the website https://edudemos.eu/en/

Every demonstrator has a guide explaining how to build it. To be prepared for the Workshop, you can download and read these guides beforehand.

- From the homepage of the website, click on **Demonstrators** in the top menu. Look for **Turtle, Solar-Tracking** and **3x1 Demonstrator**, then select **Guide** for each of them and download the **pdf file**.
- For the **3x1 Demonstrator** you can download the guide in English or Spanish. See the name of the file to identify them.
    - There are also some **videos** that illustrate how to assemble the **3x1 demonstrator.**

Technical requirements

To be able to successfully complete the Edudemos Workshop, you will need the following:

- Bring your laptop
- Have Arduino IDE installed
- Have the boards ESP8266 and ESP32 installed in Arduino
- Have the necessary libraries installed in Arduino
- Have the CP210x Driver installed

Below there is a guide explaining how to download and install everything you need.

Installation Guide

What is the Arduino IDE?

The Arduino IDE (Integrated Development Enviroment) is the software used to write, compile and upload code to your board. (In this case the ESP32-WROOM-DA and the ESP8266.)

Downloading and installing the Arduino IDE:

Step 1: Go to the Arduino Website

Open your web browser and visit the official Arduino website: https://www.arduino.cc/

Step 2: Navigate to the Arduino IDE Download Page

From the homepage, click on **Products** in the top menu. Look for **Software**, then select **Arduino IDE**. Or go directly to this link: https://www.arduino.cc/en/software/#ide

Step 3: Choose Your Operating System

On the Downloads page, select the appropriate version of the Arduino IDE for your operating system (Windows, macOS, or Linux).

- Recommended donwload: **Windows Win 10 and newer, 64 bits**

Step 4: Download the Installer

Click on the download link, and if prompted, you can choose to contribute or simply click **just download** without contributing.

Step 5: Install the Arduino IDE

- For Windows:
  - Run the downloaded .exe file.
  - Follow the installation wizard to install the IDE.
  - Check the option to install the USB driver when prompted.
- For macOS:
  - Open the downloaded .dmg file.
  - Drag the Arduino IDE to the Applications folder.
- For Linux:
  - Extract the downloaded .tar.xz file.
  - Run the install.sh script in the terminal.

Step 6: Verify Installation

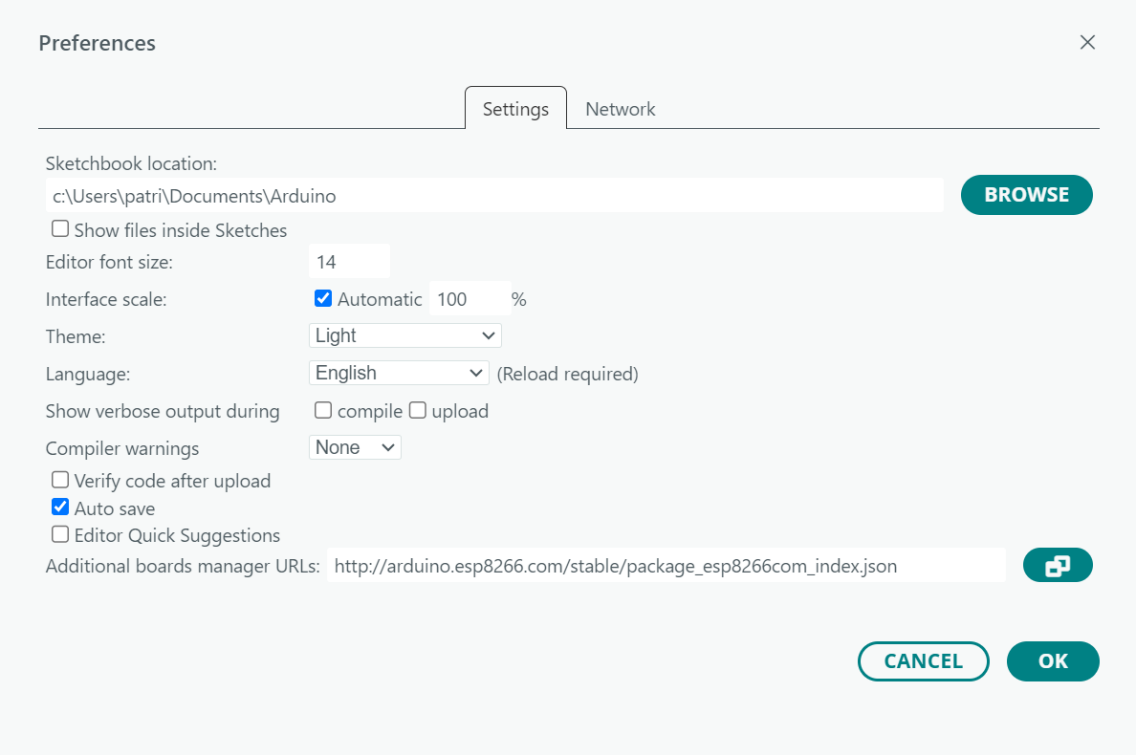
Open the Arduino IDE to ensure it launches correctly.

Cofiguring the Arduino IDE for the Sunflower and Turtle Demonstrators:

Step 1: Add the ESP8266 Board URL

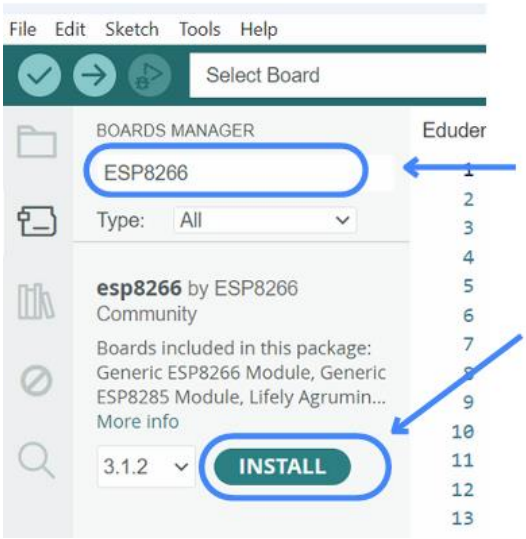
To use the ESP8266 with the Arduino IDE, you need to include the appropriate URL in the IDE's preferences:

1. Open the Arduino IDE
2. Go to **File > Preferences** (on macOS, this might be under Arduino > Preferences)
3. In the **Additional Board Manager URLs** field, paste the following URL: http://arduino.esp8266.com/stable/package_esp8266com_index.json
4. If there are already other URLs listed, separate them with a comma
5. Activate **Auto save** and **Automatic** and then click **OK**. See the image below



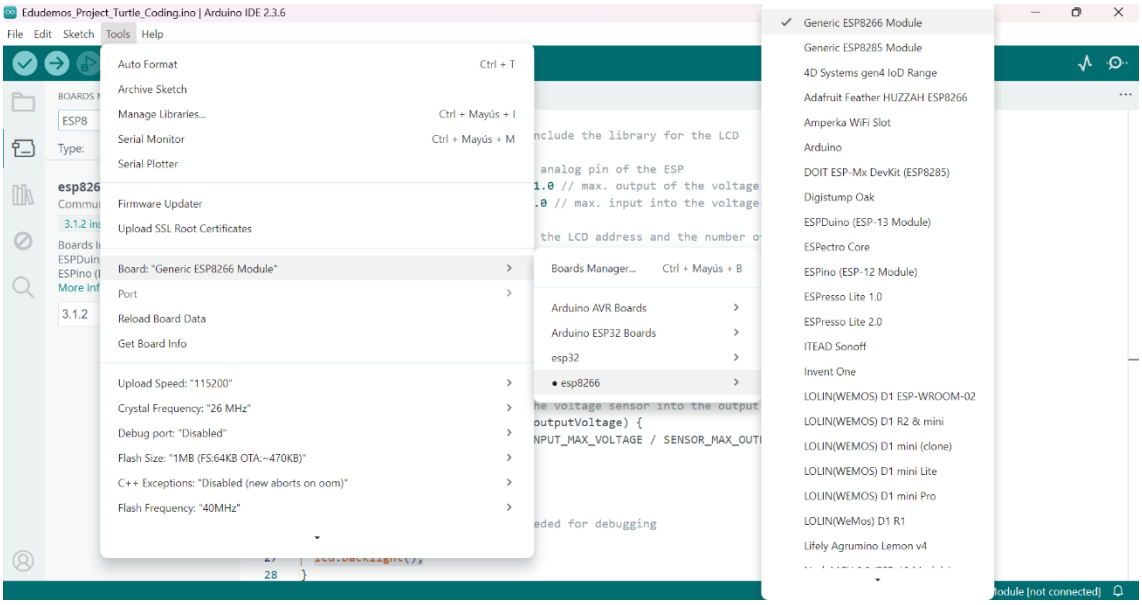
Step 2: Install the ESP8266 Board Package

1. Go to **Tools > Board > Boards Manager**
2. In the search bar, type **ESP8266**
3. Select **esp8266 by ESP8266 Community** and click **Install/update**
4. Wait for the installation to complete



Step 3: Select the ESP8266 Board

1. Go to **Tools > Board** and select **Generic ESP8266 Module**

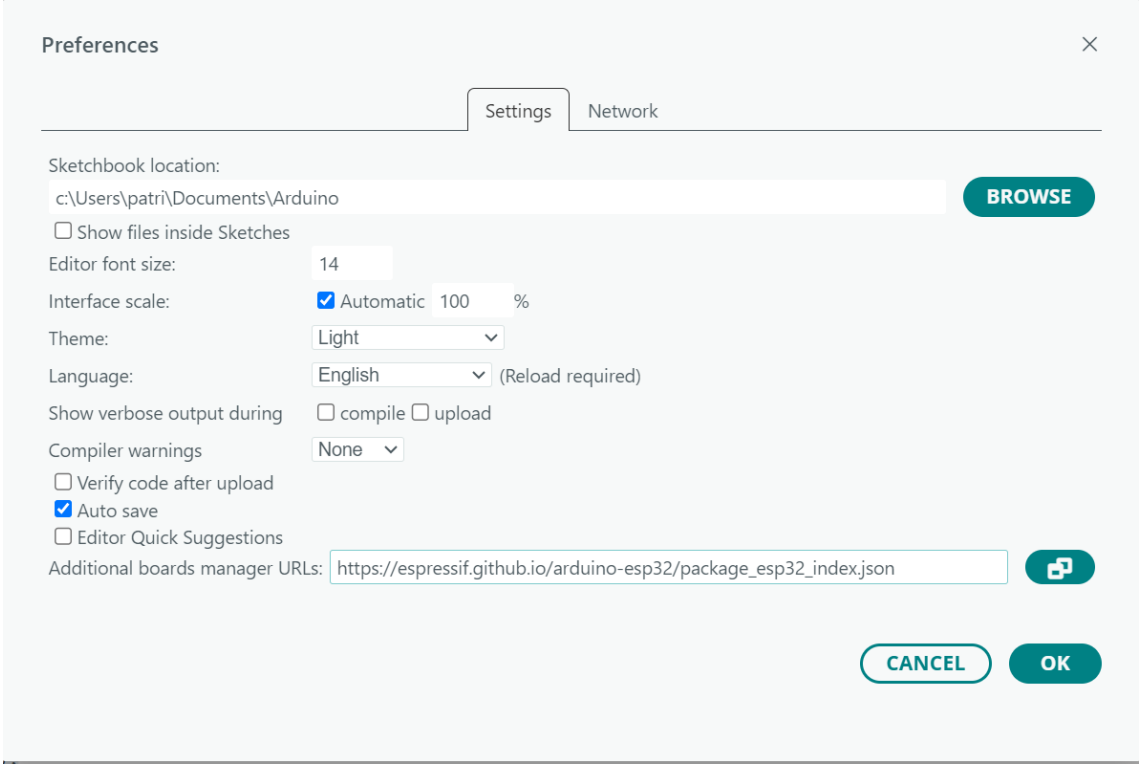


Cofiguring the Arduino IDE for the 3x1 Demonstrator:

Step 1: Add the ESP32 Board URL

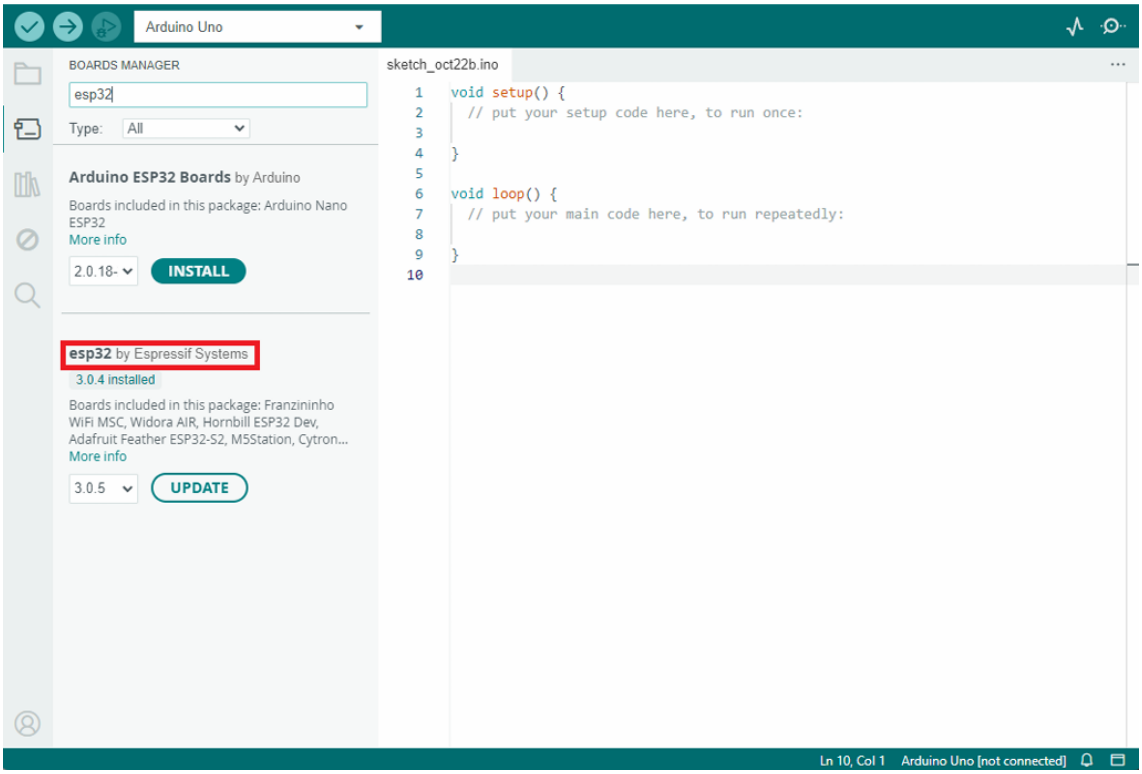
To use the ESP32 with the Arduino IDE, you need to include the appropriate URL in the IDE's preferences:

1. Open the Arduino IDE
2. Go to **File > Preferences** (on macOS, this might be under Arduino > Preferences)
3. In the **Additional Board Manager URLs** field, paste the following URL: https://espressif.github.io/arduino-esp32/package_esp32_index.json
4. If there are already other URLs listed, separate them with a comma
5. Activate **Auto save** and **Automatic** and then click **OK**. See the image below



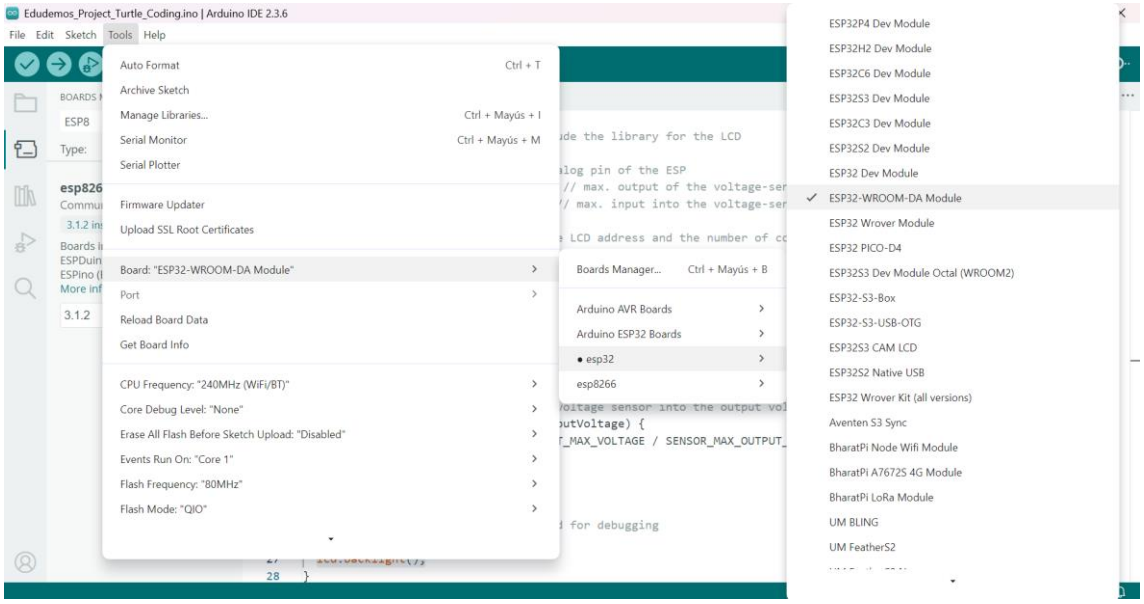
Step 2: Install the ESP32 Board Package

1. Go to **Tools > Board > Boards Manager**
2. In the search bar, type **ESP32**
3. Select **esp32 by Espressif Systems** and click **Install/update**
4. Wait for the installation to complete



Step 3: Select the ESP32 Board

1. Go to **Tools > Board** and select **ESP32-WROOM-DA Module**



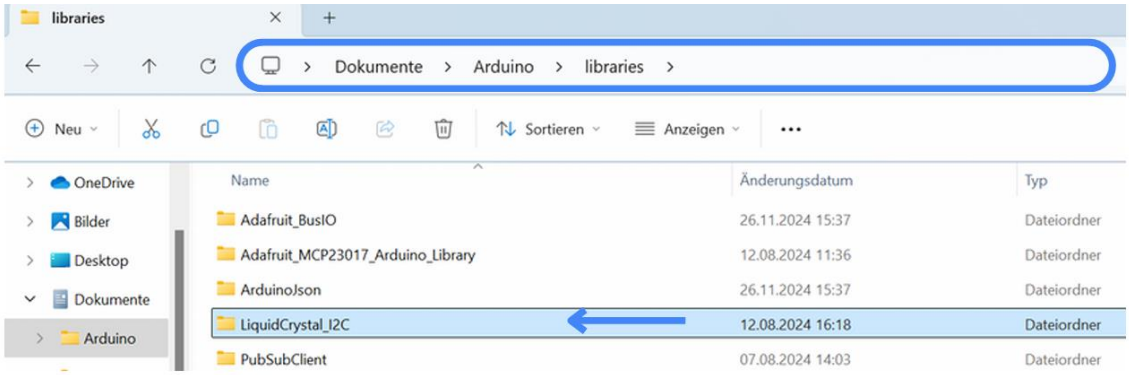
Download the Missing Libraries to Run the Code of the Turtle and Sun-Tracker Demonstrators

Step 1: Download the Libraries:

Go to the EduDemoS website https://edudemos.eu/en/demonstrators/ **> Solar-Tracking** and click on the **Programming** button. Dowload the folder called **“libraries”**.

Step 2: Move the Libraries to the Correct Folder

- Navigate to the folder where your Arduino sketches are stored (e.g., Documents/Arduino/libraries on Windows or ~/Documents/Arduino/libraries on macOS/Linux).
- Create a new folder in the libraries directory with the same name as the library (e.g., LiquidCrystal_I2C). Do this with each folder.
- Move the extracted library folder into this newly created folder.



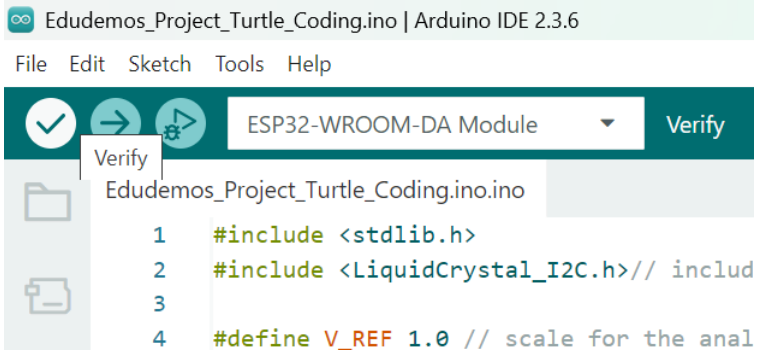
- Once the library is in the correct folder, it will be available for use in your Arduino IDE.

Where to Find the Code

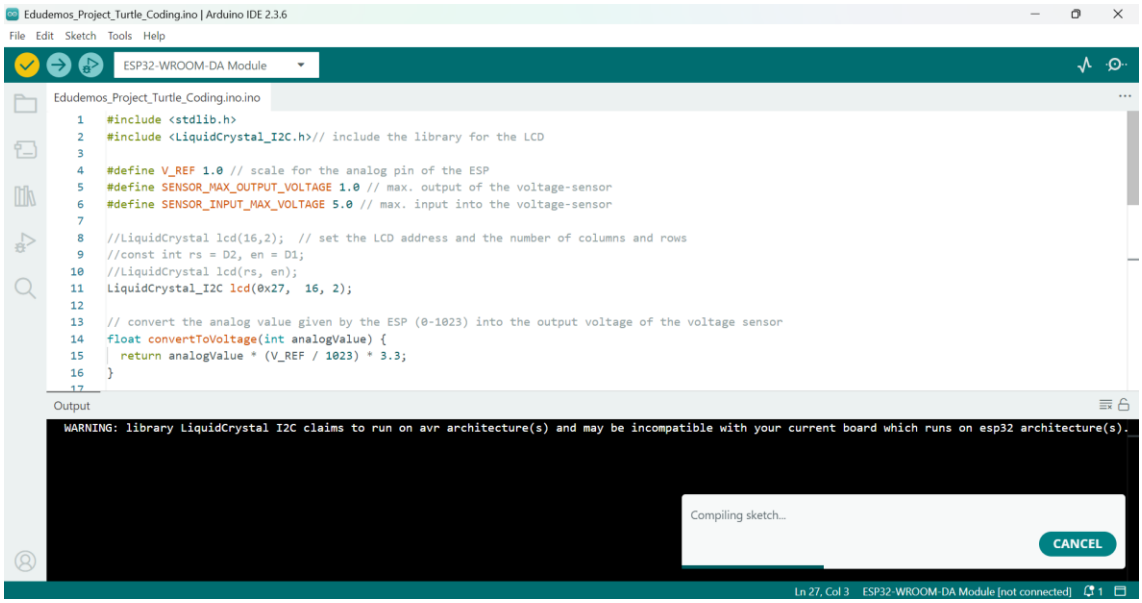
The code for the Turtle and the Solar-Tracking is available on the EduDemoS website under the Programming button of each demonstrator. https://edudemos.eu/en/demonstrators/

Running the Code

- Open the Arduino IDE and load the turtle code into a new sketch. Finally you can click on the **tick icon** to **verify** the code.



- A window will open showing the progress while **compiling the sketch**. If it compiles without any errors, everything is well installed. Otherwise, check again the libraries installation.
- Do this again with the Solar-Tracking code.



Download the Missing Libraries to Run the Code of the 3x1 Demonstrator

Step 1: Download the Libraries:

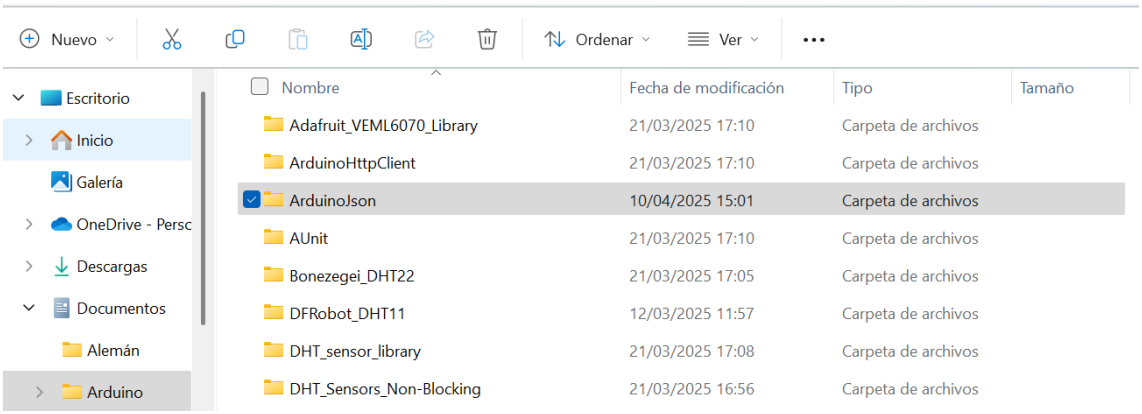
Go to the EduDemoS website GitHub - Gadeschii/EDUDEMOS and click on **src/main**. Dowload the folder called **“libraries.zip”**.

Step 2: Extract the ZIP File

Extract the downloaded ZIP file on your computer using a ZIP extractor such as WinRAR, 7-Zip, or the default extractor of your operating system.

Step 3: Move the Libraries to the Correct Folder

- Navigate to the folder where your Arduino sketches are stored (e.g., Documents/Arduino/libraries on Windows or ~/Documents/Arduino/libraries on macOS/Linux).
- Create a new folder in the libraries directory with the same name as the library (e.g., ArduinoJson). Do this with each folder.
- Move the extracted library folder into this newly created folder.



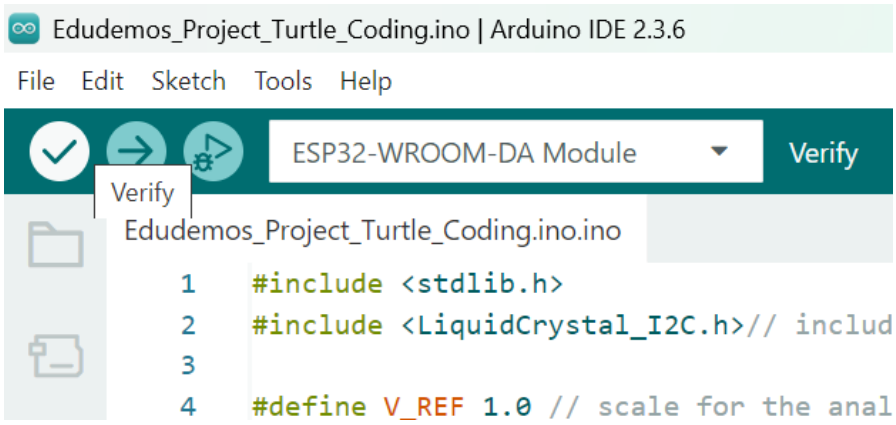
- Once the library is in the correct folder, it will be available for use in your Arduino IDE.

Where to Find the Code

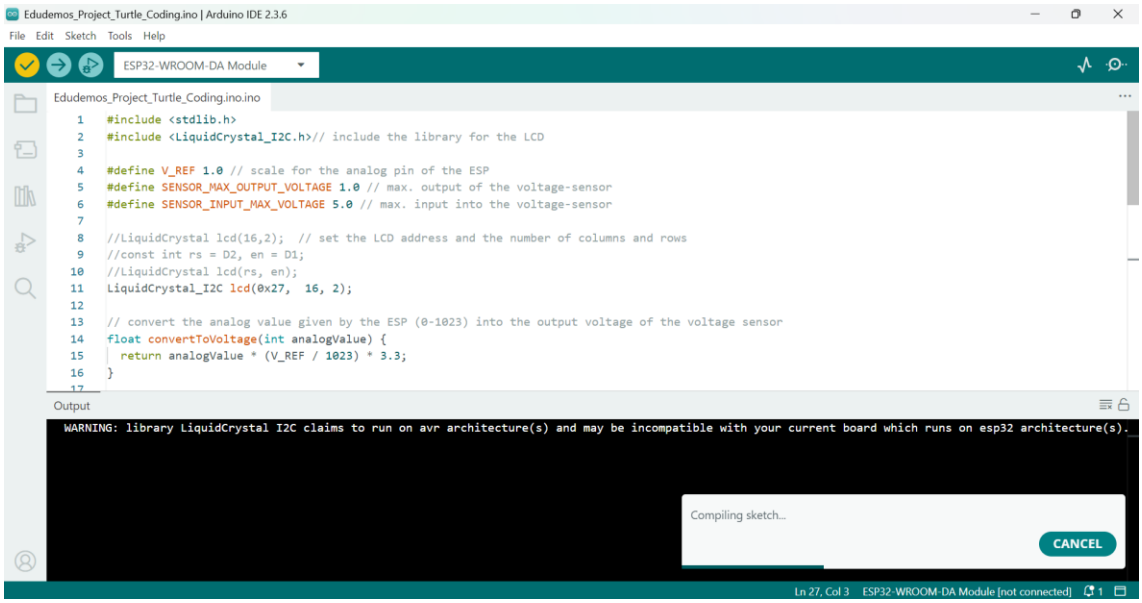
The code for the 3x1 Demonstrator is available on the EDUDEMOS GitHub repository: GitHub - Gadeschii/EDUDEMOS. Click on **src/main** and dowload the file called **“main_2”**.

Running the Code

- Open the Arduino IDE and load the 3x1 code into a new sketch. Finally you can click on the **tick icon** to **verify** the code.



- A window will open showing the progress while **compiling the sketch**. If it compiles without any errors, everything is well installed. Otherwise, check again the libraries installation.

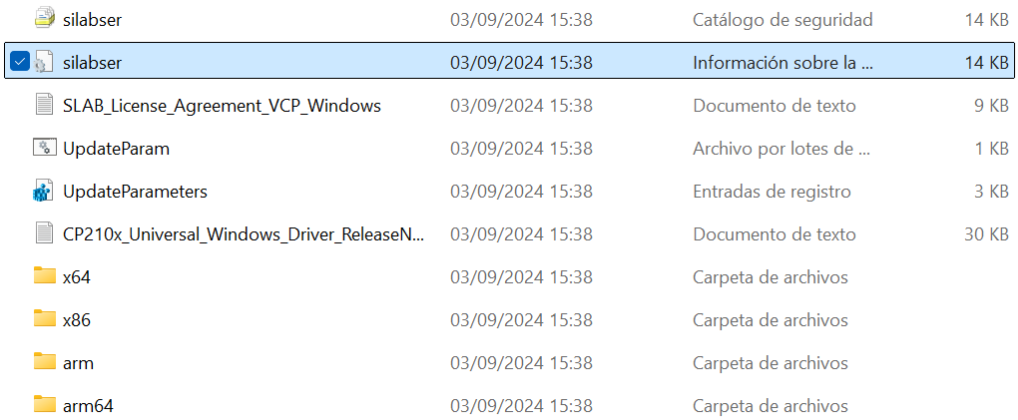


Installing USB Driver

You may need to install the appropriate USB-to-Serial driver. The boards we are using have the CP210x chip:

- **Download the Driver**
  - Go to the official Silicon Labs website: https://www.silabs.com/developer-tools/usb-to-uart-bridge-vcp-drivers?tab=downloads

- Download the appropriate version for your operating system. Recommended: **CP210x Universal Windows Driver** (Windows Universal Driver for Windows 10 and 11).
- Extract the downloaded ZIP folder on your computer using a ZIP extractor such as WinRAR, 7-Zip, or the default extractor of your operating system.
- Inside the folder click on the following file and click **install/open** and **allow** the program to make changes in your computer:



- Restart your computer after installing the driver.

Congratulations!

You have successfully installed everything you need for the EduDemoS Workshop.