

UDL MINF 20-21

Ubiquitous & Embedded Systems

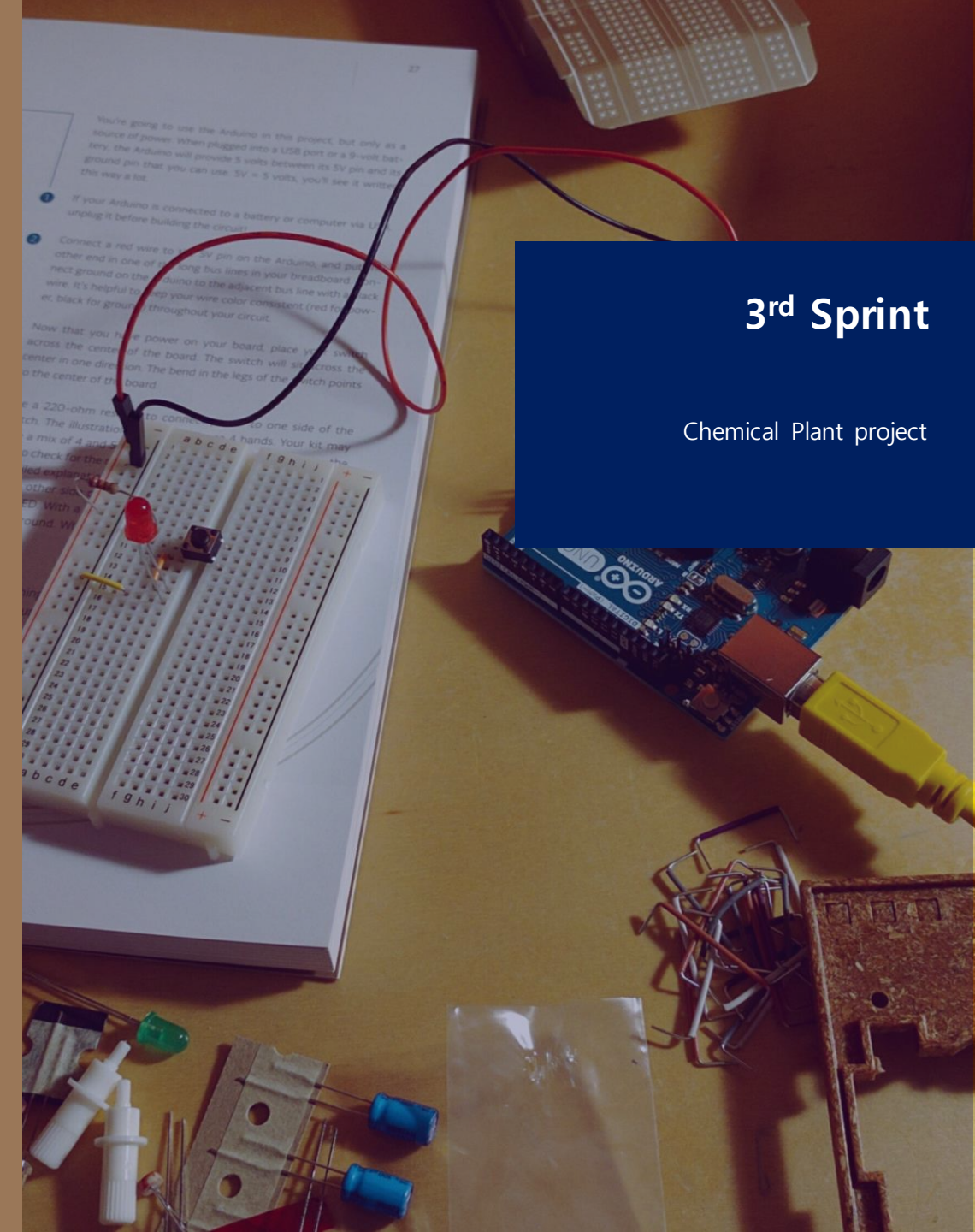
Team 1 Danillo Lange, Jeongyun Lee, Ronnel Mattew

Github : <https://github.com/jy-977/UBQ->

Danillo Lange : <https://github.com/roxdan>

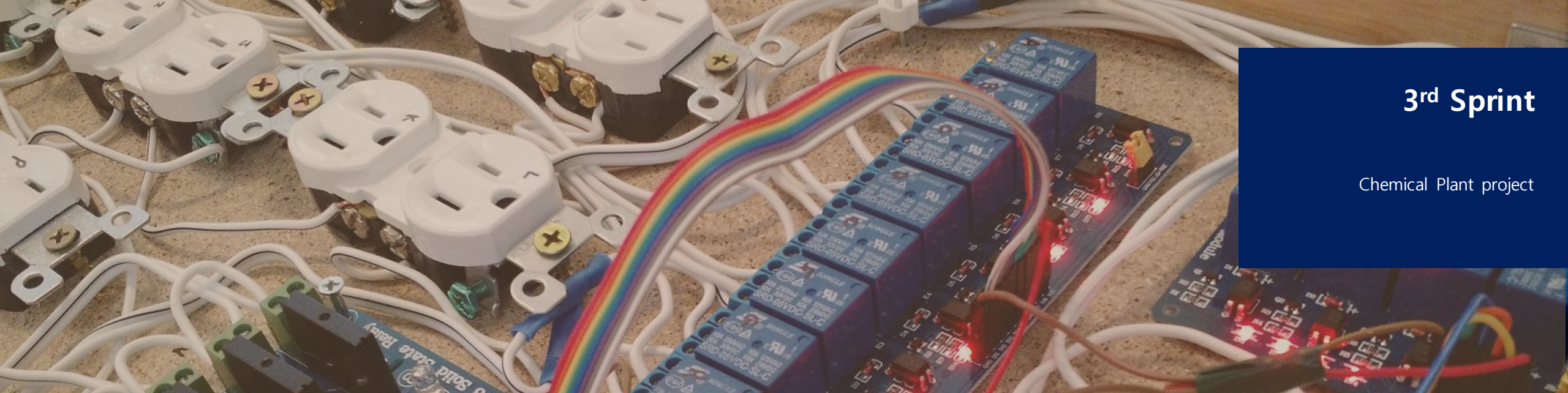
Jeongyun Lee : <https://github.com/jy-977>

Ronnel Mattew : <https://github.com/ron7858>



3rd Sprint

Chemical Plant project



3rd Sprint

Chemical Plant project

PRESENTATION INDEX

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Follow up On 2nd Sprint

01

- Github Project Organization
- Github Organization and unfinished tasks

Follow up

2nd Sprint

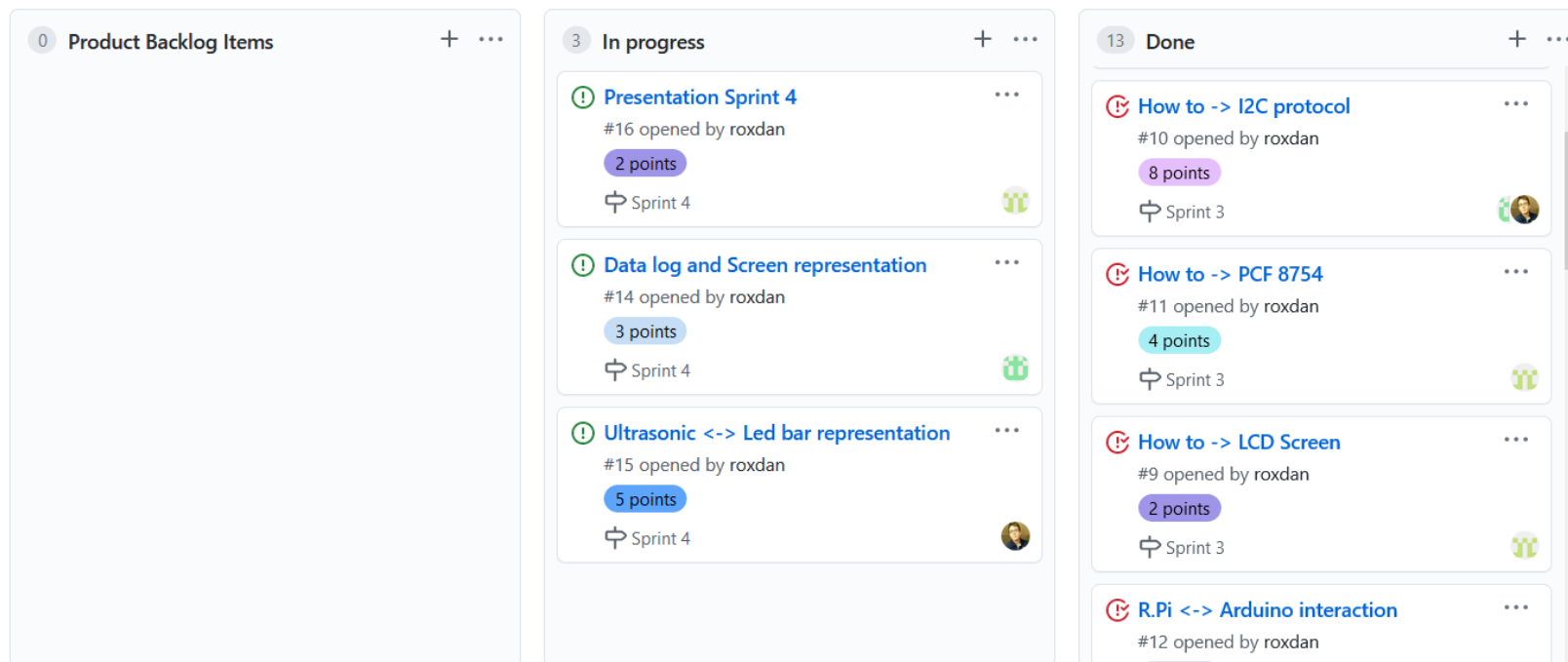
01 Github Project Organization

- Organized in kanban style
- Effort Points defined using Scrum Poker as a consensus of all team members

Chemical plant project

Updated 11 days ago

Filter cards



The screenshot shows a Github Project Kanban board with three columns: Product Backlog Items, In progress, and Done. The board is titled 'Chemical plant project' and was updated 11 days ago. A search bar labeled 'Filter cards' is in the top right corner.

Column	Card Title	Card ID	Opened by	Points	Sprint	Assignee
Product Backlog Items						
In progress	Presentation Sprint 4	#16	roxdan	2 points	Sprint 4	
In progress	Data log and Screen representation	#14	roxdan	3 points	Sprint 4	
In progress	Ultrasonic <-> Led bar representation	#15	roxdan	5 points	Sprint 4	
Done	How to -> I2C protocol	#10	roxdan	8 points	Sprint 3	
Done	How to -> PCF 8754	#11	roxdan	4 points	Sprint 3	
Done	How to -> LCD Screen	#9	roxdan	2 points	Sprint 3	
Done	R.Pi <-> Arduino interaction	#12	roxdan			

Follow up

2nd Sprint

02 Github Organization and unfinished tasks

- Issues are separated by
Milestones (Sprints)

Labels

Milestones

New milestone

3 Open ✓ 1 Closed

Sort ▼

Sprint 3

Due by November 05, 2020

Last updated 3 minutes ago

100% complete

0 open

5 closed

Edit

Close

Delete

Sprint 2

⚠ Past due by 14 days

Last updated 11 days ago

100% complete

0 open

6 closed

Edit

Close

Delete

Sprint 4

Due by November 19, 2020

Last updated 20 days ago

0% complete


3 open

0 closed

Edit

Close

Delete

 Define the checking/test process 5 points

Status: 80% -> 100%

SCRUM SPRINT

Done

01

3 **Group**
4 **Group**
3 **Group**

Components Background knowledge
Prepare the IDE – Arduino, EPS
Prepare the IDE – R.Pi +Chibi os

8 Oct-
22 OCT

02

5 **Danillo**
3 **Danillo**
3 **Yoon**
4 **Ron**
2 **Yoon**

Define the Checking/ Test Process
ESP01 – Arduino interaction
Data Producer 1 Development
Data Producer 2 Development
Presentation

22 Oct
-5 Nov

03

2 **Ron**
8 **Ron**
4 **Y / D**
9 **Y / D**
2 **Danillo**

How to – LCD Screen
How to – PCF 8754
How to – I2C protocol
R.Pi <-> Arduino interaction
Presentation

5 Nov-
19 Nov

04

3 **Yoon**
5 **Danillo**
2 **Ron**

Data log screen representation
Ultrasonic – Led bar representation
Presentation

3rd Sprint Details

01 User Stories

- Operator requires graphical representation of the temperature and humidity , obtained within the last 24h, in the controller.

→ How to -> LCD Screen: Raspberry + LCD

→ R.Pi <-> Arduino interaction: Raspberry + Arduino + i2c protocol

- Operator requires information of the current tank container level in real time and it must be shown in a led bar present in the controller.

→ How to -> I2C protocol: i2c protocol behavior and connections

→ How to -> PCF 8754: PCF connections with LED's + ChibiOS Code



Briefing tasks

3rd Sprint

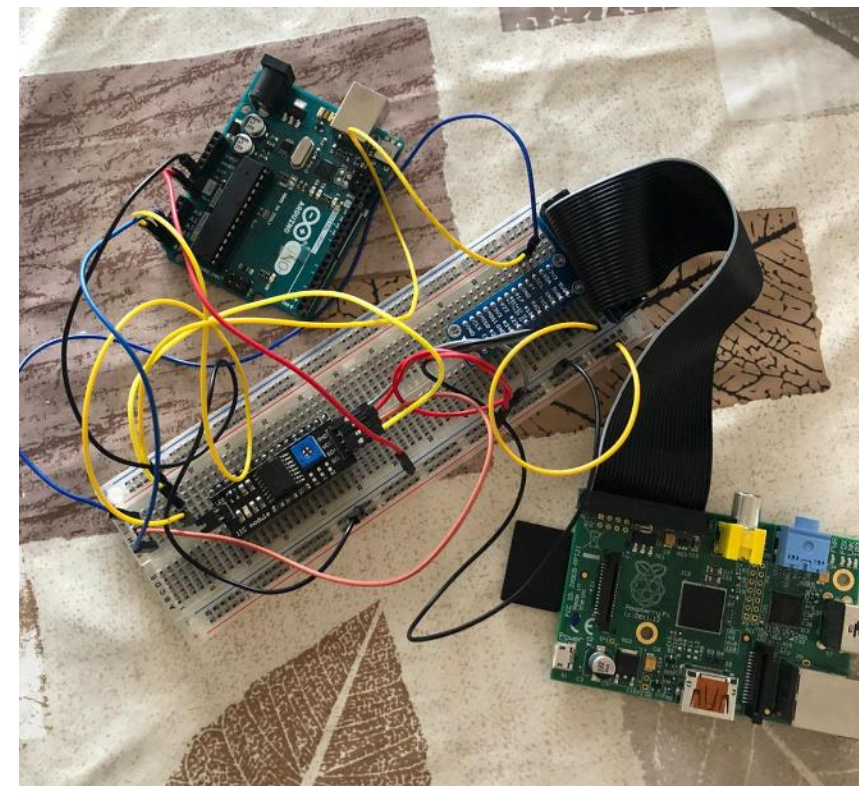
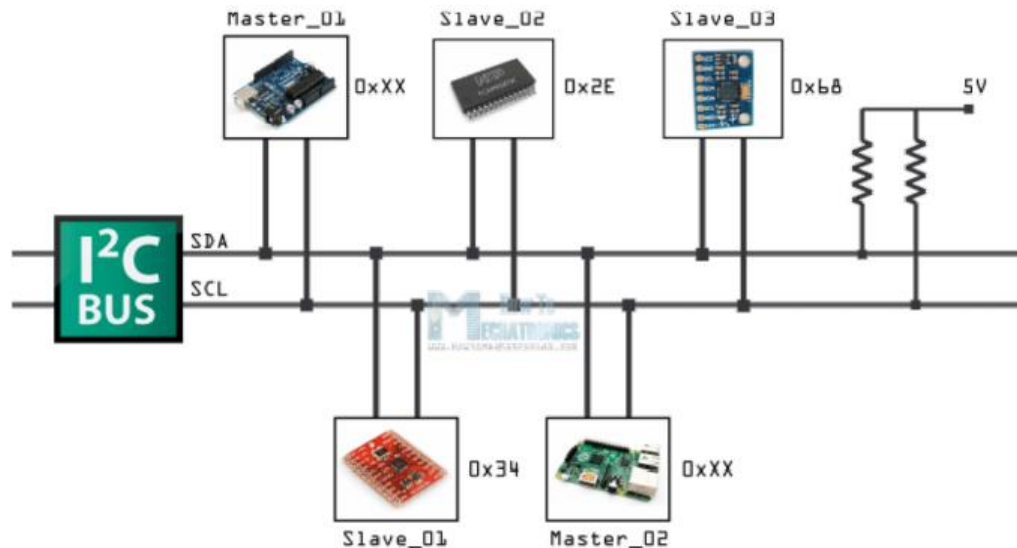
02

- Danilo Lange
- Jeongyun Lee
- Ronnel Mattew

Briefing the ongoing tasks

Danillo Lange / Jeongyun Lee

01 How to I2C Protocol



In the scope of our project, the i2c protocol will be responsible for the communication between multiple components.

The protocol works through **Master** and **Slave** devices.

The communication between devices is made through their **addresses**.

Arduino Address: 0x04
PCF8574 Address: 0x27

Briefing the ongoing tasks

Danillo Lange / Jeongyun Lee

02 Raspberry Pi <-> Arduino Interaction

We must use the **Wire** library for working with the Arduino and i2c.

To work with the Raspberry, we must connect these pins:

- Arduino A4 <> **SDA**
- Arduino A5 <> **SCL**

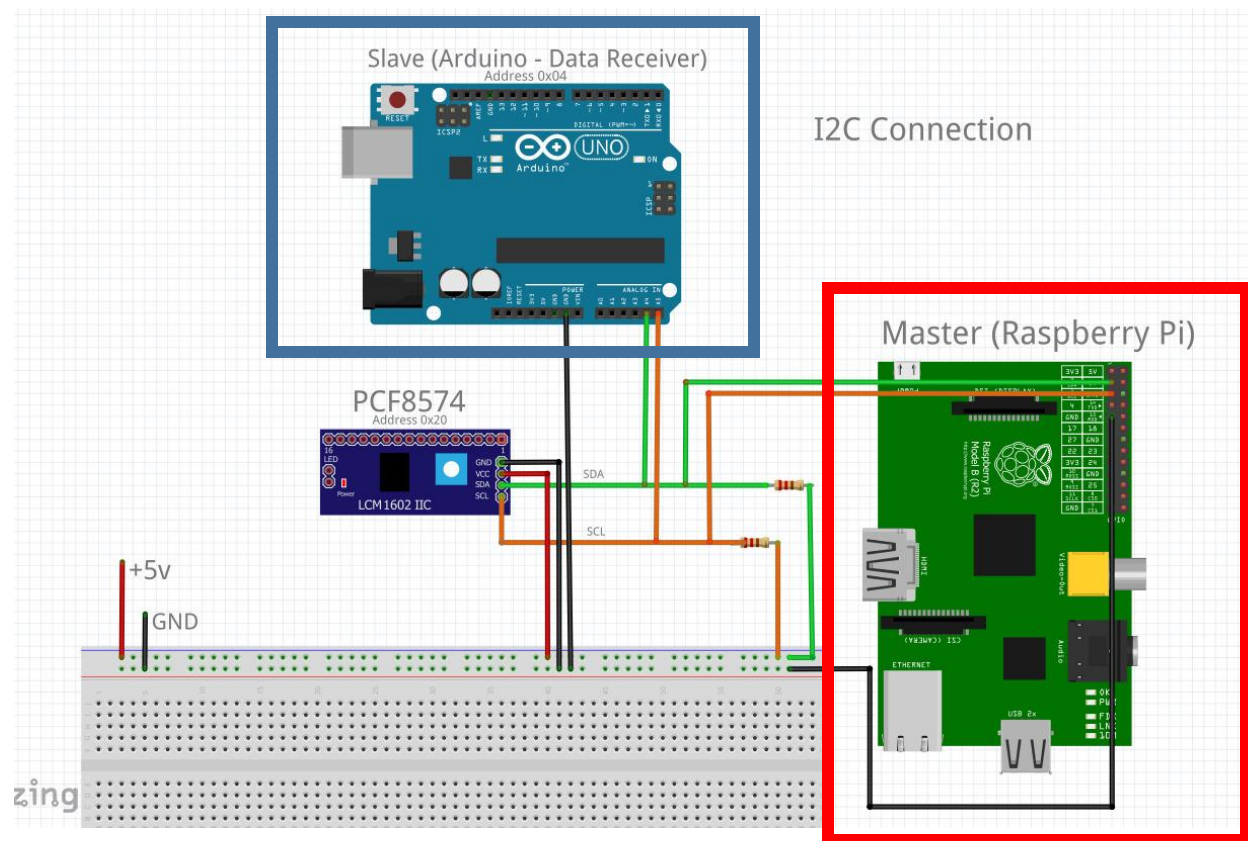
- Raspberry SDA (Pin 2) <> **SDA**
- Raspberry SCL (Pin 3) <> **SCL**

- GND (All) <> GND (All)

ChibiOS can only work as **Master**

```
- Wire.begin(I2C_ADDR);  
- Wire.onRequest(sendData_handler);  
- Wire.write((byte *) sensorData, sizeof sensorData);
```

```
- I2CConfig i2cConfig;  
- i2cStart(&I2C0, &i2cConfig);  
- i2cMasterTransmit(&I2C0, arduino_address, request, 2,  
  &result, 3);
```



Briefing the ongoing tasks

Ronnel Mattew

03 How to: LCD Screen

For achieving the communication, we are using the SerialDriver of ChibiOS, sending the data through the UART pins (in our case the TXD and RXD)

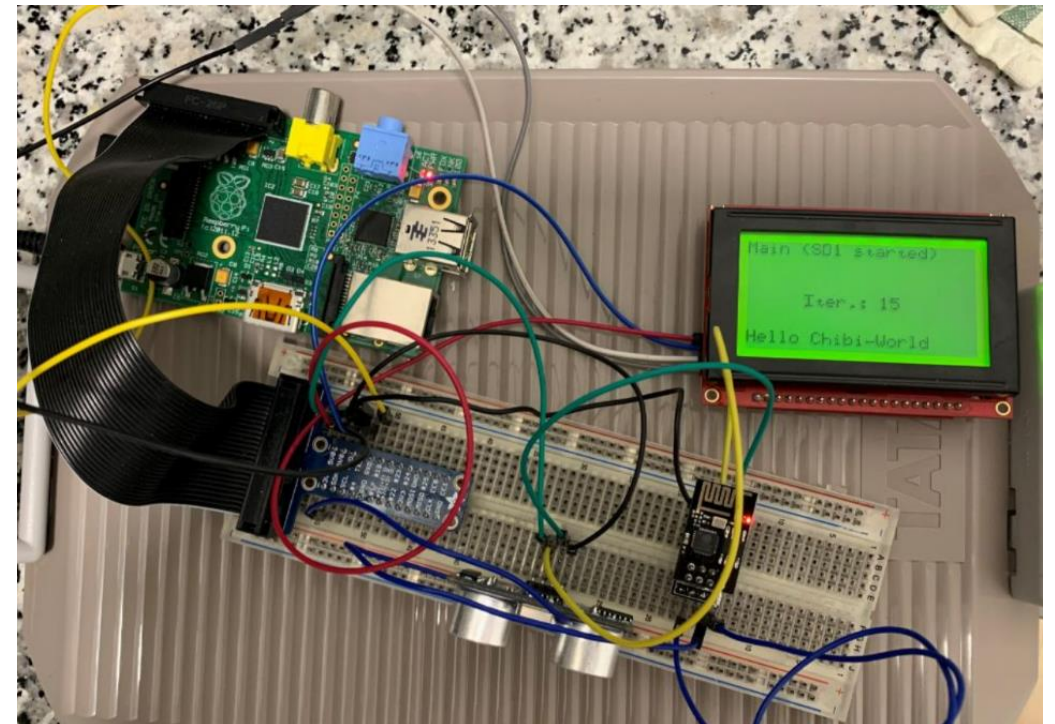
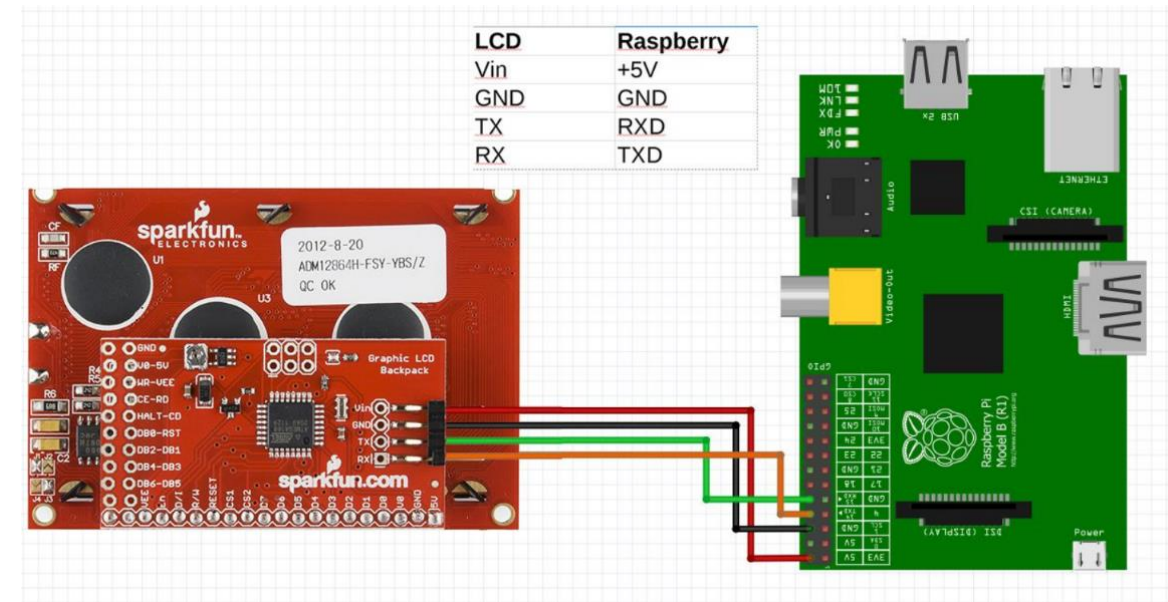
Example code:

Initializing the driver

```
sdStart(&SD1, NULL);
```

Printing values on the LCD

```
chprintf((BaseSequentialStream *)&SD1
, "Data: %u %u %u", result[0], result[1], resu
lt[2]);
```



Briefing the ongoing tasks

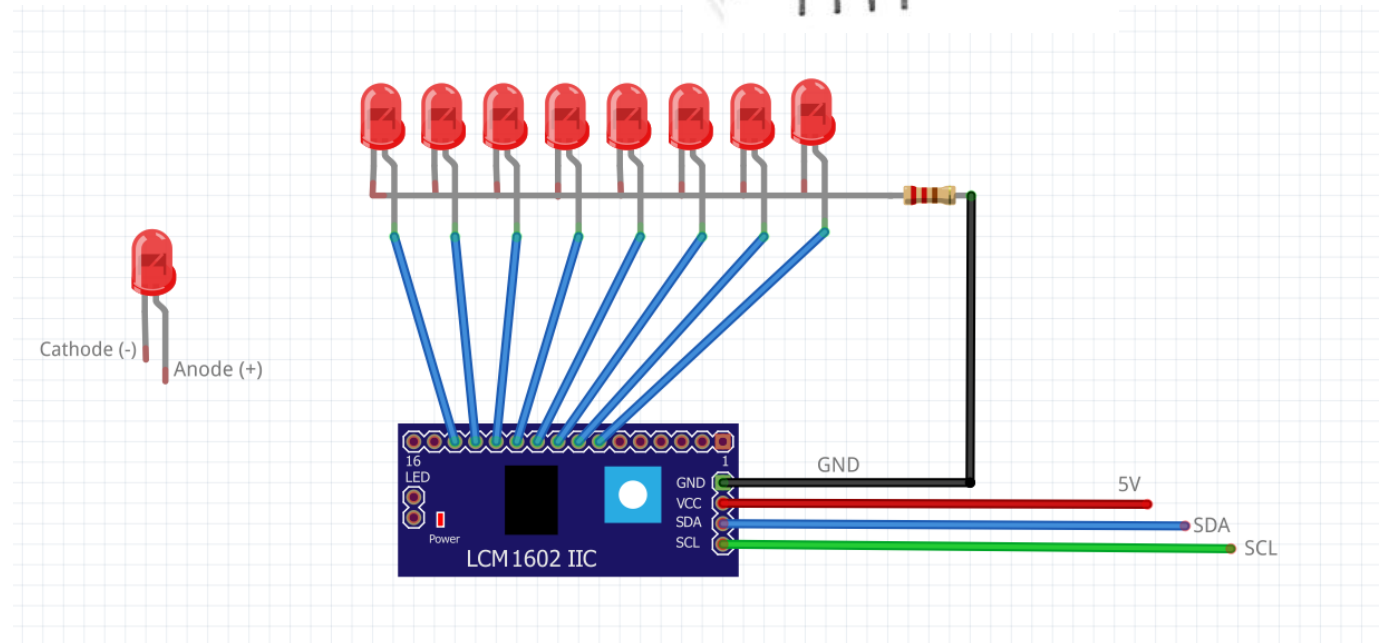
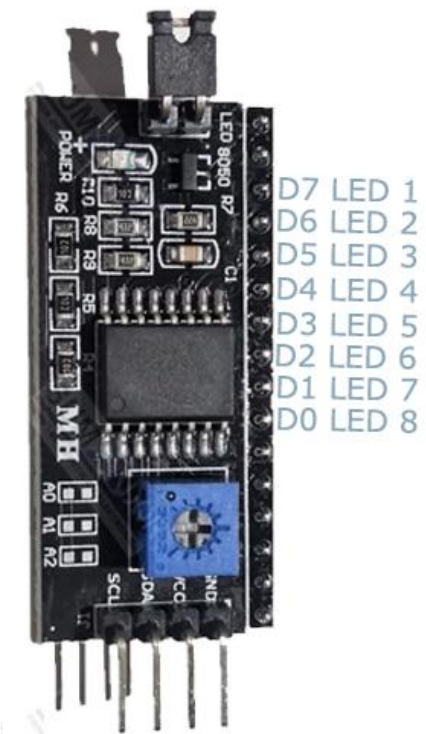
Ronnel Mattew

04 How to: PCF8574

The PCF8574 is a “port extender” that works using i2c connection. Originally it was meant to easily attach to a LCD Screen, but in our case, we are gonna use it to control a LED BAR (8 Leds).

The idea is the ChibiOS to send a command in format of 8 bits to the PCF, like 00001000.

Where the 0s and 1s will indicate to the PCF which pin to be active and turn on the corresponding LED.



3rd Sprint

02

- Documentation related to this sprint (Sprint 3) on Github:

- ## Sprint goal:

The goal of this sprint was to **concentrate** most of the remaining tasks so in that way the team would be fully prepared for assembling the graphical representation in the final sprint.

Also meant to leave less work for the final sprint to have **more time to answer to possible problems**.

- ## Problems faced:

- Power supply for testing
- Doubts about resistance on i2c
- Difficulties in debugging ChibiOS

..	
2nd Sprint.pptx	Added Arduino and ESP-01 (Receiver) code
Arduino_ESP8266.pdf	Changes in documentation
ChibiOS-RPi_Raspberry_Installation.pdf	Creating folders
DataProducer1_documentation.pdf	Changes in documentation
DataProducer2_documentation.pdf	Changes in documentation
I2C_Arduino_documentation.pdf	Added i2c and PCF Documentation
LCD_ChibiOS_Raspberry.pdf	Added doc and code about the LCD using ChibiOS
PCF8574_LEDBAR.pdf	Added i2c and PCF Documentation
Sprint2_Delivery.pdf	Added Arduino and ESP-01 (Receiver) code
Sprint3_Delivery.pdf	Added i2c and PCF Documentation

Upcoming 4th Sprint

03

■ Sprint tasks:

- Temperature/Humidity <-> Screen representation - Effort: 3 - (Yoon)
- Ultrasonic <-> Led bar representation - Effort: 5 - (Danillo)
- Final Assembling – Effort 8 - (Group)

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Q&A

Thank you for listening

04

