2023

SCRAPY Coder User Manual

Project number: **2021-1-FR01-KA220-SCH-000031617**

Co-funded by the European Union

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1. Introduction

The SCRAPY Coder is a drag & drop programming application, designed specifically for hosting a series of DIY projects based on the SCRAPY Kit. The programming environment is developed using Google Blockly, with several custom-made blocks of code to serve the requirements of the Kit's electronics, sensors, and components.

Using the Coder, an interested user can program several DIY electronic devices, learning at the same time physical computing concepts, and electricity and circuits paradigms. The Coder also provides the possibility to the user to create their own projects and program them using the coding environment.

This user manual will help users and educators get started with the SCRAPY Coder, understand its various functionalities and features, and finally become familiar with the Blockly programming environment in order to implement the Coder's projects as well their own.

2. Loging in

Accessing the SCRAPY Coder, can be done by visiting the project's website (www.scrapykit.eu) and simply click on the "Coder" button on the homepage.

Alternatively, users can use the following url: www.coder.scrapykit.eu.

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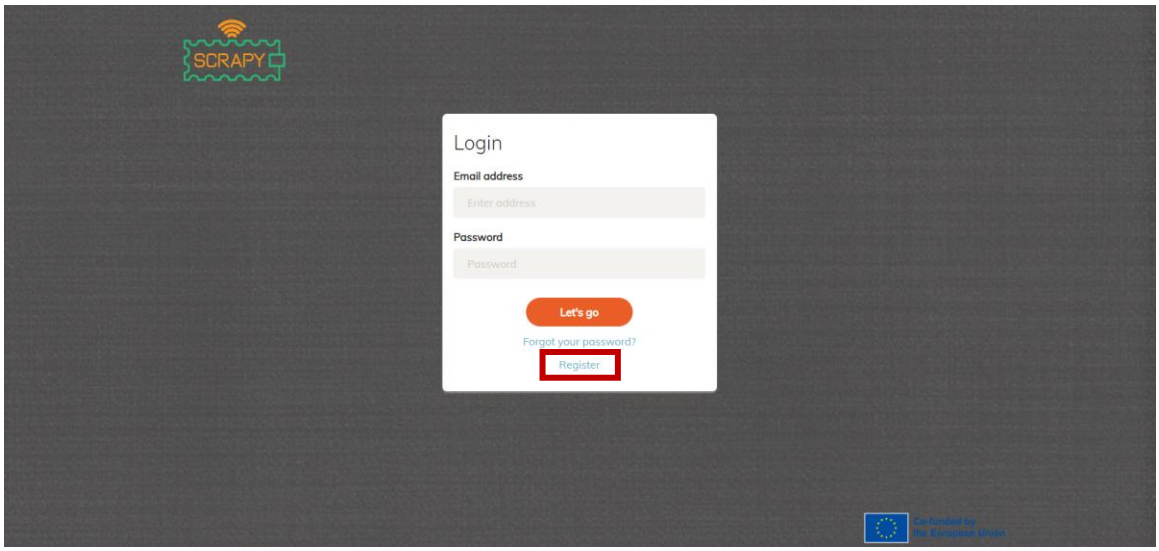
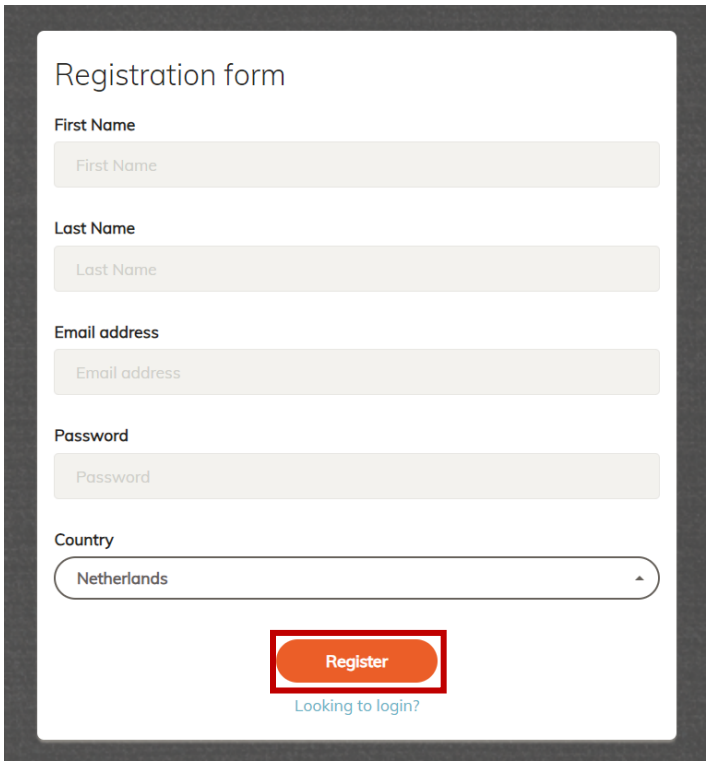
First time users are required to create an account. At the login page, simply click on the “Register” button.



Fill in your information and click on “Register”.



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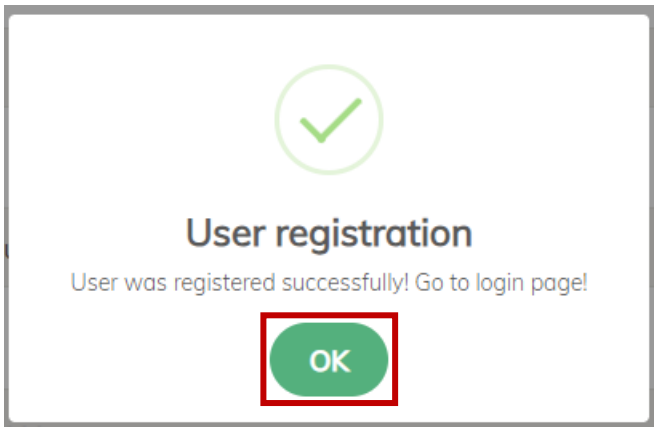
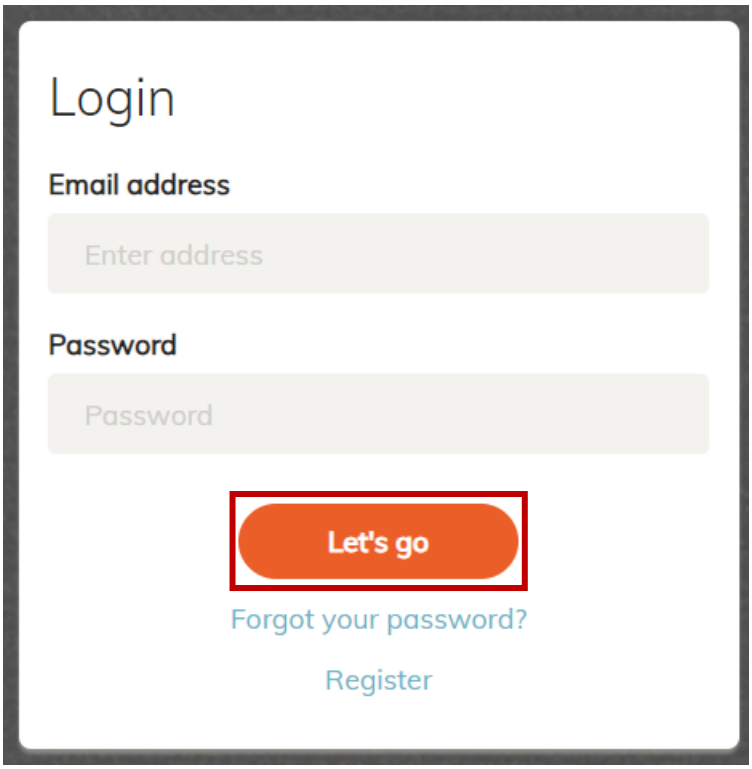
A pop-up message will appear after a successful registration. Click on “OK” and go to the login page by clicking on “Looking to login?”. Additionally, a confirmation email will arrive at your inbox, verifying your registration.



At the login page, insert your email address and password, and click on “Let’s go”.



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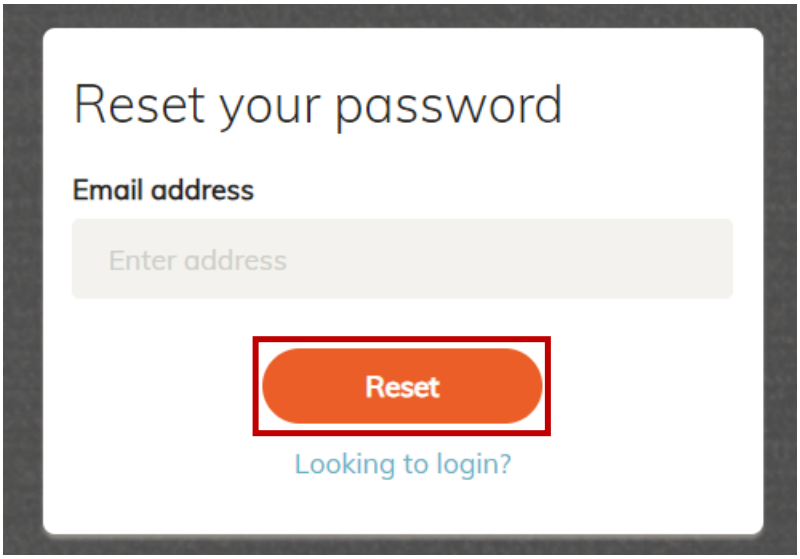
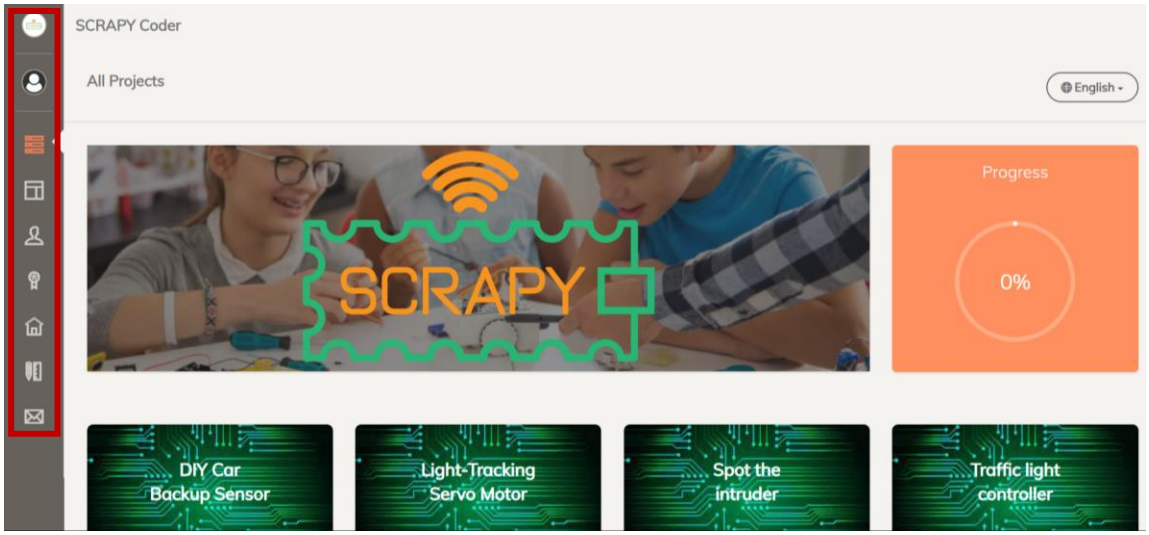
In case you forgot your password, simply click on “Forgot your password?”, and you will be redirected on the password reset page. There, insert your email address and click on “Reset”. An email containing further instructions will arrive at your inbox.



3. Home page

After successfully logging in to your account, you will be redirected to the Coder’s homepage. There, the list of available projects will be presented, along with language selection options, progress status and some other information. Most of the Coder’s features can be accessed through the navigation panel on the left side of the homepage.



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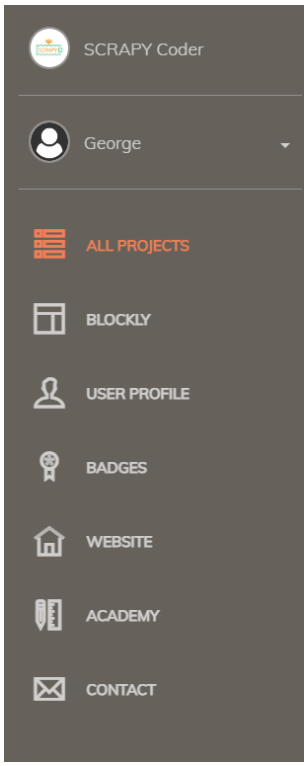
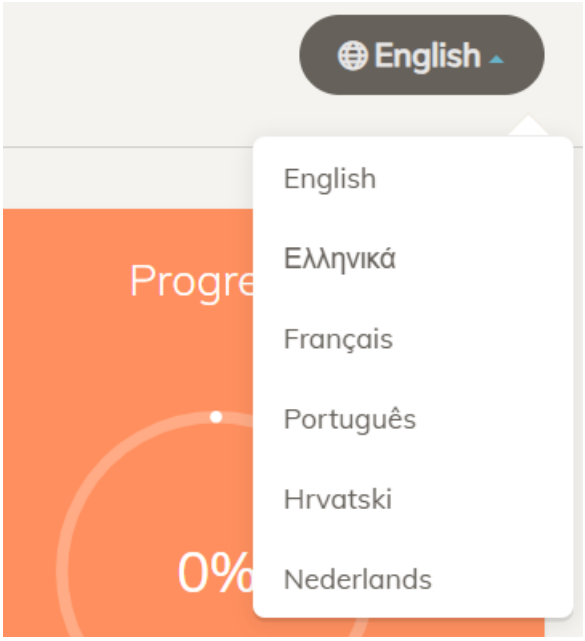


3.1. Language selection

On the top right corner, there is a language selector. Simply click on it and choose your preferred language. The SCRAPY Coder is provided in six languages: English, Greek, French, Portuguese, Croatian, and Dutch.



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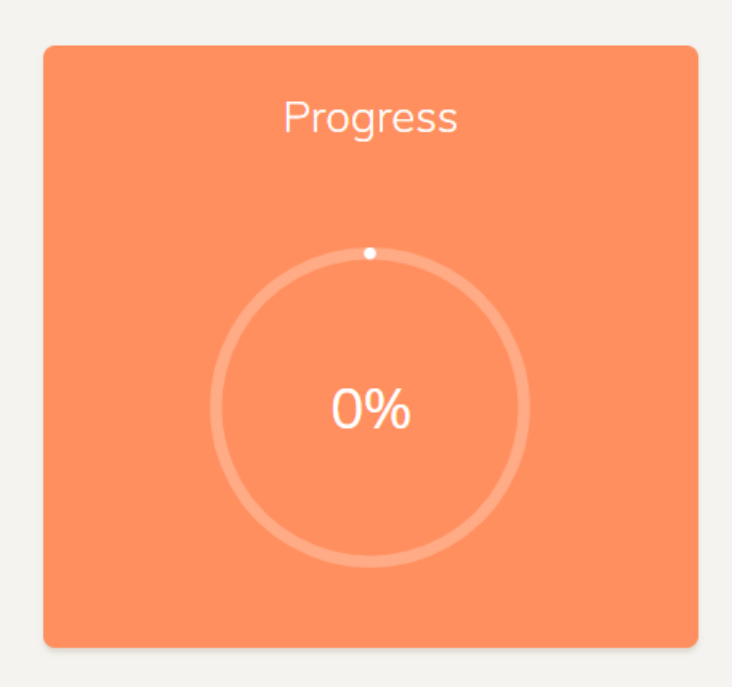
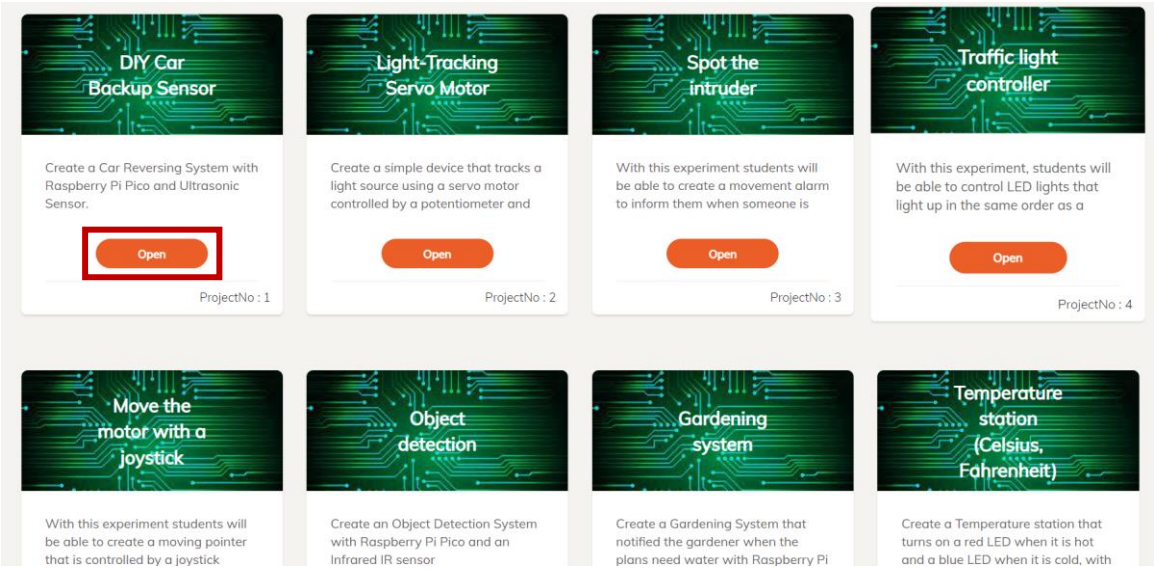
3.2. Progress

Directly under the language selector, there is a progress wheel. Each time you complete a project, the percentage will increase until you reach 100% completion.



3.3. All Projects

The Coder provides access to 12 DIY projects, utilizing the SCRAPY Kit's electronics, sensors and other components. All projects have free access by simply clicking on the "Open" button.



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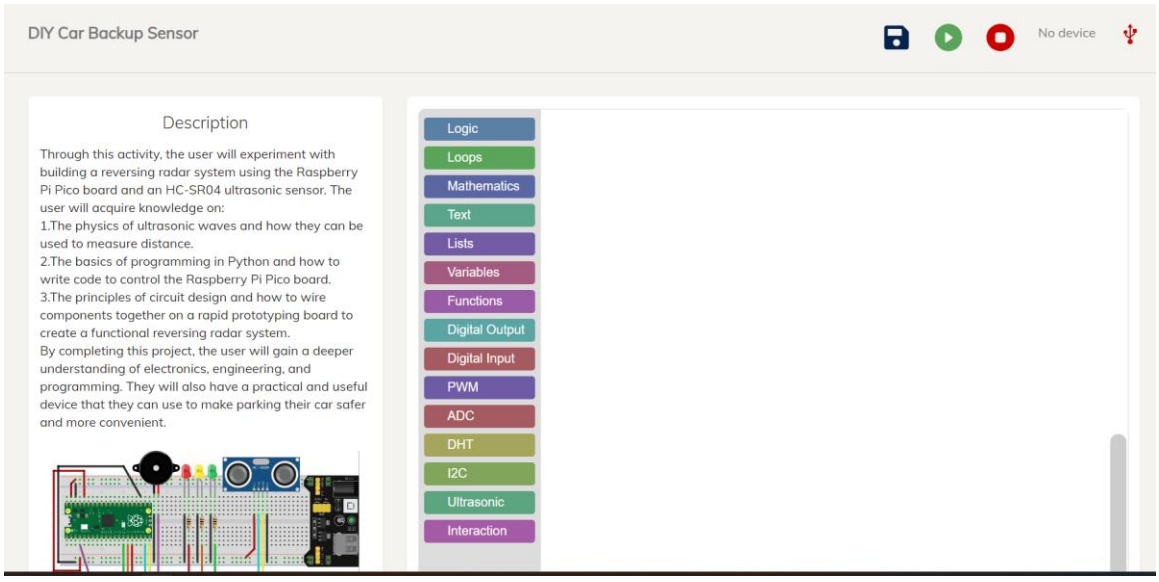
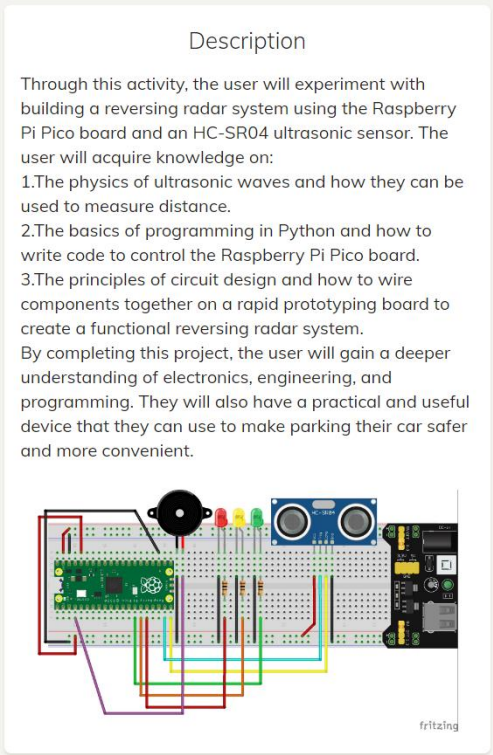
By clicking on the “OPEN” button, the user will be directed to the coding environment for this specific project.



There, the user can see the Blockly coding environment, a description of the project, and a step-by-step guide for implementing the project.



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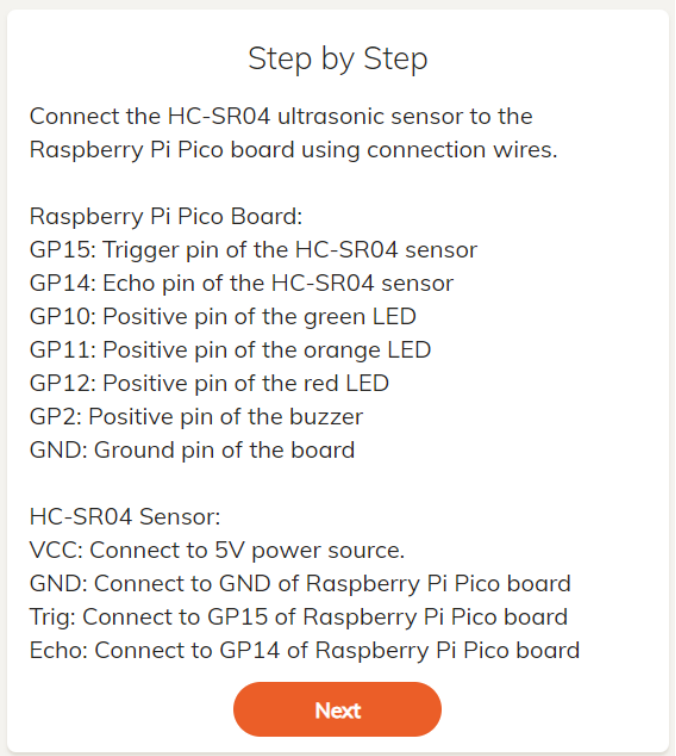

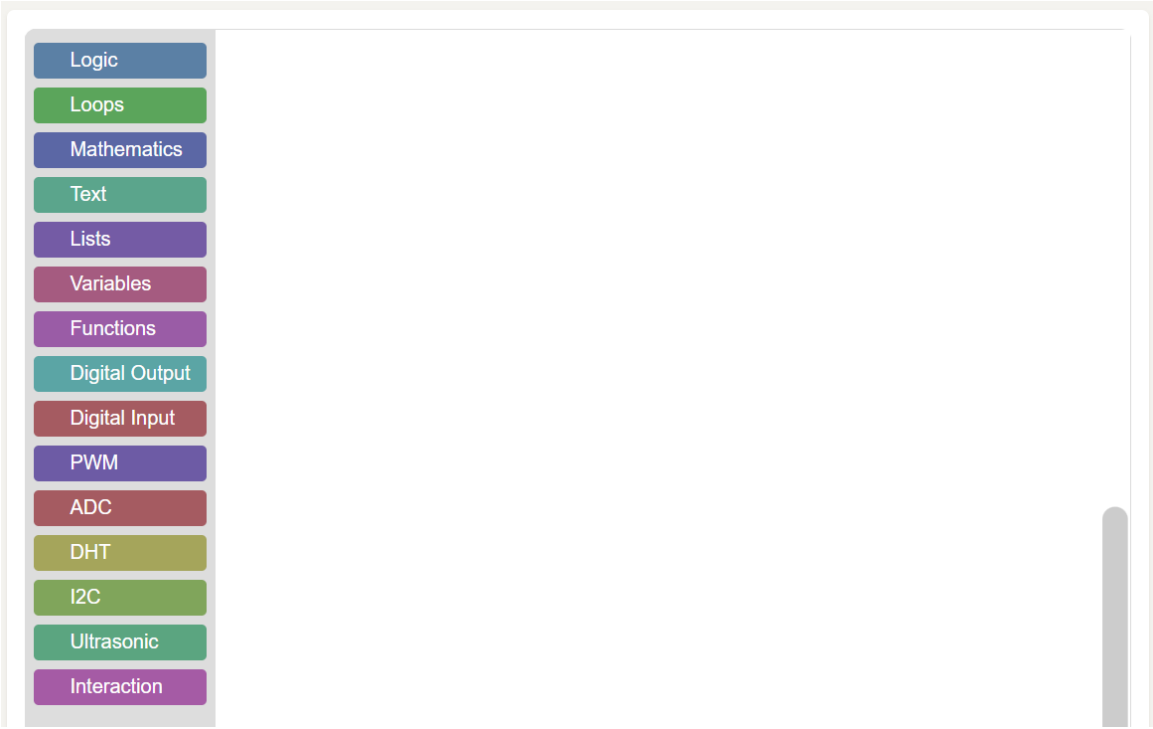

In addition, there a few options on the top right corner related to the connectivity of the Raspberry Pi Pico.

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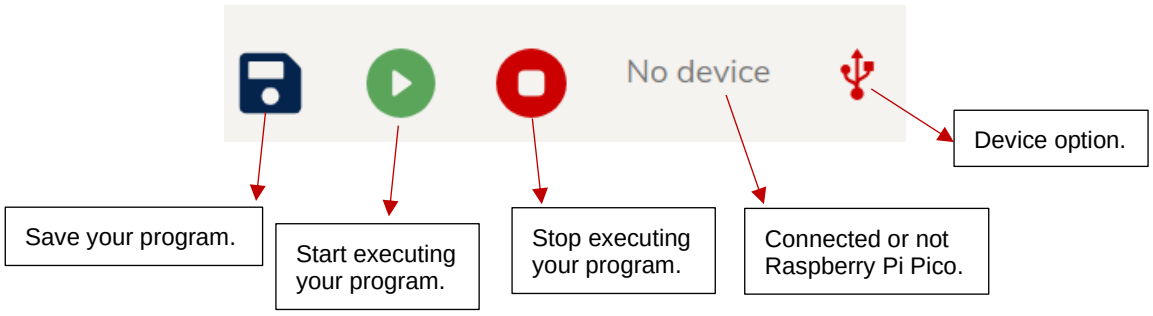
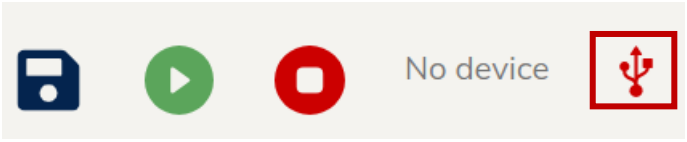
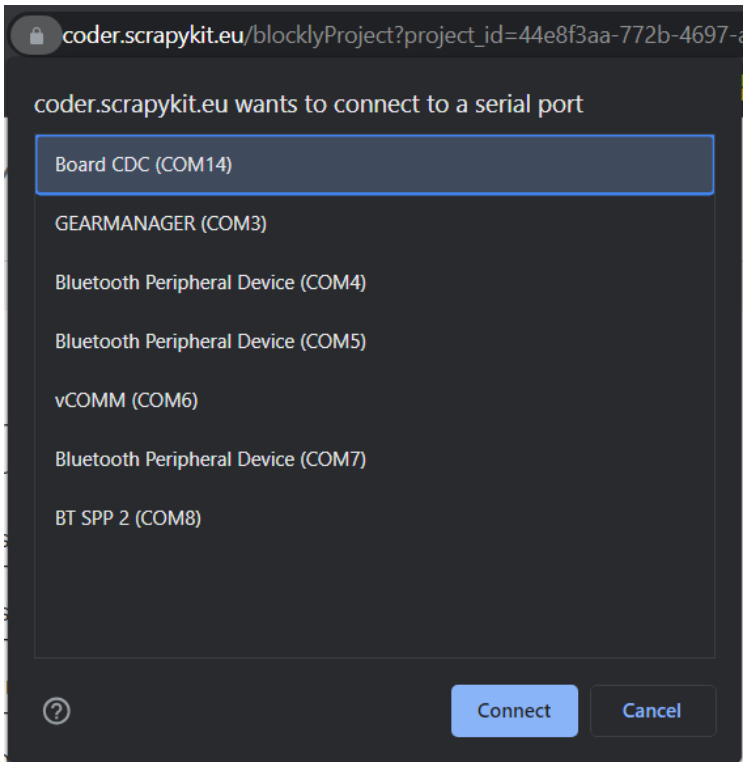


To make the Coder interact with the physical world, you need to connect your Raspberry Pi Pico. The first step is to ensure your Pico has its firmware installed. Browse pages 12-19 of the SCRAPY Kit Manual if you are not sure how to do that. Make sure to close the Thonny Python application. Then, go to the project of your choice, and click on the Device option icon.



A list of all available devices, connected to your computer will pop-up. Choose the one called Board CDC. Then click “Connect”.



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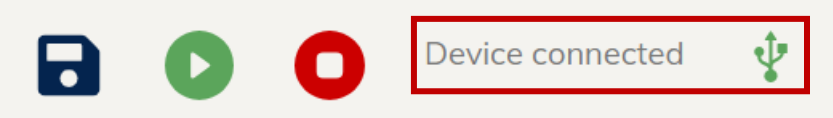
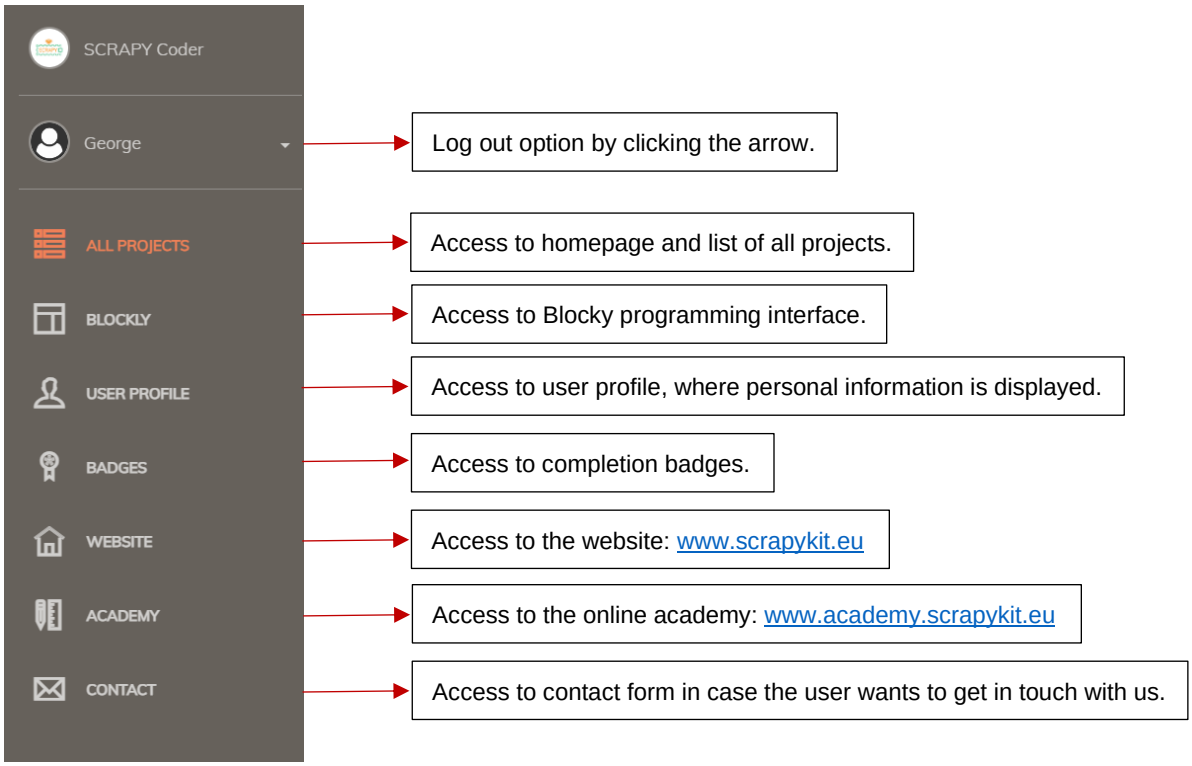
You will get a message that the device is connected, which can also be seen in the top right corner.



Now, you are ready to start building your code for the project of your choice. Once ready, click on the Play button and see what happens in the physical world. You will also get a message that your program is running. If you need to stop your program, simply click on the Stop button.

3.4. Navigation bar

The navigation bar on the left offers quick access to several features and information related to the Coder, as well as the project SCRAPY.



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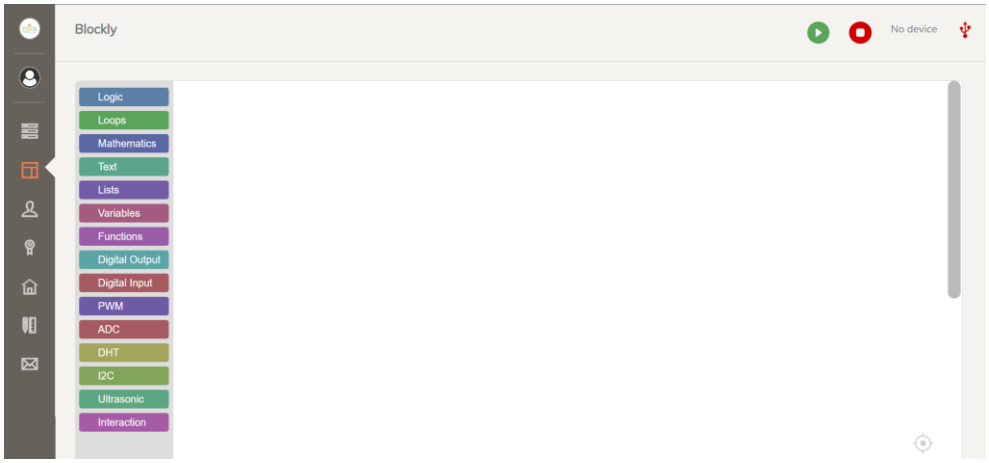
4. Blockly programming environment

Accessing the Blockly programming environment can be done by the navigation bar on the left by simply clicking on “BLOCKLY”. The application will redirect you to the following interface:



Blockly gives a variety of blocks in order to build different programs depending on your needs. All blocks can be accessed through the “Blocks” bar on the left where all coding categories are displayed. Coding blocks can be dragged and dropped on the white coding space. Each category offers several coding options.

Logic	Logic describes actions such as if statements and true/false conditions.
Loops	Loops are control structures and repeat until a certain action occurs.
Mathematics	Mathematics handles calculations and can also issue random numbers.
Text	Text can access inputs and generate individual outputs.
Lists	Lists create lists in combination with text or math elements.
Variables	Variables can be used to assign pin numbers and other data.
Functions	Functions describe the code behavior when a certain input is detected.
Digital Output	Digital Output describes the state of a pin number (ON, OFF, TOGGLE).
Digital Input	Digital input assigns pin number to sensors that require input from the environment.
PWM	PWM provides custom coding blocks to electronics that require the PWM framework.
ADC	ADC provides custom coding blocks to electronics that require the ADC framework.
DHT	DHT is a custom block for using the DHT11 Temperature & Humidity sensor.
I2C	I2C is a custom block for using the I2C framework, such as for the OLED display.
Ultrasonic	Ultrasonic is a custom block for using the HC-SR04 ultrasonic sensor.
Interaction	Interaction is a custom block for using the `sleep` library and for measuring time.

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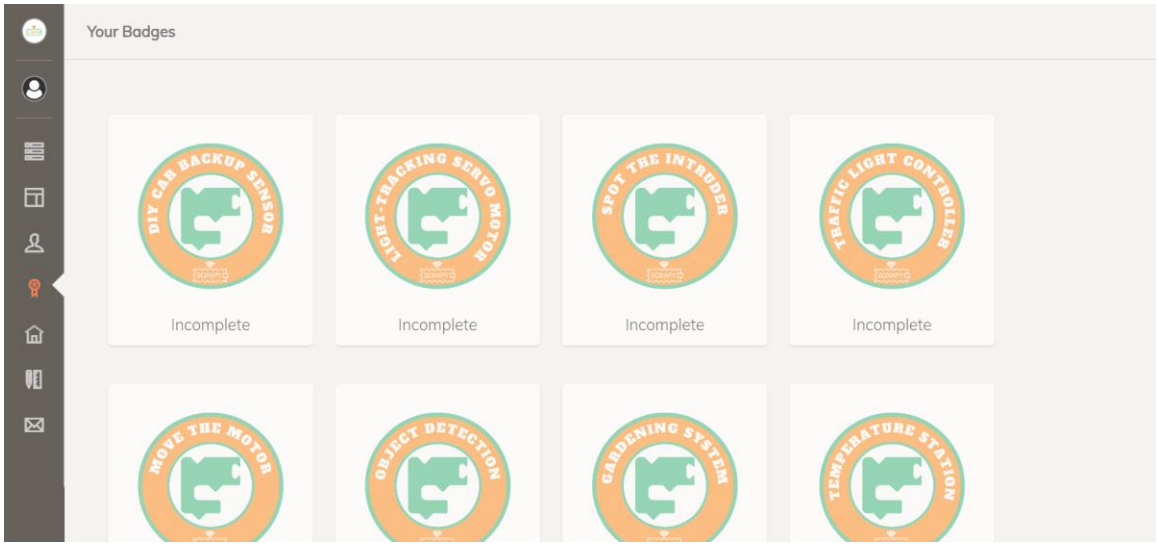
5. Badges

SCRAPY Coder awards completion badges for each completed project. These badges can be accessed through the navigation panel on the left, by simply clicking on “BADGES”. In the Badges page, users can see the awarded badges which are marked as “complete”.



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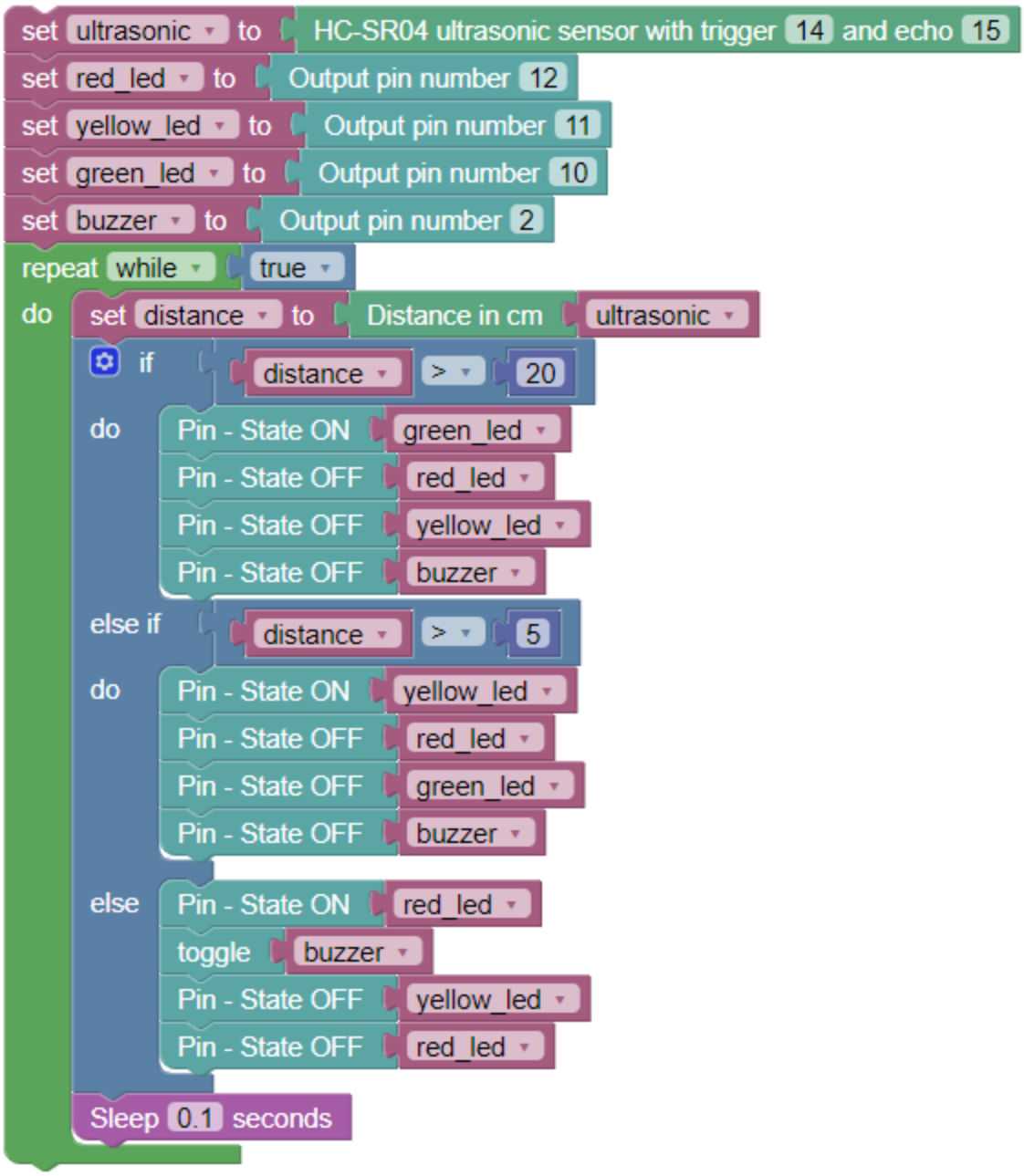
6. Projects solutions

Project No 1 – DIY car backup sensor



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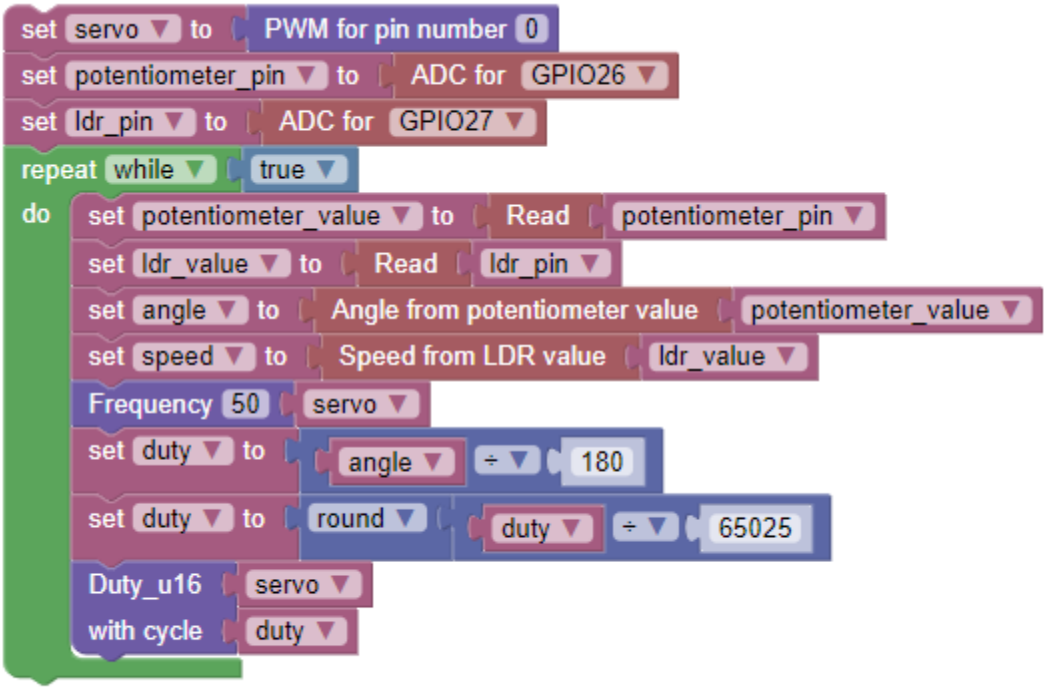
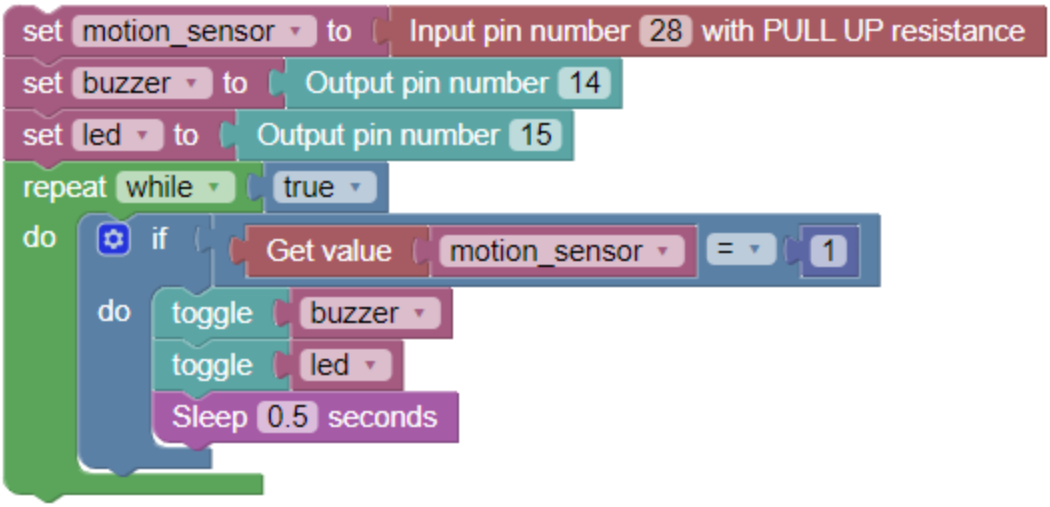
Project No 2 – Light-tracking servo motor



Project No 3 – Spot the intruder



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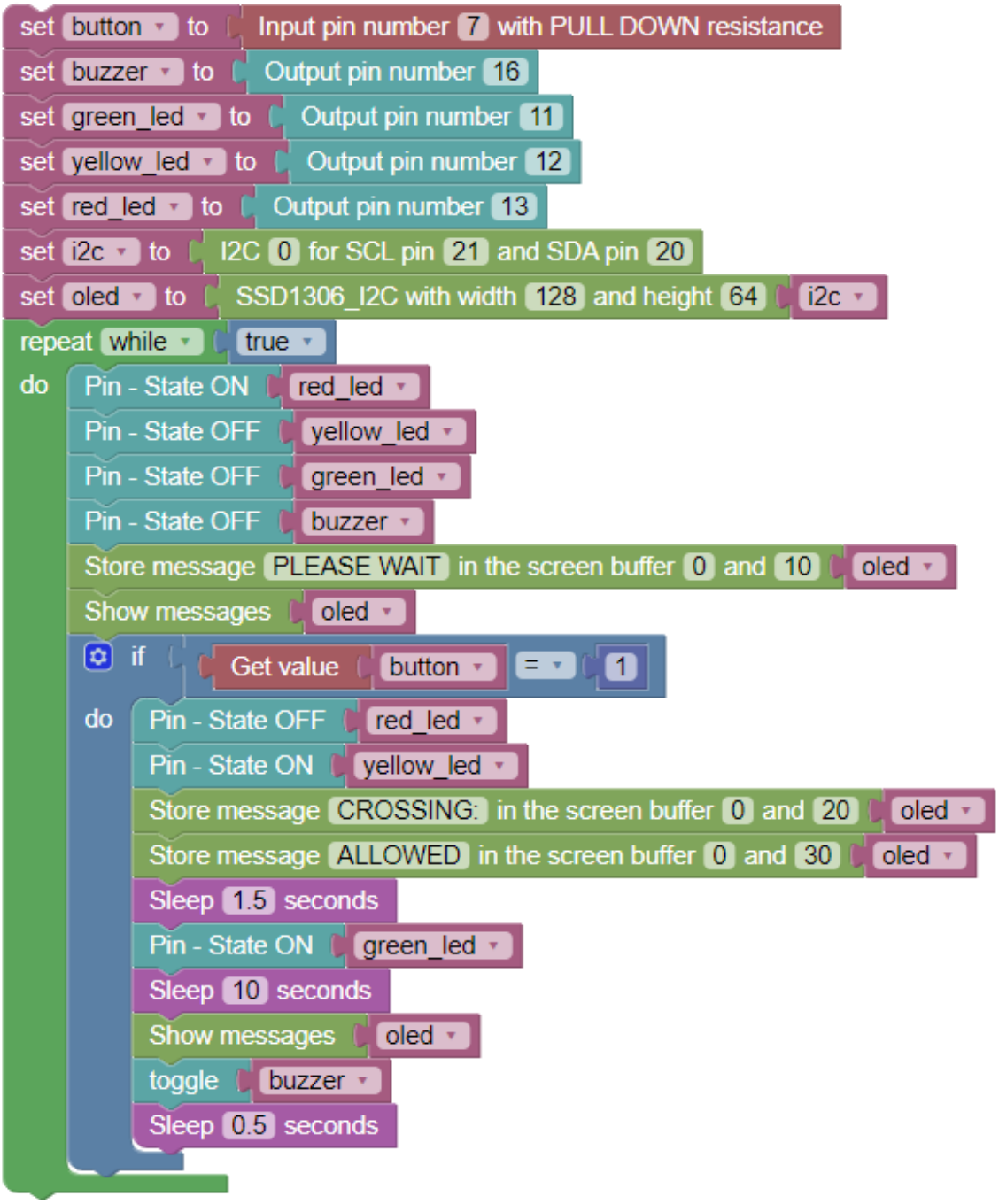
Project No 4 – Traffic light controller



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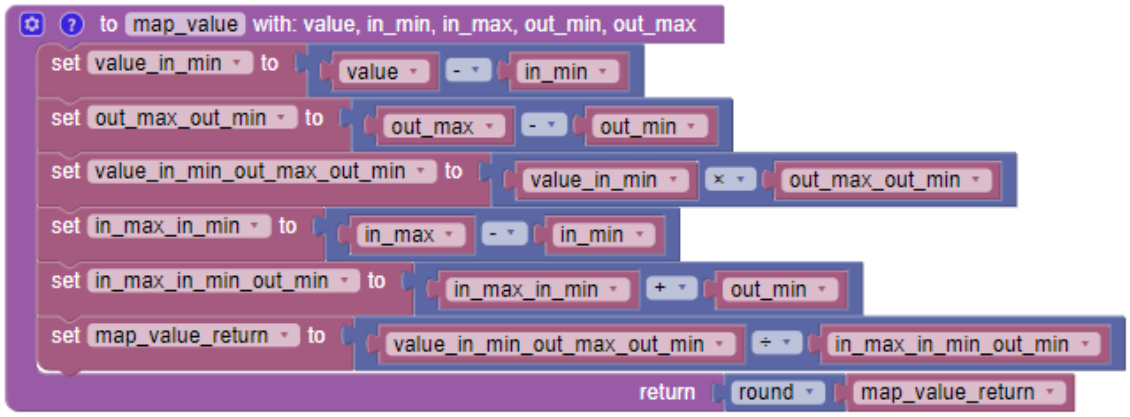
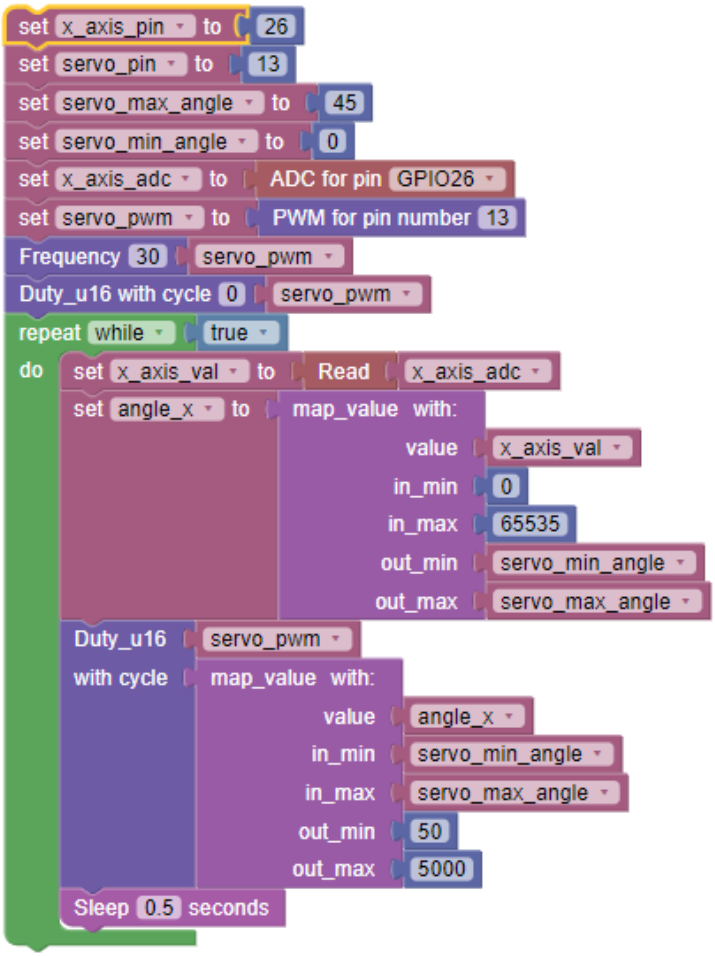
Project No 5 – Move the motor with a joystick





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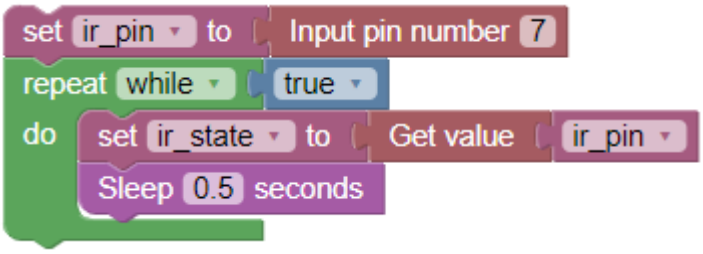
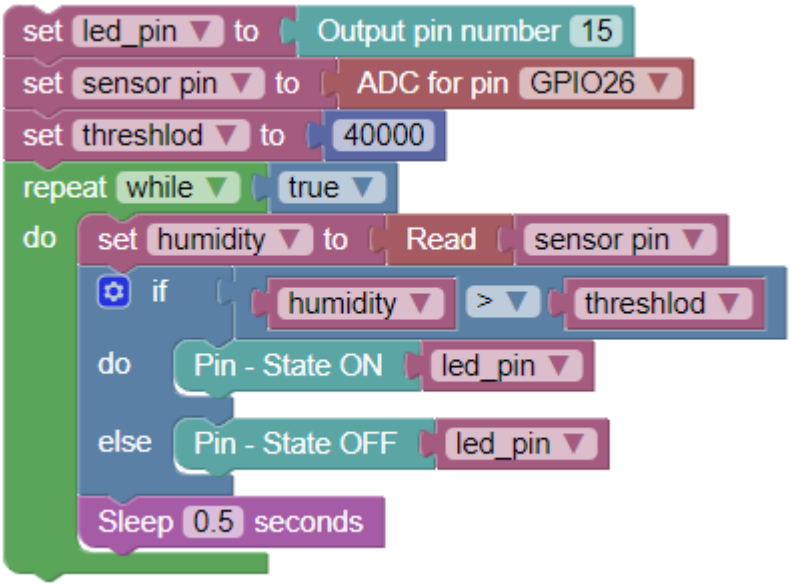
Project No 6 – Object detection



Project No 7 – Gardening system



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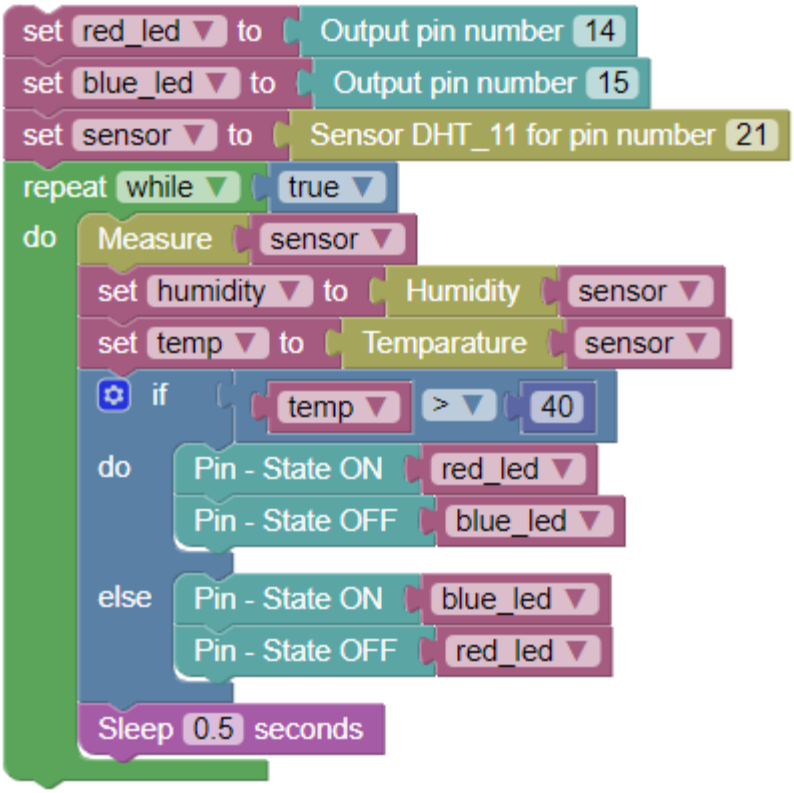
Project No 8 – Temperature station (Celsius, Fahrenheit)



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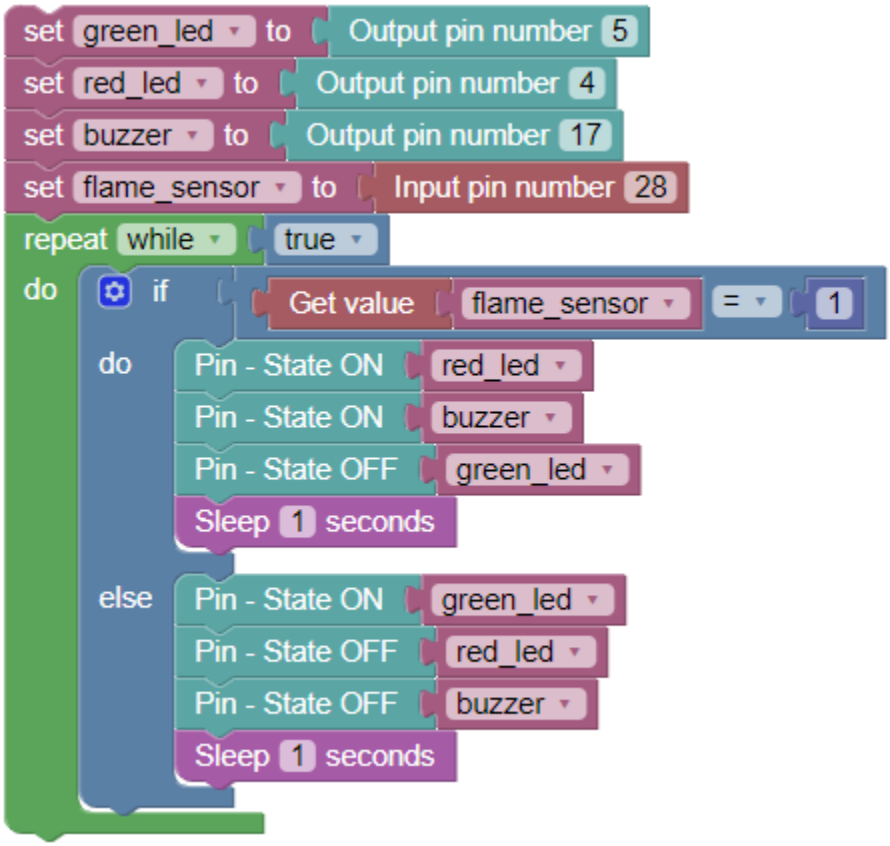
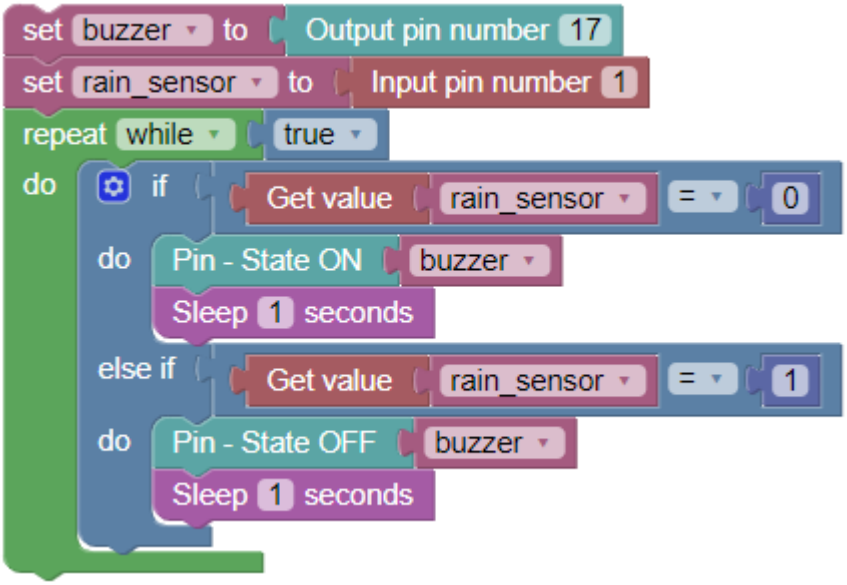
Project No 9 – Fire alarm



Project No 10 – Smart clothes dryer



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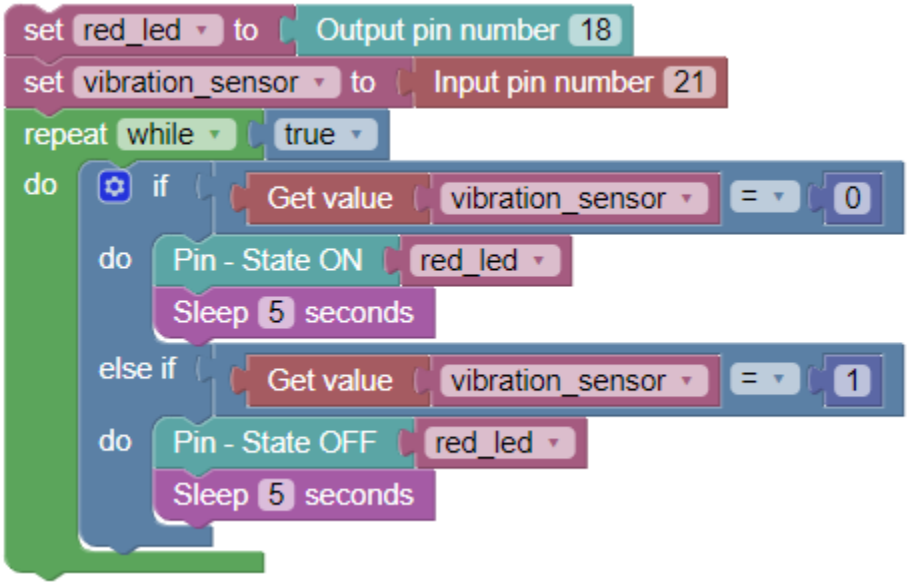
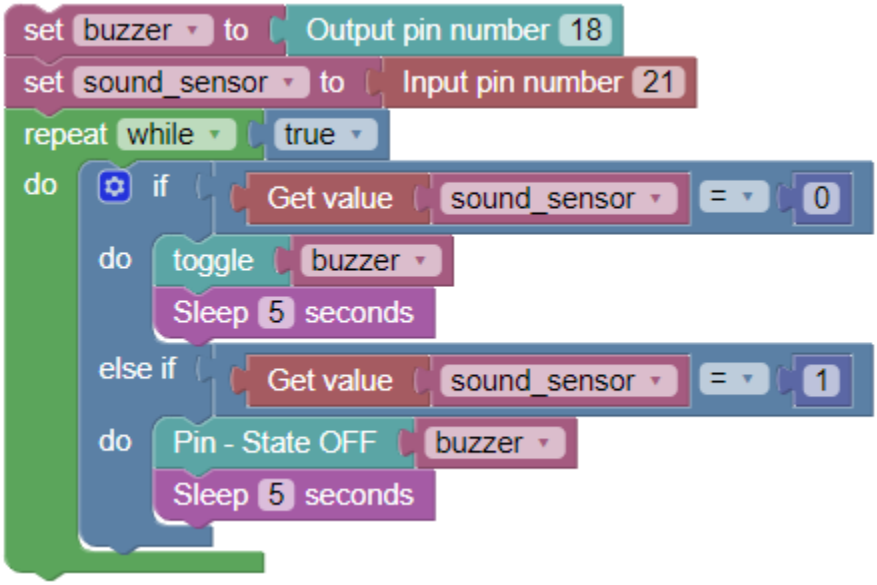
Project No 11 – Knocking light



Project No 12 – Sound detection warning alarm



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