The weather station project (Level 1)

Worksheet for students

Team:...................................

Where the measurement of temperature, pressure and humidity can be important? Search for information online and write your answers below.

How the temperature and pressure can be measured? Search for information online and write your answers below.

Review several scenarios, how weather station can be build, and choose one to demonstrate. Sketch your weather station and list the crafting materials that you may need.

Area for sketches

Bill of materials

During this project, the sensors with grove standard will be used. This standard allows to connect elements easily. This is really important when sensors are sensitive to damage.

First, connect the Arduino UNO/Mega 2560 to *Grove Base Shield/Grove Mega Shield* as is shown in Fig. 1. This shield allows to connect elements in grove standard to Arduino board.
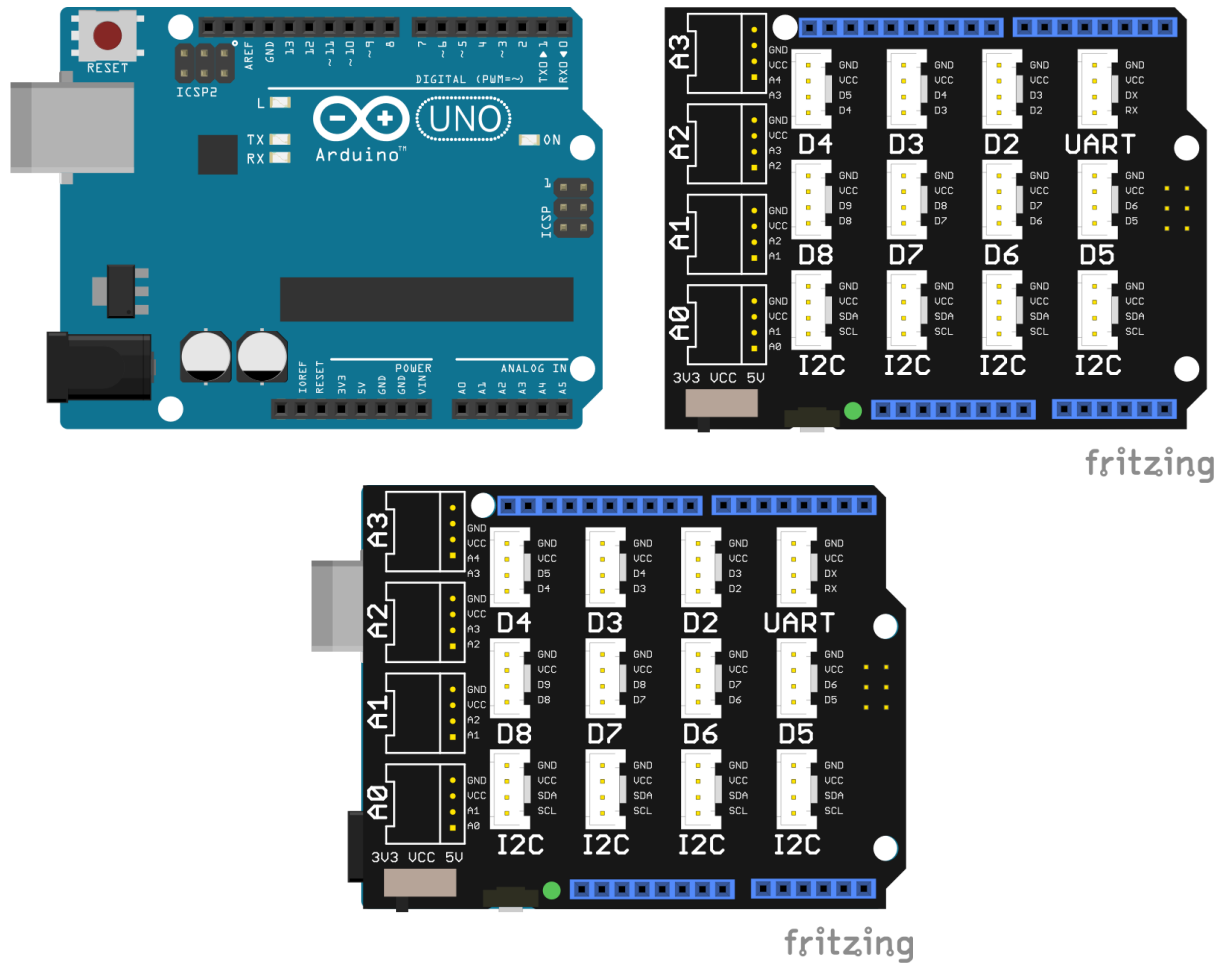

Figure 1: Top figure: Arduino Uno board and Grove Base Shield separately. Bottom figure: Grove Base Shield connected with Arduino Uno board.

Second, the BME280 sensor should be connected to the shield as is shown in Fig. 2. This sensor module consists of temperature, humidity and pressure sensors.

Time for hands-on practice!
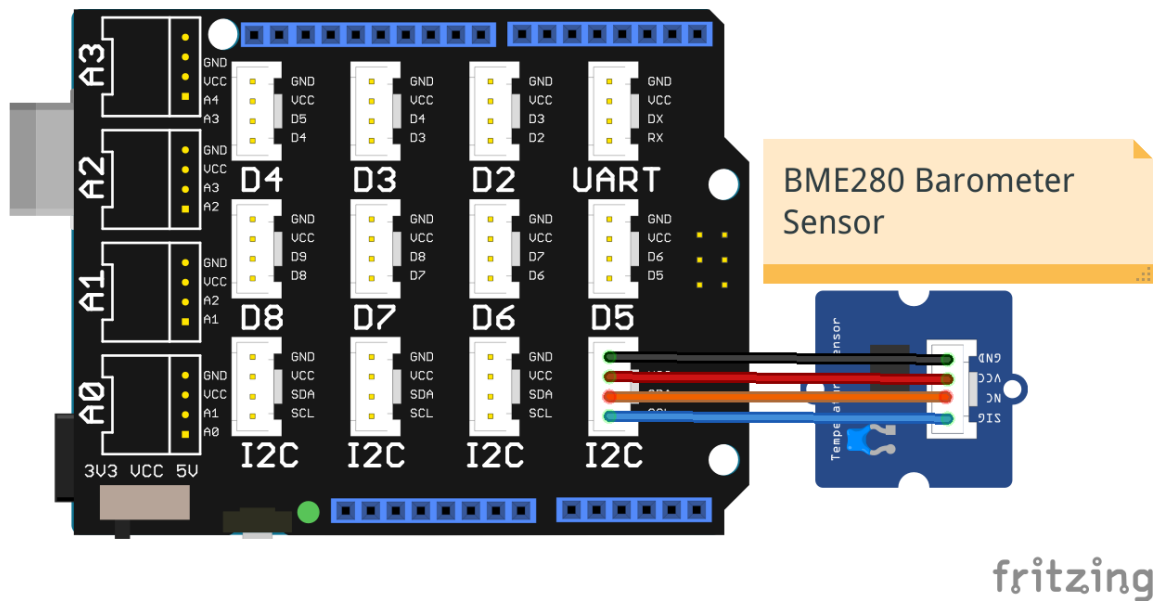Let's create the circuit using your Arduino board and the corresponding electrical components.

Figure 2: The BME280 sensor module connected to the Grove shield.

> **Time for programming!**
> Connect your Arduino to USB and open Arduino IDE software.

Most sensors have already prepared dedicated libraries, which can be easily downloaded from manufacturer's website or repository (e.g. github). The BME280 has such library available on page:https://github.com/Seeed-Studio/Grove_BME280 . If you do not have installed library, download library and save to *libraries* folder inside of Arduino IDE folder. Than, unzip library and run again Arduino IDE.

Open the example from library by choosing *File → Examples → Grove - Barometer Sensor BME280 → bme280_example*. All programs consist of two functions: *setup* and *loop*. First function runs only one. Therefore, all commands inside *setup* function will execute only once. The *loop* function is running continuously. Therefore, all commands inside the *loop* function will be repeated until Arduino board is powered off. Try to analyze and understand the example.

Write your own code based on the example, which will read temperature, pressure and humidity and display their values on serial monitor. Use tabulator ("\t") as a separator. When you finish, open the serial monitor and look on values. Do they look reasonably?
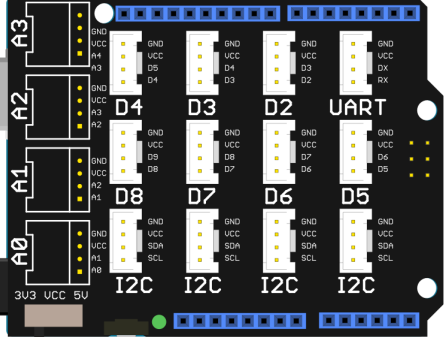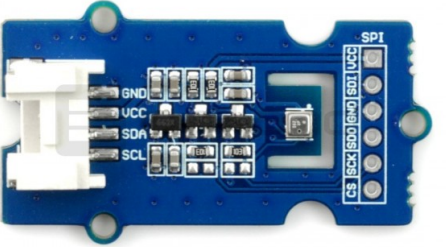
Time for crafting!
Start working on the design of the weather station using the available crafting materials; bear in mind that your model will be revised several times sand adjustments/improvements will be introduced.

The following table is an index containing all the components that need to be implemented for accomplishing the present activity.

	Grove Base Shield (for Arduino UNO) or Grove Mega Shield (for Arduino Mega 2560)
	Grove Barometer Sensor (BME280)

Creator

Angelika Tefelska (WUT)

Declaration

This report has been prepared in the context of the ROBOSCIENTISTS project. Where other published and unpublished source materials have been used, these have been acknowledged.