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Design of algorithm for offshore energy

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UNIVERSITÉ TOULOUSE III

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Université de Toulouse

Introduction : Nottingham

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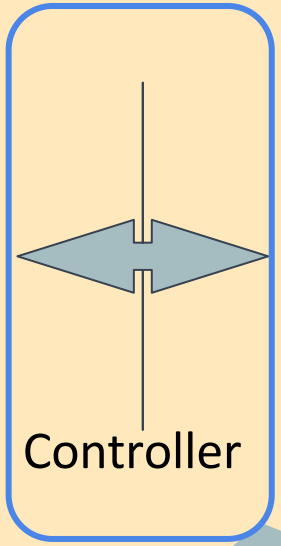
- Small company
- Founded by Matthew Little in 2008
- Specialist of electronics for off grid energy.

renewable energy innovation

Project

- The goal of my internship is to design and prototype an open-source charge controller for off-grid systems, with a focus on maximum power point tracking algorithms.



Designing and testing method

Algorithm

- Internet research
- Matthew's information
- Book documentation

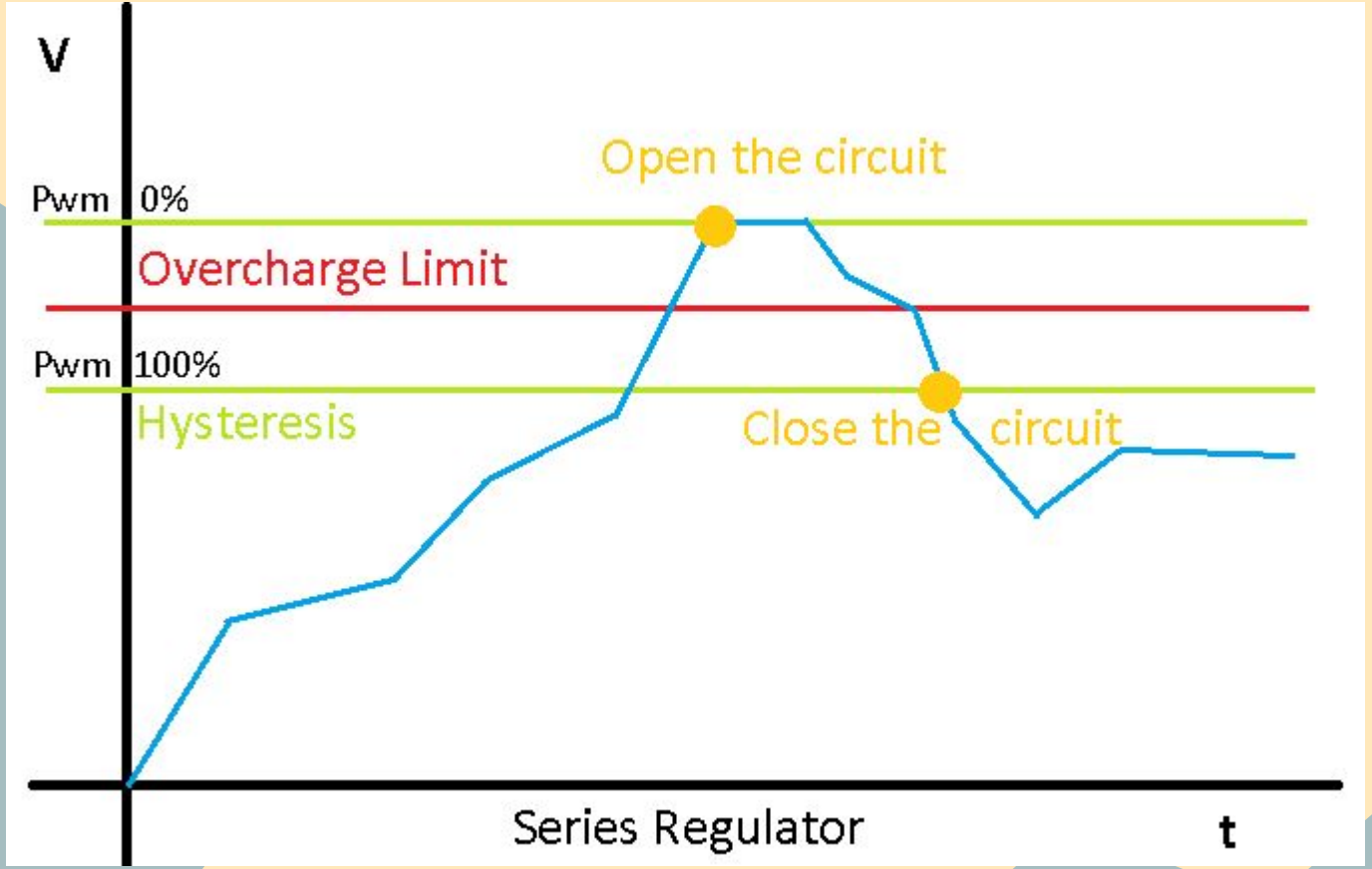
Program on arduino

- Translate in C
- Use library to control the other component
- Control the memory space

Test on the prototype

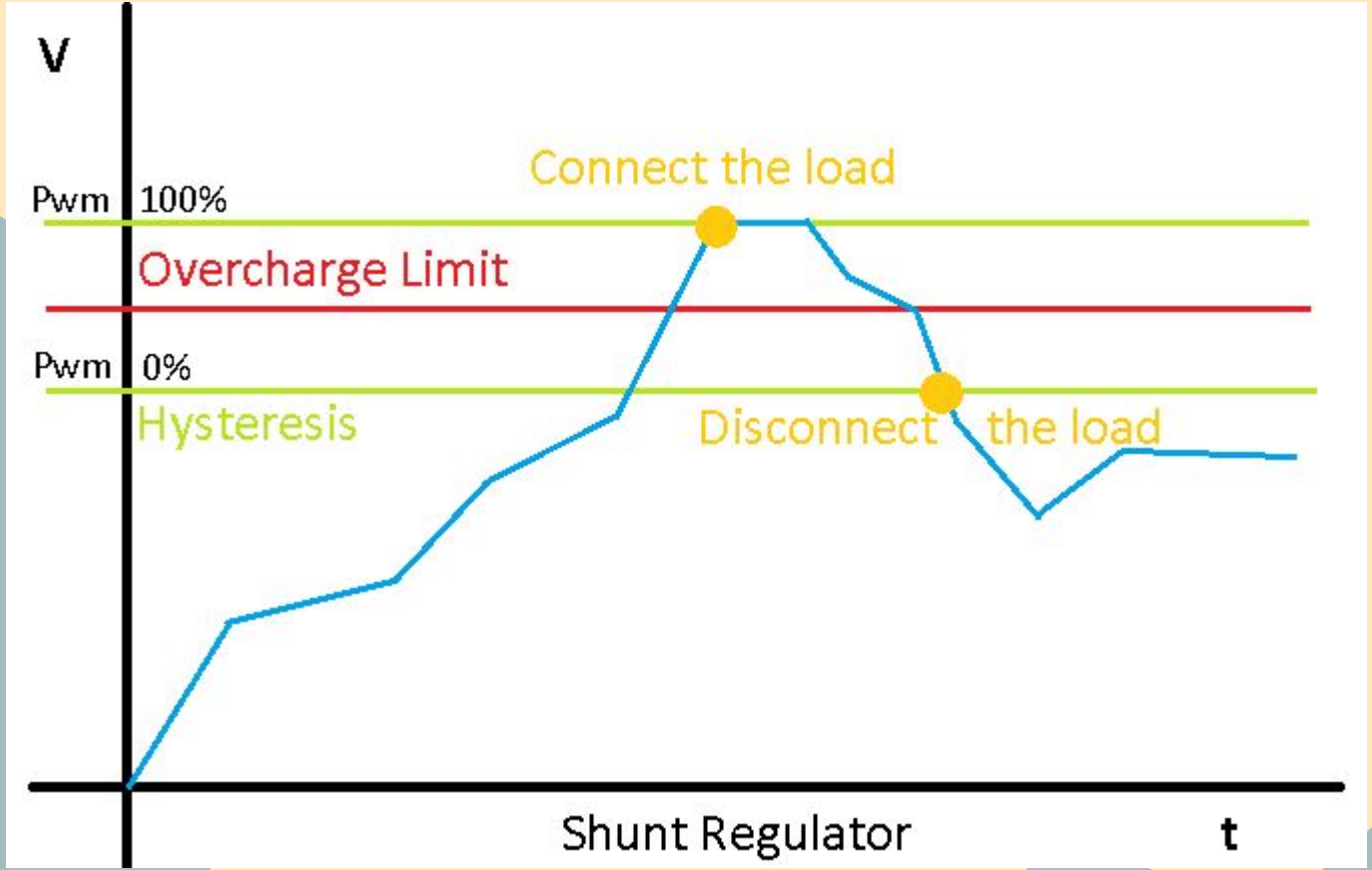
- Test the behavior of the controller
- Verify with Matthew

Theory : Series controller



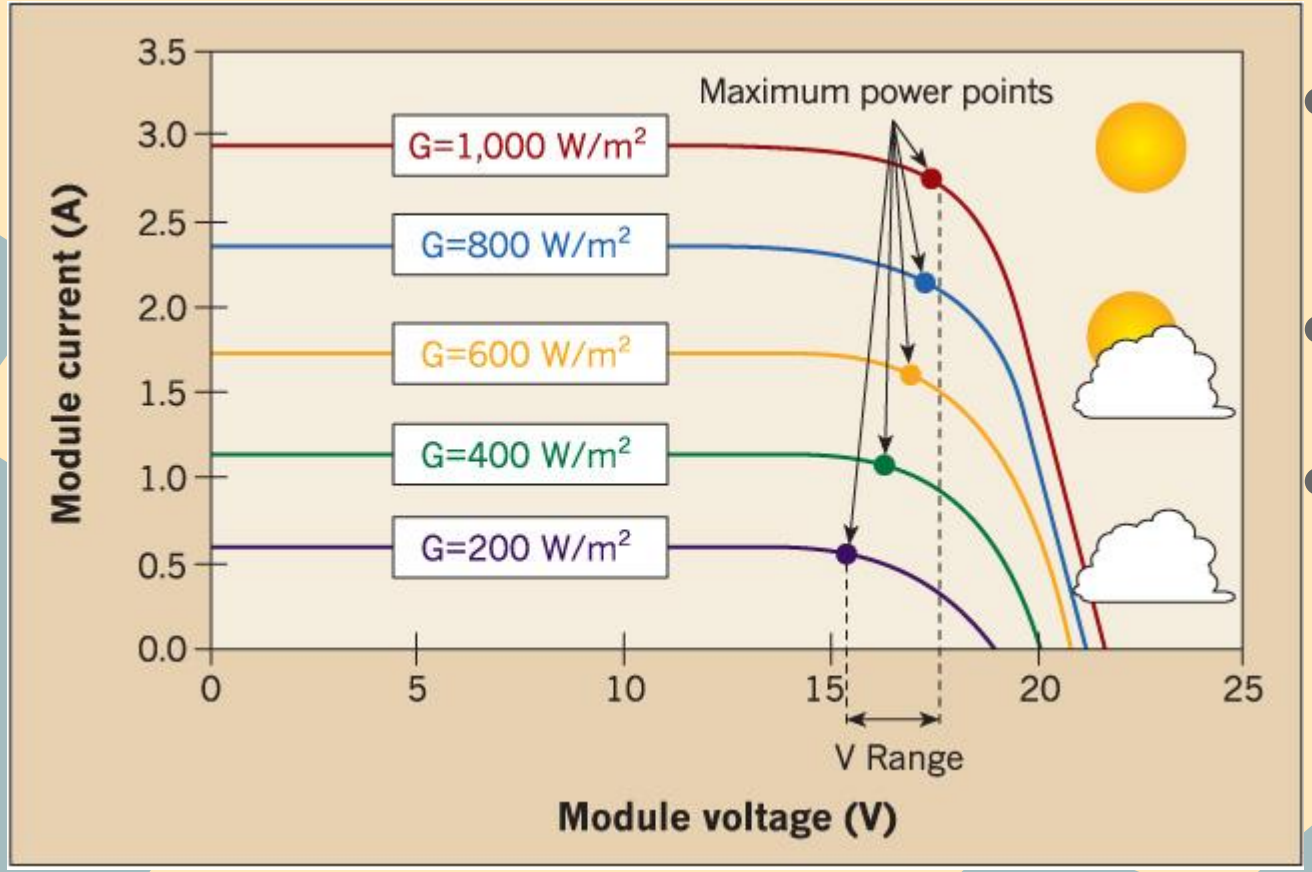
- Low price
- Can only be used with solar panel

Theory : Shunt controller



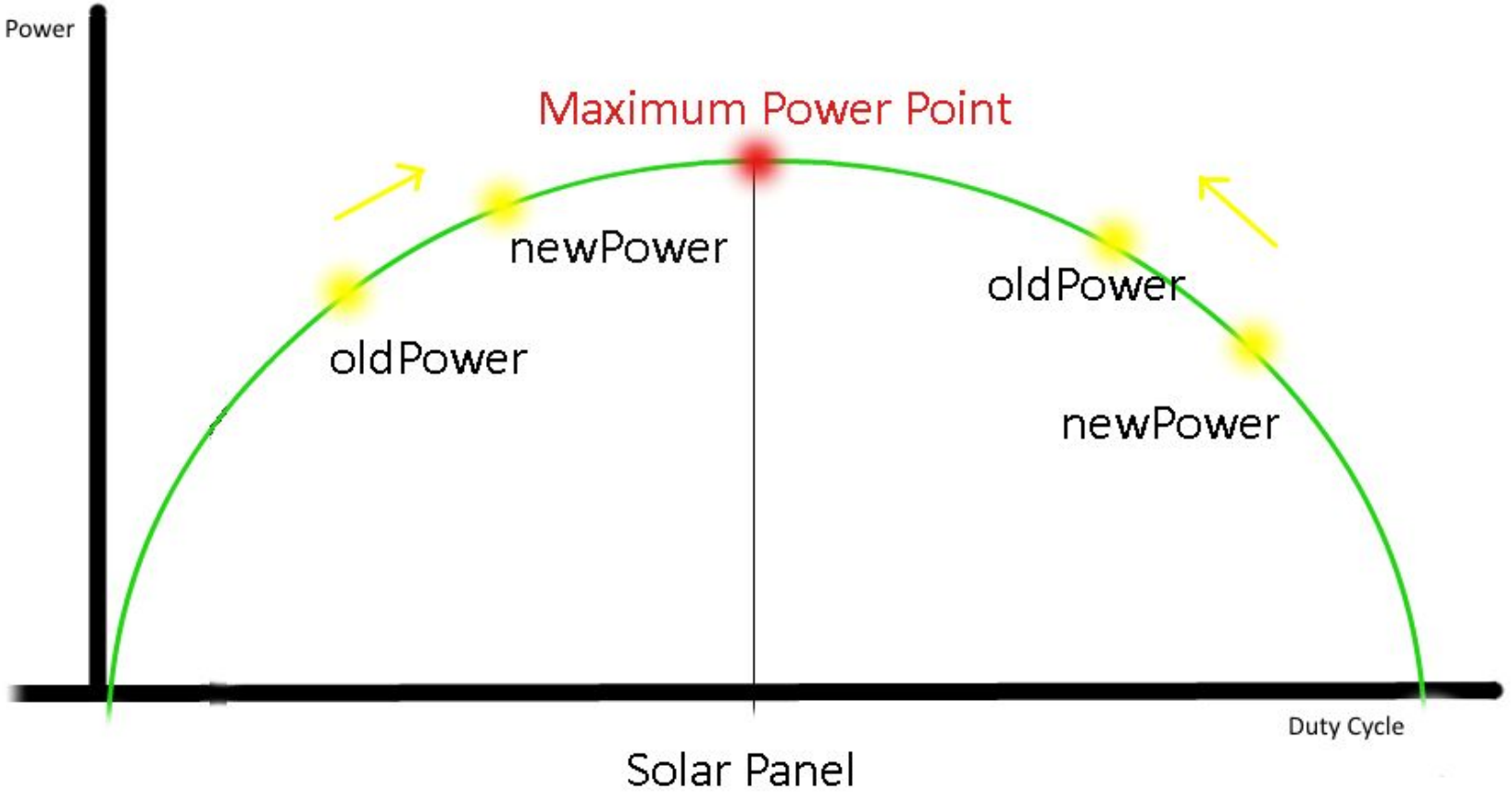
- Low price
- Lose of current
- Can be used with every energy (solar, wind and hydro)

Theory :Maximum Power Point Tracking

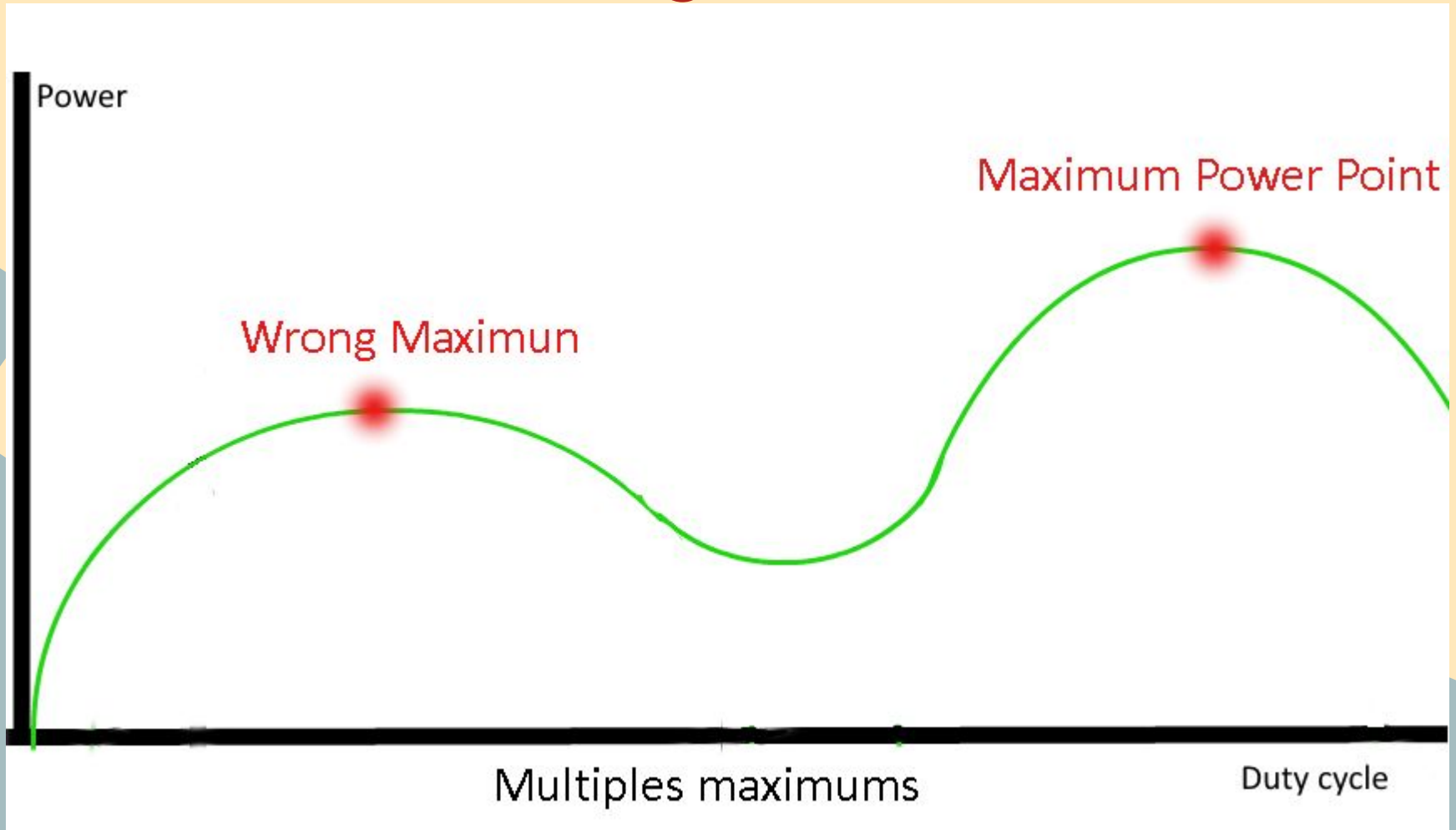


- Maximum output at any time
- Higher price
- Can be used with every type of energy

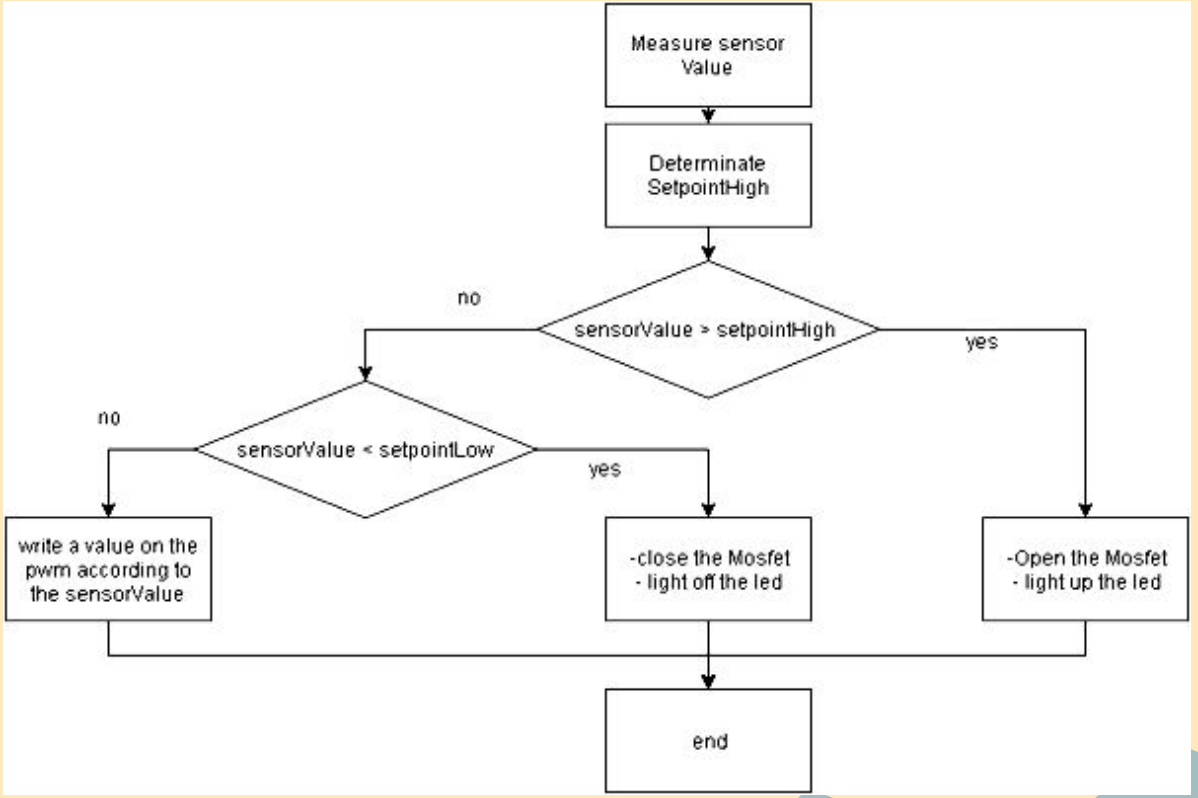
MPPT : Hill climbing method



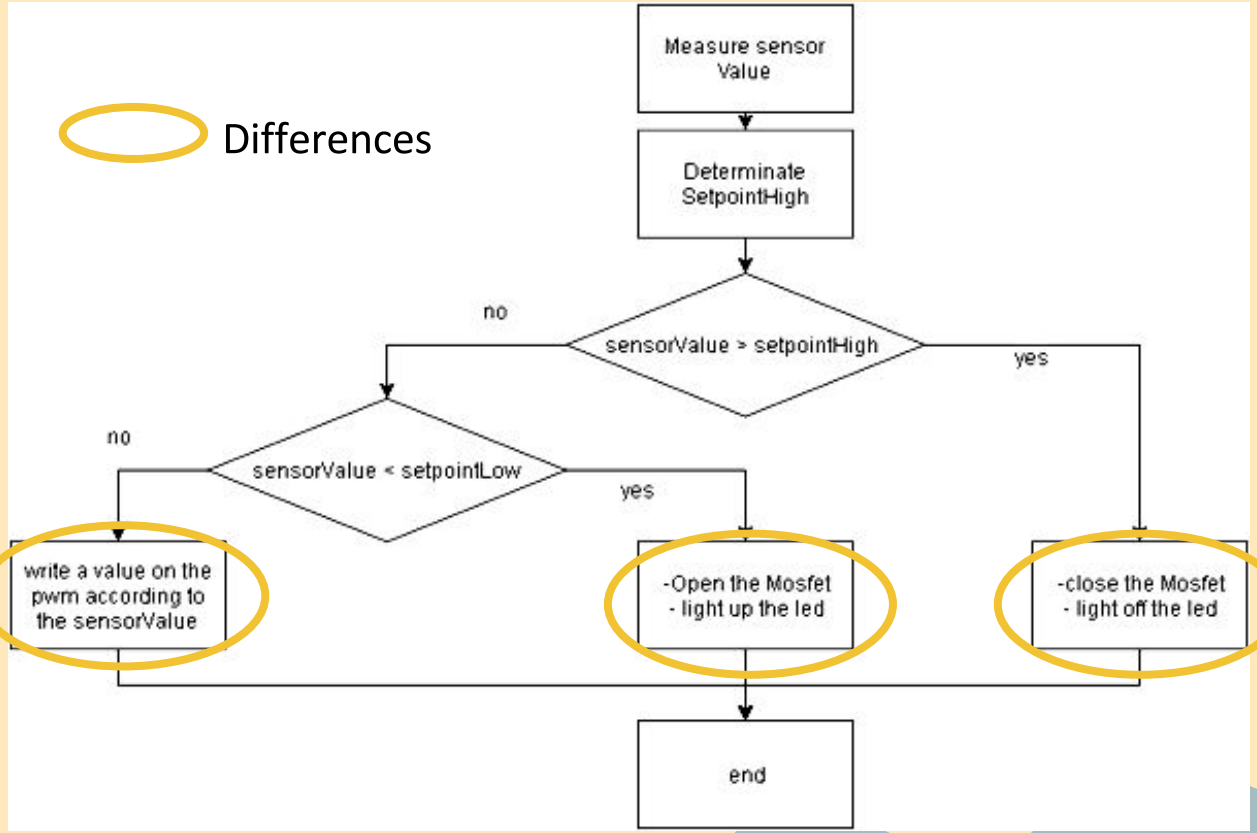
MPPT : Hill climbing method



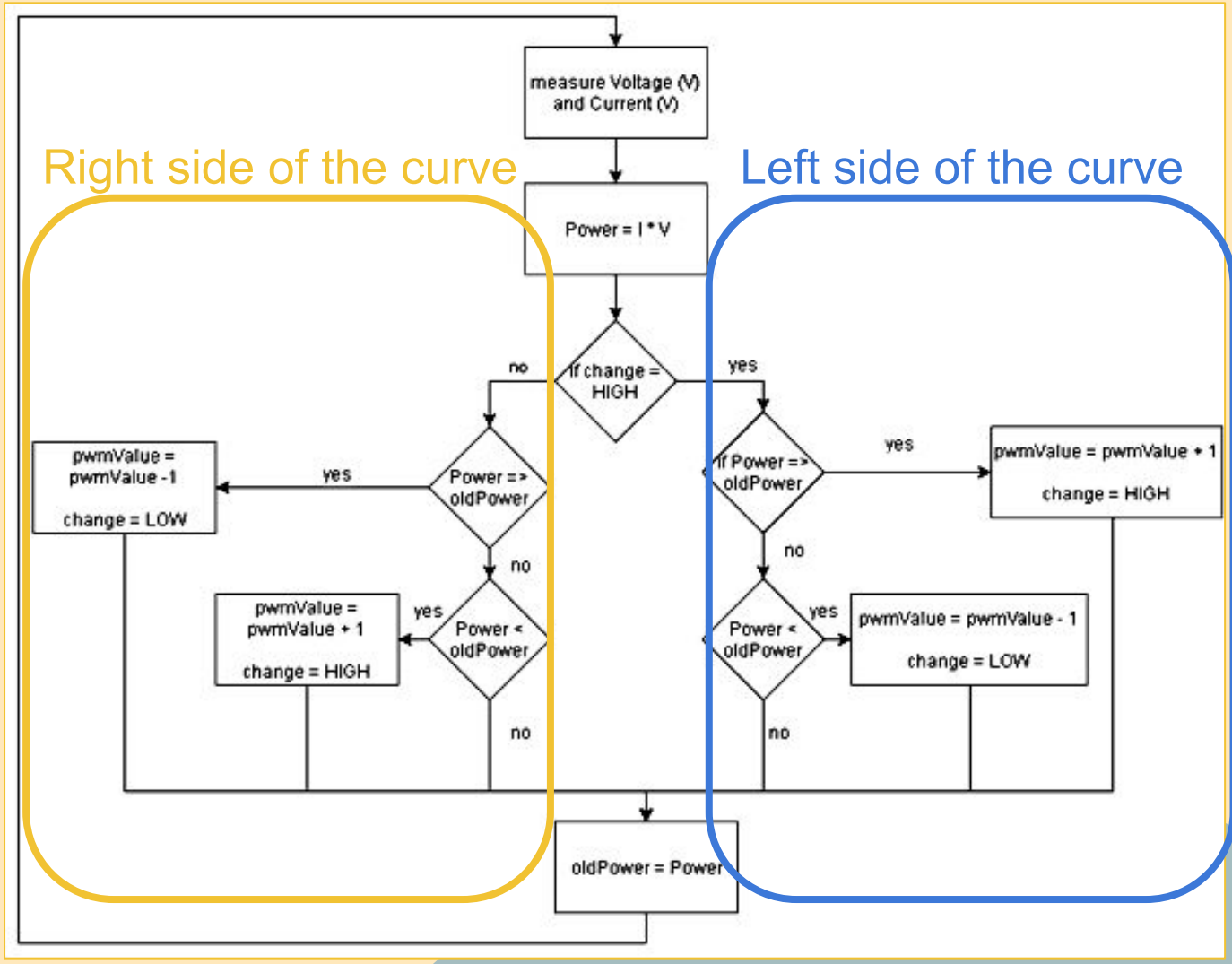
Algorithm : Series Controller



Algorithm : Shunt Controller

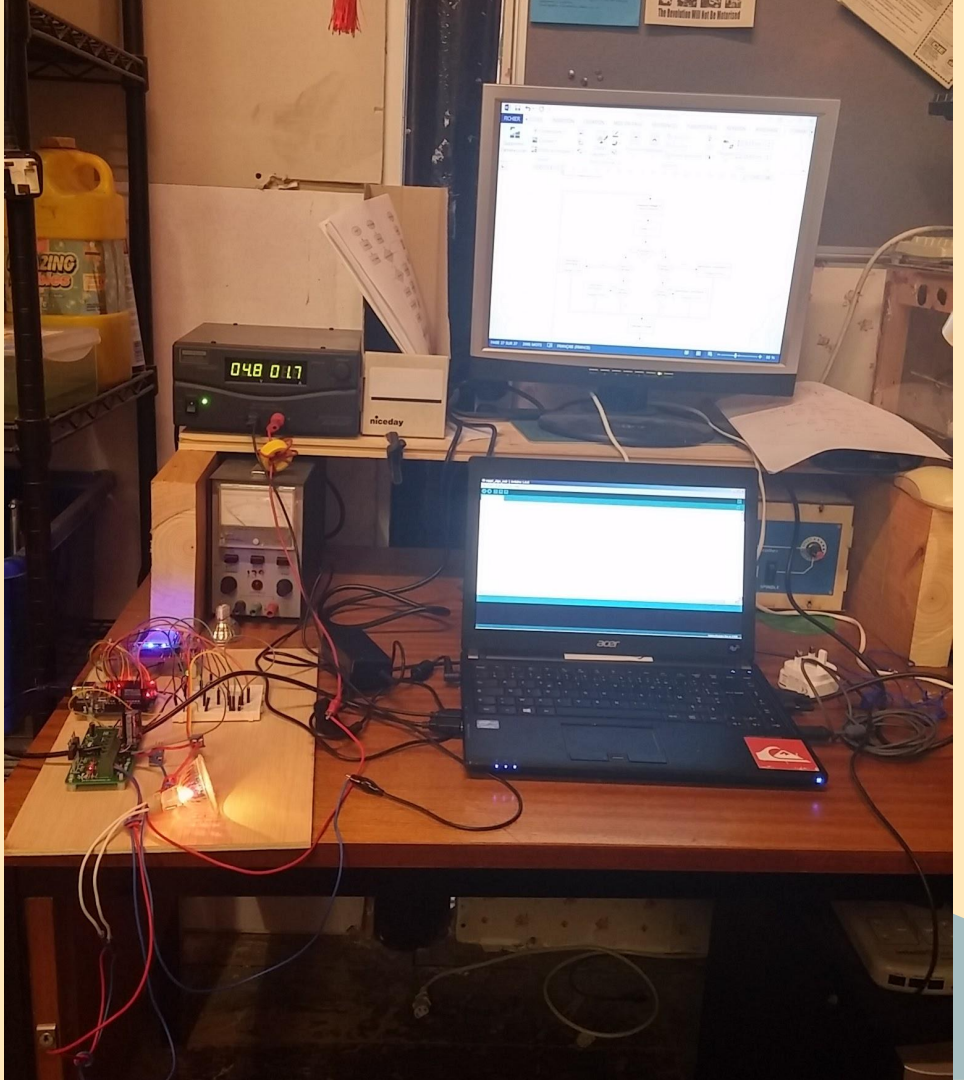


Algorithm : MPPT

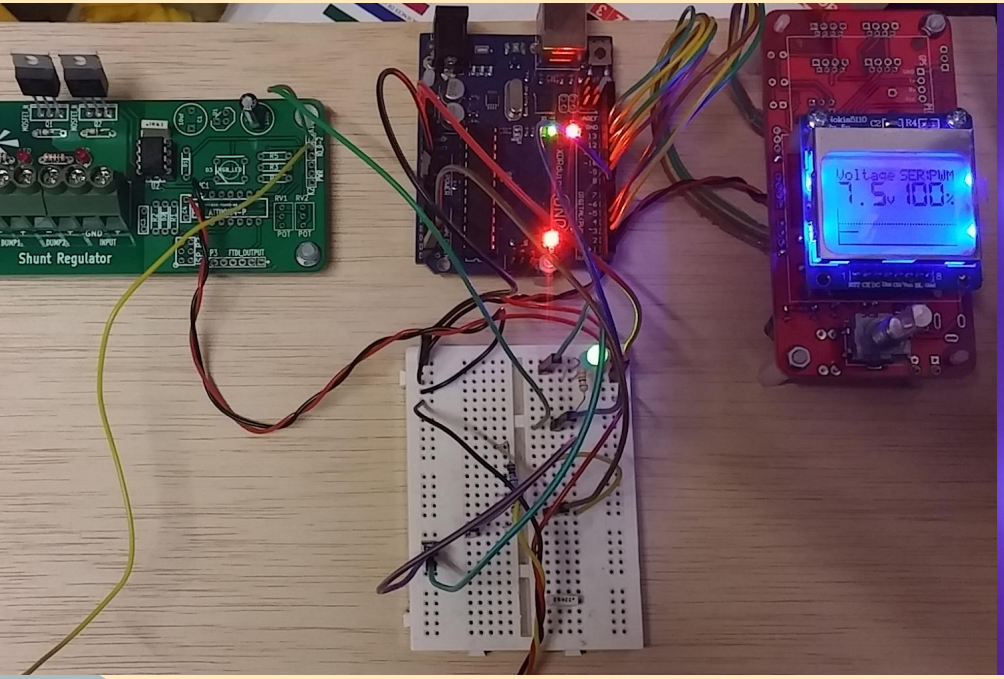


Good equipement

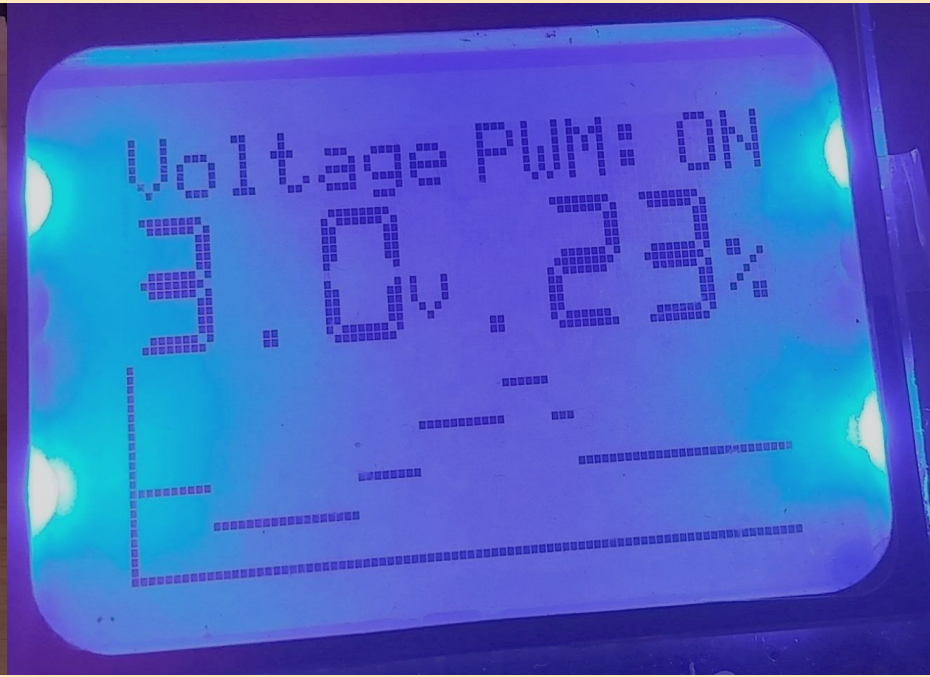
- Power supply
- Prototype board
- Oscilloscope



My work :

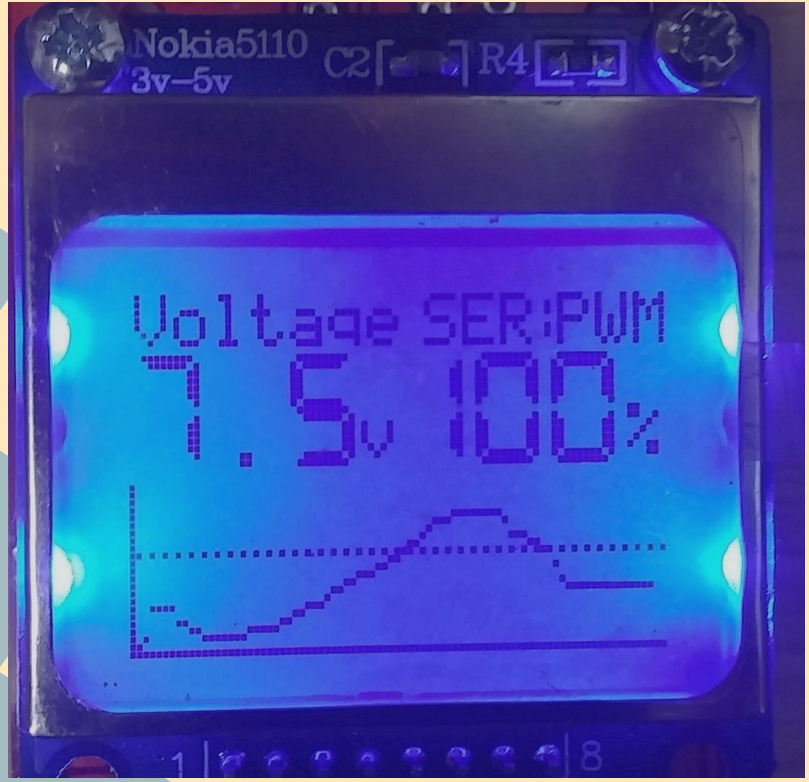


Prototype

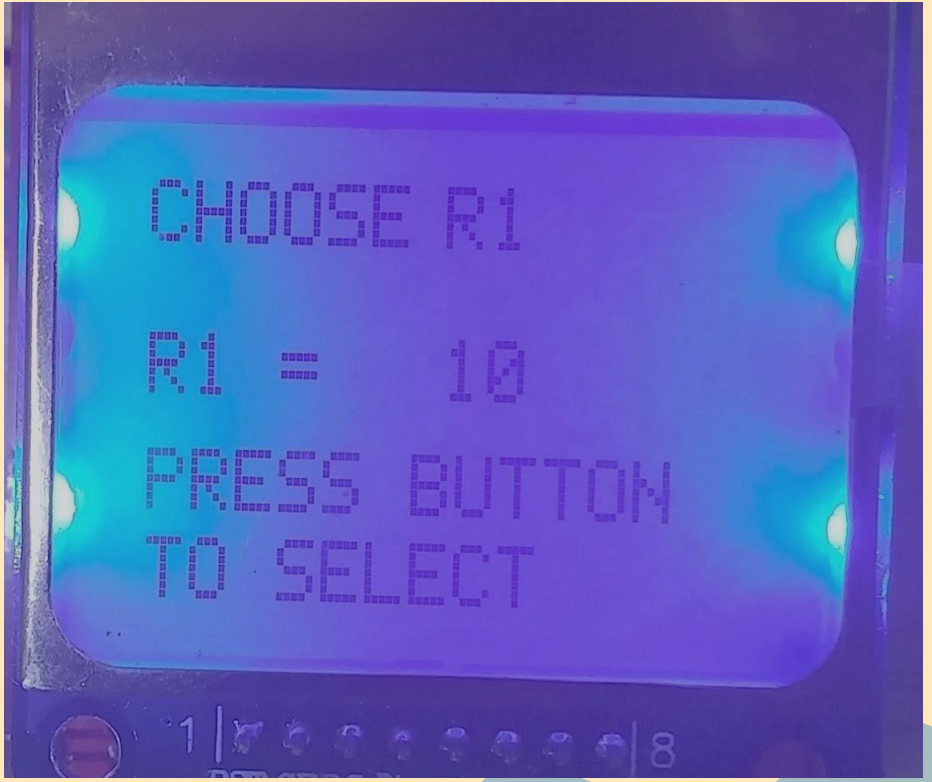


LCD : Display of the result and the curve

My work :

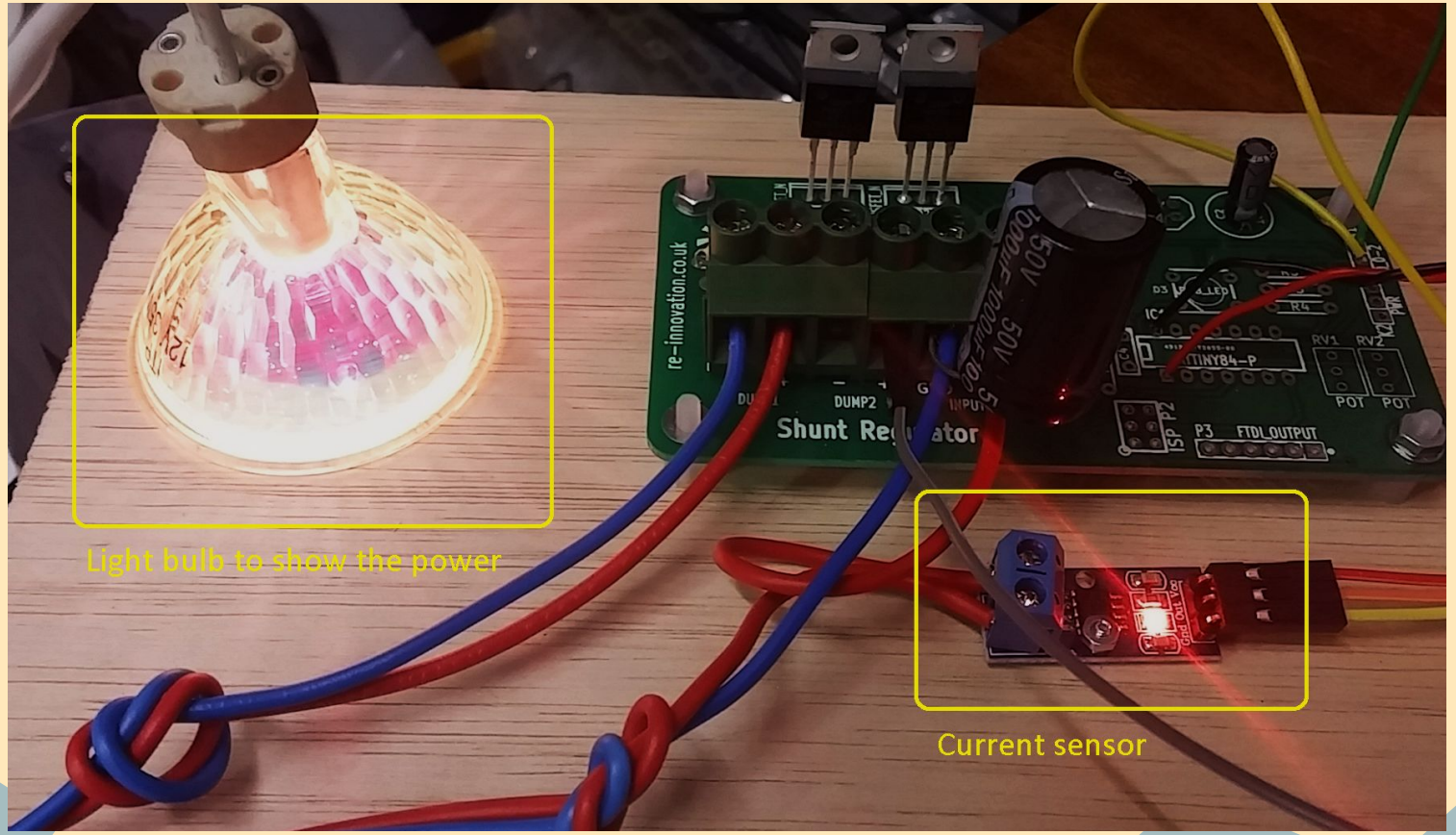


Nokia LCD : Display result



Nokia LCD : Menu

Mppt prototype :



Biggest technical difficulties :

- Use of all the component
  - Nokia Lcd
  - Rotary Digital Encoder
  - Interrupt
- Manage the memory
  - Use of the EEPROM
- Test of the MPPT algorithm

Outcome for the company :

- Series / shunt control finished
- Mppt algorithm working
- Possibility to sell kit of series / shunt controller.

Logo of the company

Outcome for me :

Skill progress :

- C programation
  - Library
  - EPROM
- Project
  - Design
  - Test method
  - prototype

Self enrichment :

- First professional experience in the electronic domain
- First insertion in a foreign country
- Team work with other student from GE2i (Yoann Rey)

Questions