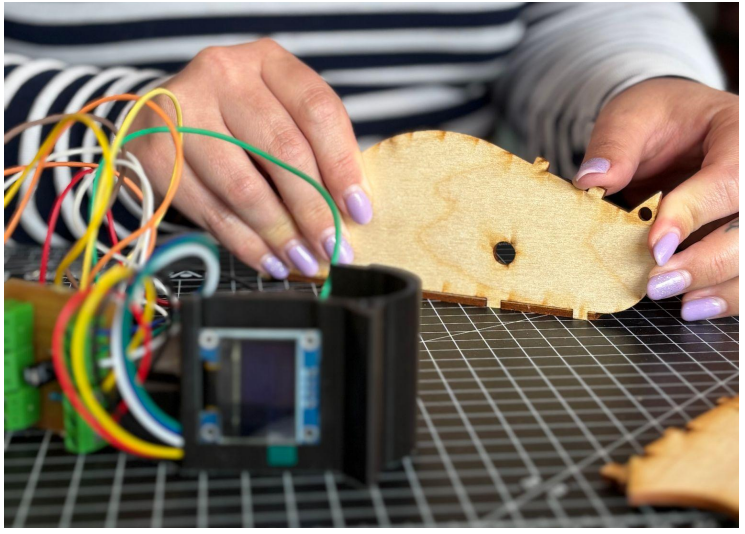
Orange Digital Center

Welcome

1 DAYDISCO – IoT Discovery @ ODC Fablab



Build a smart environmental sensor with Arduino IoT Cloud

- 09:15 - Welcome coffee
- 09:45 - Workshop Pt I, circuits, code
- 13:00 - Lunch break
- 14:00 - Fablab tour
- 14:30 - Workshop Pt 2, IoT Cloud
- 17:30 - Wrap-up

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What’s a Fablab ?

A Fablab (Fabrication Laboratory) is an open, collaborative space equipped with digital tools like **3D printers, laser cutters, CNCs, and basic electronics.**
It's a place where anyone can **design**, **prototype**, and **learn by making.**

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- **Core Values of a Fablab:**

  - **Peer-to-peer learning – knowledge is shared openly among participants.**
  - **Creative experimentation – build, test, iterate freely.**
  - **Open source mindset – contribute to a global network of makers.**
  - **Access to tools – democratize access to advanced technologies.**
  - **Community building – connect people through making**

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*“Make almost anything, with almost anyone, anywhere.” - **Neil Gershenfeld**, founder of the Fablab concept.*

- # Project introduction

  - ## What is Canari?

    Canari is an open-source environmental monitoring device developed by échoFab, a community-based Fab Lab in Montréal. The project empowers citizens to measure and understand local air quality using digital fabrication tools and accessible electronics.

- **Objectives of the project**

  - **Measure environmental conditions (air, temp, humidity) in real-time.**
  - **Visualize the data locally (OLED) and remotely (Arduino IoT Cloud).**
  - **Prototype using Fablab tools: 3D printing, laser cutting, CNC.**
  - **Enable mobile access via a connected IoT dashboard.**
  - **Raise awareness of air quality in everyday environments.**

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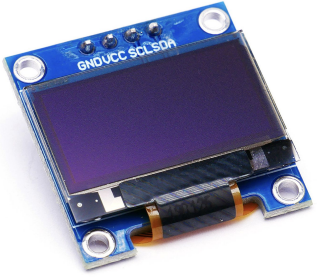
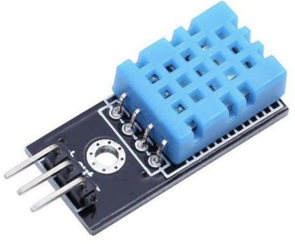
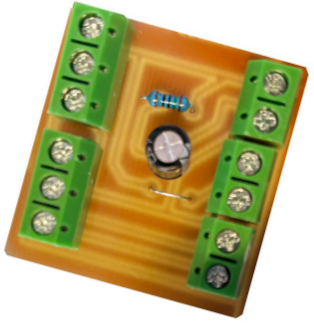
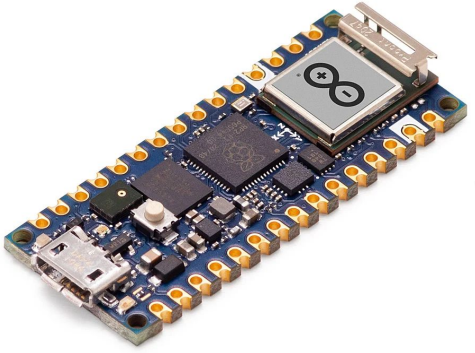
- **Hardware overview**
  - **Arduino Nano RP2040 Connect - IoT Microcontroller**
  - **PCB - Used to interconnect components**
  - **OLED SSD1306 - 128 X 64 Display**
  - **DHT11 - Temp & humidity sensor**
  - **PM2.5 - Particle sensor**
  - **Jumper cables**









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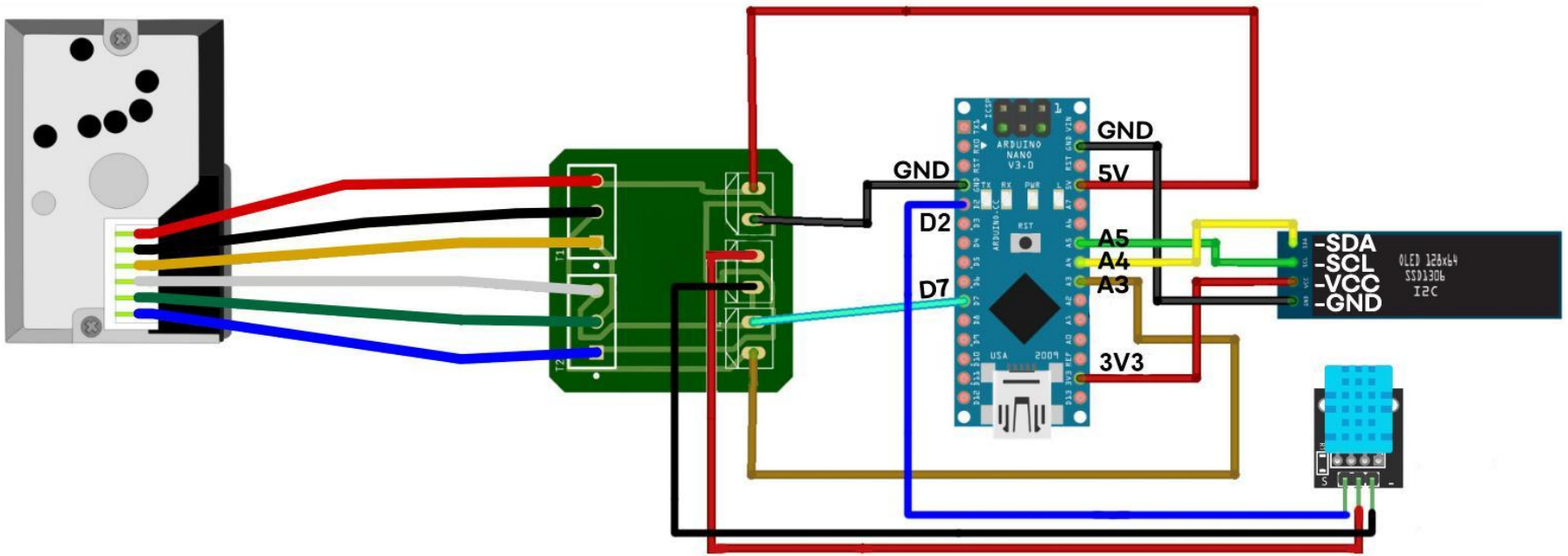
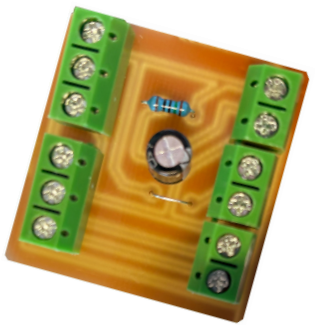
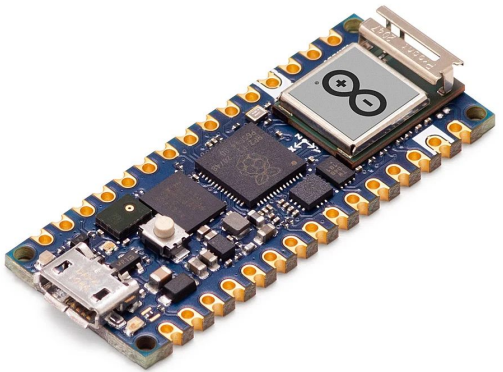
- **Setting up the hardware**

  - **Here we'll start connecting the components like so:**



- **Connecting the particle sensor**
  - **What is needed:**
    - **PM2.5 - Particle sensor**
    - **Arduino**
    - **PCB**
    - **Jumper cables**





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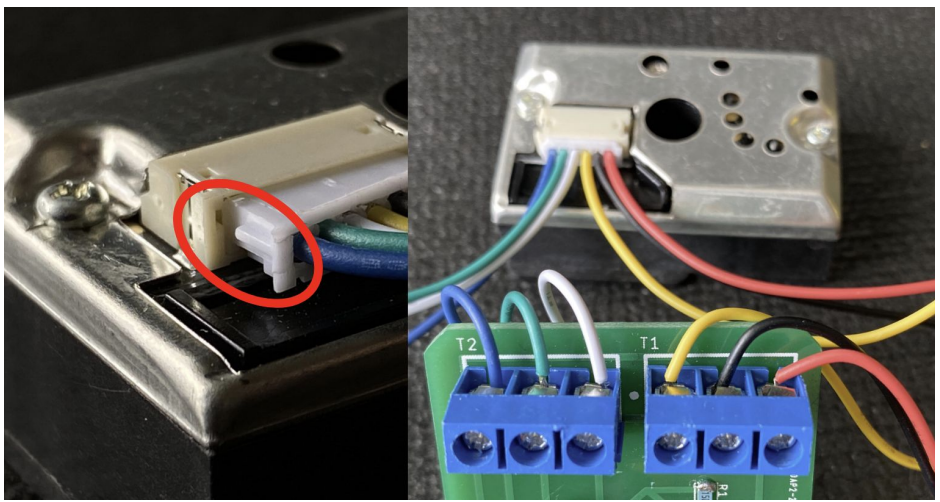
Connecting the particle sensor

- Let’s start by connecting the sensor to the PCB
  - Check the wire connector is facing the right way.
  - Loosen the 6 small screws on T1 and T2
  - Match the wire colors (use the guide)
  - Put the metal part of each wire into the holes
  - Tighten the screws to hold the wires in place



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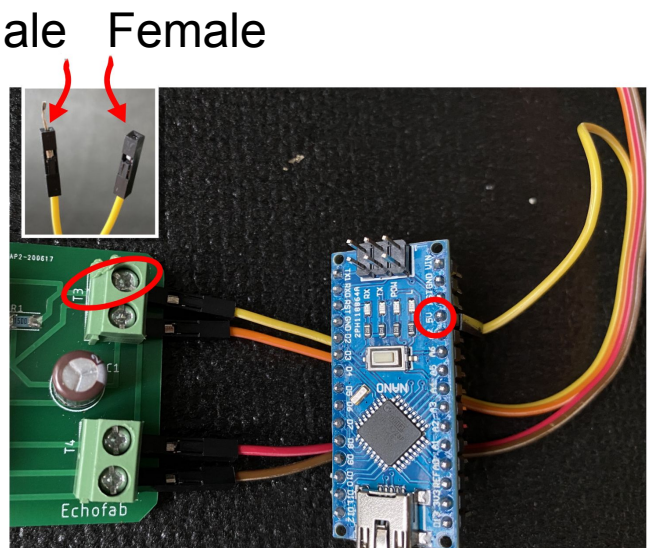
Connecting the Arduino board

- No need to match wire colors for this step.
- Use male-to-female jumper cables.
- Plug a cable into each of the T3 and T4 terminals.
- Put the metal part of each wire into the holes.
- Connect female ends to Arduino (see guide below).

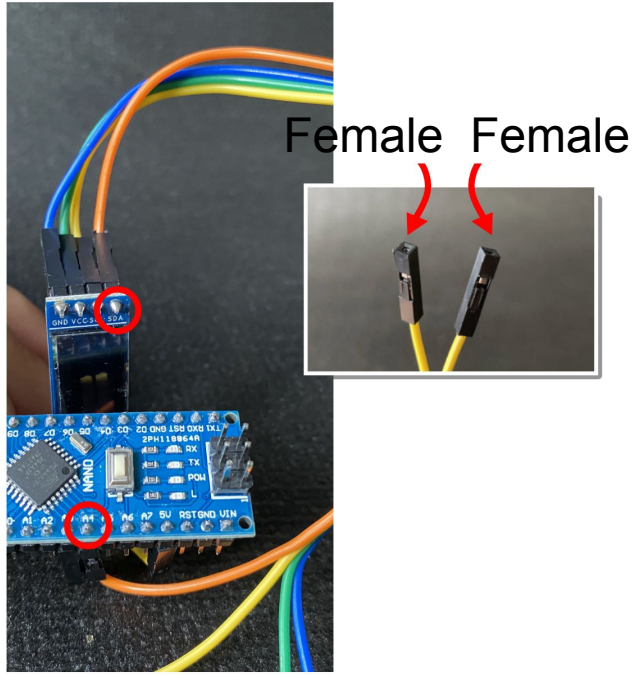
T3 (outer) → 5V
T3 (inner) → GND
T5 (inner) → D7
T5 (outer) → A3



Connecting the OLED display

- Again, wire colors don’t matter here.
- Use female-to-female jumper cables.
- Plug a cable onto each pin of the display.
- Put the metal part of each wire into the holes.
- Connect other ends to Arduino (see guide below).

Screen (SDA) → A4
Screen (SCL) → A5
Screen (VCC) → 3.3V
Screen (GND) → GND



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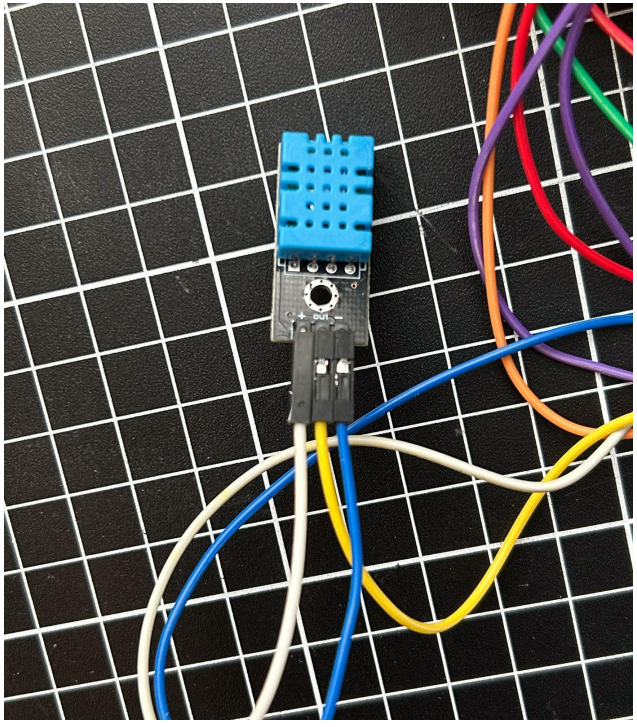
Connecting the DHT11 sensor

- Again, wire colors don’t matter here.
- Use female-to-male jumper cables.
- Plug a cable onto each pin of the sensor.
- Put the metal part of each wire into the terminal.

DHT + → T4 top
DHT - → T4 bottom
DHT s → Arduino A2 pin



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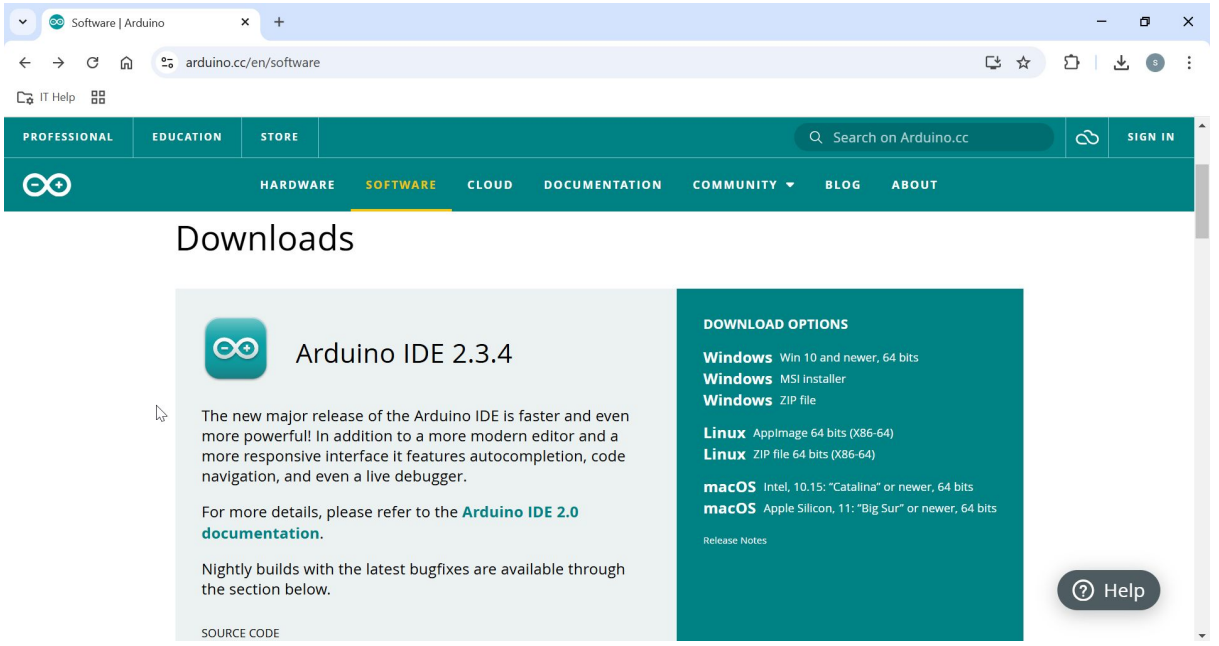
- **Setting up the software**

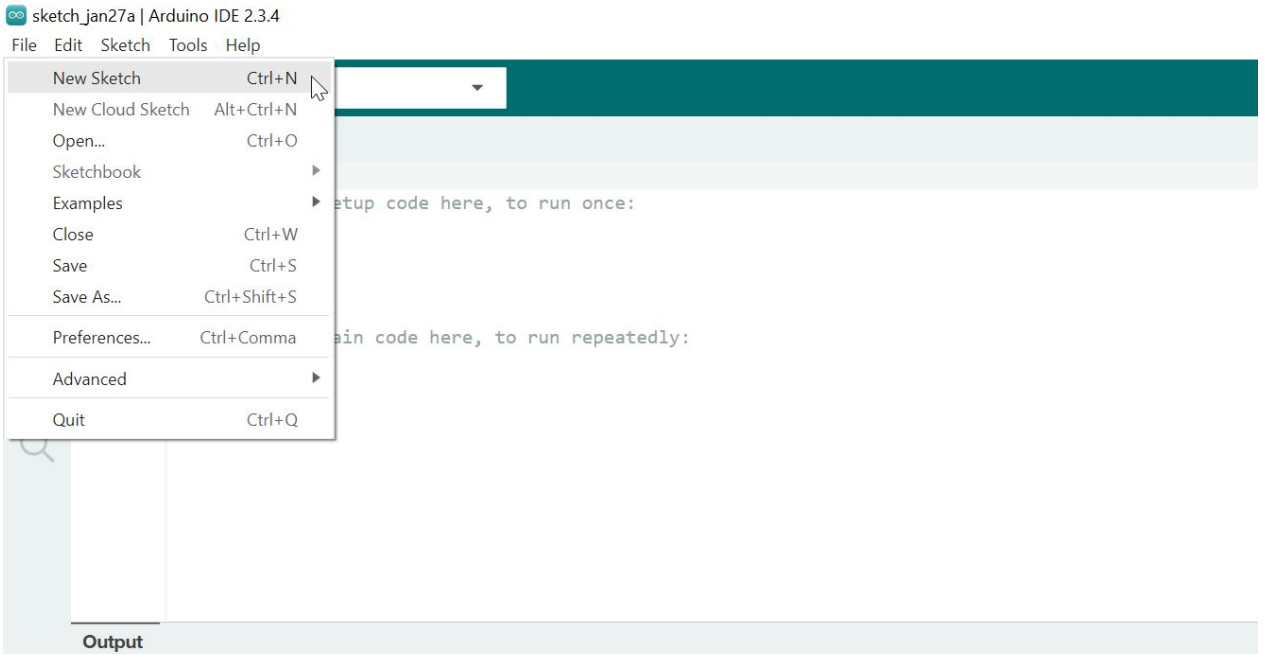
  - **Once installed, we'll create a new sketch for our code**



https://www.arduino.cc/en/software

- **Setting up the software**

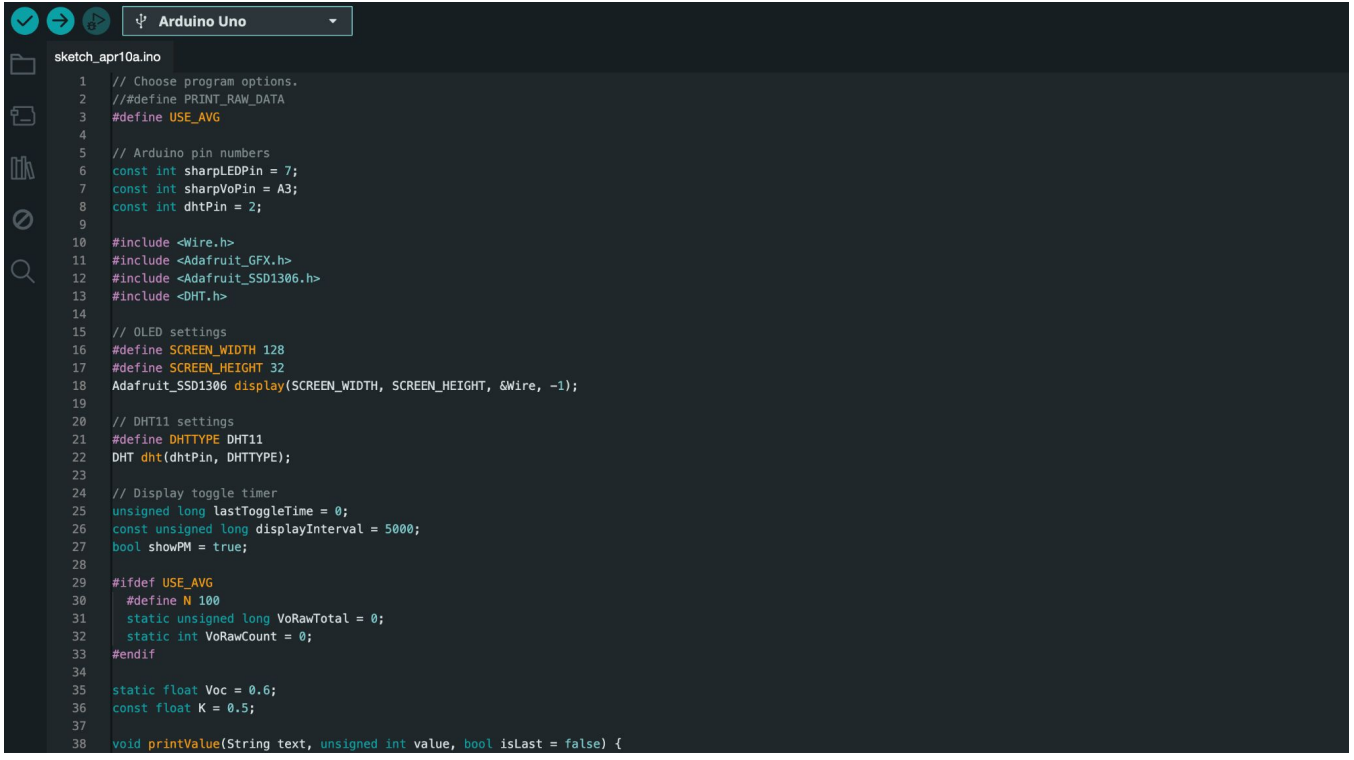
  - **Here we'll start off by installing the Arduino IDE**



https://www.arduino.cc/en/software

Uploading the program program

Insert the code :



https://github.com/ArduinoFablab/Discoday_IoT/blob/main/Arduino_Dust_DHT_Wi-Fi_128X32

Installing the electronics in the 3D-printed frame

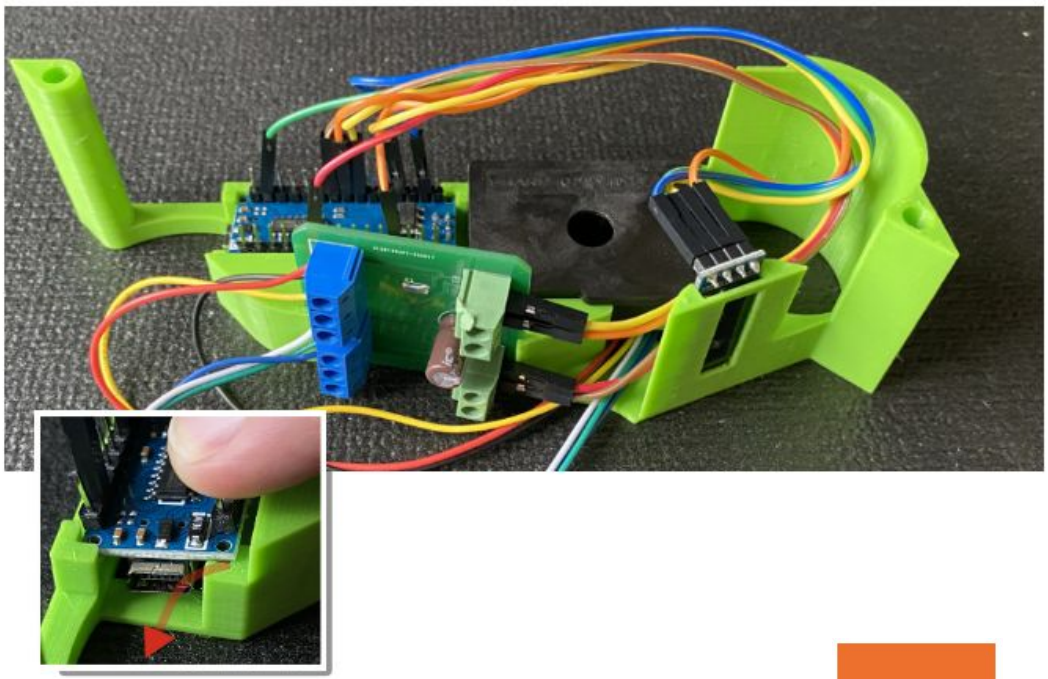
1. **Push the fine particle sensor into its slot,** making sure the wires are not pinched.

2. **Slide in the printed circuit board** so that the components are visible.

1. **Organize the wires and store the excess** inside the bird's belly and head

2. **Push it outward and then toward the back to enclose the Arduino**
   The USB connector must point toward the bird's tail.

3. **Slide the screen into its slot.**

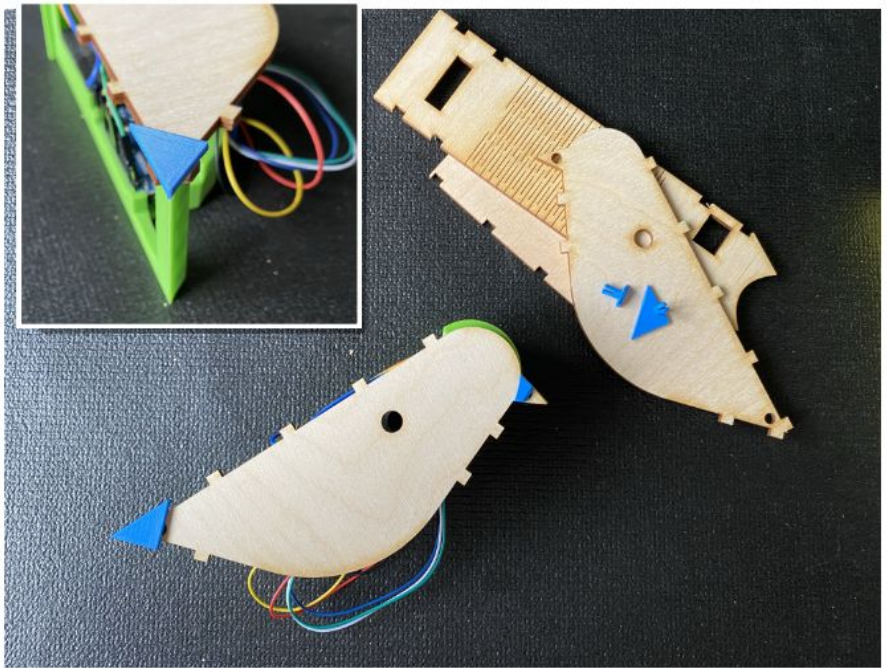


Installing the wooden casing

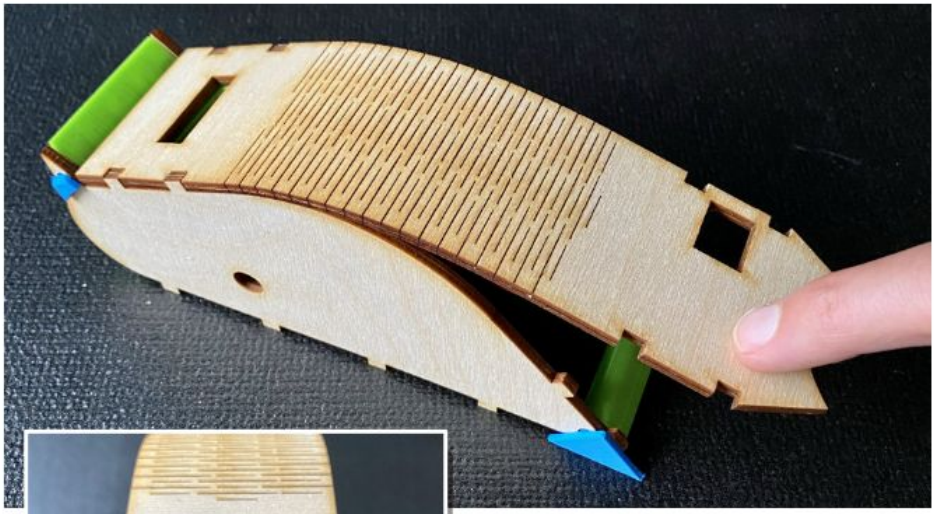
1.

Attach the bird’s side panels first, using the 3D-printed attachment buttons.

Make sure to follow the correct orientation when installing it.



Installing the wooden casing



2. Build the belly using the wood bending technique.
This flexible section will also hold the screen in place.

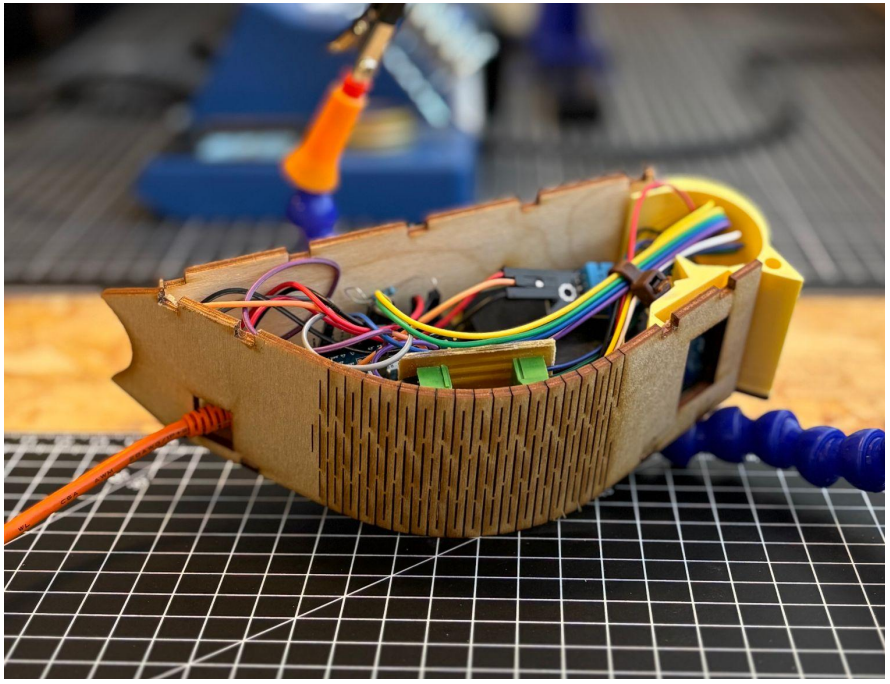
3. Align the mini USB hole.
Make sure the mini USB opening in the wood lines up with the Arduino's USB connector inside.

Installing the wooden casing

4. **Connect the USB cable and attach your cord**

5. **Double-check the wiring.** Ensure everything is properly connected and no wires stick out or get pinched during closure.

6. **Install the back of the bird.**



Want to bring your Canari further?

You can:
- Print new vinyl wings
- Add extra sensors to detect temperature, humidity, or even CO_2

Come back to the Fab Lab! We'll be here to help you upgrade, explore, and collaborate.

Congratulations! Your Canari is alive and ready measure the air like a pro.

In just a day you discovered how we can bring new ideas to life with our digital tools like 3D printers, laser cutters, CNCs, and electronics.

Don’t forget to share your feedback with your instructor! We hope you’ll find the perfect place for your new creation.