Tiny Trainable Instruments - User Guide

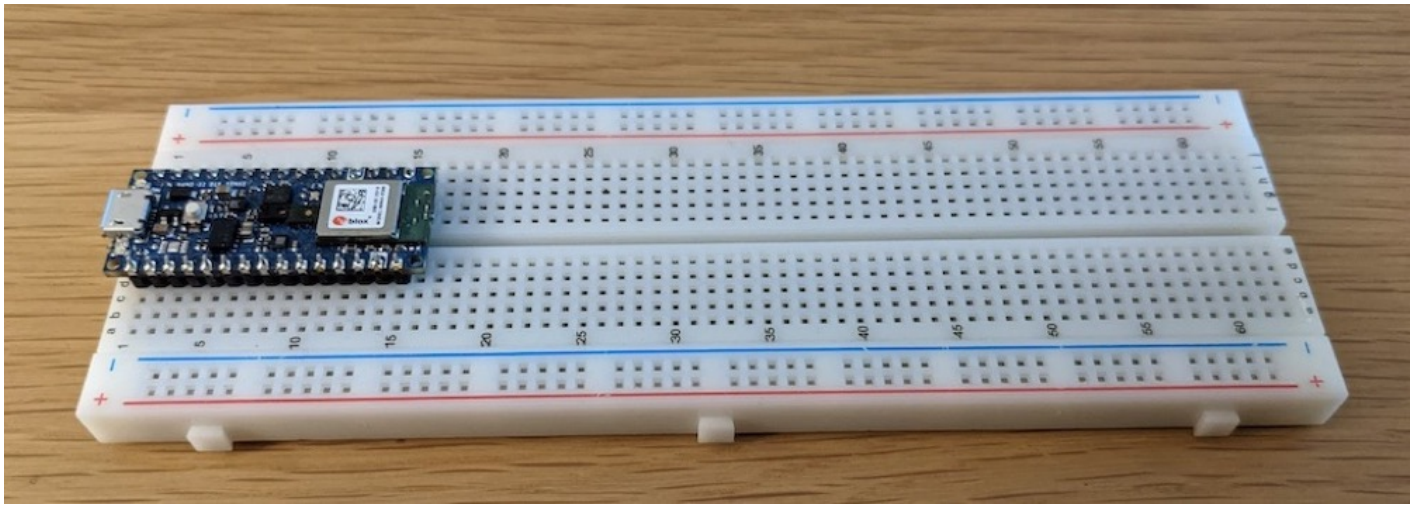
Materials

Participants of the study will will get a kit with these 6 materials for building their Tiny Trainable Instruments:

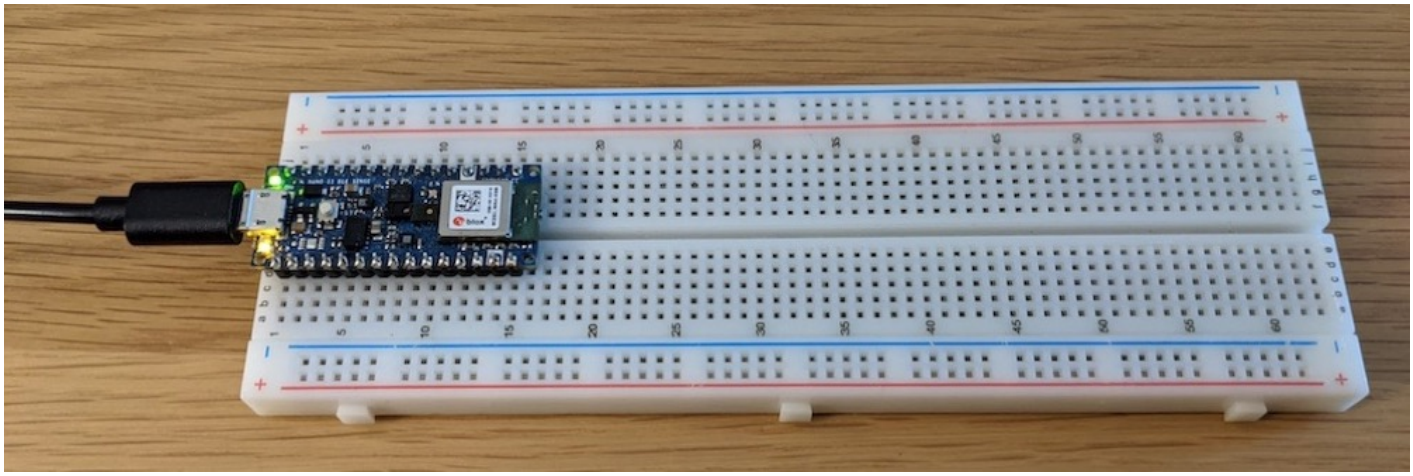
1. 1x Arduino Nano 33 BLE Sense microcontroller with headers
2. 1x Micro USB Cable
3. 1x Solderless breadboard
4. 1x Pack of jumper wires
5. 1x Micro servo motor
6. 1x Piezo buzzer

Assembly

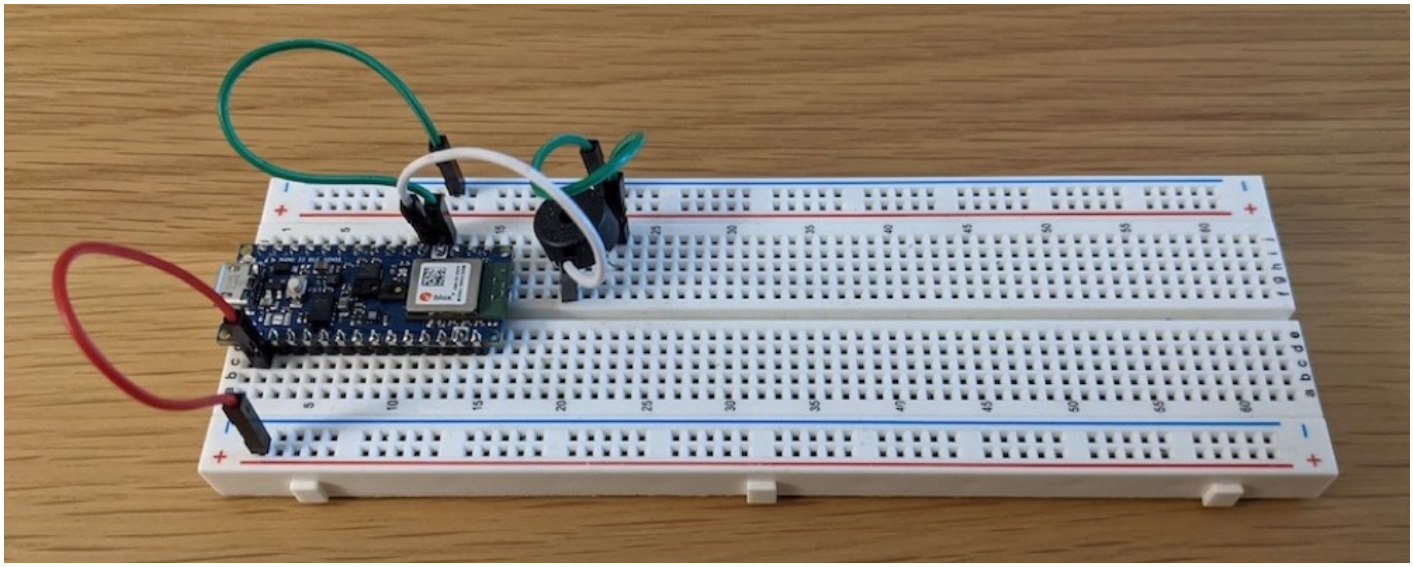
During the workshop, we will place the Arduino microcontroller on the solderless breadboard, to make all the connections in a safe and easy way.



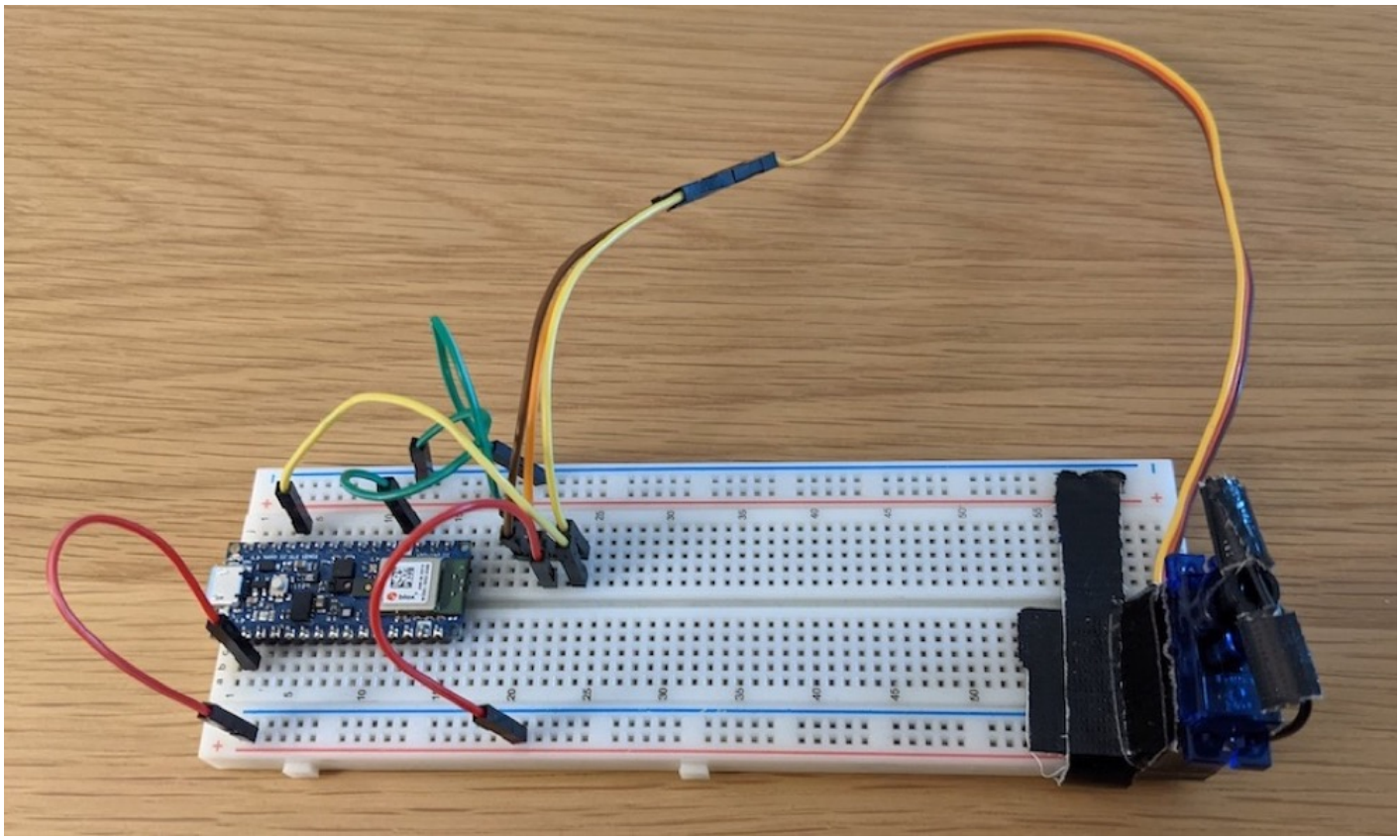
We will use the USB cable to both power our instruments and to be able to upload code from our computers. When the Arduino microcontroller is powered on, its LEDs light up.



During the workshop we will build 2 instruments with the same materials: the first uses the piezo buzzer for outputting sound, and we make connections using 4 jumper wires.



The other instrument uses a servo motor for outputting movement and we need 8 jumper wires to build it.



Installation

For this study the participants will install free open source software on their computer from Arduino and from myself, will access the free cloud service Google Colab for training machine learning algorithms, and will install the Google Chrome web browser.

Step 1

Install on your computer the free open source official Arduino editor from their website https://www.arduino.cc/en/software, available for Linux, Mac, and Windows computers.

Step 2

Install the additional free open source software libraries for the microcontroller we are using, the Arduino Nano 33 BLE Sense, following the official Arduino quickstart guide, available at https://docs.arduino.cc/software/ide-v1/installing-mbed-os-nano-boards

Step 3

Install the open source software library built for this project, available directly from the Arduino editor as TinyTrainable and also at the website https://github.com/montoyamoraga/TinyTrainable.

Step 4

For this study, you need a free Google account, to be able to run machine learning algorithms on the cloud using the free service Google Colaboratory, also known as Google Colab. More information is available at https://research.google.com/colaboratory/faq.html

Step 5

Install the Google Chrome web browser on your computer, available at https://www.google.com/chrome/.