# Research and inspirations

## Software and Hardware:

## Software


Arduino IDE[1], Visual Studio Code on Raspberry Pi[2]

For this project the main programming languages we will be using are Python and Arduino's language, which is based on C/C++.[3] On the Raspberry Pi we installed both the Arduino IDE and Visual Studio Code. We installed Python3[4], Pip3[5], PySerial[6], Guizero[7] and Adafruit GFX[8] libraries. The PySerial Library was necessary to connect the Arduino and the Raspberry Pi by establishing a serial connection. This way, the data from the potentiometers could be transmitted to the interface, enabling the progress bars to change in real time based on the user's interaction with the hardware. To create the interface, I used the Guizero library so that I could code it in Python, as it is being programmed directly for the DFRobot 7" LCD

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[1] Software (no date) Arduino.cc. Available at: https://www.arduino.cc/en/software/ (Accessed: May 15, 2025).

[2] Visual Studio Code on Raspberry Pi (no date) Visualstudio.com. Available at: https://code.visualstudio.com/docs/setup/raspberry-pi (Accessed: May 15, 2025).

[3] No title (no date) Arduino.cc. Available at: https://docs.arduino.cc/tutorials/generic/language-comparison/ (Accessed: May 15, 2025).

[4] The Python standard library (no date) Python documentation. Available at: https://docs.python.org/3/library/index.html (Accessed: May 15, 2025).

[5] Pip documentation v25.1.1 (no date) Pypa.io. Available at: https://pip.pypa.io/en/stable/ (Accessed: May 15, 2025).

[6] Welcome to pySerial's documentation — pySerial 3.0 documentation (no date) Pythonhosted.org. Available at: https://pythonhosted.org/pyserial/ (Accessed: May 15, 2025).

[7] Sach, L. (no date) guizero: A Python 3 library to allow learners to quickly and easily create GUIs. Available at: https://github.com/lawsie/guizero (Accessed: May 15, 2025).

[8] Adafruit-GFX-Library: Adafruit GFX graphics core Arduino library, this is the "core" class that all our other graphics libraries derive from (no date). Available at: https://github.com/adafruit/Adafruit-GFX-Library (Accessed: May 15, 2025).

touchscreen. This was beneficial as it was both easy to learn and intuitive to use as it followed a box-based structure. Allowing me to create a simple user interface that can be controlled by the Raspberry Pi. The Adafruit library was necessary to control and code the NeoPixels we used during the prototyping phase, however, this wasn't required for our outcome, as we had to change the pixels we used.