



GETTING STARTED



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GETTING STARTED

The world of Kniwwelino

What is Kniwwelino?

The Board

The programming interface

Setup

Materials needed

Plug your Kniwwelino board

Connect your board to a local Wi-Fi

Setup the online programming environment

First step

Your very first program

Transfer the code to your board

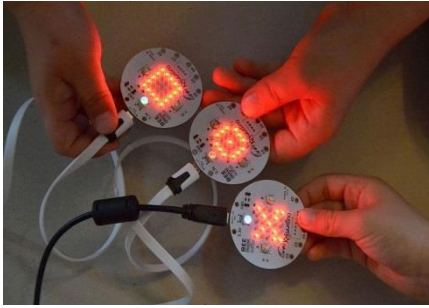
Add an extension

Extensions available

The world of Kniwwelino

What is Kniwwelino?

Kniwwelino® is a creative environment to learn programming and electronics



Learn the basics of programming

Kniwwelino® contains a circuit board based on the Arduino® and Wi-Fi™ technologies and a visual programming interface.



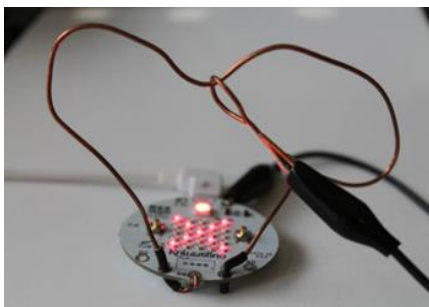
A fun environment

The online visual programming interface, in which blocks are assembled like a puzzle, has been designed especially for children. Extensions can be connected to the board to enable them to learn about electronics.



Learning by doing

An extensive catalogue of tested and approved fun activities makes progressive and independent learning easier. Kniwwelino® lets children think up and create their own projects.



Creative kits

Ready-to-use kits are available to introduce them to and let them create their first projects.

The world of Kniwwelino

The Board

RGB LED

Light that can change color.

USB Connexion

To connect your Kniwwelino board to the computer or a "power bank" (rechargeable battery).

Wifi chip

To connect the electronic card to the Internet and exchange messages with other cards.

Additional Ports

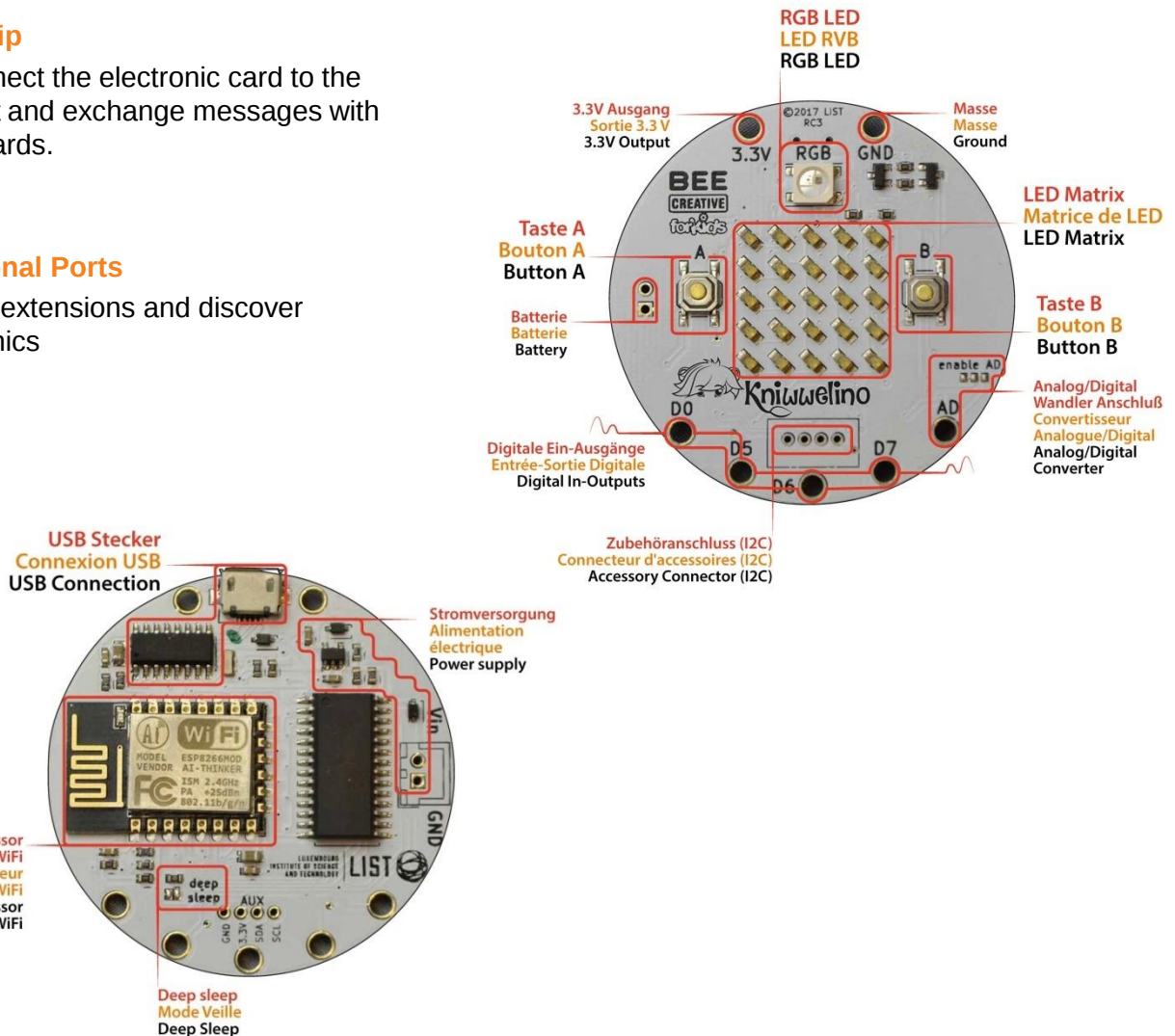
To add extensions and discover electronics

Buttons A and B

You can click on button A, button B or both (A and B). You can click them or keep them pressed.

LED Matrix

Small red lights that allow me to display a text or an image.

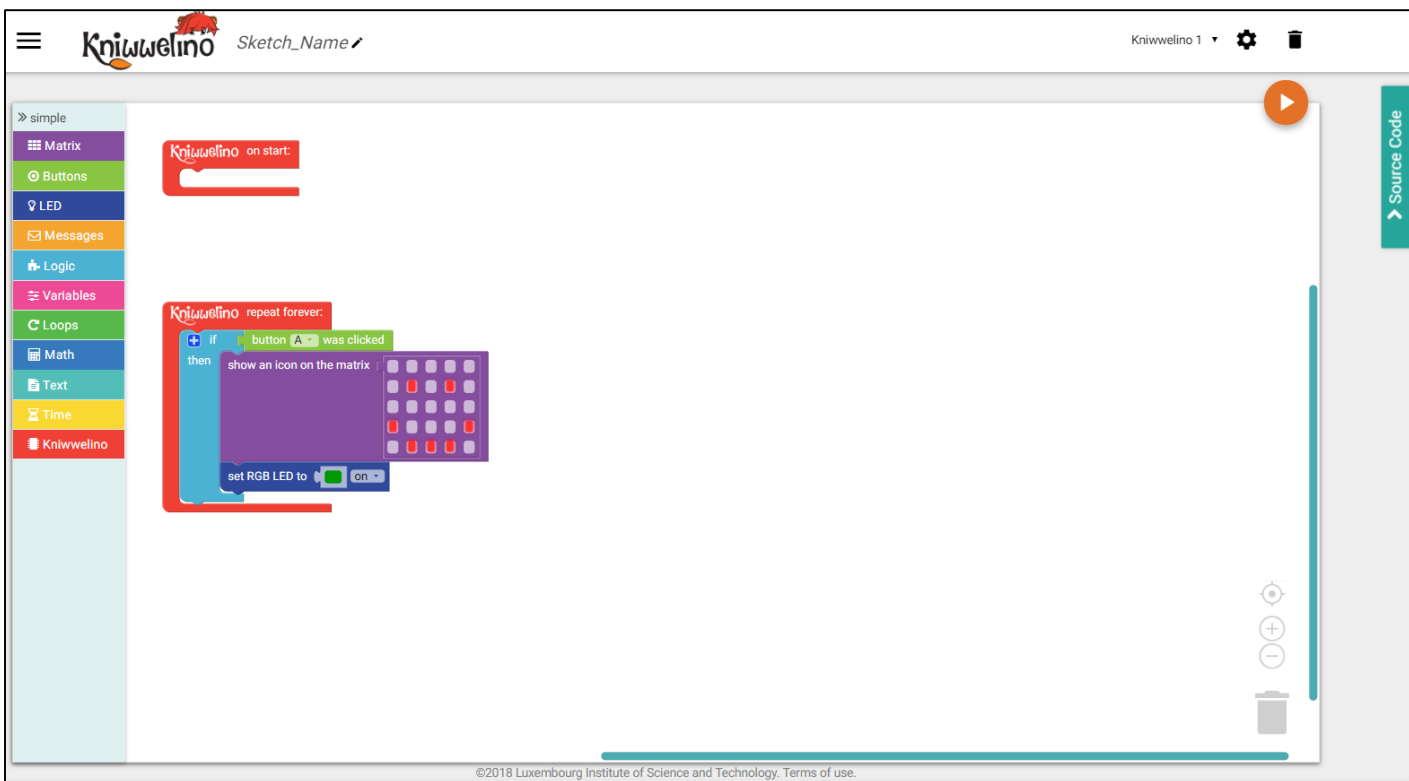


The world of Kniwwelino

The programming interface

To tell your Kniwwelino board how it should behave and react, you have to write a computer program. To do this, you must use the visual programming interface available at:

<https://code.kniwwelino.lu/>

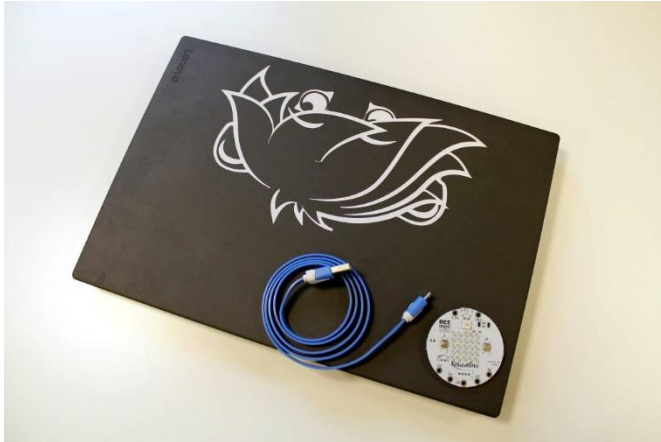


The screenshot displays the Kniwwelino visual programming interface. The top bar features the Kniwwelino logo, a sketch name field labeled "Sketch_Name", and a dropdown menu set to "Kniwwelino 1". A left sidebar contains a category list: "simple", "Matrix", "Buttons", "LED", "Messages", "Logic", "Variables", "Loops", "Math", "Text", "Time", and "Kniwwelino". The main workspace shows a "Kniwwelino on start:" block and a "Kniwwelino repeat forever:" loop. Inside the loop, an "if button A was clicked" block is followed by a "show an icon on the matrix" block (which includes a 4x4 grid of icons) and a "set RGB LED to on" block. A right sidebar has a "Source Code" button. The bottom of the interface includes a copyright notice: "©2018 Luxembourg Institute of Science and Technology. Terms of use."

Setup

Materials needed

To do your very first Kniwwelino project, you only need:



- 1 Kniwwelino
- 1 Micro USB cable
- 1 Computer or tablet
- WIFI connection

Setup

Plug your Kniwwelino board

To start your Kniwwelino board, you must first plug it with a USB cable.
For example:



a computer



a powerbank



a Micro USB
based charger

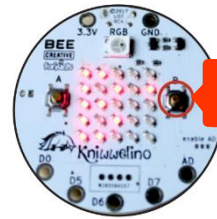
Setup

Connect your board to a local WiFi

To be able to program your Kniwwelino with the online programming tool, you need to connect it to a local WiFi.

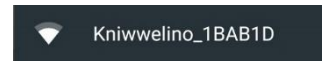
- 1 Press and hold button B, then start (plug) your Kniwwelino board.

The LED blinks purple, and the Matrix says "WIFI AP".



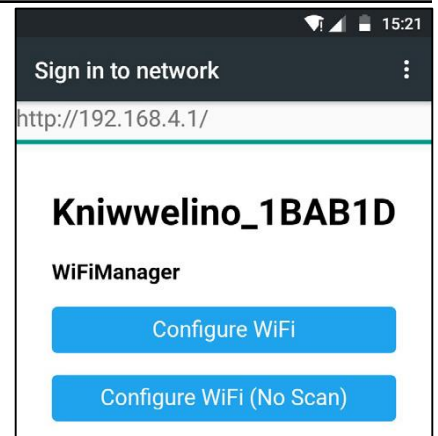
Push

- 2 Use a smartphone (or tablet or computer) and connect to the Network "Kniwwelino_<ID Nr>".
Here: Kniwwelino_1BAB1D.



- 3 On the connected device, open a web browser and type the address <http://192.168.4.1>

The following screen will show:



- 4 Click on "Configure WiFi" to specify name and password of the new network (the same as connecting a computer or phone to the Wi-Fi network).

- 5 Your Kniwwelino board will now try to connect to this network. The LED lights in green if it was successful.

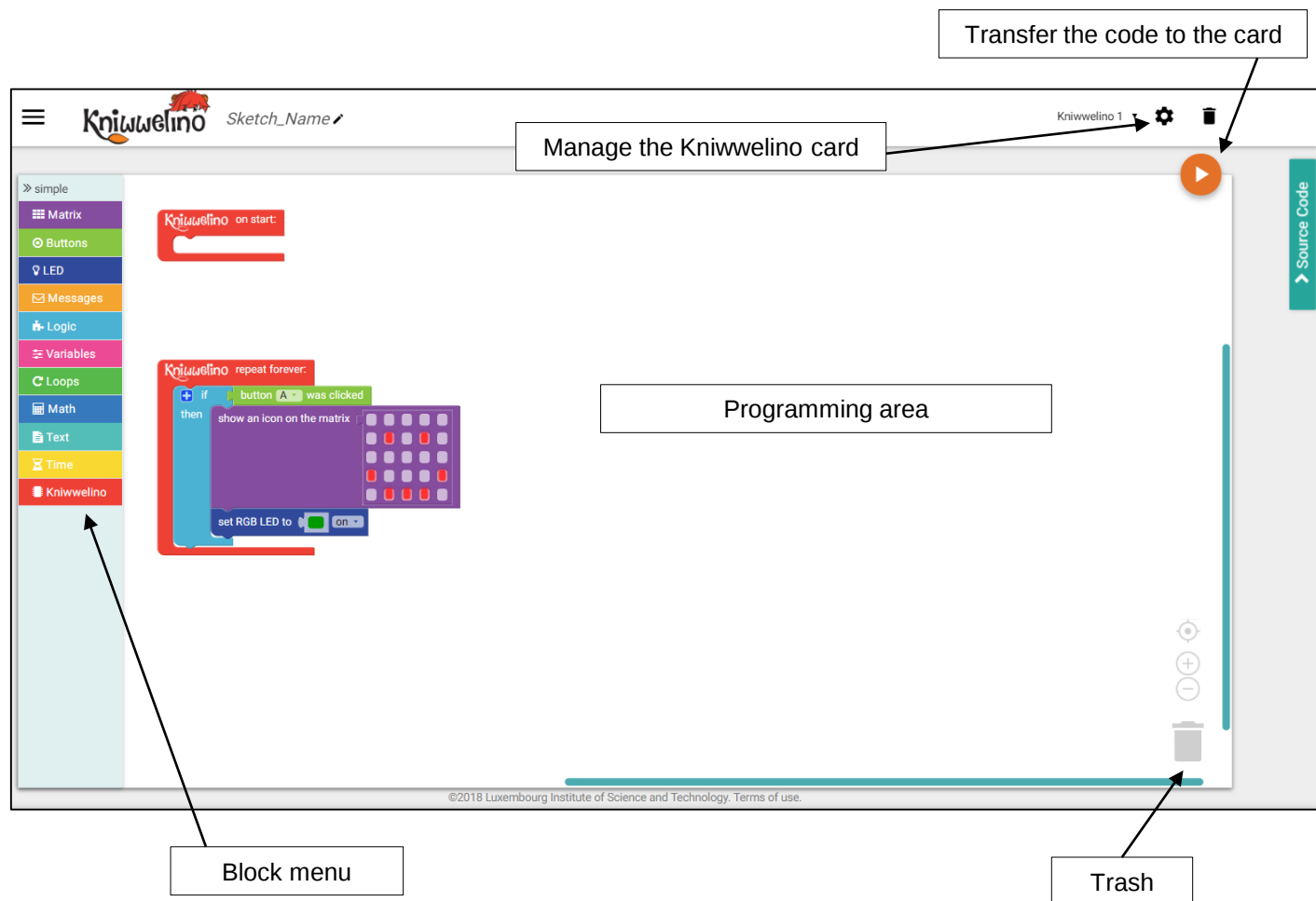


Setup

The programming interface

To tell your Kniwwelino board how it should behave and react, you have to write a computer program. To do this, you must use the visual programming interface available at: <https://code.kniwwelino.lu/>

For example: if button A is clicked then smile and light the LED in green



The screenshot shows the Kniwwelino visual programming interface. The interface includes a sidebar on the left with a 'Block menu' containing categories like Matrix, Buttons, LED, Messages, Logic, Variables, Loops, Math, Text, Time, and Kniwwelino. The main area is the 'Programming area' where code blocks are assembled. A 'Kniwwelino on start:' block is at the top, followed by a 'repeat forever:' loop containing an 'if button A was clicked' block with a 'show an icon on the matrix' block and a 'set RGB LED to' block. The top right has a 'Manage the Kniwwelino card' button and a 'Transfer the code to the card' button. The bottom right has a 'Trash' button. The bottom of the interface shows a copyright notice: '©2018 Luxembourg Institute of Science and Technology. Terms of use.'

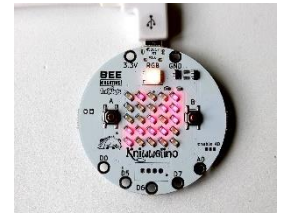
Setup

Set up the online programming environment

Before you can start coding, you need to add your board to the list of Kniwwelino boards.

- 1 Press and hold button A, then start (plug) your Kniwwelino board.

Hold the button until a pattern shows up on the LED matrix.



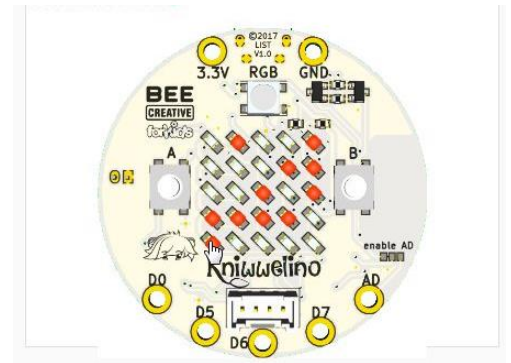
- 2 Click on the gear in the menu.



add Kniwwelino first ▼

- 3 A window for managing your boards will open.

Copy the pattern of the LED matrix onto the Kniwwelino by clicking on the LEDs to turn them on or off.



- 4 Define a name for your Kniwwelino, for instance "Kniwwelino 1".

Kniwwelino Name
Kniwwelino 1

- 5 Click on 

Your Kniwwelino board now appears in the list of boards.

Manage your Kniwwelino boards

You are managing: 1 Kniwwelinos



Kniwwelino 1
ID: 412F8E
MAC: 2C3AE8412F8E



First step

The programming interface

1. Select the blocks you want to use from the menu. The menu is organized in categories and can be extended.

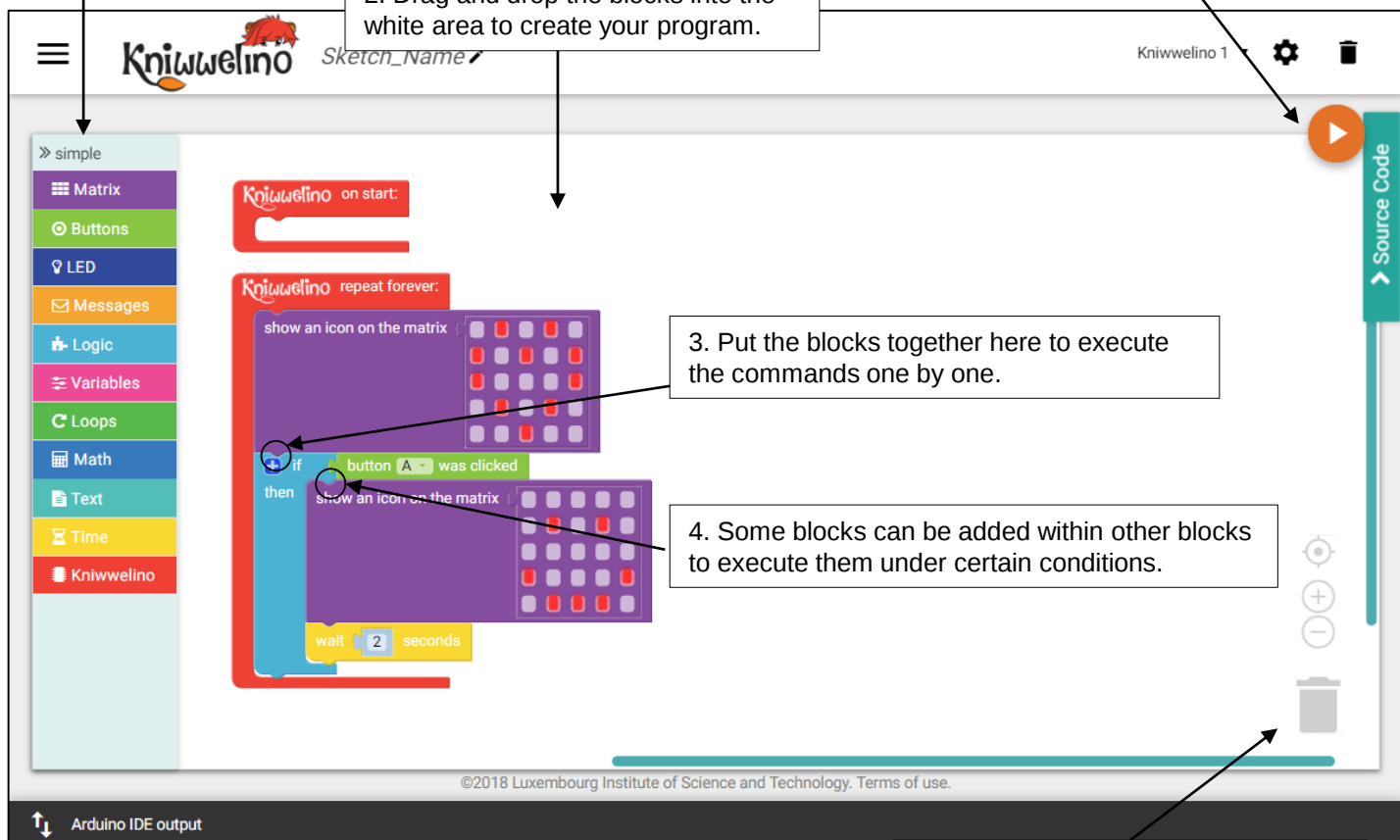
2. Drag and drop the blocks into the white area to create your program.

5. You can test your program at any time. Click here to transfer it to your board. After 30 seconds the LED lights up in green: your board is ready to execute your program.

3. Put the blocks together here to execute the commands one by one.

4. Some blocks can be added within other blocks to execute them under certain conditions.

6. Drag the blocks to the trash to remove them.



The screenshot shows the Kniwwelino programming interface. On the left is a menu with categories like Matrix, Buttons, LED, Messages, Logic, Variables, Loops, Math, Text, Time, and Kniwwelino. The main workspace contains a sequence of blocks: a red 'Kniwwelino on start:' block, a red 'Kniwwelino repeat forever:' block, a purple 'show an icon on the matrix' block, a green 'if button A was clicked then show an icon on the matrix' block, and a yellow 'wait 2 seconds' block. On the right, there is a trash icon and a 'Source Code' button. The bottom of the interface shows the Arduino IDE output area.

The visual programming interface allows you to write a program by assembling the blocks as pieces of a puzzle. All available blocks are organized into categories in the menu on the left.

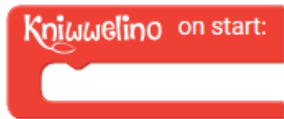
The following categories are available in the mode “simple”

Category	Description
 Matrix	To program the 5×5 red lights in the middle of your Kniwwelino. For instance, you can show an icon or a text.
 Buttons	To program buttons A and B on the Kniwwelino. In addition, there are blocks to program external buttons that can be attached on the Kniwwelino pins.
 LED	To program the RGB light above the matrix. You can select the color, brightness and effect. In addition, there are blocks to program external LEDs that can be attached on the Kniwwelino pins.
 Messages	To send and receive messages via Wifi. You can, for instance, send an icon or text to another Kniwwelino.
 Logic	Blocks related to logic, such as if-then conditions, or the comparison of two numbers.
 Variables	To create variables, i.e. placeholders to hold a value or a text and reuse it later in your program.
 Loops	To repeat a same piece of code multiple times.
 Math	Blocks related to numbers and mathematical operations on numbers, such as addition, subtraction, but also rounding or generating random numbers.
 Text	To create text or do operations on text, such as concatenating text.
 Time	To control time in your program, for instance to let Kniwwelino wait before the next block, or to get the current date or time.
 Kniwwelino	Kniwwelino on start contains the blocks that must be executed only once, when the Kniwwelino board starts (e. g. variable declaration). Kniwwelino repeat forever contains the blocks that will be executed as long as the Kniwwelino board is connected (to the computer or to a power source).

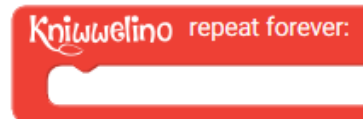
First step

Your very first program

When you open the visual programming interface, you can see two blocks in the middle of the white area.



Kniwwelino on start contains the blocks which are only executed once, at the start of Kniwwelino (for instance the variables' initialisation).



Kniwwelino repeat forever contains the blocks which are executed repeatedly, while Kniwwelino is powered.

You can start creating your computer program to give instructions to your card.

To tell Kniwwelino to display your name, you have to:

- 1 Open the menu **Matrix** and click on the block **Write a text on the Matrix...**



- 2 Drag and drop this block inside the block **Kniwwelino repeat forever.**



- 3 Click on the default text **Hello Kniwwelino**, delete it, and replace it with my name.



Your first computer program is ready, now you just have to transfer it to your card!

First step

Transfer your program to your board

You have to transfer your program to your Kniwwelino board to test it. This will take about 30 seconds.

1

Click on the orange play button at the top right of the screen



This will trigger the uploading process.

2

The code will first be compiled, then transferred to your Kniwwelino board.

Uploading Code to Kniwwelino...



3

As soon as the transfer starts, an arrow will show on your Kniwwelino.



4

Then your Kniwwelino will reboot and reconnect to the WiFi: all LEDs on the matrix will switch on, then progressively off.



5

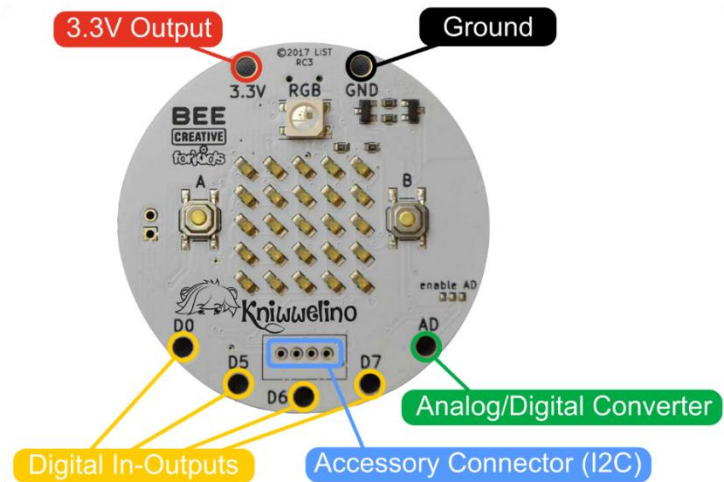
When the RGB LED lights up in green, the Kniwwelino will start to run your code.



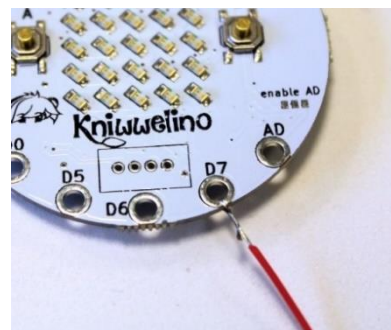
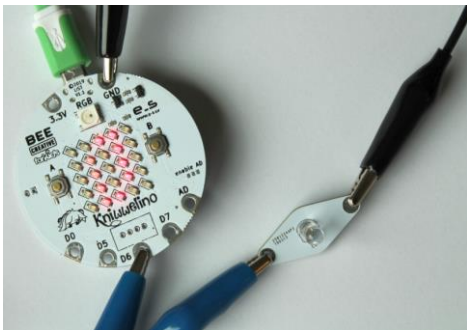
First step

Add extensions

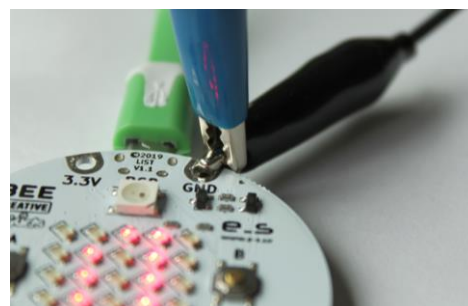
To add the extensions, you use the pins D0, D5, D6, D7, 3.3V and GND of the Kniwwelino board. Each extension is connected using at least 2 pins.



Connect your extensions with crocodile clips or silicone cables:

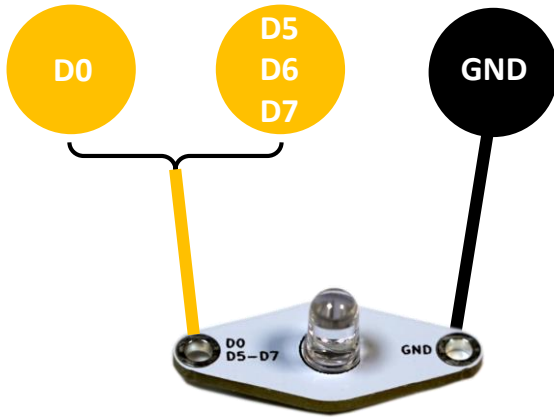


To connect 2 clips on the same pin, you can plug them onto each other:



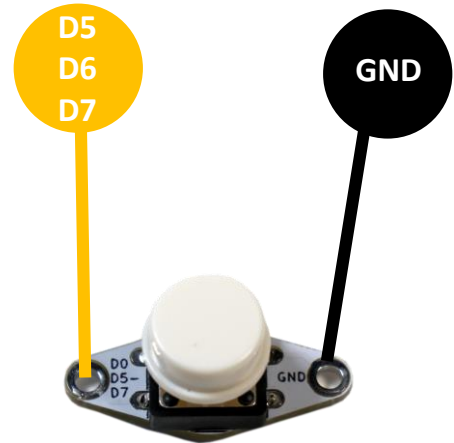
Extensions available

External LED



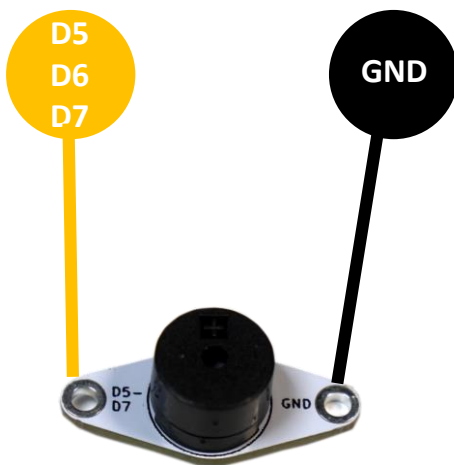
💡 LED

External push button



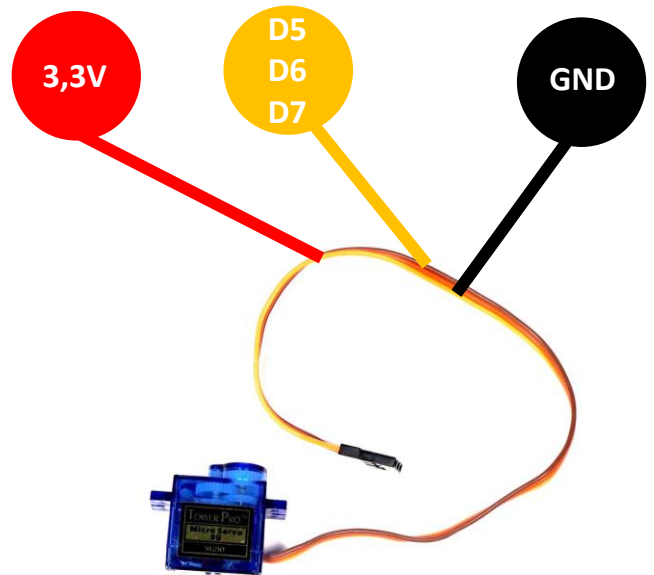
🔘 Buttons

Buzzer



🔊 Audio

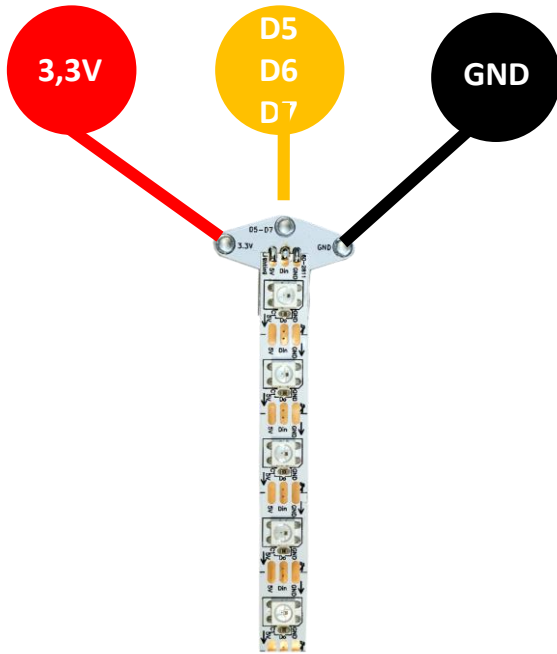
Micro Servo motor SG90



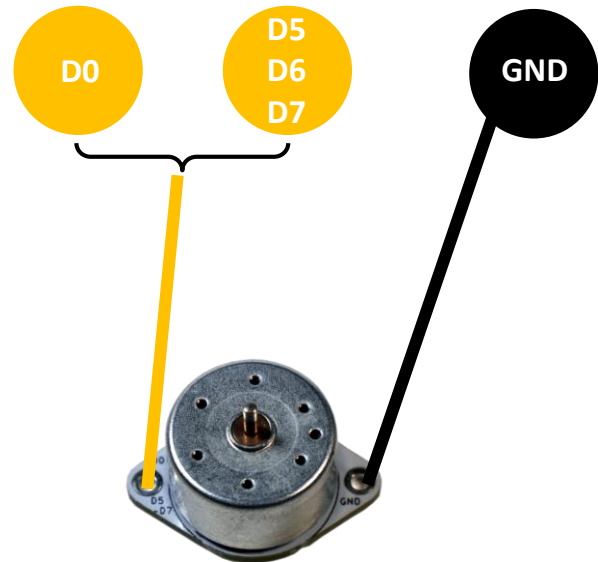
⚙️ Motors

Extensions

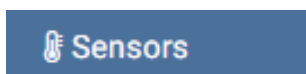
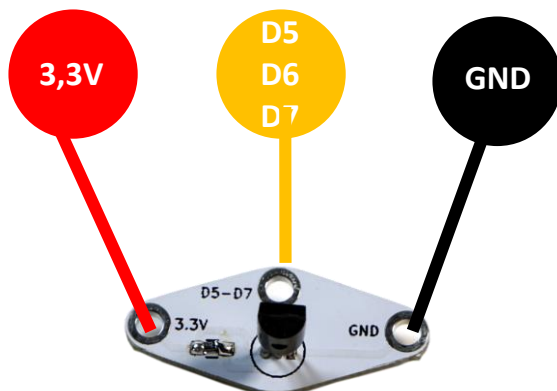
RGB LED Strip



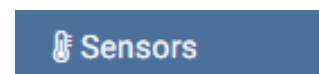
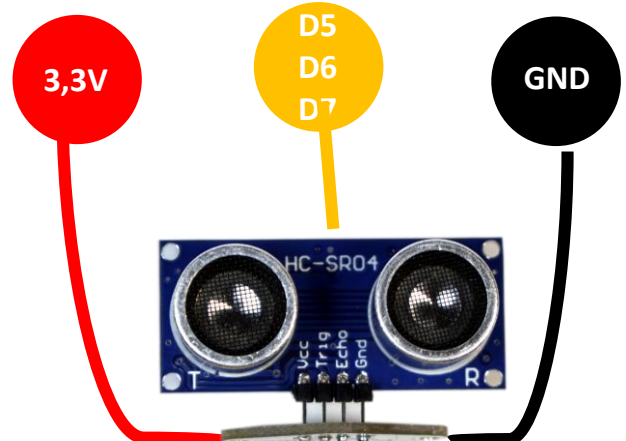
DC Motor



Temperature Sensor DS18B20

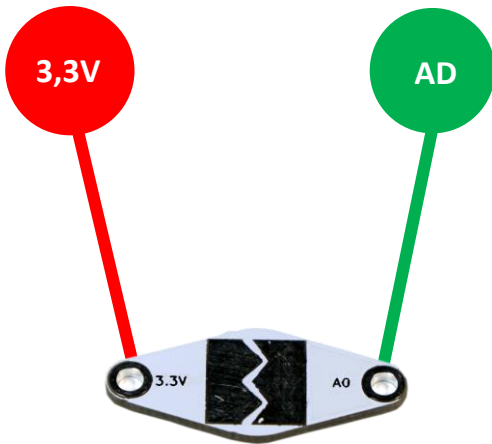


Ultrasonic Distance Sensor HC-SR04



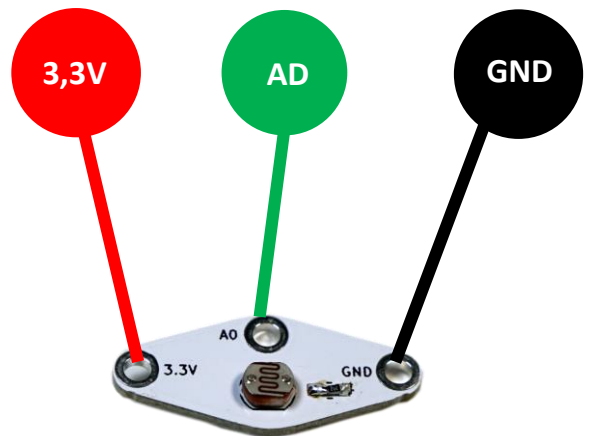
Extensions

Touch button



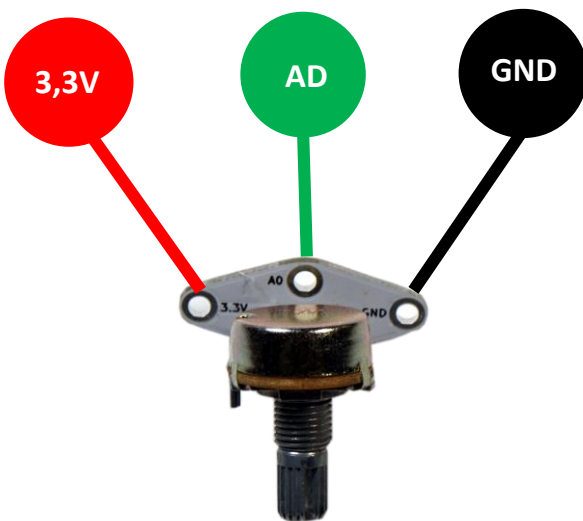
↔ Input/Output

Light Sensor LDR



↔ Input/Output

Potentiometer



↔ Input/Output