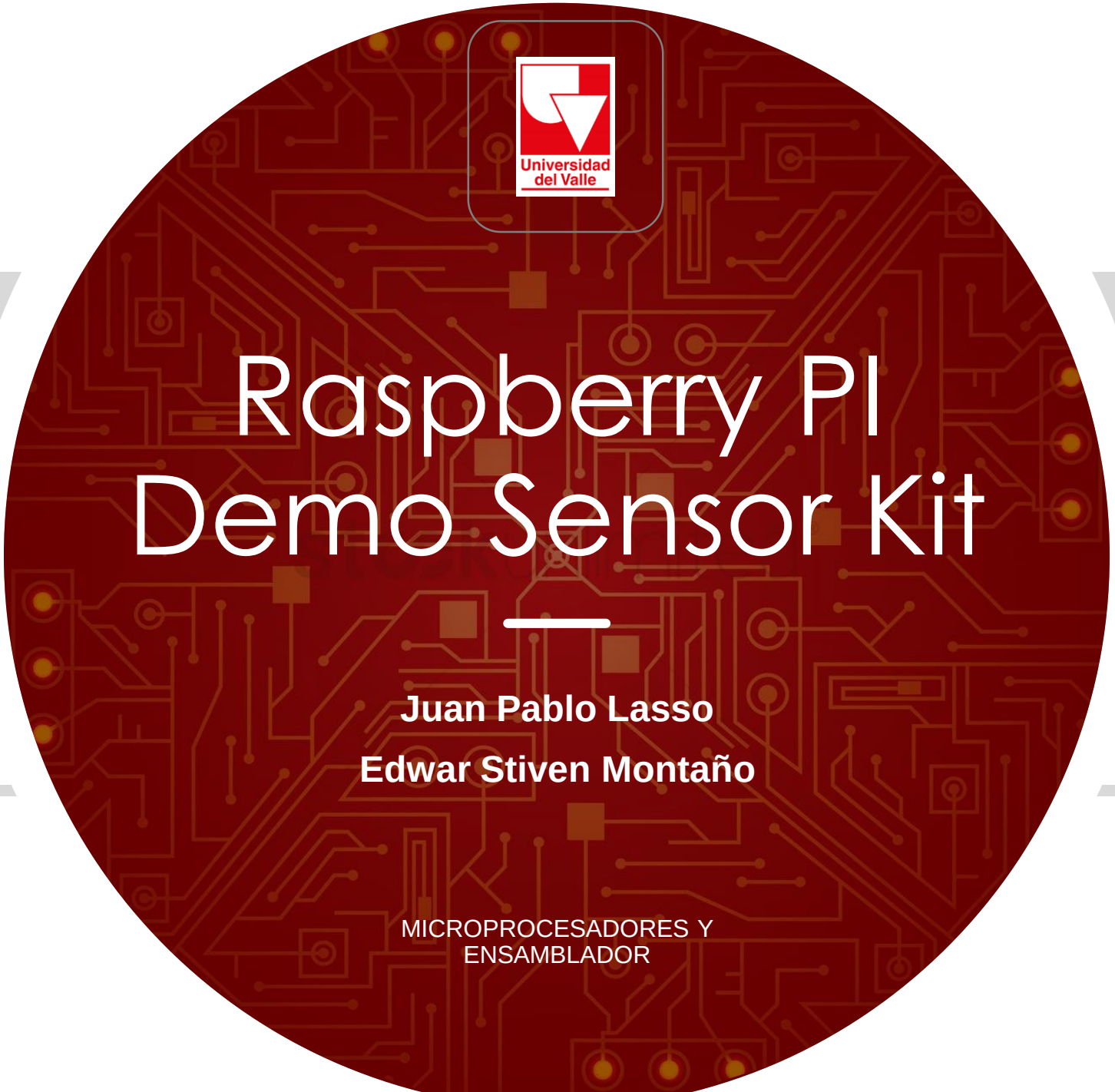

Raspberry PI Demo Sensor Kit

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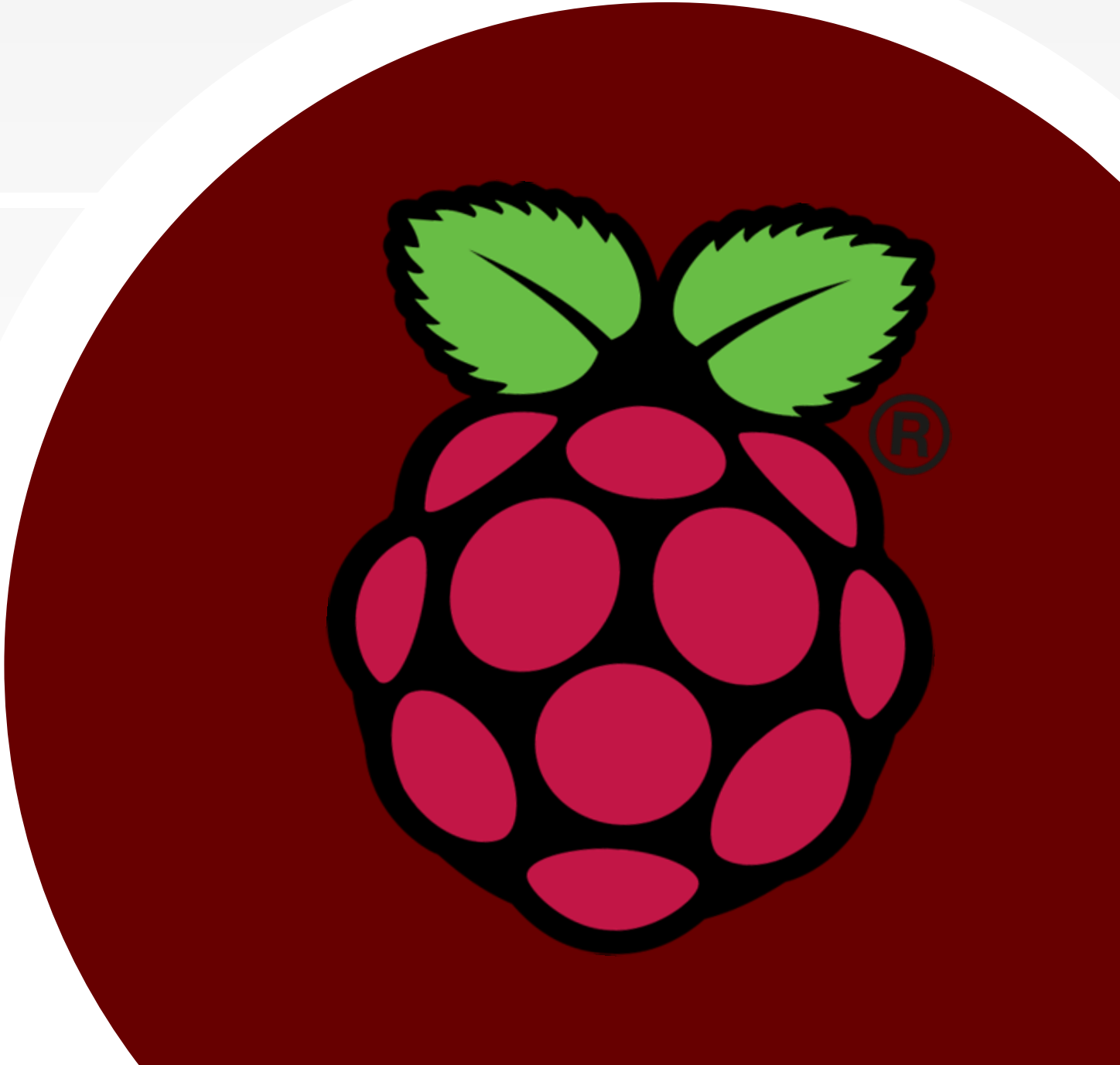
Edwar Stiven Montaño

MICROPROCESADORES Y
ENSAMBLADOR

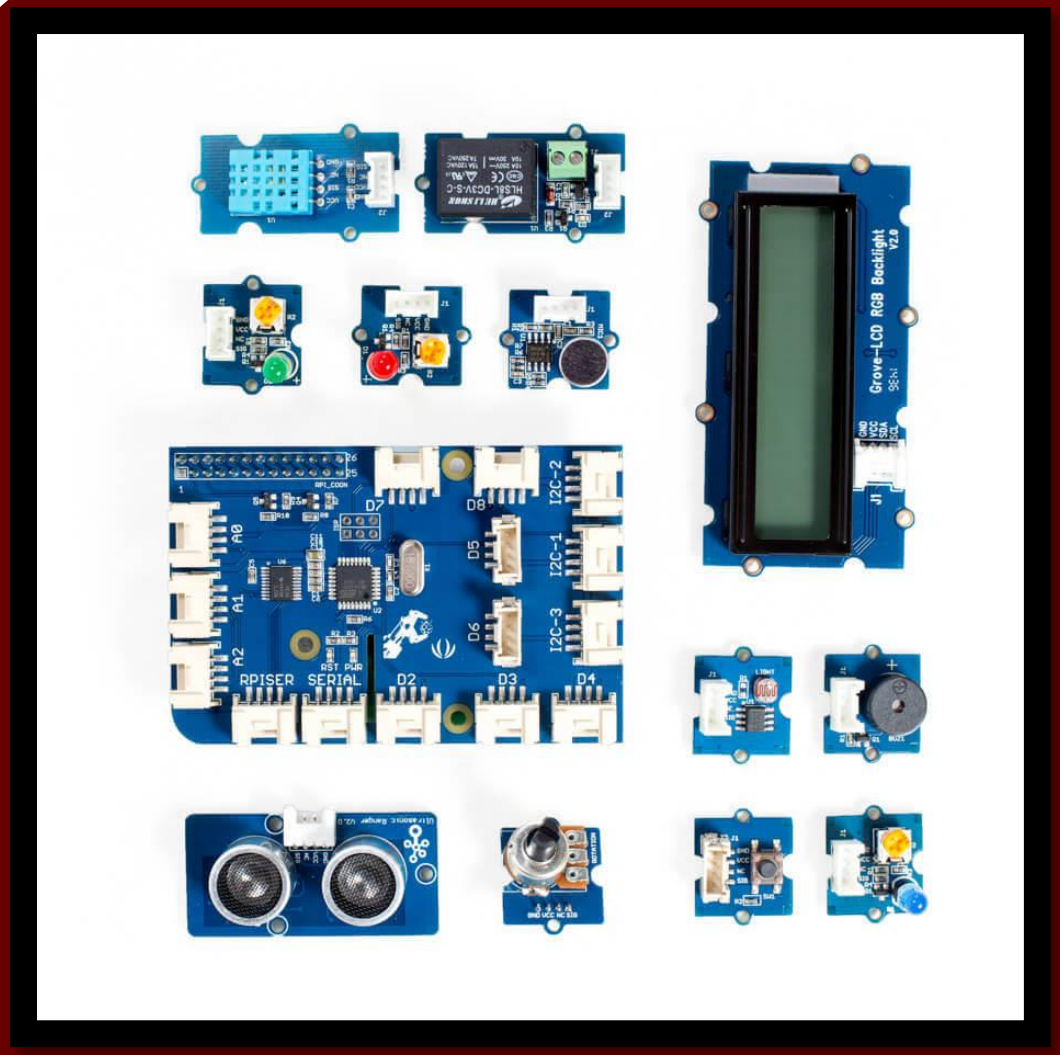
Project 09

To develop a software tool in Python in order to perform a demo application for the GrovePi+ sensor kit. This demo application must include at least 5 activities including all sensors in the GrovePi+ kit. The Python GUI must have a tab for each activity, as well as, the corresponding hardware must be checked previously to start the activity.



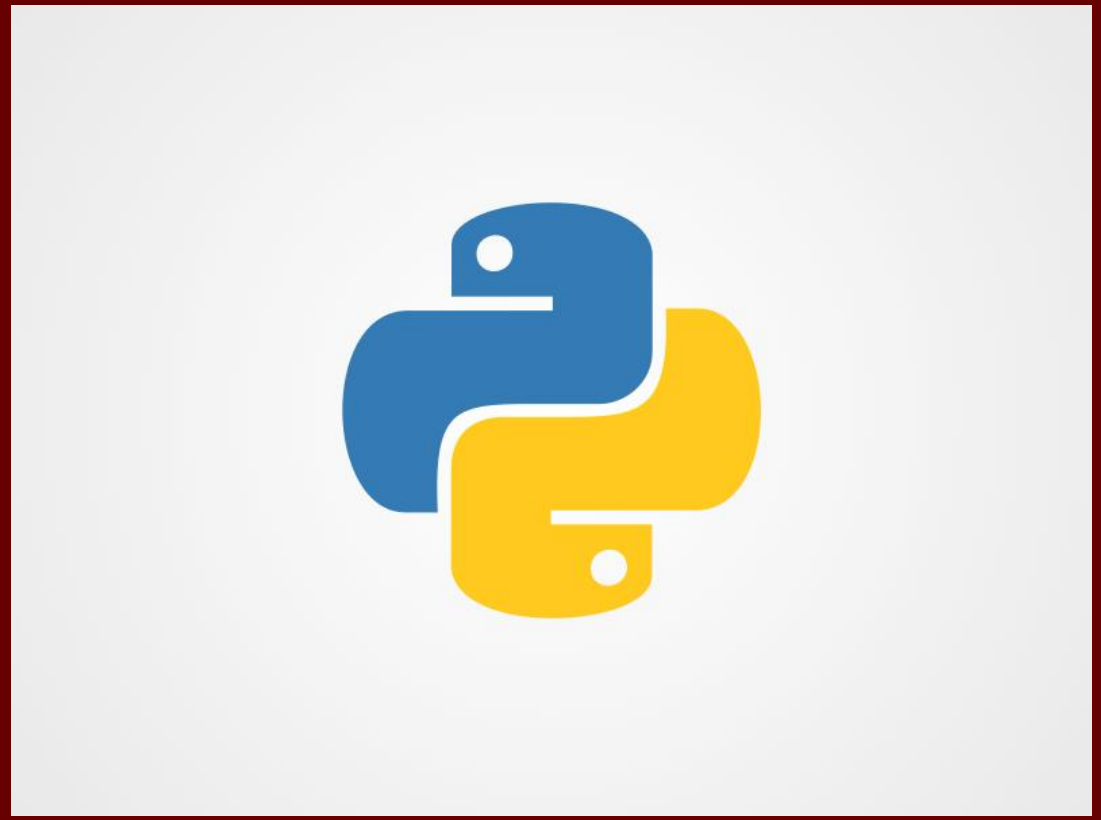
Phase No. 1:

1. To research about the specifications of the GrovePi+, and the demo activities to develop.
2. To design the hardware schematics of each activity, and define their main goal.
3. The software design using R.U.P. (functional and non-functional requirements,
4. Digital report.



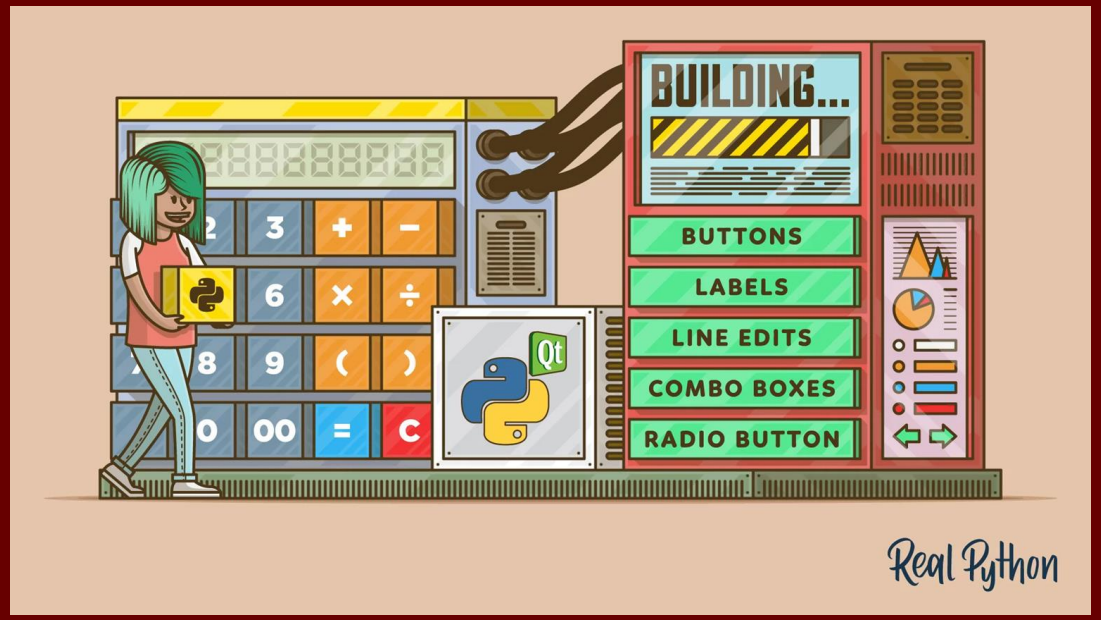
Phase No. 2:

1. Students must present the activity No. 1 working using Python, but not GUI.
2. Students must present the activity No. 2 working using Python, but not GUI.
3. Students must present the activity No. 3 working using Python, but not GUI.
4. Students must present the activity No. 4 working using Python, but not GUI.
5. Students must present the activity No. 5 working using Python, but not GUI.
6. The RUP documentation updated.
7. Digital report.



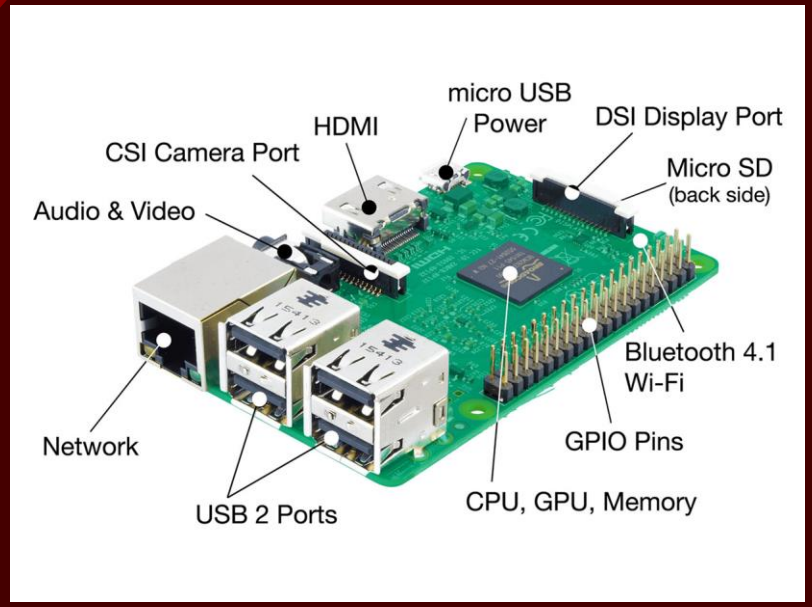
Phase No. 3:

1. Students must present the demo application for activity No. 1 using the Python GUI
2. Students must present the demo application for activity No. 2 using the Python GUI
3. Students must present the demo application for activity No. 3 using the Python GUI
4. Students must present the demo application for activity No. 4 using the Python GUI
5. Students must present the demo application for activity No. 5 using the Python GUI
6. The RUP documentation updated
7. Digital report



Raspberry Pi 3

- **SOC:** Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC
- **CPU:** 1.4GHz 64-bit quad-core ARM Cortex-A53 CPU
- **RAM:** 1GB LPDDR2 SDRAM
- **WIFI:** Dual-band 802.11ac wireless LAN (2.4GHz and 5GHz) and Bluetooth 4.2
- **Ethernet:** Gigabit Ethernet over USB 2.0 (max 300 Mbps). Power-over-Ethernet support (with separate PoE HAT). Improved PXE network and USB mass-storage booting.
- **Thermal management:** Yes
- **Video:** Yes – VideoCore IV 3D. Full-size HDMI
- **Audio:** Yes
- **USB 2.0:** 4 ports
- **GPIO:** 40-pin
- **Power:** 5V/2.5A DC power input
- **Operating system support:** Linux and Unix



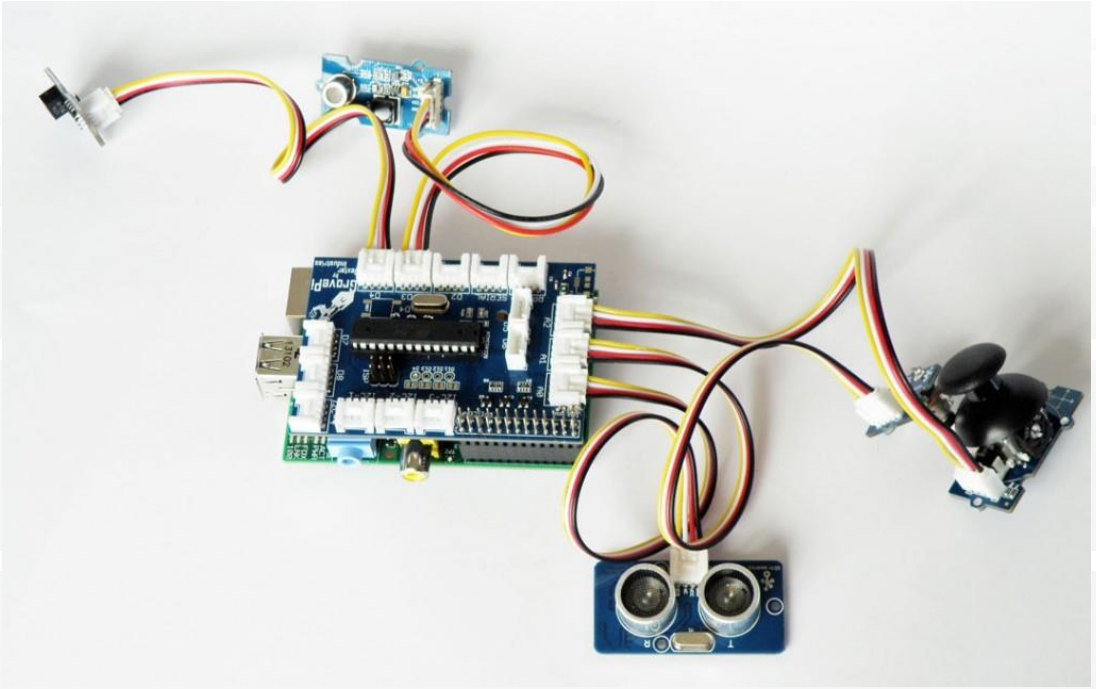
GrovePI+

GrovePi is an add-on board that brings Grove Sensors to the Raspberry Pi. As a new version of GrovePi. It adds support for the newly RaspberryPi Model B+ and Model A+. There are three mounting holes can perfect match all version of Raspberry Pi. Camera cable outlet hole. It also improves the voltage level converting sub circuits. ATmega328p

- **7** digital Ports
- **3** analoge Ports
- **3** I2C ports
- **1** Serial port connect to GrovePi
- **1** Serial port connect to Raspberry Pi
- Grove header Vcc output Voltage: 5Vdc

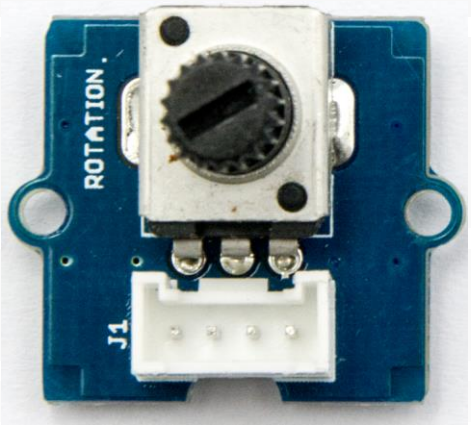
Grove Modules

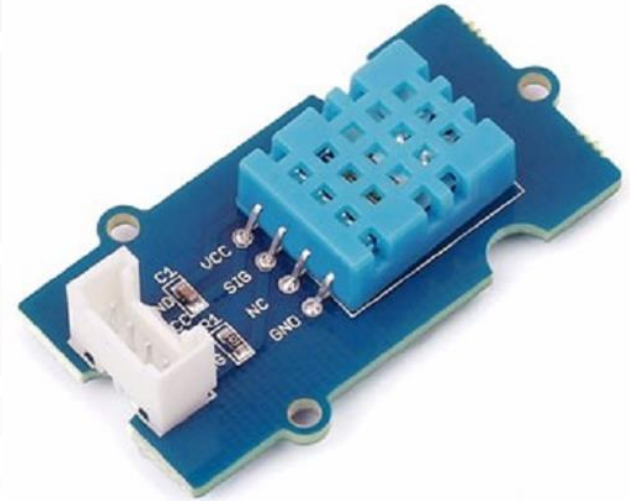
#	Module	Type Periferic	Type Signal
1	Sound Sensor	Input	Analog
2	Temperature and Humidity	Input	Analog
3	Light Sensors	Input	Analog
4	Relay	Output	Digital
5	Button	Input	Digital
6	Ultrasonic Sensor	Input	Digital
7	Rotary Angle Sensor	Input	Analog
8	LCD RGB Backlight	Output	Digital
9	Buzzer	Output	Digital
10	Red LED	Output	Digital
11	Blue LED	Output	Digital
12	Green LED	Output	Digital



Sensors

Rotatory angle sensor

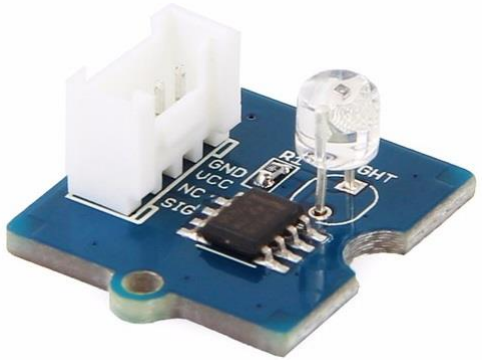




Temperature sensor

Sound sensor

Button sensor

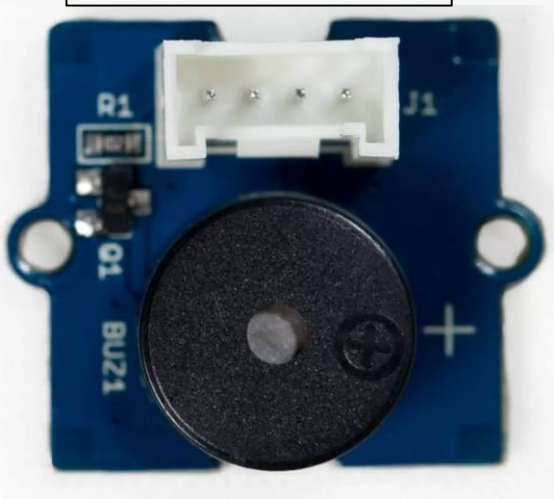


Light sensor

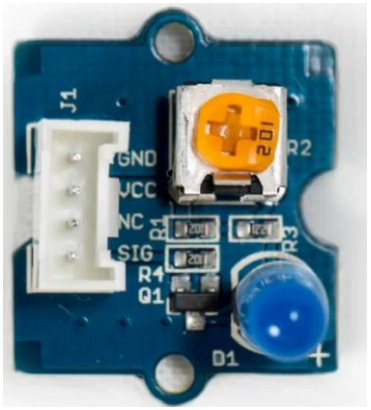
Ultrasonic sensor

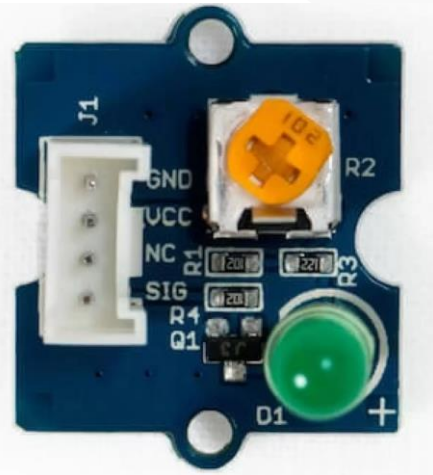
Actuators

Buzzer sensor

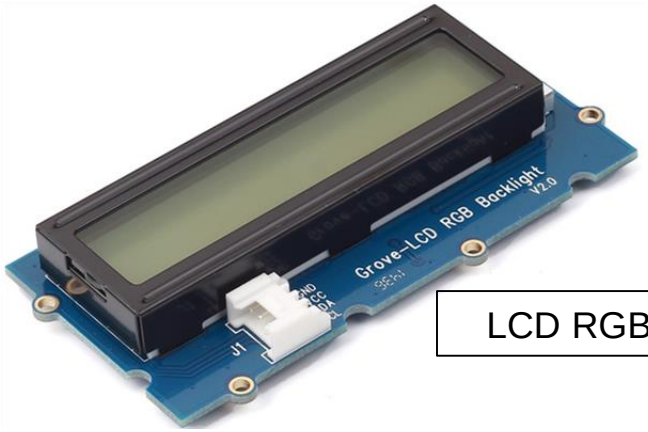


Led sensor





Relay sensor



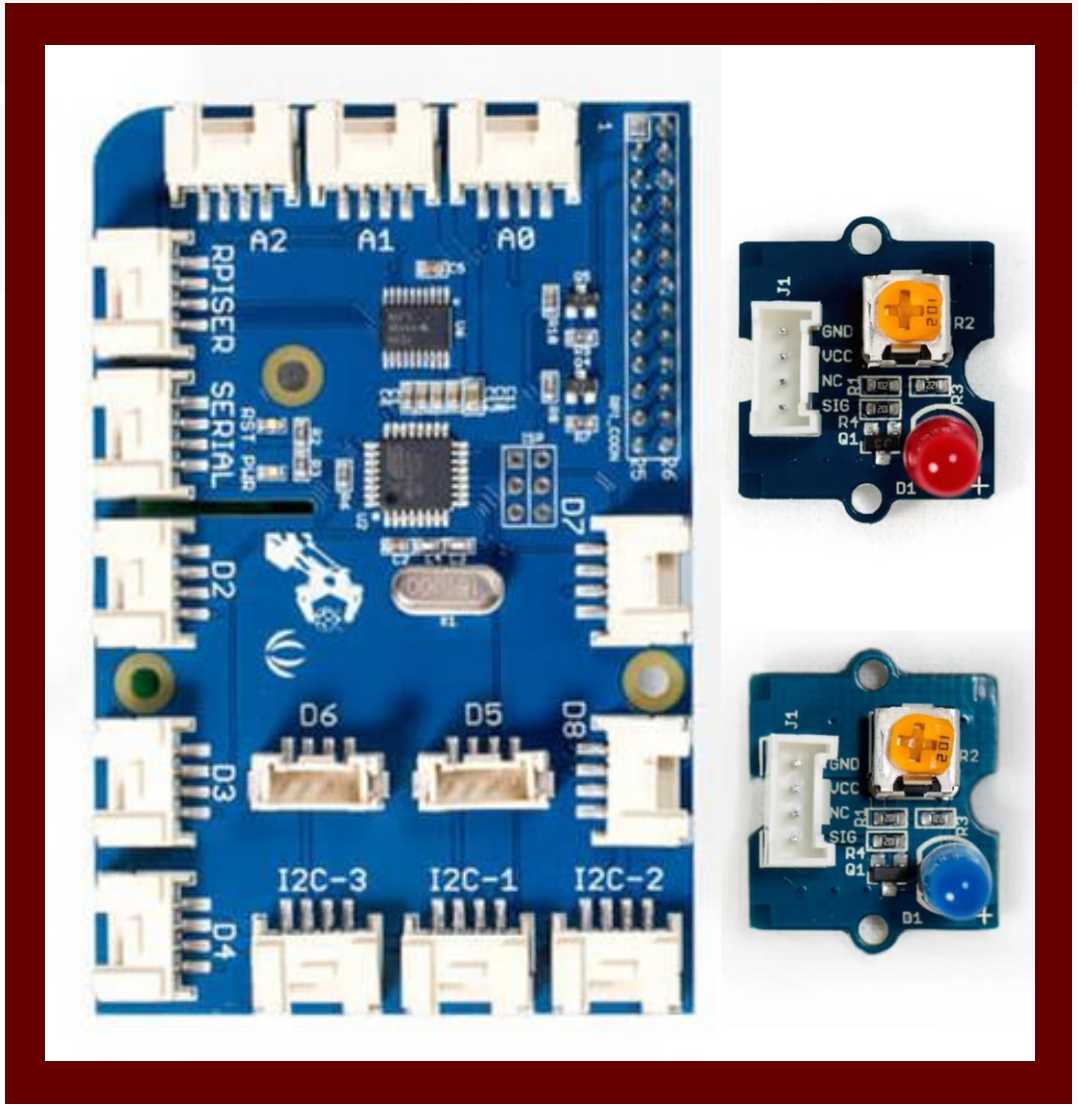
LCD RGB sensor

Activity No. 1
Hola mundo

< Hello World >

Objectives:

- Carry out the initial configuration of the Raspberry Pi 3.
- Learn the basics of Raspberry and the Python programming language
- Implement simple program in Python, to achieve a Blink_LED

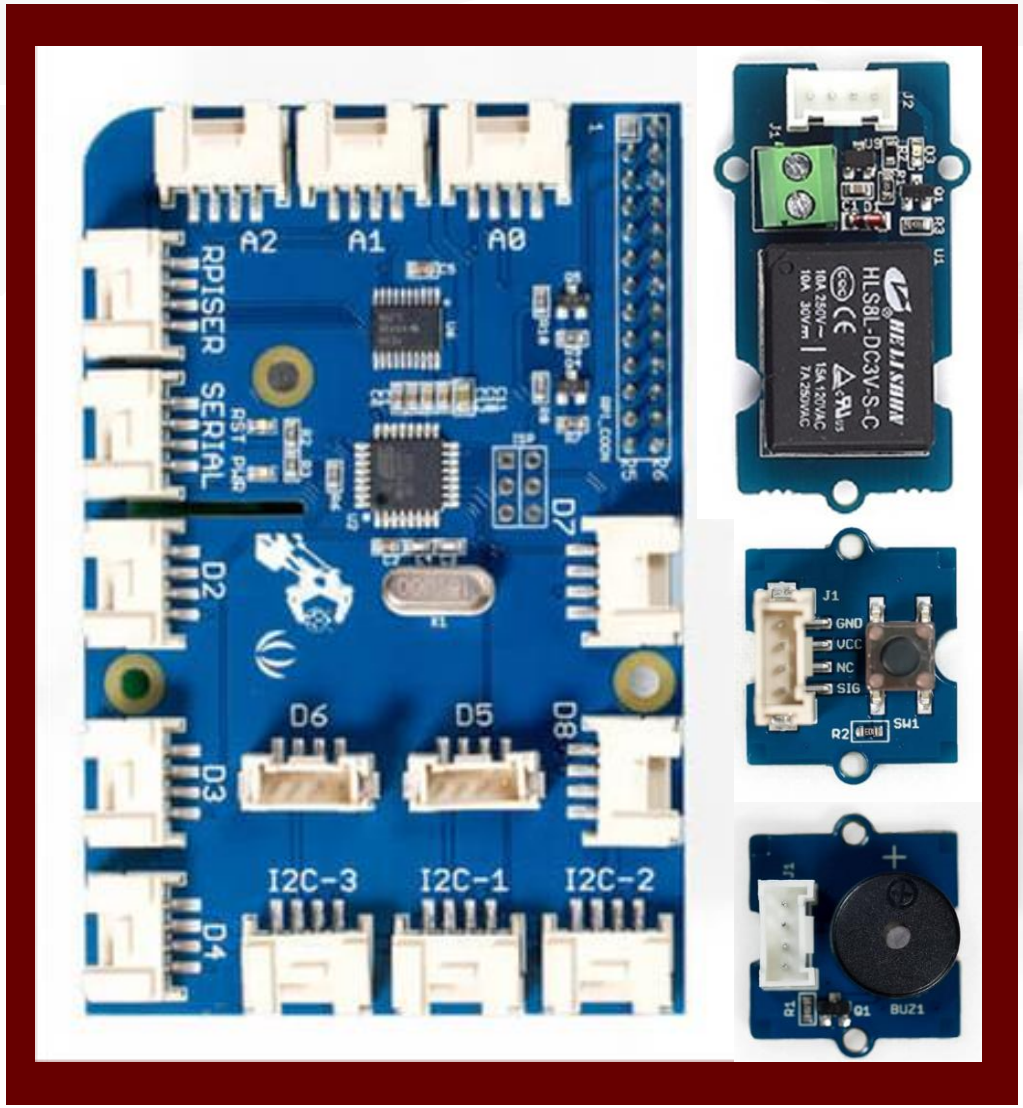


Activity No. 2
Alarm

Inputs / Outputs

Objectives:

- Develop simple programs for the GrovePi board in Python
- Manage the input and output ports of the GrovePi board through Python programming
- Become familiar with the use of input and output peripherals such as the relay module, buzzer and LEDs

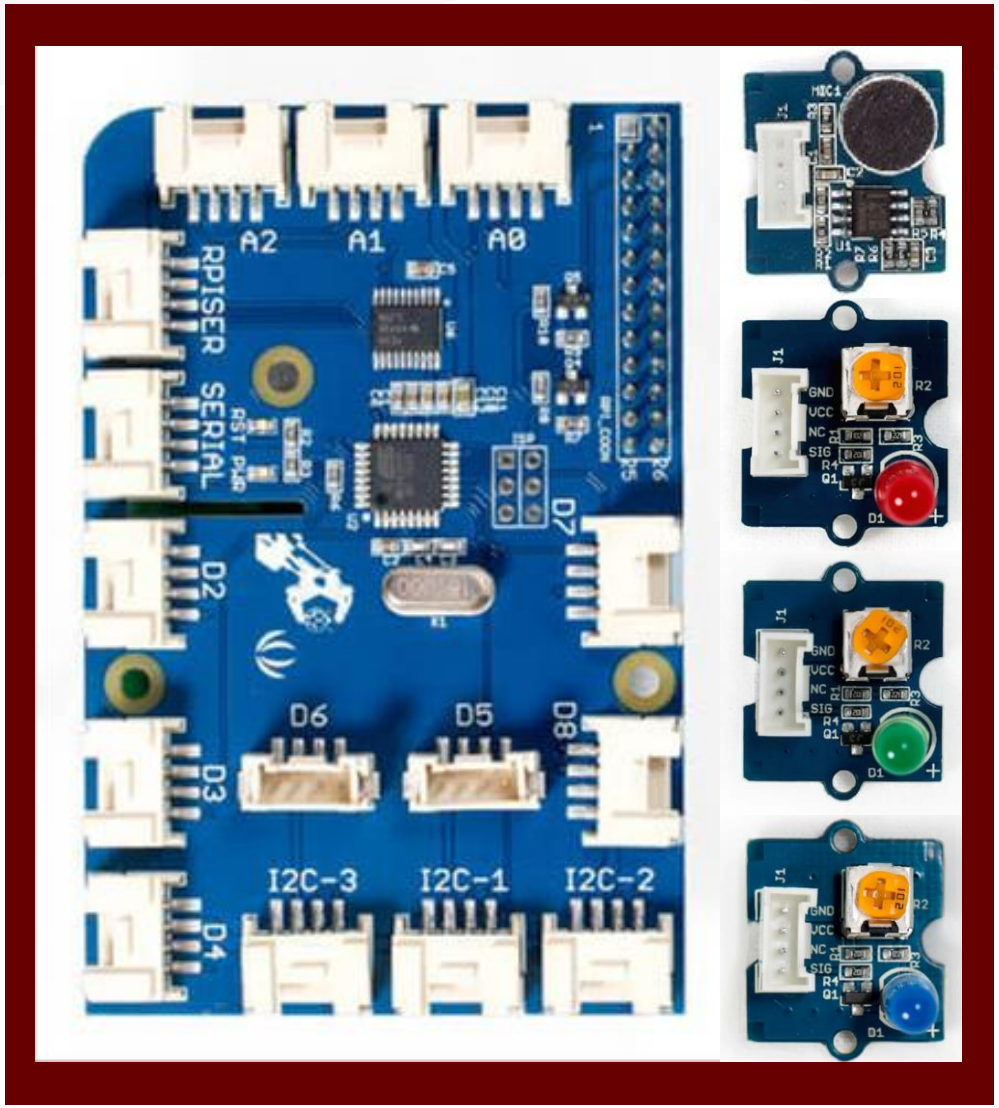


Activity No. 3
Ambient noise meter

ADC

Objectives:

- Know the management and configuration of ADC channels that the GrovePi board has
- Use led modules as indicators of ambient noise level

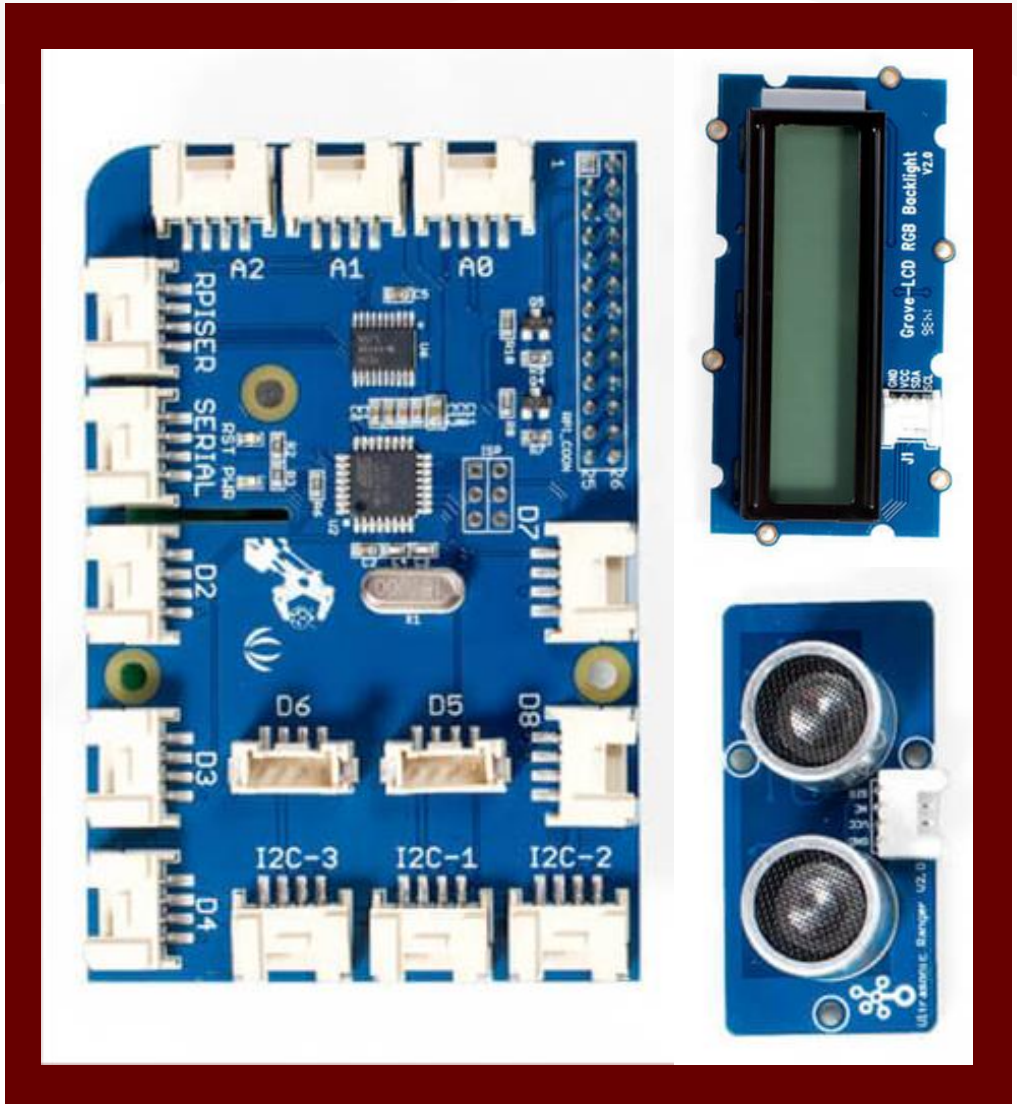


Activity No. 4
Height Meter

PWM & I2C

Objectives:

- Know the handling and configuration of the PWM pulse width for the use of the ultrasonic sensor.
- Know and configure the lcd display module with I2C communication present on the card.

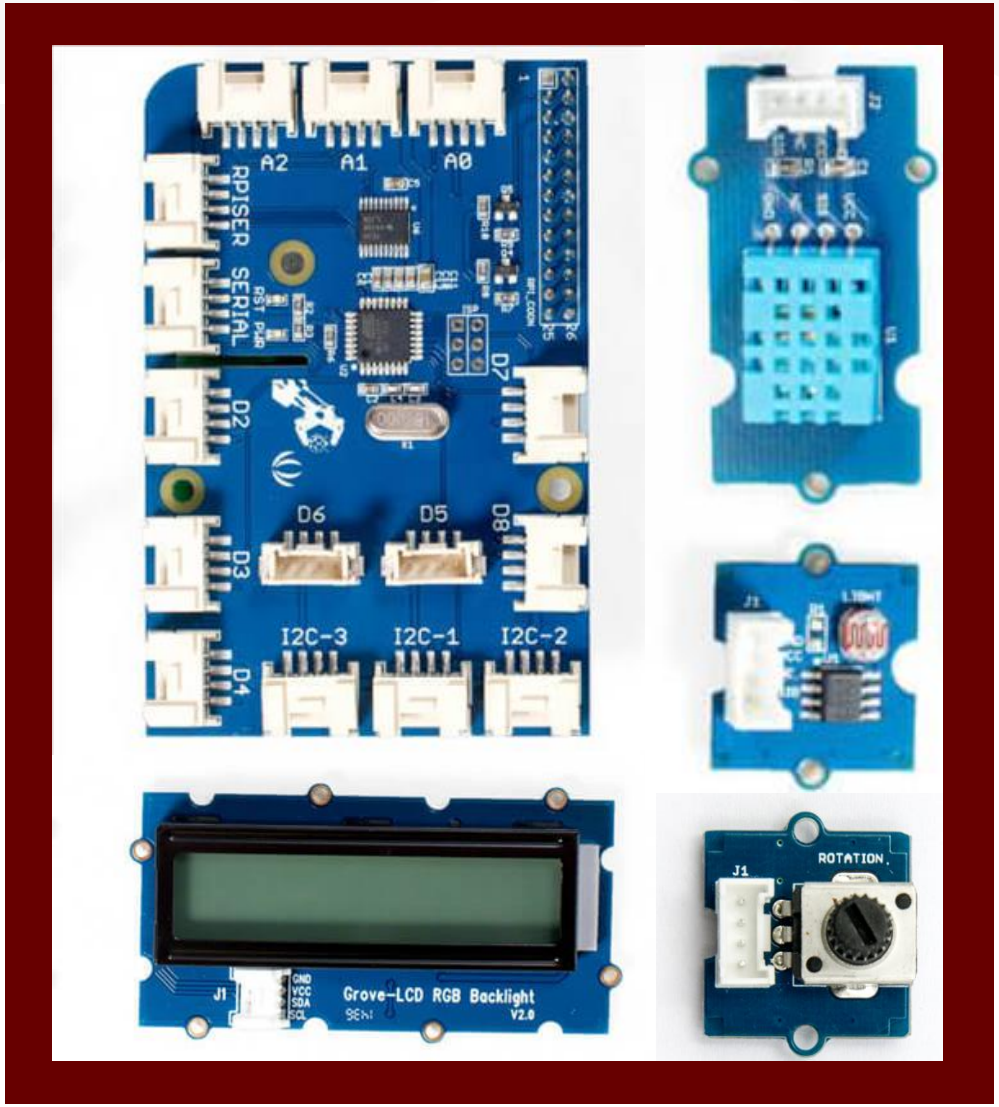


Activity No. 5
Weather station

Implementation

Objectives:

- Develop a practical implementation for the measurement and visualization of weather variables.
- Obtain and display the levels of the signals obtained from the sensors with the GrovePi board.
- Configure the lcd display module with I2C communication present on the card.




¡THANKS!