

A guide for a simple weather station with Raspberry Pi:

Goal:

With this guide you will build a simple weather station that displays the current temperature, relative humidity and barometric pressure as well as a graph showing the course of these parameters in the last 24 hours.

What will you need?

- A Raspberry Pi
- A BME 280 sensor
- A 128x64 OLED display
- several push buttons
- A breadboard
- Some jumper wires

Step 1:

If you are using the raspberry pi for the first time, install the Raspbian OS on the SD card and put it into the Raspberry Pi's card reader. After starting the Raspberry Pi make sure to update the Raspbian OS and enable i2c. connect the BME 280 sensor and install the BME 280 library. You can find a good tutorial for setting up the sensor [here](#). measure the current room temperature in order to check that everything is working correctly.

Step 2:

Connect the OLED display to the Raspberry Pi (the display uses the same GPIO pins as the BME 280 sensor). Use the breadboard to connect both the sensor and the display to the SCL and SDA pins. I recommend using the lib_oled96 library for using the display. Go through the following tutorials in [English](#) or [German](#), try the different examples and make sure you understand what each command does.

Step 3:

Now that we got the hardware running it's time to write the programs for our weather station. The first program that we'll need will measure the temperature, humidity and barometric pressure every ten minutes and save it as an csv file in an infinite loop. We are only interested in the last 24 hours so after the first 24 hours the oldest measurement should be removed when a new measurement is being added. Use the sleep function from the time library to make the program wait ten minutes between each measurement.

Step 4:

The next program will load and display the data when the button is pressed. The program should contain several functions that read the csv file, plot it and display the data on the OLED display. Use matplotlib to plot the temperature, humidity and barometric pressure in the last 24 hours and save the plots as a png file. you may need to use the 'resize' argument when calling the 'draw.bitmap' function for displaying the plots.

Tip: since the OLED display is quite small the plots should be as simple as possible. This means no axis label, title, etc. use the following command to remove the axis tick label:

```
frame1 = plt.gca()
frame1.axes.xaxis.set_ticklabels([])
frame1.axes.yaxis.set_ticklabels([])
```

for controlling the buttons use the gpiozero library. In the documentation in the following [link](#) you can learn how to connect the buttons to the raspberry pi and program them. set each button to display either the current temperature, humidity and pressure or to plot the data from the last 24 hours. After achieving that feel free to experiment and expand the functionalities of the buttons such as finding a way to access the data with only one or two buttons .

Now all that remains is to run the two programs in the command line as following:

```
python3 program_name1.py &
python3 program_name2.py &
```

Enjoy!