Smart lighting system

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Project aim

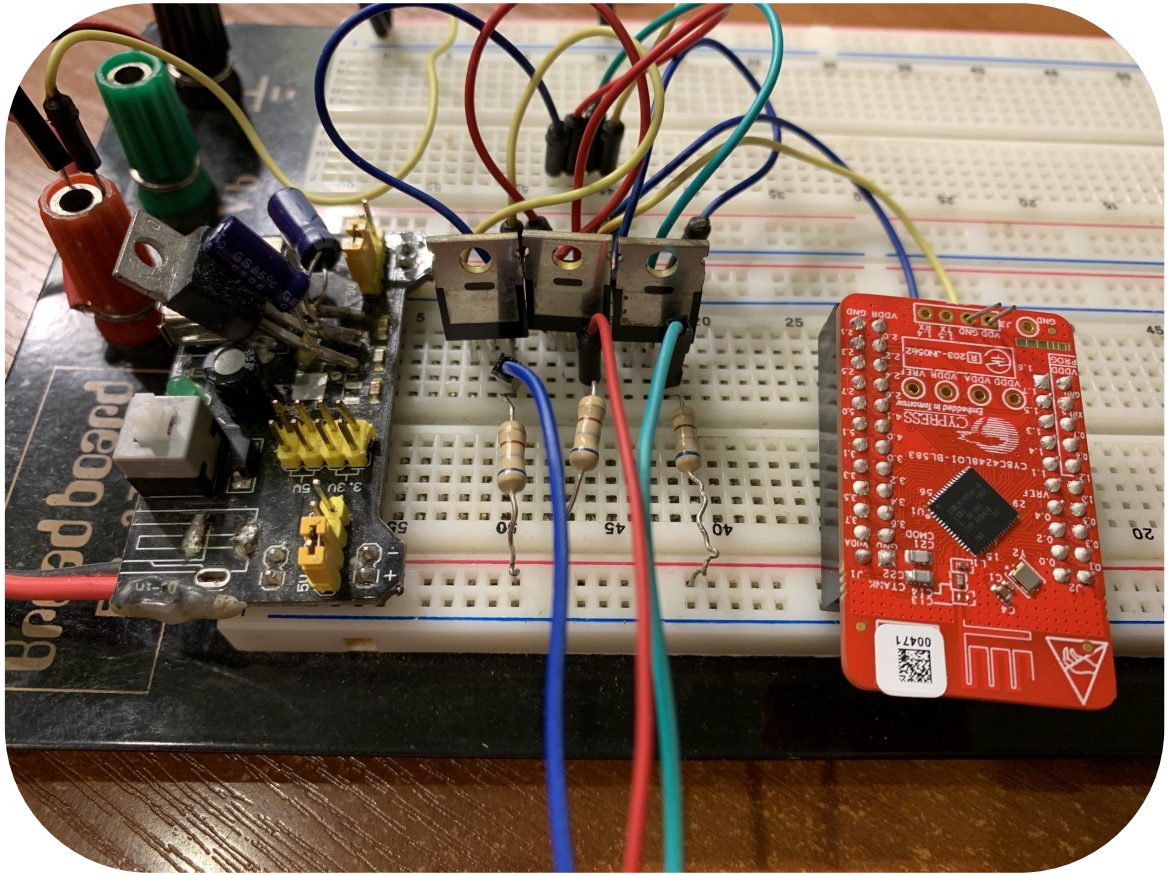
Develop a dynamic **system of lighting devices** that have the following functionality:

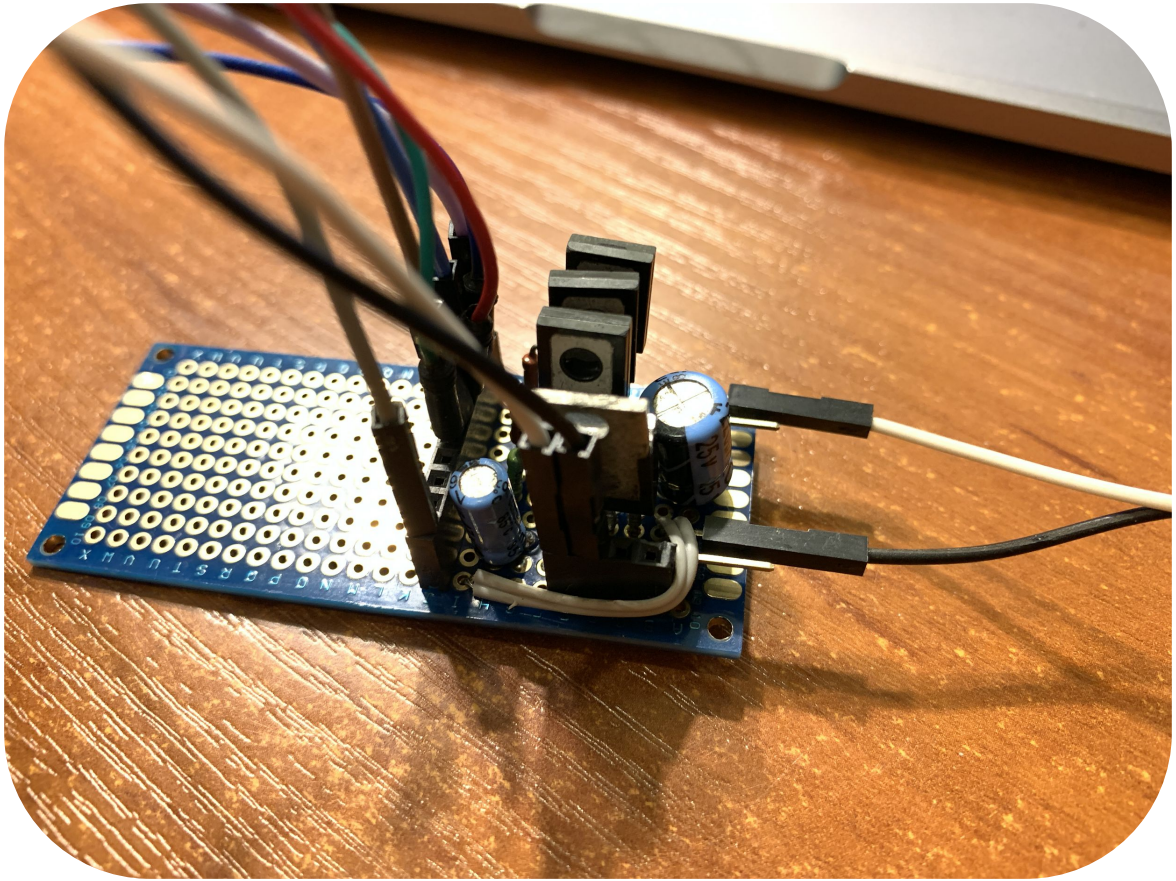
- Based on distributed control system
- Can be controlled from a smartphone via Bluetooth
- Disco mode (lighting different colors based on music playing)
- Dimming, Morse Code functionality

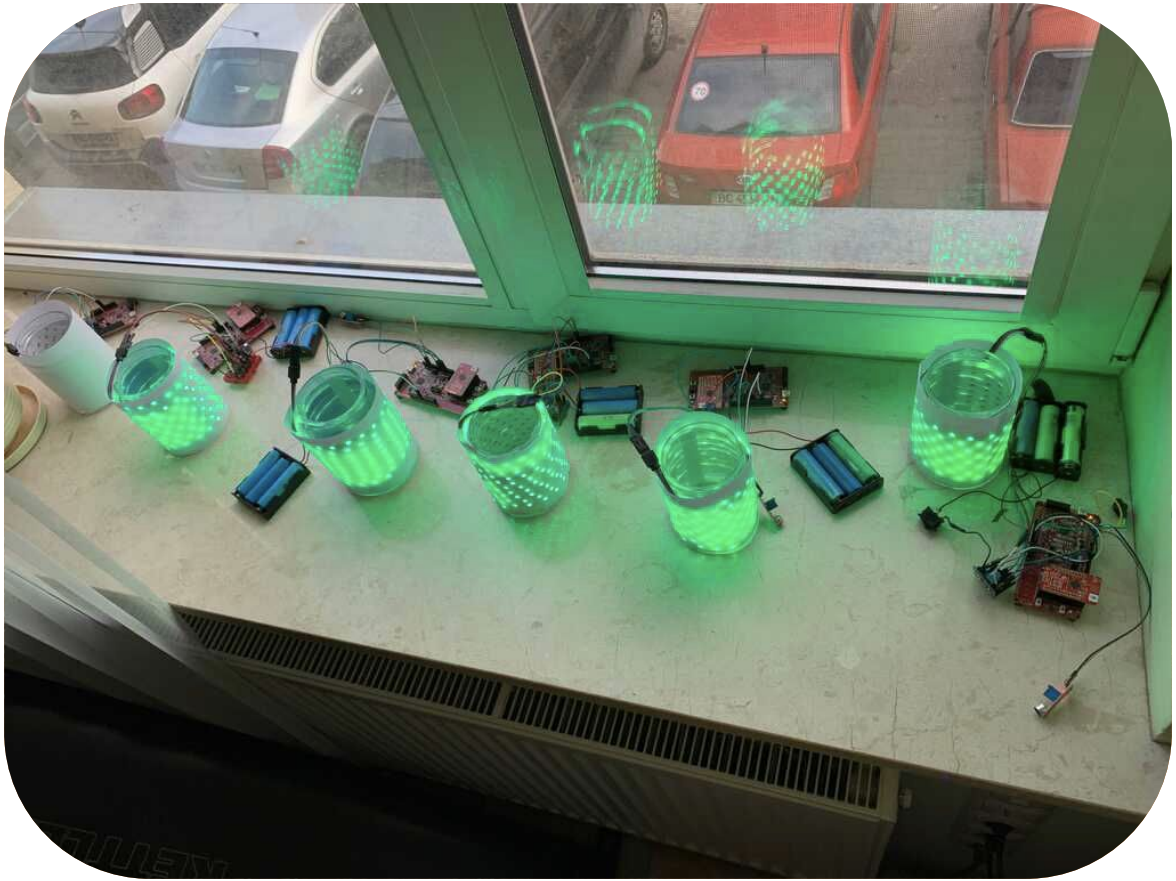
Development Stages

1. - Environment setup
   - PSoC basics
   - Meetings with our mentor
2. - Connection via BLE
   - Creating a system of devices
3. - Order LED RGB strips and connect them
4. - Modify BLE Mesh
   - Write the program of the main board
5. - Morse mode
   - Sync with music (for one device)
6. - Optimizing data exchange
7. - Auto reassignment of the main board
   - Switching roles
8. - Being able to easely control the network

Connecting LED RGB Strips.



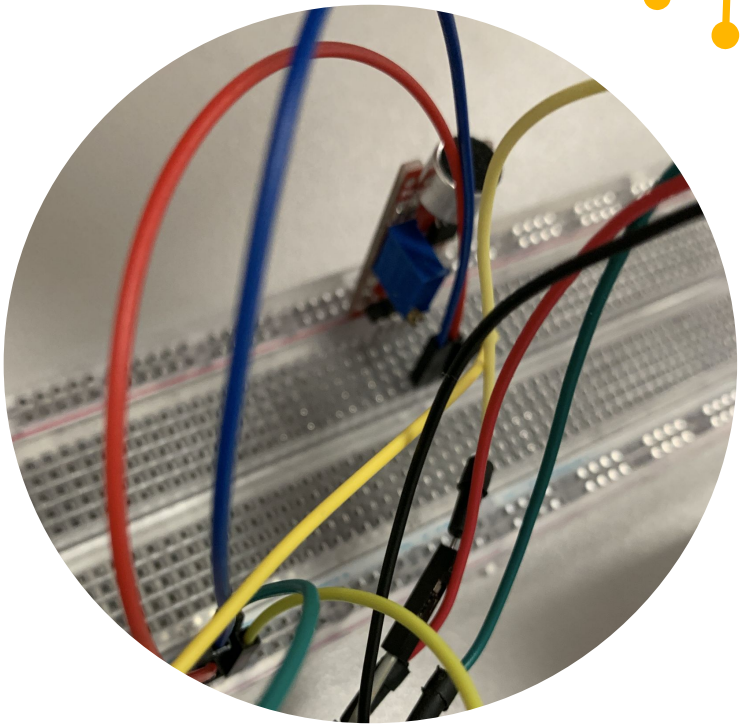




Sound Support

- Analysis of digital and analog data
- Fully integrated in the main project
- Fine music visualizer

Performed with ADC and Interrupts



Music Synchronisation

Brightness Correlation

Easely control the network

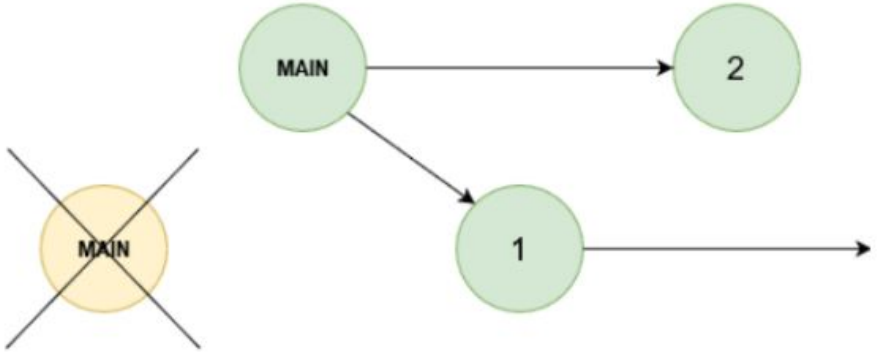
- Reacts to claps:
- Turn on/off on single clap
- Changes the mode (color for simplicity) on two claps

Performed with Timers and interrupts

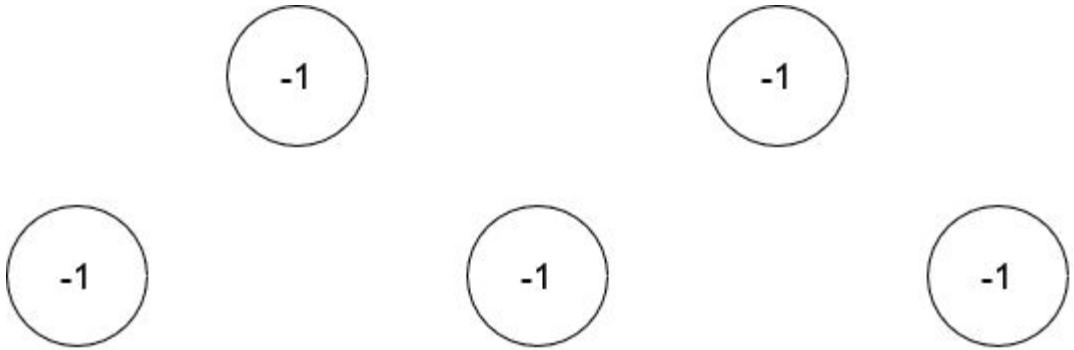
Demonstration

Auto reassignment of Main

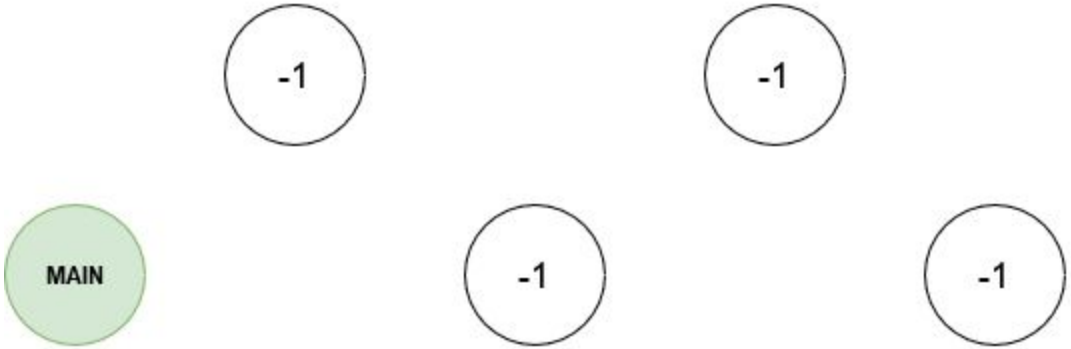
- Initial **main** control board starts the data spread among the network
- Furthermore, if the main board disappears, one of the **peripherals** becomes the **main** board.



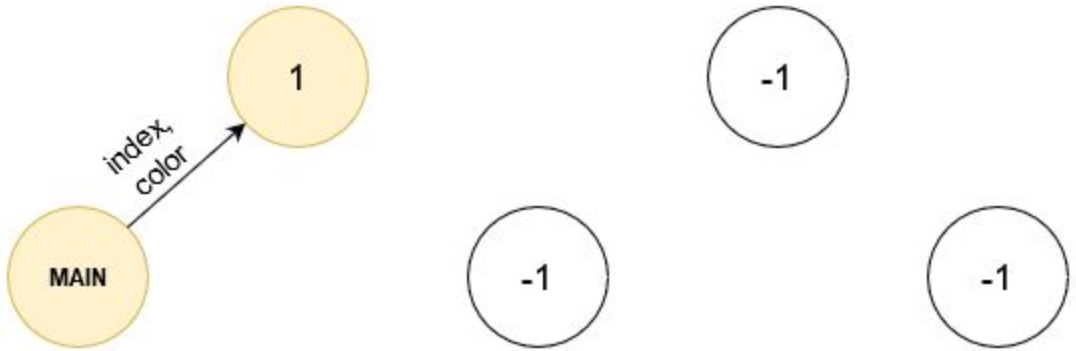
Identical peripherals



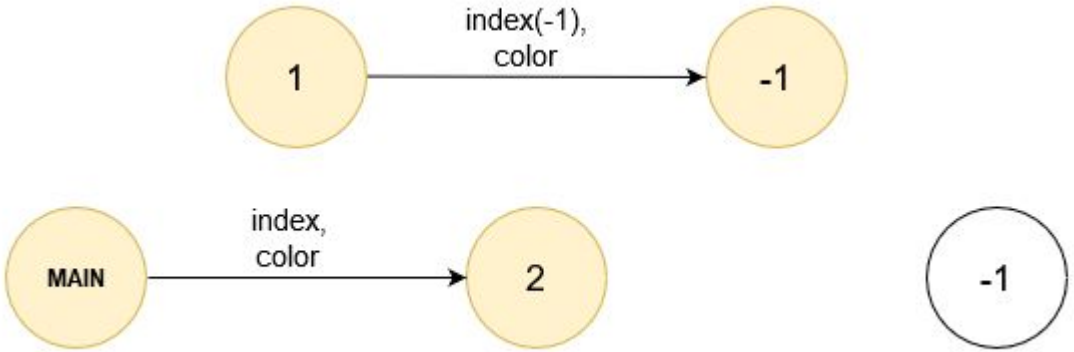
Assignment of the main board

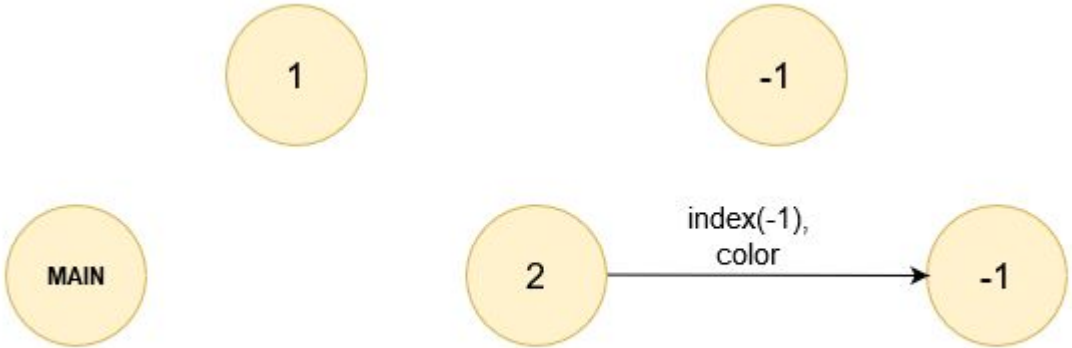


First transmission

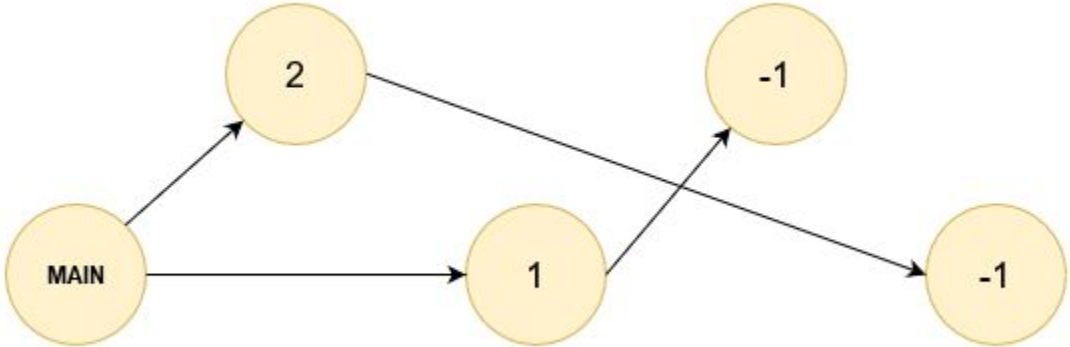


Second transmissions

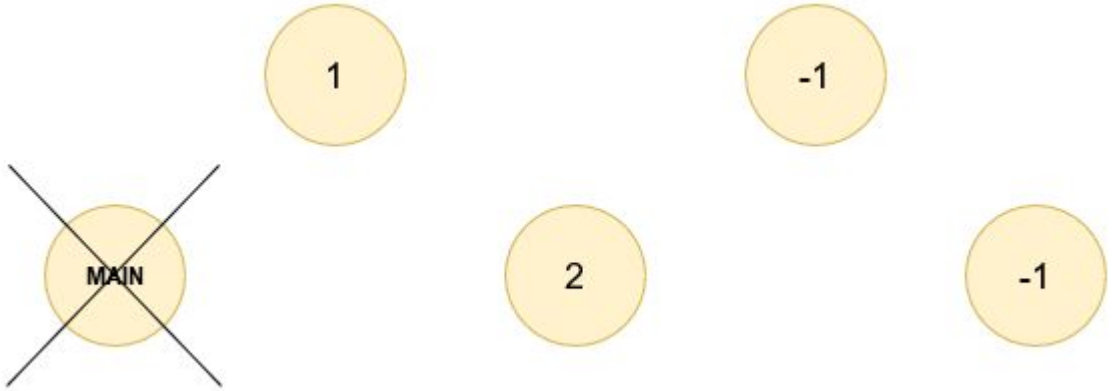



1
-1
MAIN
2
index(-1),
color
-1

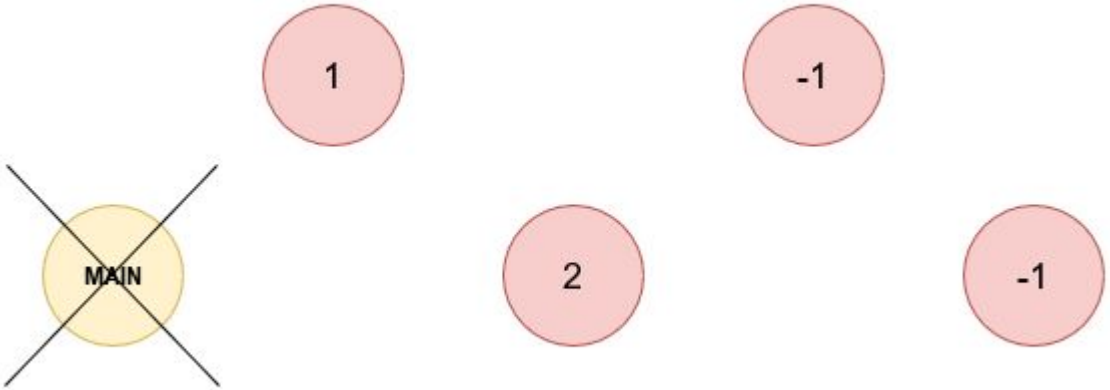
Every time mesh transmissions



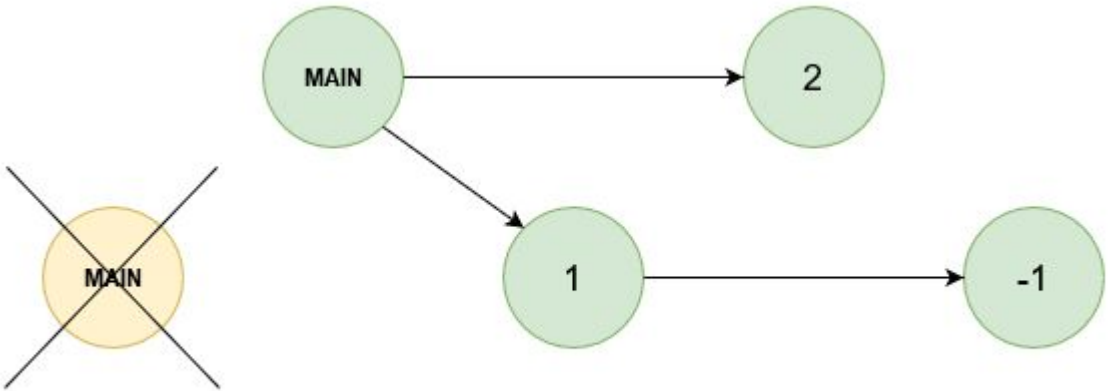
Turning off the main board



All nodes recognize the loss



First neighbour becomes a new main



Demonstration

GitHub Repository

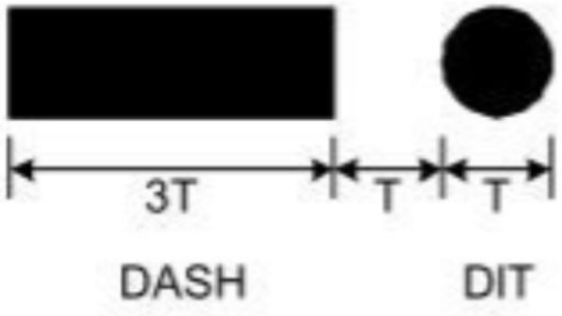
Follow us and star the repo!

Thank you!

Any Questions?

Morse Code

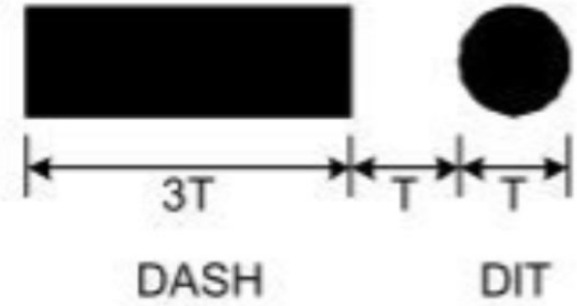
- Input via UART and blinking with respective delays and timings

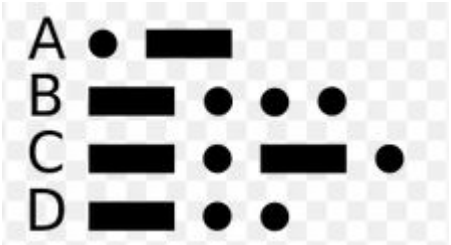


Performed with PWM and Timers

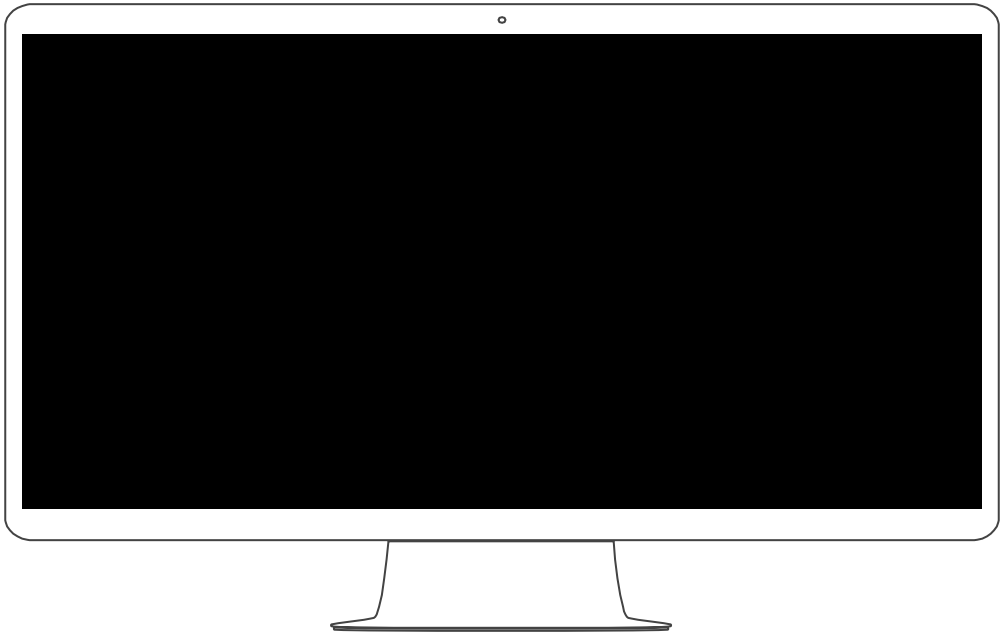
International Morse Code

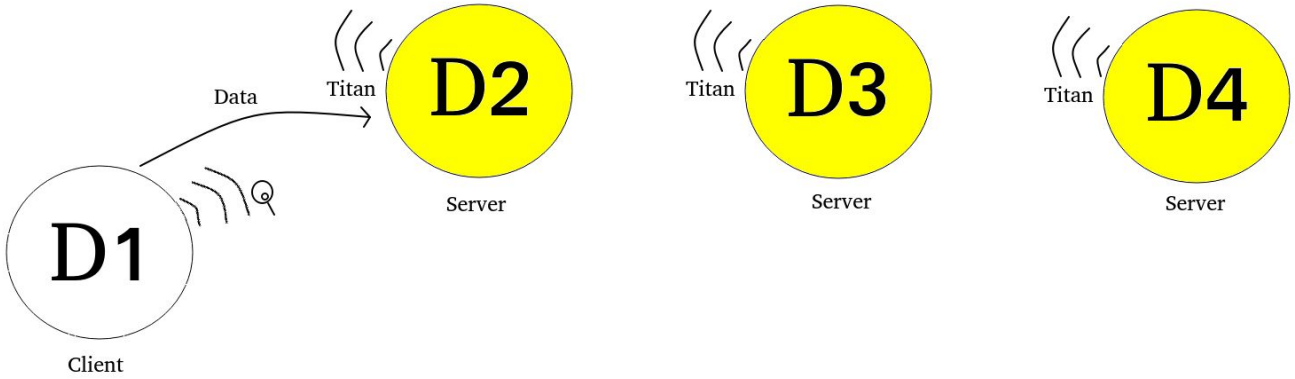
1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

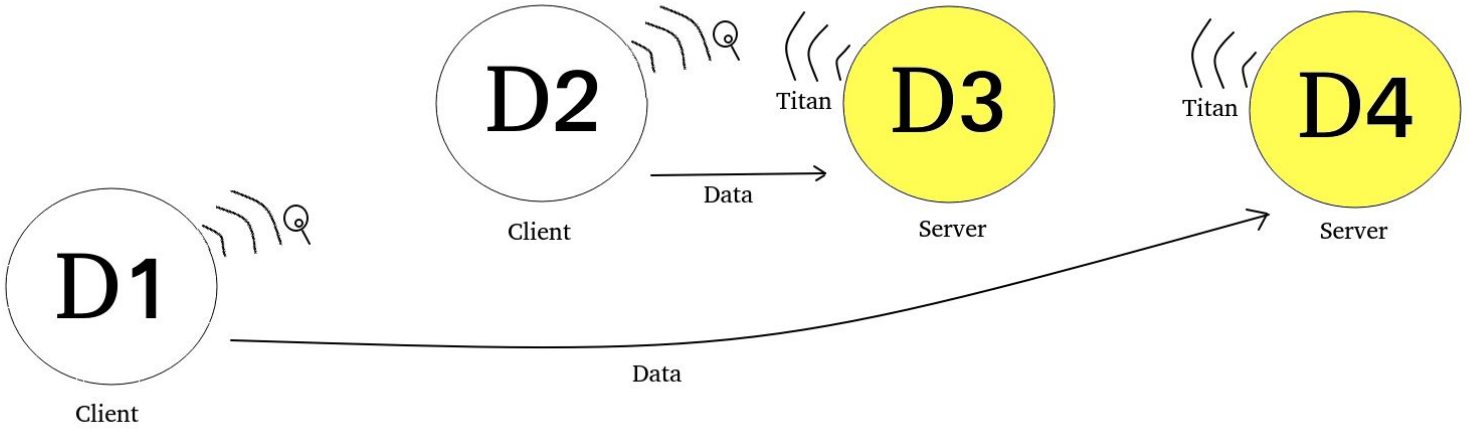


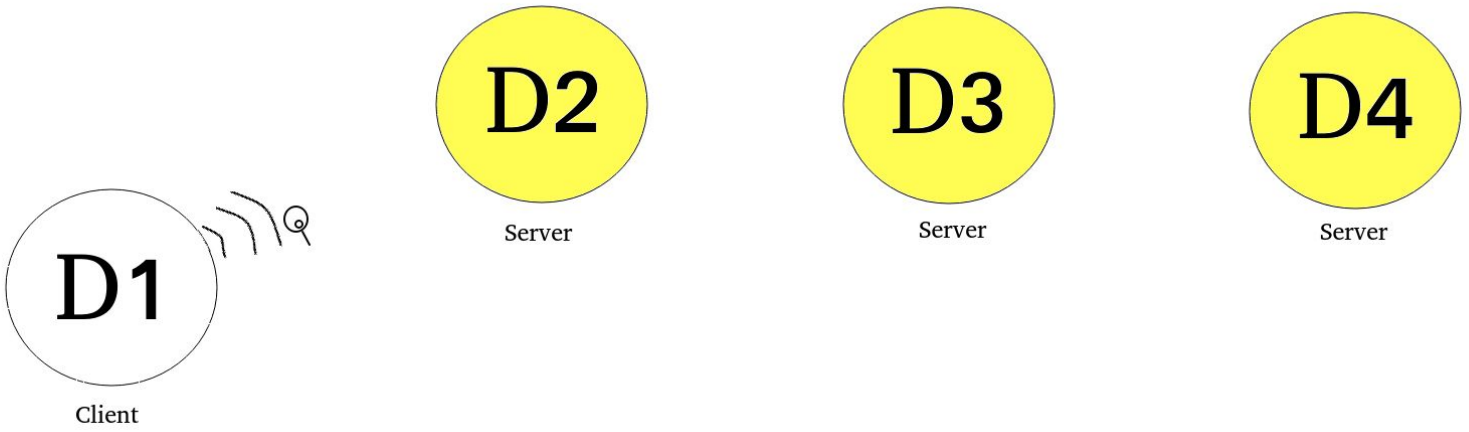


Morse Mode




Data
Titan
D2
Server
D1
Client
Titan
D3
Server
Titan
D4
Server


D2
Titan
D3
Titan
D4
D1
Client
Data
Client
Server
Server
Data


D2
D3
D4
D1
Server
Server
Server
Client