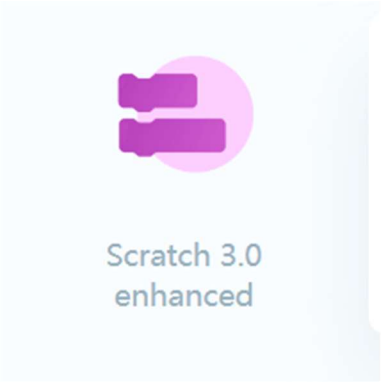
Block Programming MBLOCK



Contents

What is block programming?

Block based programming utilized drag-and-drop method to stack/nest blocks. These blocks have a specific function which is usually written on the block itself. For example:

This block will turn the Red light of your car for 1 second then it turns it off.

Blocks are made from snippets of a higher-level language, called source code, and given a block shape by a software. So, block coding is a method of grouping codes (with a single function) together into blocks.

This method is an easier way to start programming. Programming is not only writing a bunch of codes either memorized or copied but rater it is using logical flowing statements. Mathematics, and problem-solving skills to approach a problem.

Software we will be using

For this event, you will be using a programming software called mBlock. This software is either block based or uses C or Python programming language.

To use mBlock, you either have an option of using the web version of install the offline software to your computer. To use the web version of the software, click on this link (https://ide.mblock.cc/) and it will take you directly to the mBlock website. But to upload a code even from the web version, you need to install mLink (discussed below).

To install mBlock to your computer follow the following steps:

- First install a software called 'mLink' from (https://mblock.makeblock.com/en-us/download/mlink/). This will be necessary to upload your code to your car or whatever robot you have.
- Then install the mLink software and open it.
- Afterwards go to the mBlock website (https://mblock.makeblock.com/en-us/download/).
- Then find mBlock PC version.
- Click Download for windows if you have windows and click Download for Mac if you have a mac/apple laptop
- Then install the mBlock software and open it.

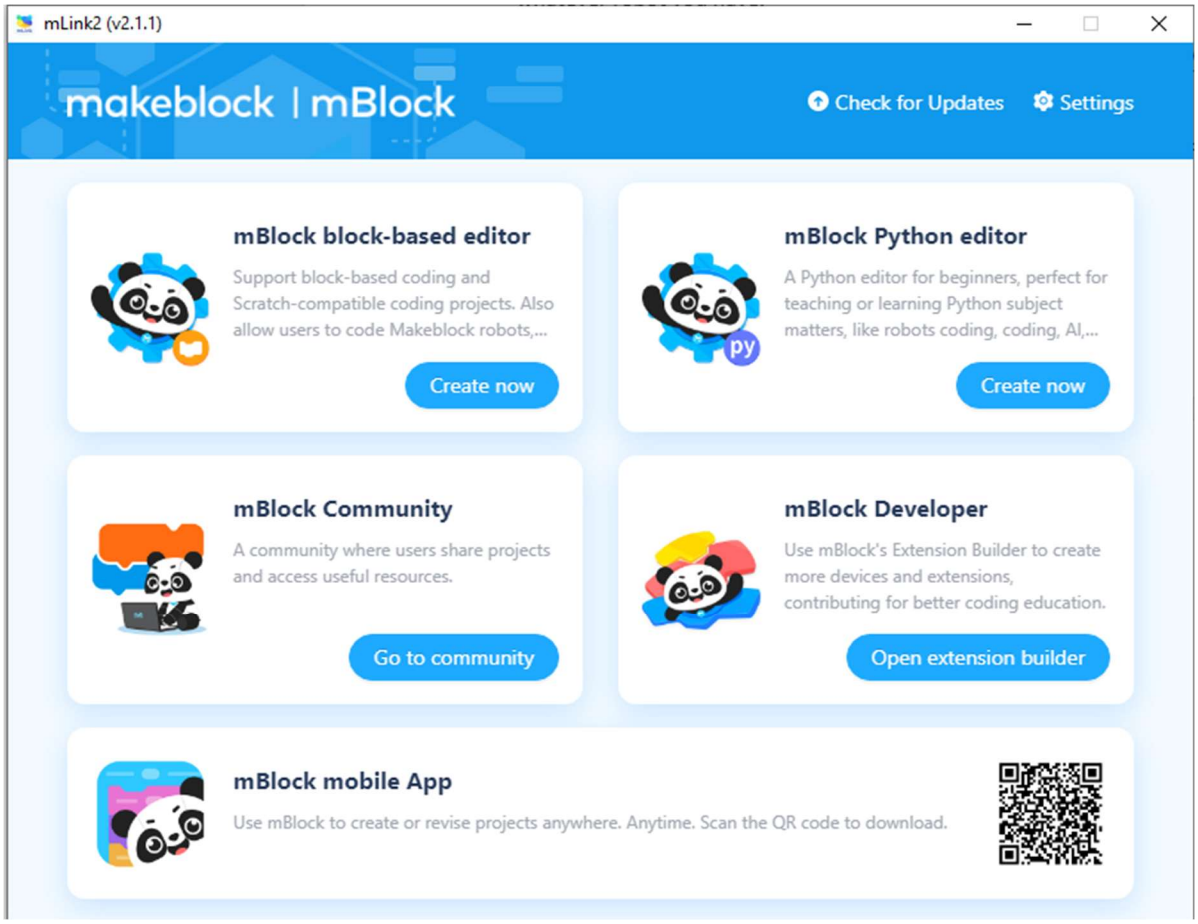


Figure 1: mLink window when opened in your computer.

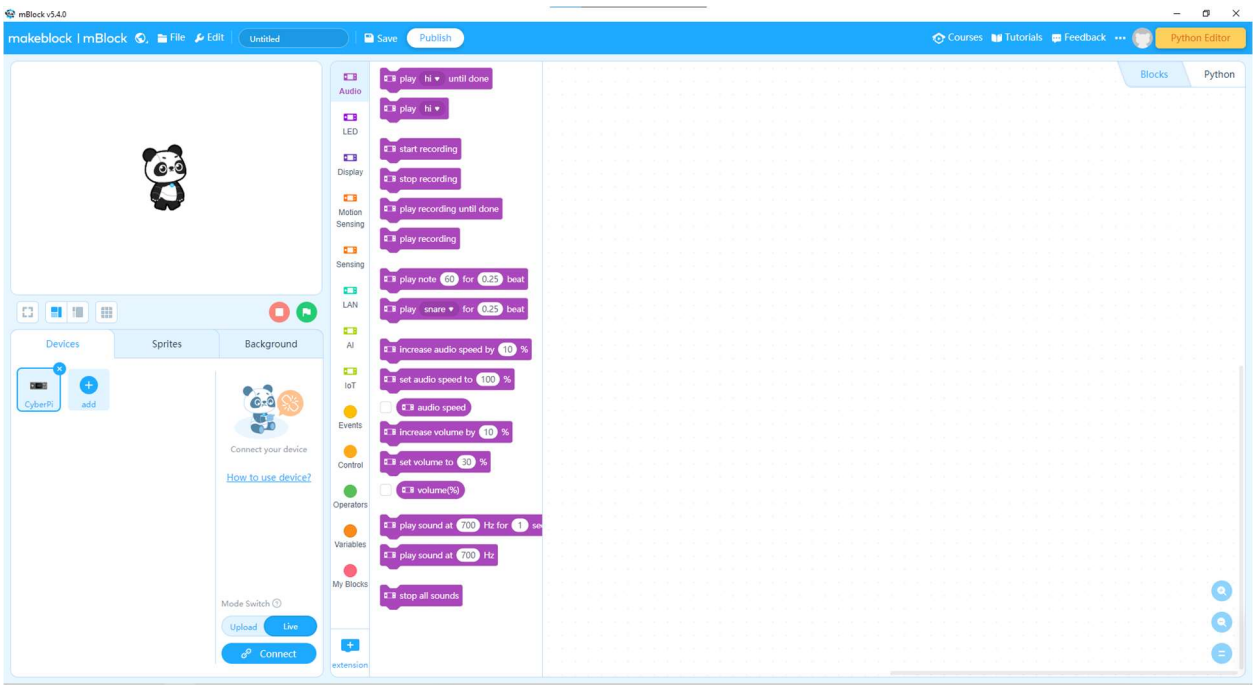


Figure 2: mBlock software when opened in your computer.

What mLink does

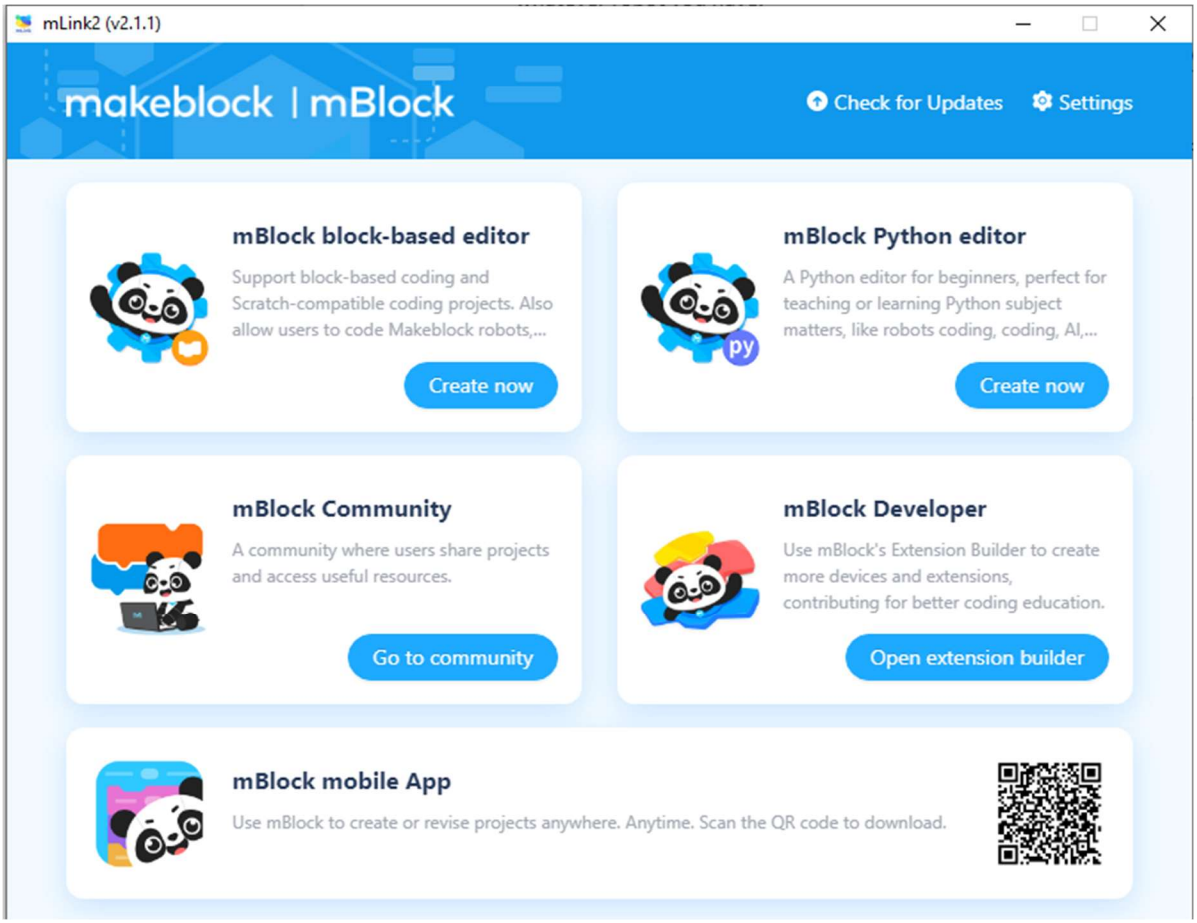
If we look at the mLink window there are 4 links to click and ne QRcode. Their function is listed below:

mBlock block-based editor: the “create now” button on this section will directly take you to the mBlock website where you can start to code with blocks.

mBlock Python editor: the “create now” button on this section will directly take you to the mBlock website where you can start to code with Python language.

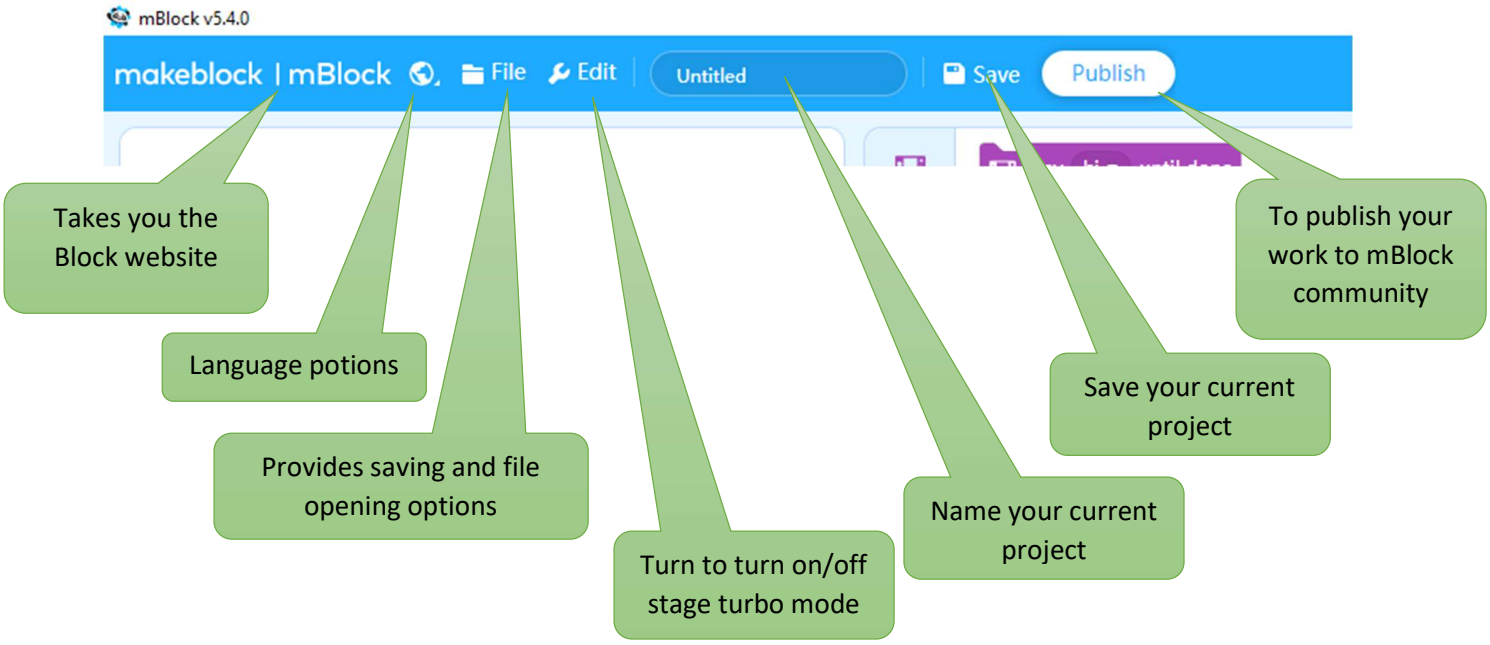
mBlock Community: the “Go to community” button on this section will directly take you to the mBlock community website where you can find resources to help you in your coding journey, find different accounts to follow, ask questions and look at answered questions.

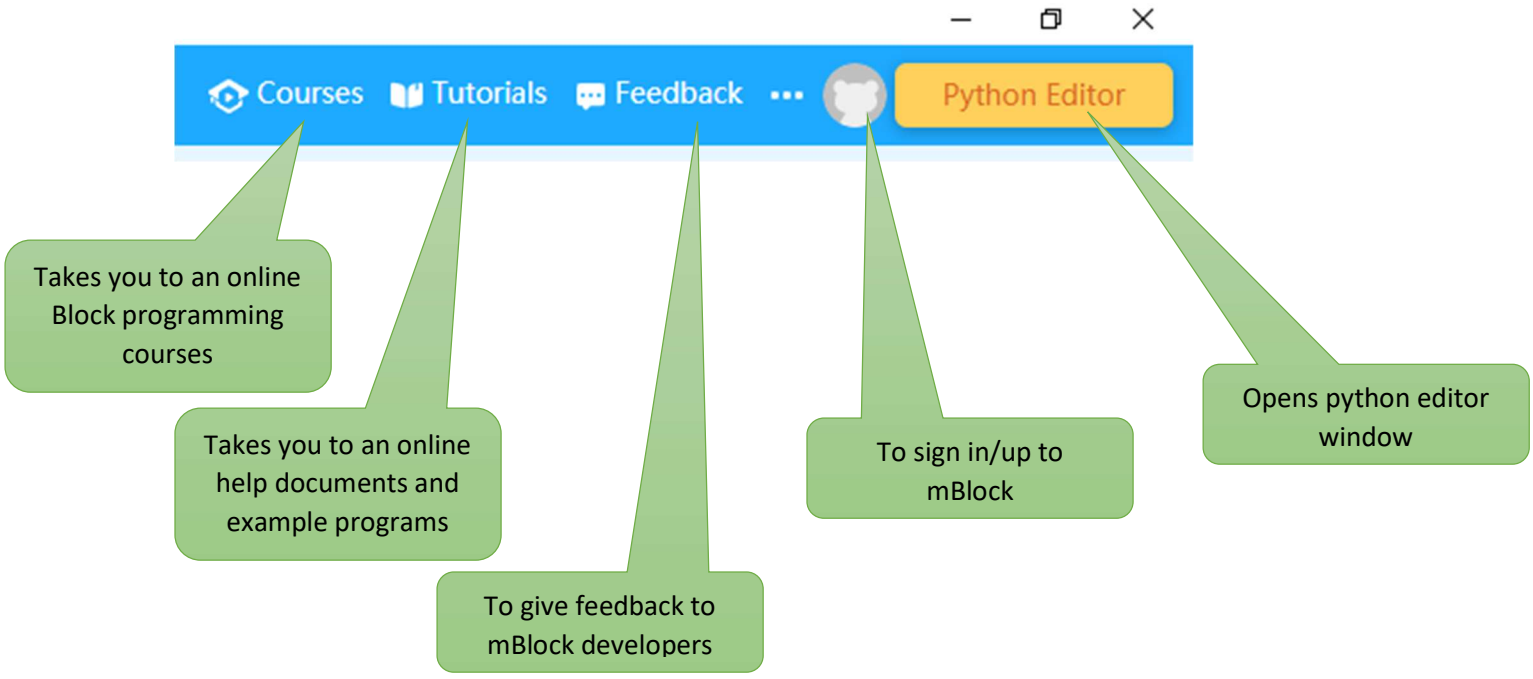
mBlock Developer: the “Open extension builder” button on this section will directly take you to the mBlock extension builder website where you will be required to make an account (it is the same account as your mBlock account if you have one).



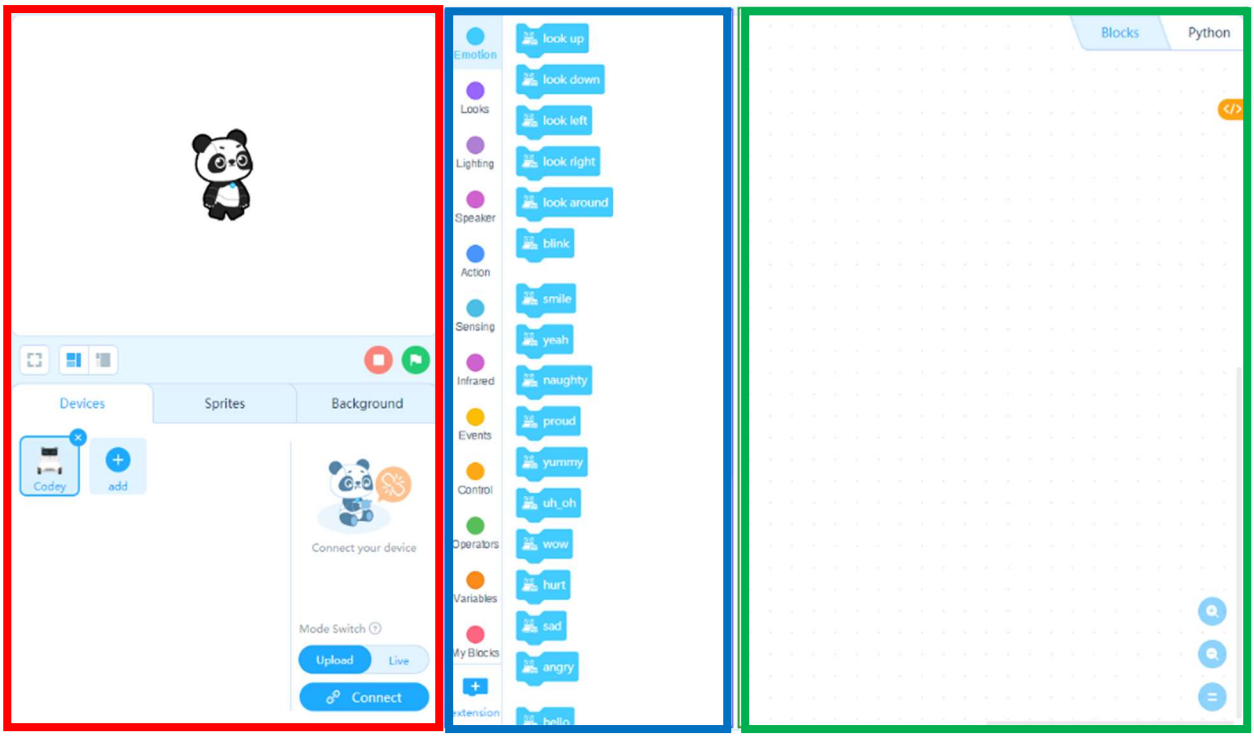
Navigate through mBlock UI

Toolbar

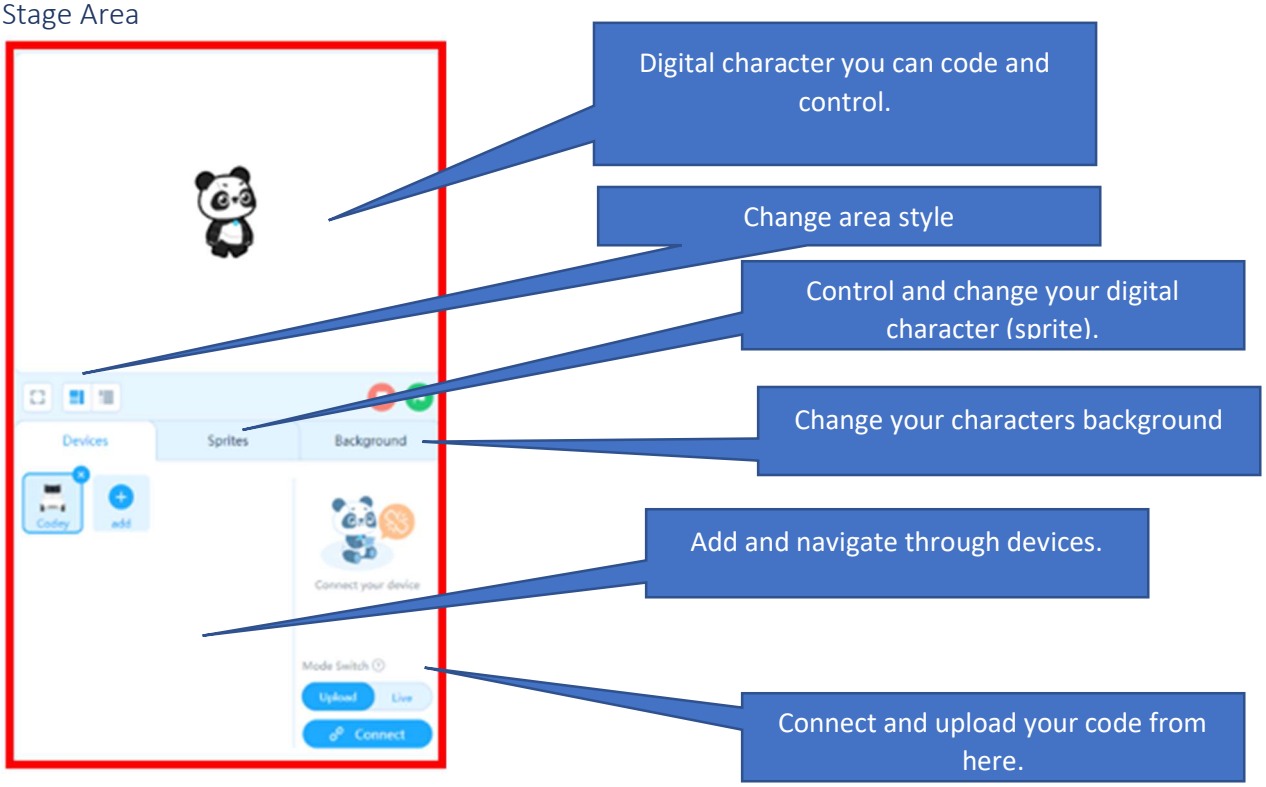




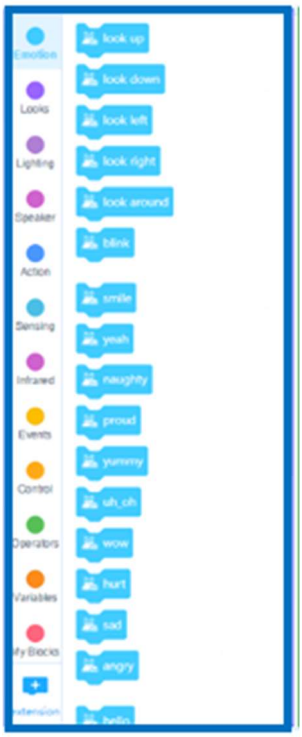
Editing Area



Stage Area

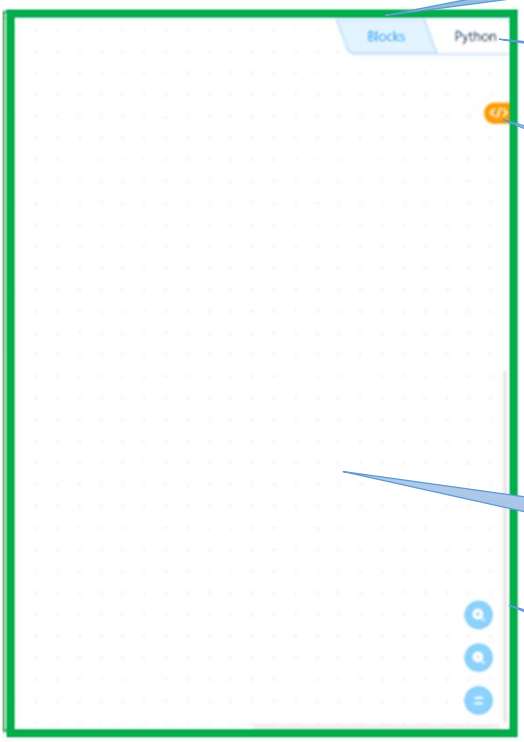


Blocks area



You have different blocks and groups to categorize blocks.

Script area



Block programming work area

Python work area

Place to see your equivalent C language interpretation of your block code.

Work area where you drag and position your blocks

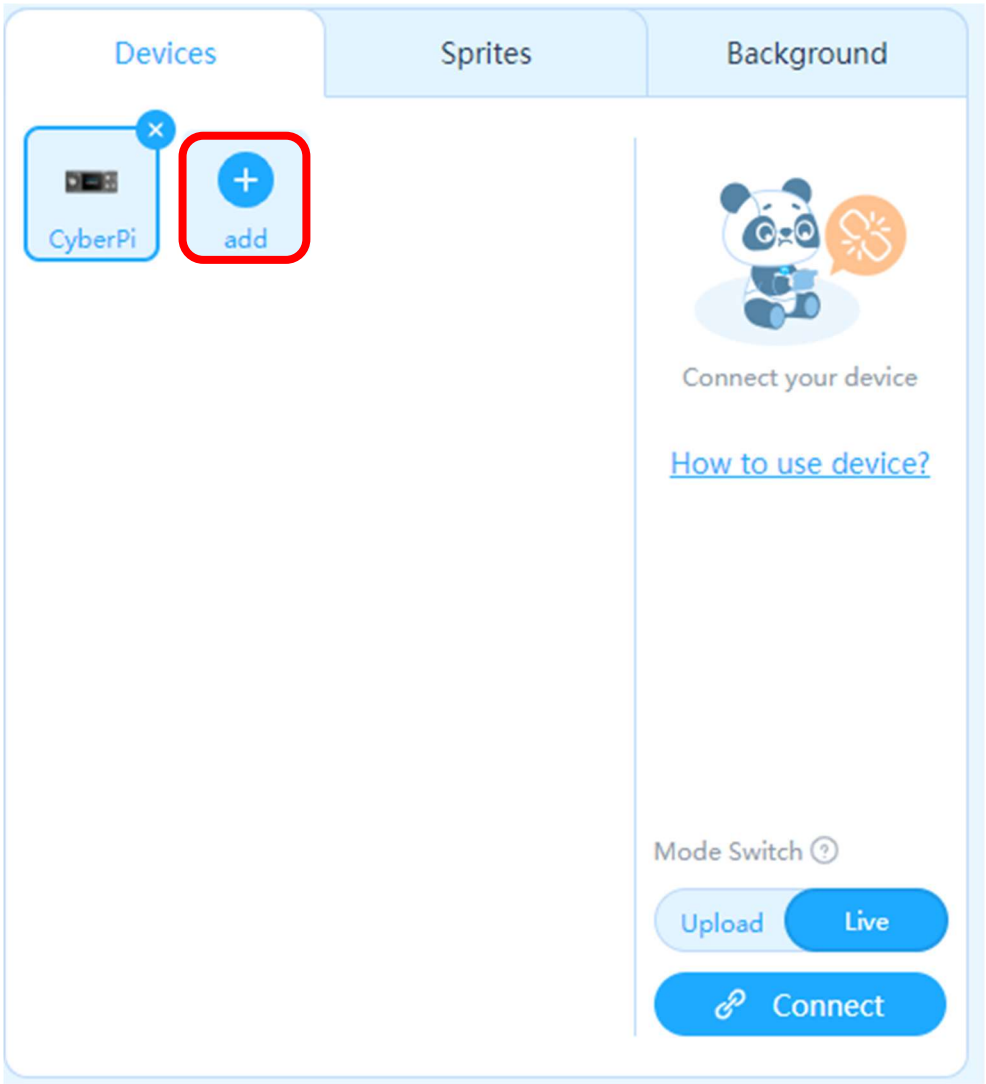
- Zoom in
- Zoom out
- Center screen

Start to program for our freenove 4WD car

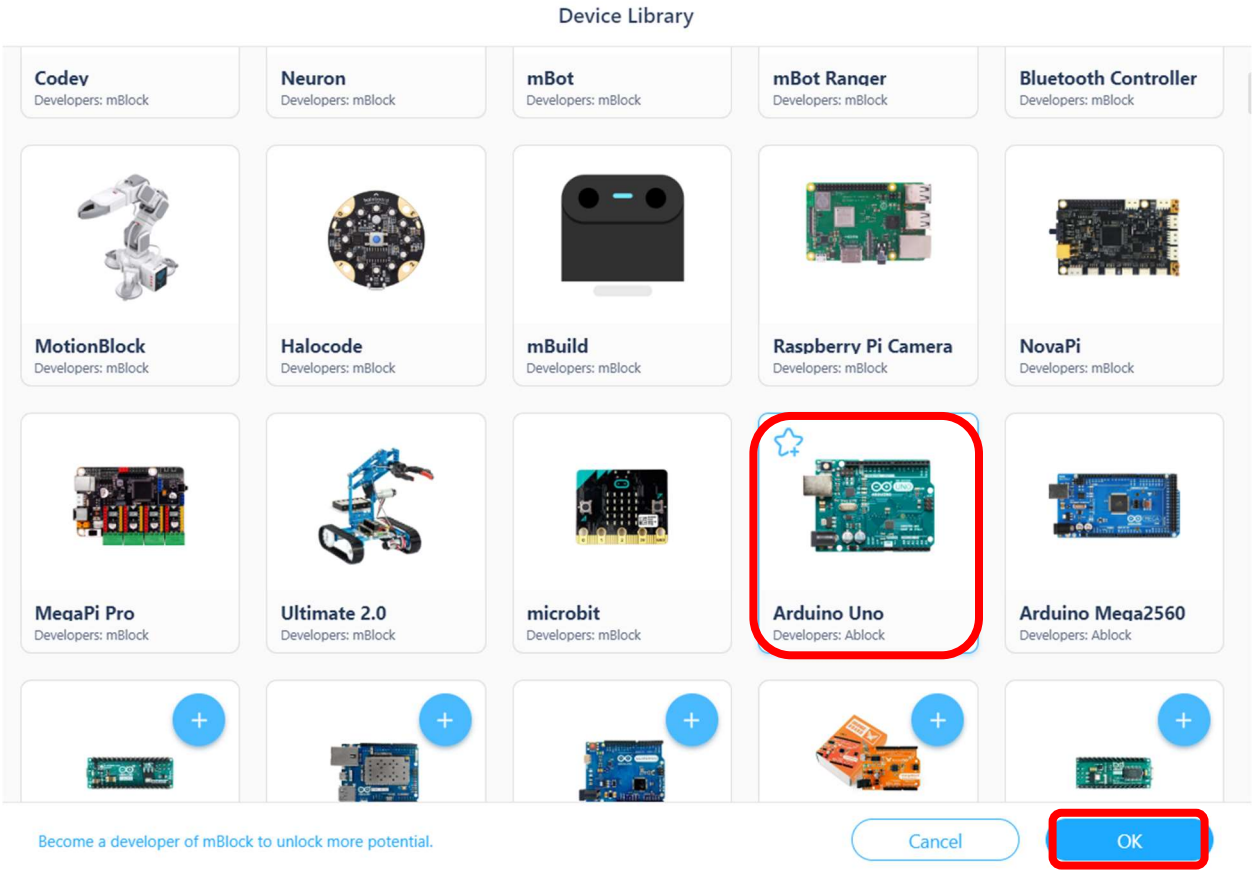
Programming in the website or the offline program is basically the same. The following instructions will be given by using the pictorial aid of the offline software.

Setup device and extension

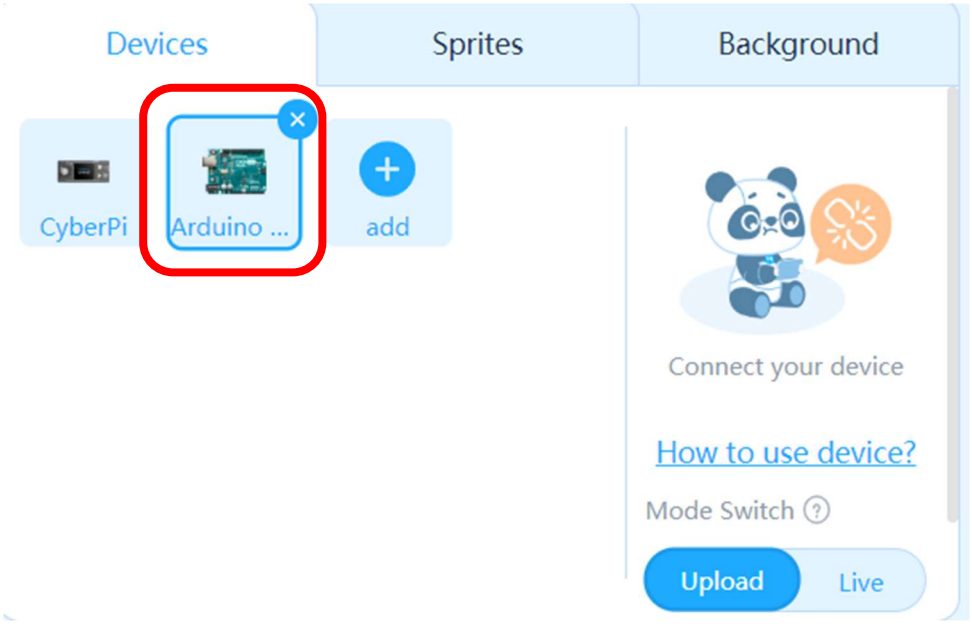
- Go to devices section and click the “+” option



- Then scroll down and find a device called “Arduino Uno”. If it isn’t downloaded yet, it will have a blue plus sign on it which you have to press. Then click the device and click OK at the bottom right.



- Then you will have your device ready for programming.



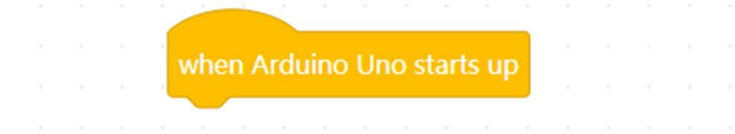
- To start using your car, you need an extension for programming it. I will be available and already uploaded to your mBlock software (if not please ask your instructors). So your blocks should be classified as this:

What each block does

You will not be using all the blocks for your activities and so this document will be outlining the set of blocks you will be needing.

Events

From this section the section will only allow you to use one block in upload mode. This block looks like:

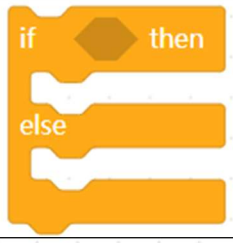


This block makes it so the rest of your other codes work. This is because it includes all the necessary libraries for an Arduino. So, you **need to always ha**ve it be at the beginning of any code you are working.

Control

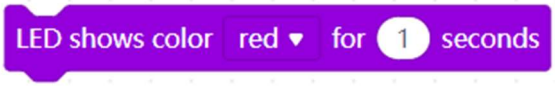
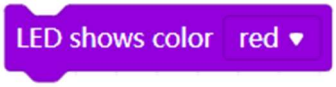
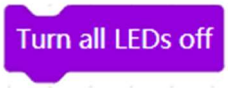
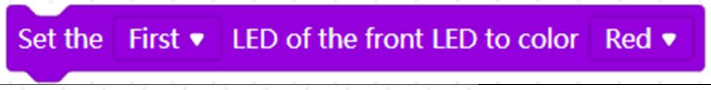
This section includes all your conditional blocks, wait block and repeat blocks.

	This block will insert a delay/pause of how many seconds you want. (In this case it is1 seconds)
	This block repeats whatever block of code is inside it, how many number of times you have specified. (In this case it is 10 times)
	This block repeats whatever block of code inside it, infinite times until you decide to unplug your device.
	This is a conditional block that executes a block of code you put inside if the condition you set is met.

	This is a conditional block that executes a block of code you put inside if the condition you set is met. If the condition in the if section is not met, then your block of code in the else section will execute.
	This block inserts a delay/pause until the condition you put is fulfilled.
	This block repeats whatever block of code inside it, infinite times until the condition you put is fulfilled.

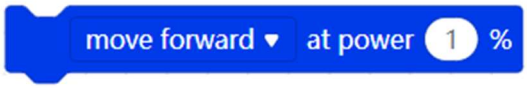
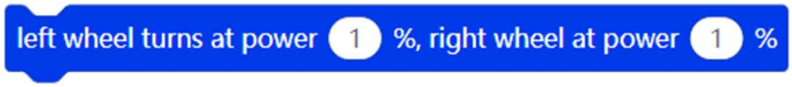
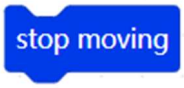
Show

This section includes all your blocks that control the LED lights.

	This block will light your LED in the color you chose from the dropdown menu for how many ever seconds you want. (In this case, the LED is red for 1 second then turns off)
	This block will light your LED in the color you chose from the dropdown menu forever till you stop it. The LED will not automatically turn off so it might require a stop LED block.
	This block will turn all LED off
	This will turn the LEDs as the color combination of the primary colors red, green, and blue.
	This will turn individual LEDs you choose as the color you chose.
	Plays a sound for the amount of time you choose.

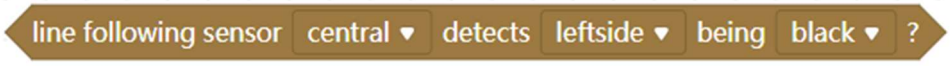
Action

This section includes all your blocks that control the 4 motors/wheels of your car.

	This block will turn all four wheels forward at the set power/speed for the set number of seconds.
	This block will turn all four wheels backwards at the set power/speed for the set number of seconds.
	This block will turn both the right wheels forward at the set power/speed for the set number of seconds.
	This block will turn both the left at the set power/speed wheels forward for the set number of seconds.
	This block will move forward, backward, left and right based on the dropdown option you choose, at the set power/speed you set forever until stopped by a block.
	This block turns the left wheels and the right wheels at a set power/speed for each side of the wheel forever until stopped by a block.
	This block will stop all wheels of your car.
	This block allows the car to make a sharp left turn by moving the right wheel forward and the left wheel backwards at power you set for the time you want.
	This block allows the car to make a sharp right turn by moving the left wheel forward and the right wheel backwards at power you set for the time you want.

Sensing

This section includes all your blocks that control the 4 motors/wheels of your car.


This block returns a value of true or false based on the conditions chosen from the dropdown options. This block gives information from the line following sensor. - The first menu lets us choose one of the three sensors to get information from. - The second menu lets us choose information about direction of color change detected. - The third menu lets us choose which color we want to get information about.

This block will give you the value your line sensor gets when sensing the two colors (black or white).

This block will give you the distance the ultrasonic sensor is measuring in centimeter.