STM32 IoT Contest

Wireless Pong Game !

Presented by :

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POLYTECH NICE-SOPHIA

life.augmented

ARM mbed

Bluetooth SMART

Wireless Pong Game !

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Summary

1. The contest rules
2. Our fun project!
3. Implementation
4. It will be fun they said… Problem experienced and chosen solutions
5. Final result
6. How green is our project? Power analysis

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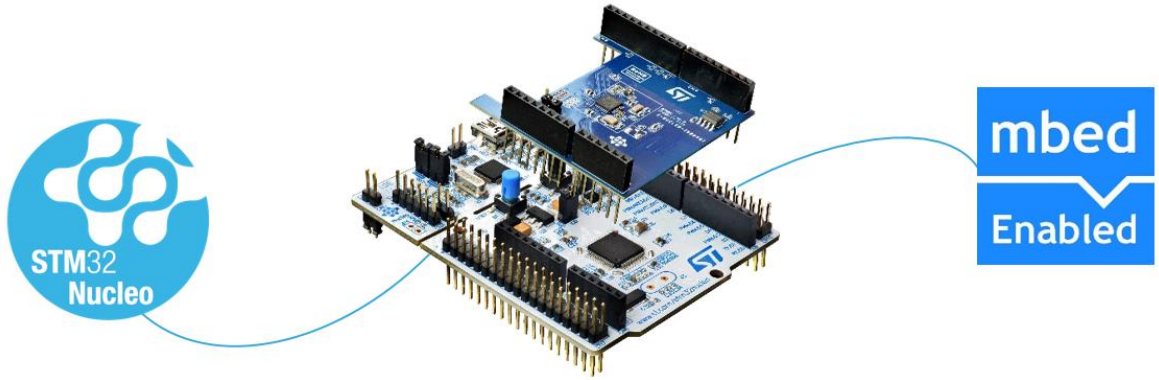
1. The contest rules

Develop the most innovative and fun “green electronics” project !

Controller : ST’s NUCLEO-L152RE

Bluetooth Low Energy Module : X-NUCLEO-IDB04A1



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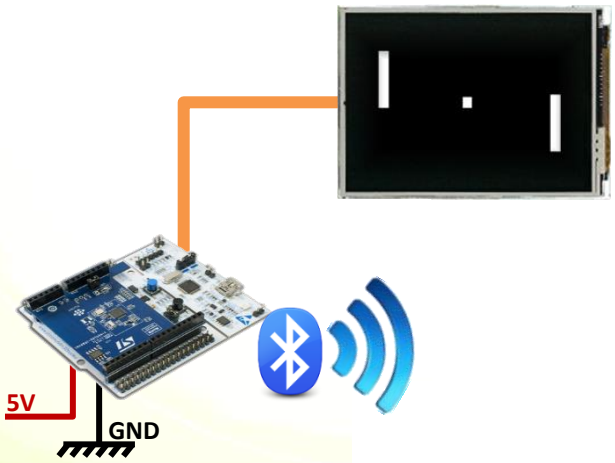
2. Our fun project !

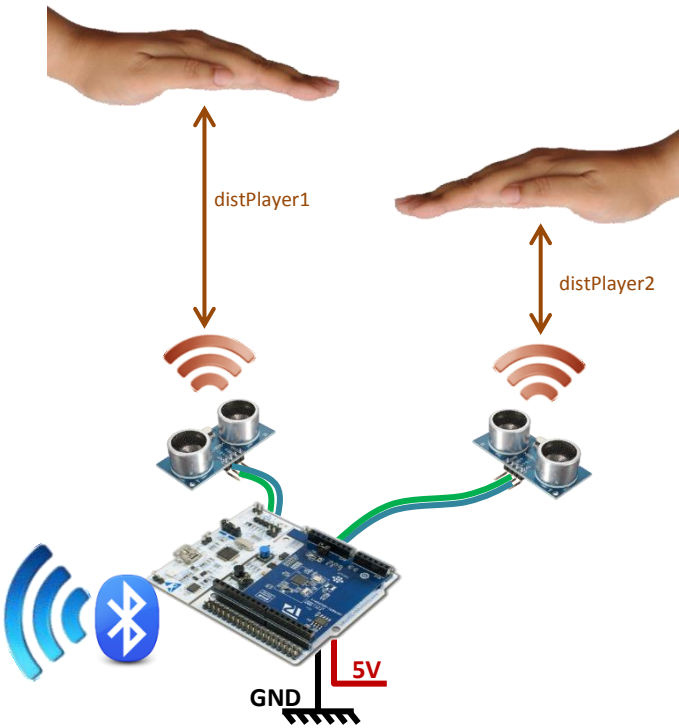
Each player controls their own paddle without any gamepad !

Thanks to range sensors, everybody can play wireless,
with their hand or with a « fakepad ».

Distances are transmitted through Bluetooth SMART
to the receiver, which displays the game on the screen.



Maître



Esclave

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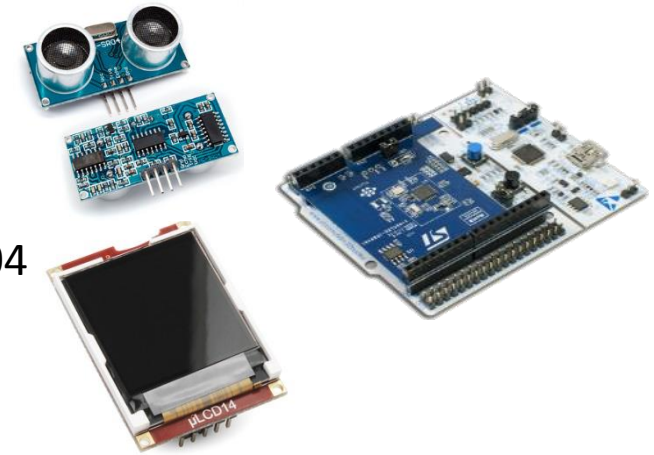
3. Implementation

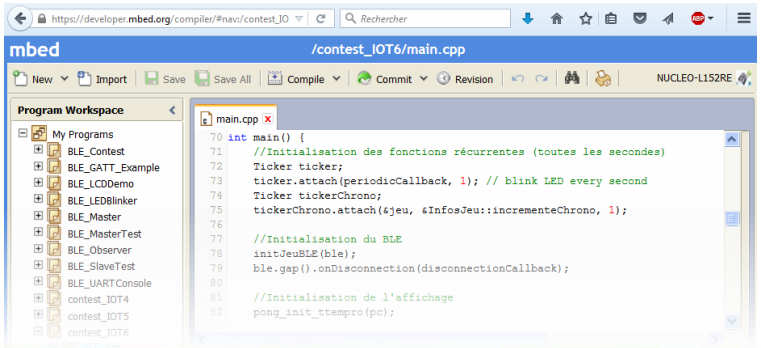
Bill of materials :

- Range Sensor : HC-SR04
- Controller : ST NUCLEO-L152RE
- Bluetooth Low Energy Module : X-NUCLEO-IDB04
- Display : 4D System LCD TFT screen µLCD-144



ARM mbed IDE :

- Online compiler
- Growing community
- Best asset : its simplicity!



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4. *It will be fun they said…* Problems and solutions

Bluetooth Low Energy Module problem :

- Incomplete mbed library for X_NUCLEO_IDB0XA1 : Emitter (slave) fully functionnal, but not the receiver (Master) →Master-Slave transmission problem
  Developper are supposed to use a smartphone for communications
  →**We will transmit scores and game time to the smartphone**

```
946 // ANDREA
947 ble_error_t BlueNRGGap::startRadioScan(const GapScanningParams &scanningParams) {
948     // Empty by now
949     return BLE_ERROR_NONE;
950 }
```

TFT Screen Firmware :

- Necessary firmware update for use with our controller → **Update error, try again.**
  Connection issue with computer, home message keeps displaying on the screen.
  → **We will use a terminal to display the game, using VT100 commands**

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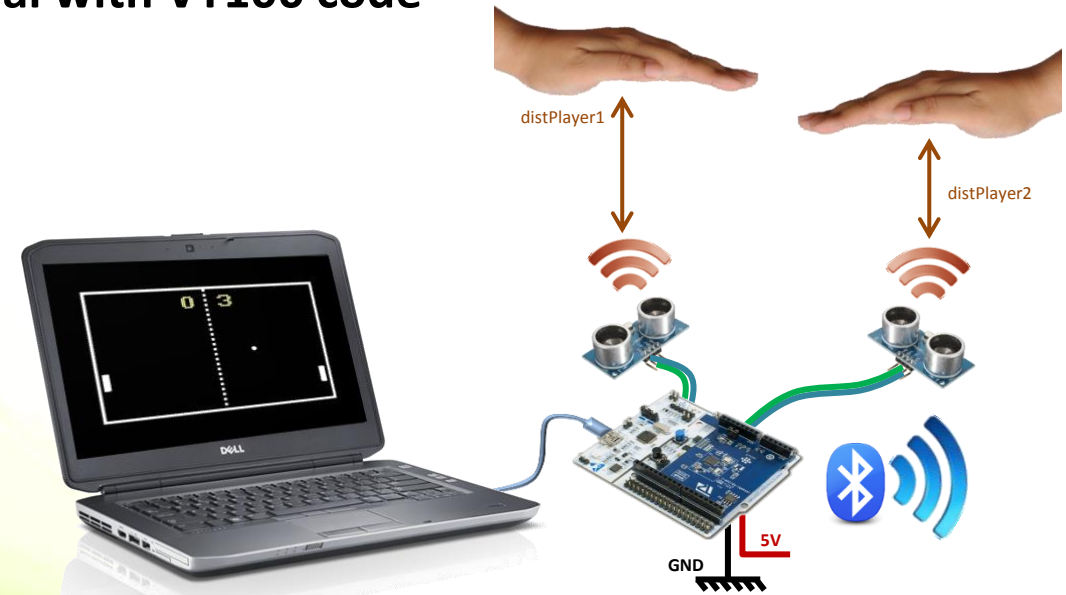
5. Final result

- Implementation on only one board
- 2 HC-SR04 range sensors to control the game
- Scores and game time transmit through BLE
- Display on terminal with VT100 code



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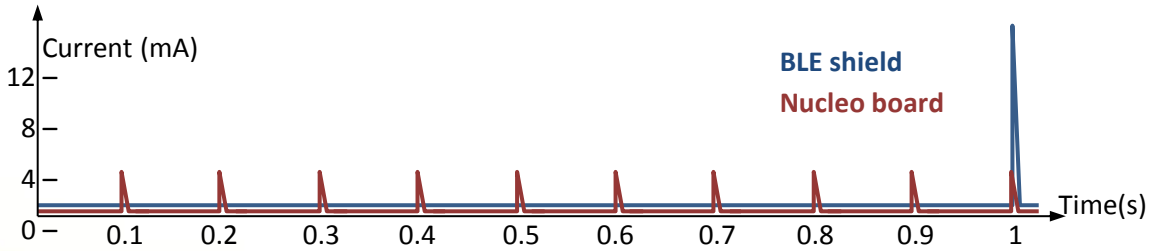
6. How green is our project? Power analysis

- **BLE X_NUCLEO_IDB0XA1:**
  Baseline current (Idle state) : 6-10µA
  Radio current (Advertising state) : 10-15mA
  Average current : ≈35µA (99.7% - 0.3%)
  With a coin cell battery (3V) : System may last around 7000h ≈ 1 year

- **Nucleo-L52RE :**
  Standby mode (using Thread::wait) : 1.11 µA
  Run mode : 195 µA/MHz (3,12mA @16MHz)
  Average current : ≈ 125.8µA (96% - 4%)



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Thanks for your support

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