

BWAT prototyping

Working doc

Project by [SODER](#), in collaboration with [SENSORICA](#)
In the context of [Eco2Fest](#) by [OuiShare MTL](#)

Table de matiere

[Technical team for electronics and software development](#)

[Project description](#)

[Mechanical design](#)

[Software and electronics design](#)

[User experience](#)

[Registering a new user](#)

[Opening the box](#)

[Keeping inventory](#)

[Bill of materials](#)

[NFC Door lock](#)

[Adafruit Mini 8x8 LED Matrix w/I2C Backpack](#)

[Solar power](#)

[Electrical connections](#)

[RFID reader to Arduino connections](#)

Technical team for electronics and software development

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Project description

Collective street furniture, Pandora's boxes allow you to share objects or services, send or receive packages.

[See video presentation](#)

BWAT est une collection de mobilier urbain, disponible en "open-source" et facilement concevable en "DIY". Dans les ruelles montréalaises, il est fréquent de retrouver plus de 100 riverains. Le potentiel d'établir un réseau de partage d'outils et d'objets est énorme. BWAT propose du mobilier, fait sur mesure pour les ruelles, qui permettront aux résidentes et résidents d'une même ruelle de mettre certains services en commun.

Texte 250 :

BWAT est une collection de mobilier urbain, disponible en "open-source" et facilement concevable en "DIY". Les résidences montréalaises sont souvent disposées autour de ruelles.

Il est fréquent d'y retrouver plus de 100 riverains. À l'époque des ruelles vertes et de la réappropriation des espaces publics, il existe une véritable mobilisation citoyenne à proximité de ces espaces en transition.

Plus encore, le phénomène de la consommation est de plus en plus fort. Plusieurs objets du quotidien ne sont utilisés que quelques minutes par année, au plus. La plupart des ménages montréalais collectionnent les mêmes objets sous-utilisés, ce qui amène à une réflexion sur la possession d'objets et d'outils.

Le potentiel d'établir un réseau de partage d'outils et d'objets est énorme. BWAT propose du mobilier, fait sur mesure pour les ruelles, qui permettront aux résidentes et résidents d'une même ruelle de mettre certains services en commun.

Le projet BWAT est une initiative de la Soder. Depuis 1996, la Soder développe des projets environnementaux à forte dimension sociale.

[See reference](#)

Mechanical design

See the SODER team

Software and electronics design

[Open Github repository](#)

User experience

Registering a new user

- A few community trusted individuals hold a master NFC key. Let's call these trusted community members *super_users*.
- A community member needs access to the box. He needs to become a *user*.
- This individual is sponsored by a *super_user* as a legitimate user of the box.
- The *super_user* scans the master NFC key (passes the NFC card in front of the reader, at a few mm distance).
- The door NFC lock system enters in programming mode.
 - A visual feedback tells the users that the box system is in programming mode to register a new user. [Programming visual signal to be defined]
- A new NFC card is scanned, in order to enter it into the database of legitimate users.
 - A visual feedback tells the users that the box system is in programming mode to and that the new card has been registered. [Programming visual signal to be defined]
- The *super_user* scans again the master NFC key in order to put the system back into the default state.
 - A visual feedback tells the users that the box system is now in default mode. [Programming visual signal to be defined]
- The new *user* scans his newly registered key to test it.
- If the new key works the registration process is successfully completed.
- If the new key doesn't work the registration process is repeated.

Opening the box

- A visual feedback tells the users that the box system is in default mode. [Programming visual signal to be defined]
- The user scans its key to open the door.
 - A visual feedback tells the users that the box system is in door open mode. [Programming visual signal to be defined]

Keeping inventory

All objects in the box have an NFC card.

Entering a new object in the inventory

Question: Any user can add objects into the box?

- The user opens the box.
- The user scans its user card 3 consecutive times
- A visual signal tells the user that the door's system is in *New object input mode*.
- The user scans the object's NFC tag.
- A visual signal tells the user that the door's system has recorded a new object
- The user scans his NFC key again to close the transaction

Taking an object from the box




- The user opens the box.
- The user takes an object out of the box and scans the object's NFC tag to register the object out. A visual signal tells the user that the object is taken out of the box.




Taking an object from the box

- The user opens the box.
- The user scans the object's NFC tag to register the object in. A visual signal tells the user that the object is taken in the box.


Bill of materials


NFC Door lock

Item	Price	Local supplier	Numbers needed	Picture
Arduino Nano microcontroller	1	Future & energies	1	
LED matrix Visual feedback Adafruit Mini 8x8 LED Matrix w/I2C Backpack	1	ABRA	1	
One channel Relay	1	Future & energies	1	

RFID Kit RC 522	12	Future & energies	1	
Electric strike lock	50	Future & energies	1	
NFC cards	0	STM access cards	1	

Solar power

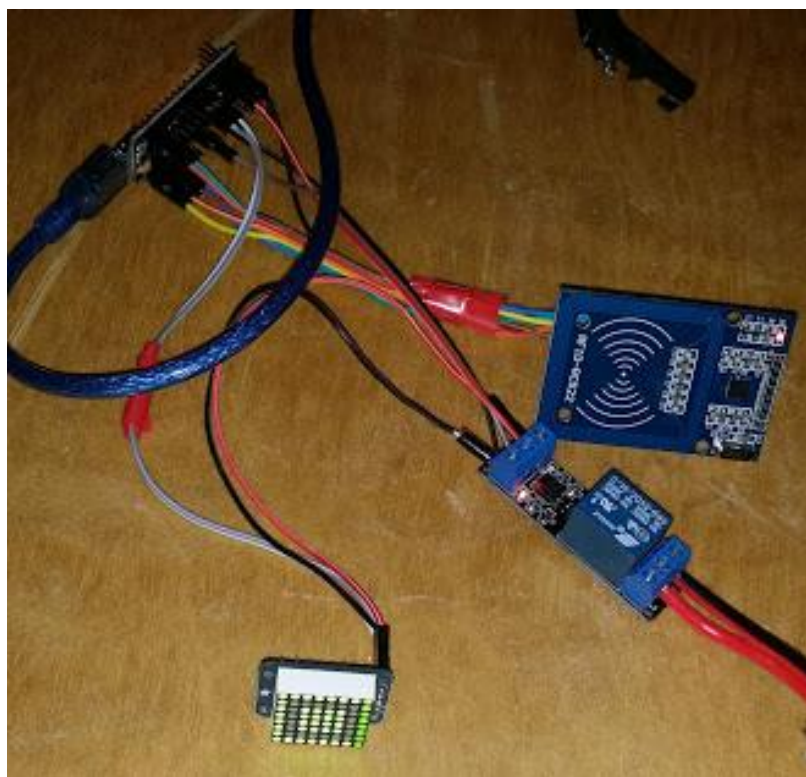
Item	Price	Local supplier	Numbers needed	Picture
7 watt solar cells	3.5	Future & energies	9	
Solar charge controller 12-24V 20A BSV 20A	25	Future & energies	1	
DC DC converter	7.5	Future & energies	1	
Wire connectors		Addison	2 pairs	

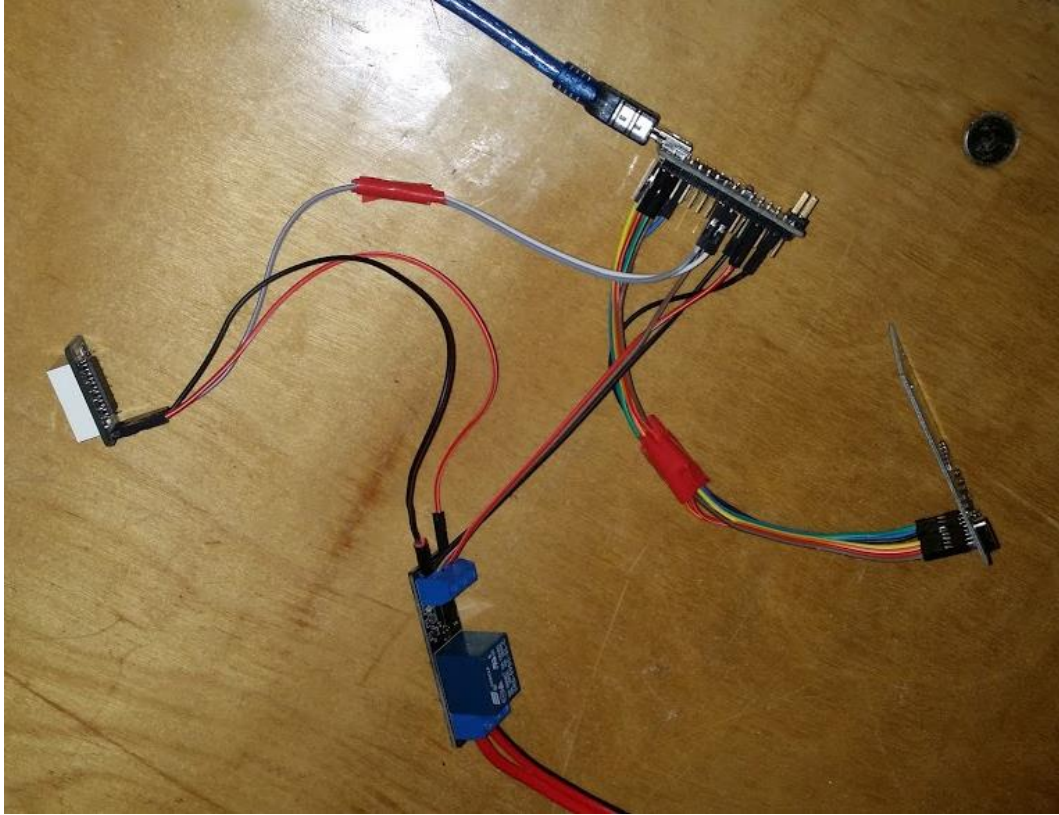
Wires		Addison	X m	
12V battery 7Ah Vision CP1270			1	

Electrical connections

RFID reader to Arduino connections

MOSI: Pin 11 / ICSP-4
 MISO: Pin 12 / ICSP-1
 SCK : Pin 13 / ICSP-3
 SS : Pin 10 (Configurable)
 RST : Pin 9 (Configurable)



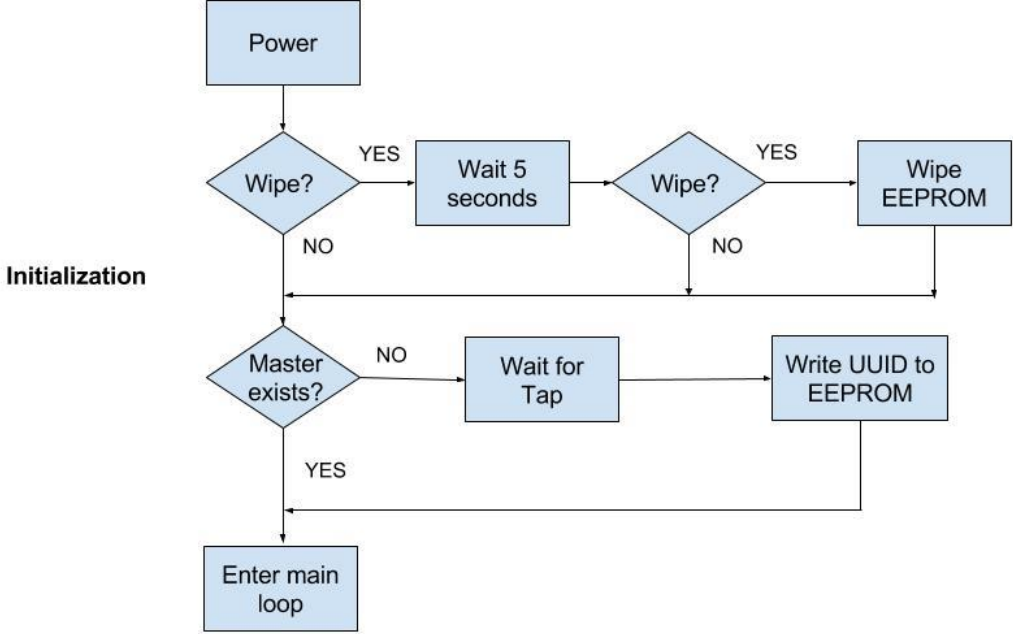


Code:

<https://github.com/Sensorica/BWAT>

Logic:

NFC Access control
Arduino sketch flow diagram



NFC Access control
 Arduino sketch flow diagram

