Strawbees® EDUCATION

ROBOTIC INVENTIONS for the micro:bit

ONBOARDING

LEARNING PLATFORM

For activities, lesson plans and support material please go to:

learning.strawbees.com

WELCOME TO ROBOTIC INVENTIONS ONBOARDING

You will learn how to:

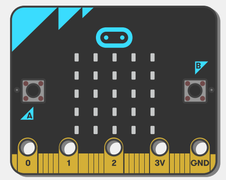
- Assemble the Strawbees Robotics Board for the micro:bit.
- Use a battery to power the micro:bit.
- Use motors with the Robotics Board and the micro:bit.
- Connect the micro:bit to Strawbees structures.
- Installing and Getting Started with the Strawbees MakeCode extension.
- Use the micro:bit Coding cards.

You will need:

Internet connection

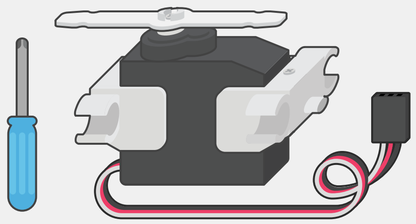
A computer with MacOS 10.6 or Windows 7 or newer, or a smart phone or tablet

Robotics Board for micro:bit

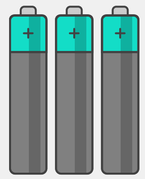


BBC micro:bit

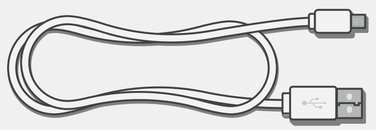
micro:bit Clip



Servo motor, arm, mount and screwdriver



3 x AAA Batteries



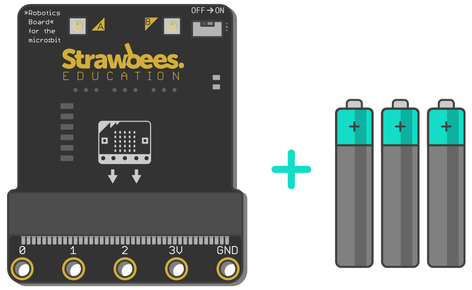
USB cable

BATTERIES AND POWER

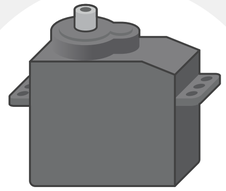
The Robotics board runs on 3 AAA batteries

The batteries power:
- Connected Servo Motors
- Built-in RGB LEDs
- The micro:bit board

The Robotics Board gives power to the micro:bit, but the micro:bit does NOT give power to the Robotics board.

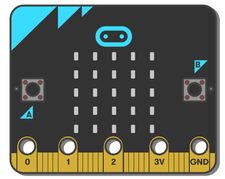


Strawbees Robotics
Board for the micro:bit
with 3 AAA batteries

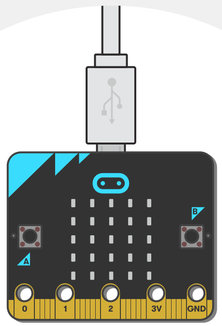


Servo motors

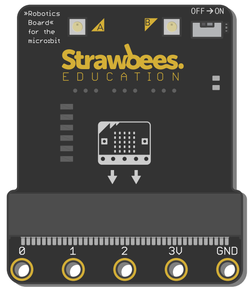
Build in
RGB LEDs



micro:bit



micro:bit
powered by USB

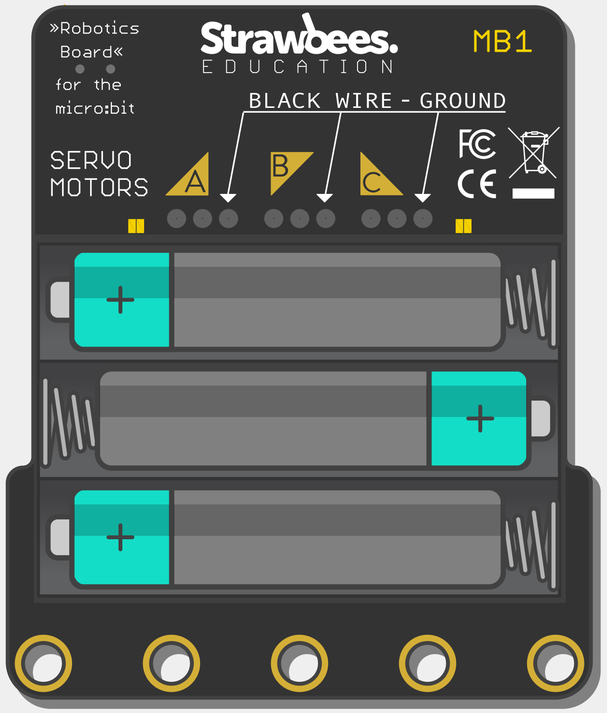


Strawbees Robotics
board for the micro:bit

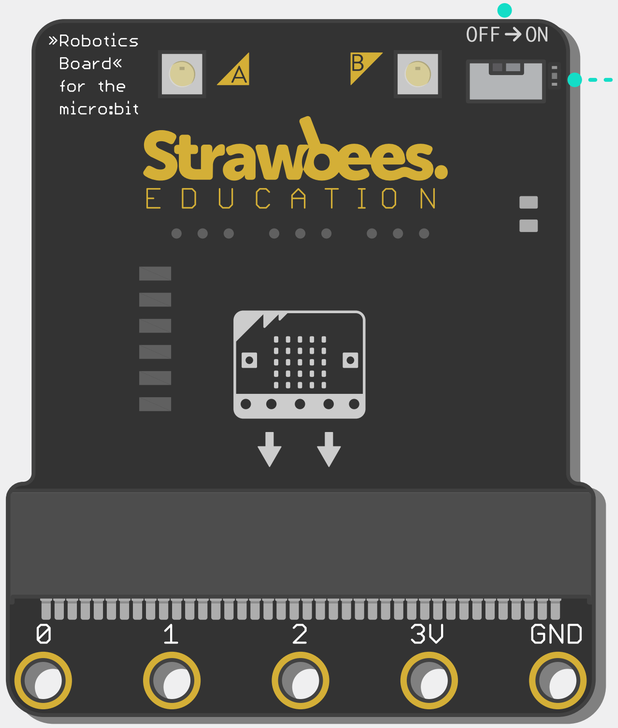
This means that if you power the micro:bit from the USB cable that will not automatically give the motors power. The motors always need the Robotics Board have batteries and the power switch to ON to work.

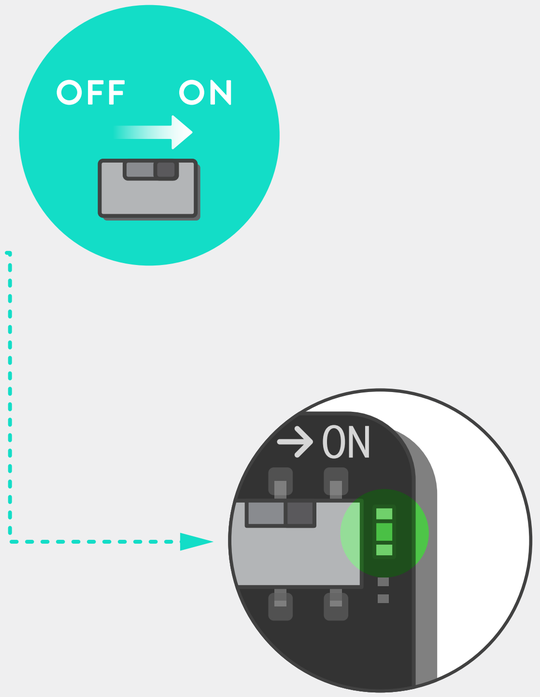
INSERT BATTERIES AND POWER ON

1 Insert the batteries like this:



2 Switch ON the power to test the batteries:





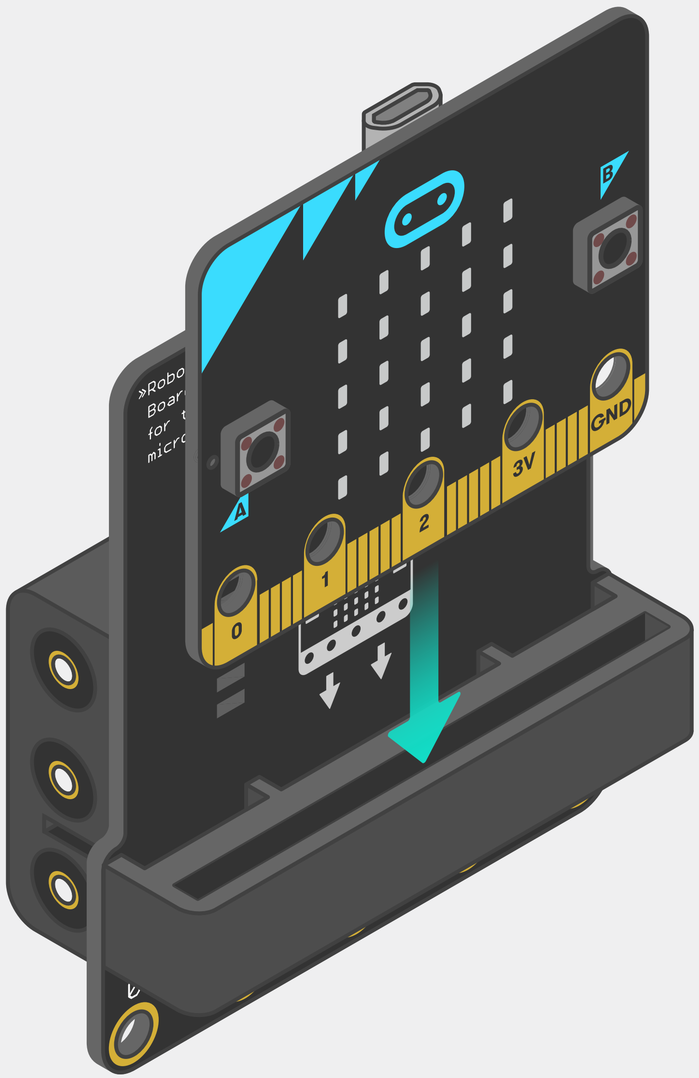
3 The green LED should light up if the batteries work

It’s good practice to switch the power **OFF** when adding or removing motors. Also when plugging and unplugging the board.

INSERTING THE MICRO:BIT

Slide the micro:bit to the Robotics board like this:

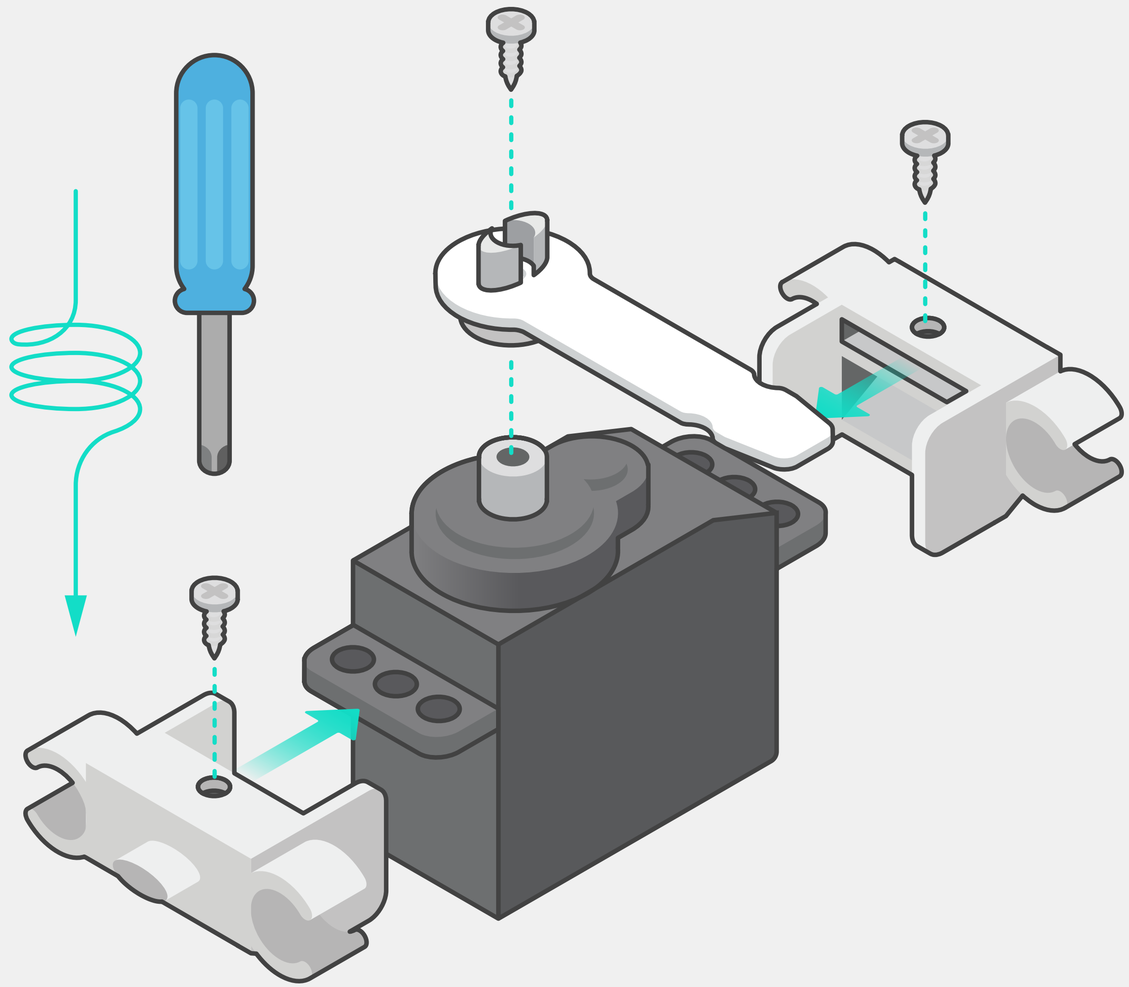
1



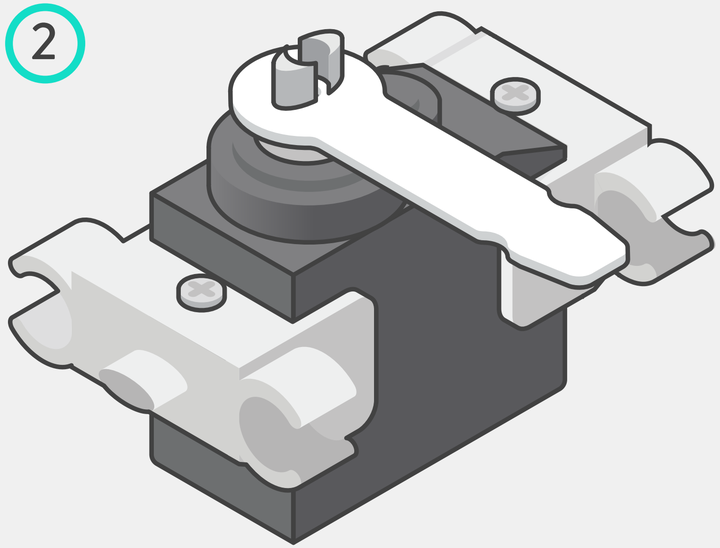
2

HOW TO ATTACH SERVO MOUNTS AND ARM

1

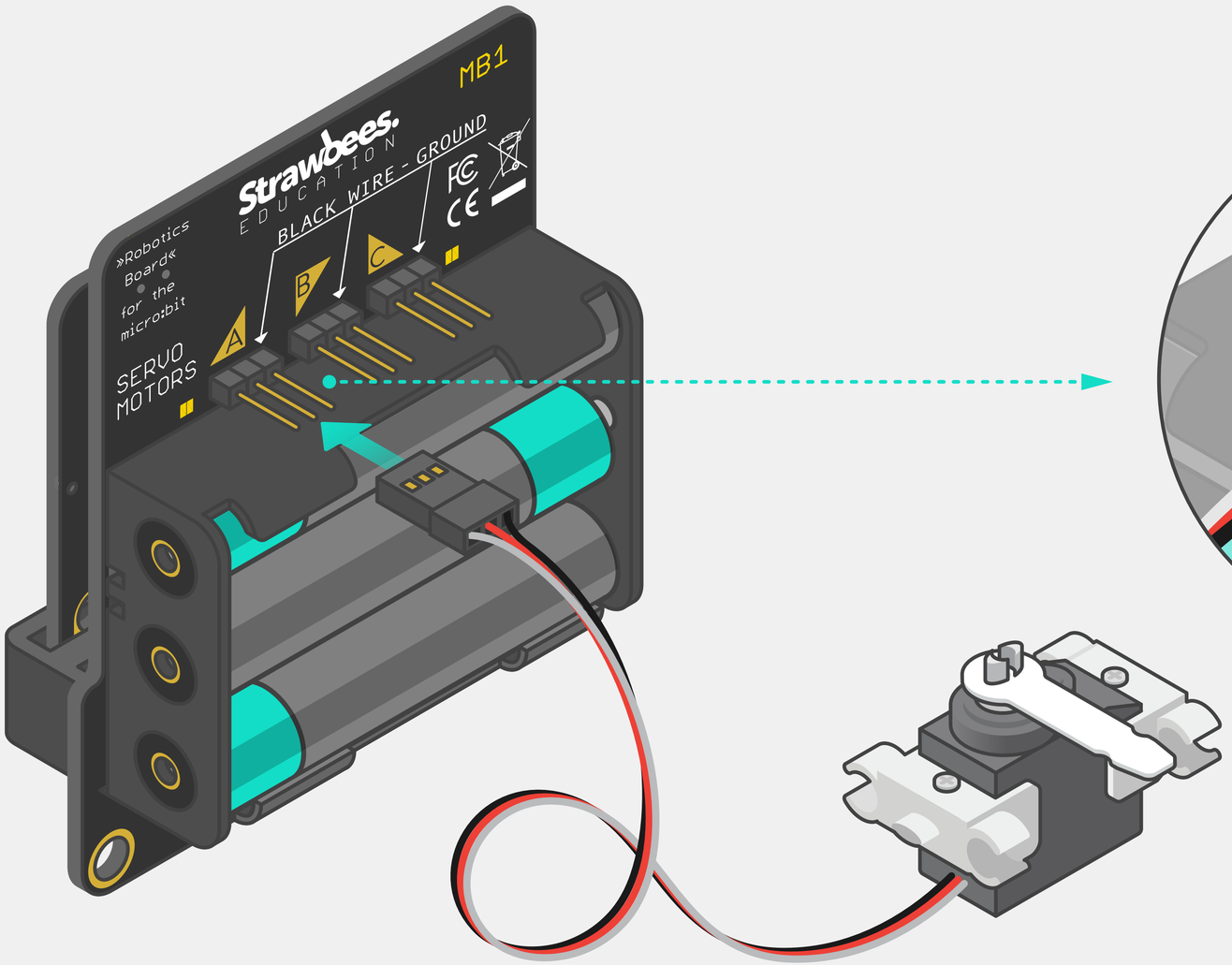


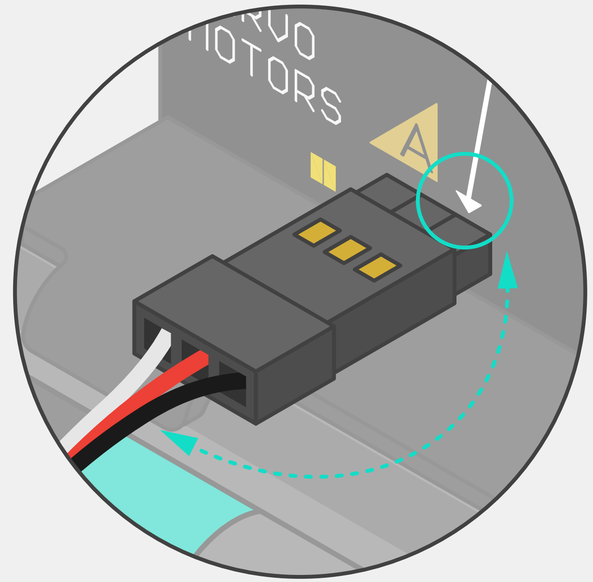
2



CONNECTING THE MOTOR

It’s possible to connect up to **3** servo motors at a time.



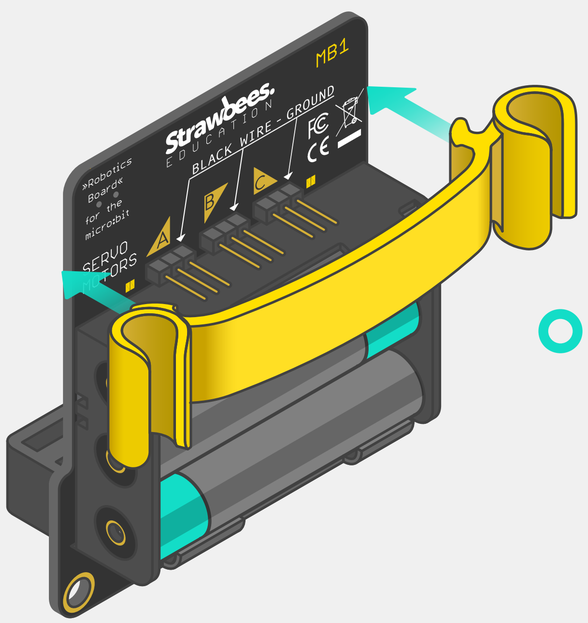


Make sure the the black cable is aligned with this marked arrow.

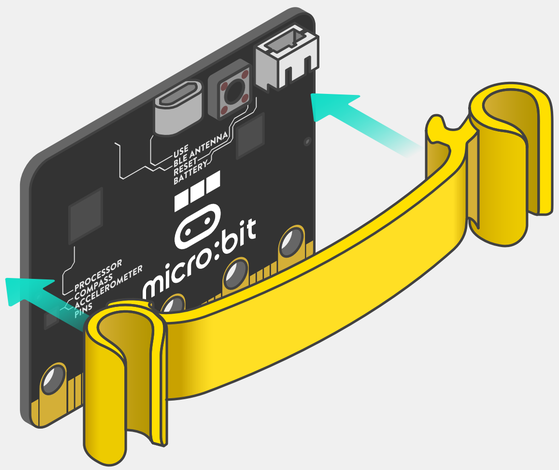
ADD THE CLIP

The Clip makes it possible to connect the Robotics board or just the micro:bit to a Strawbees construction.

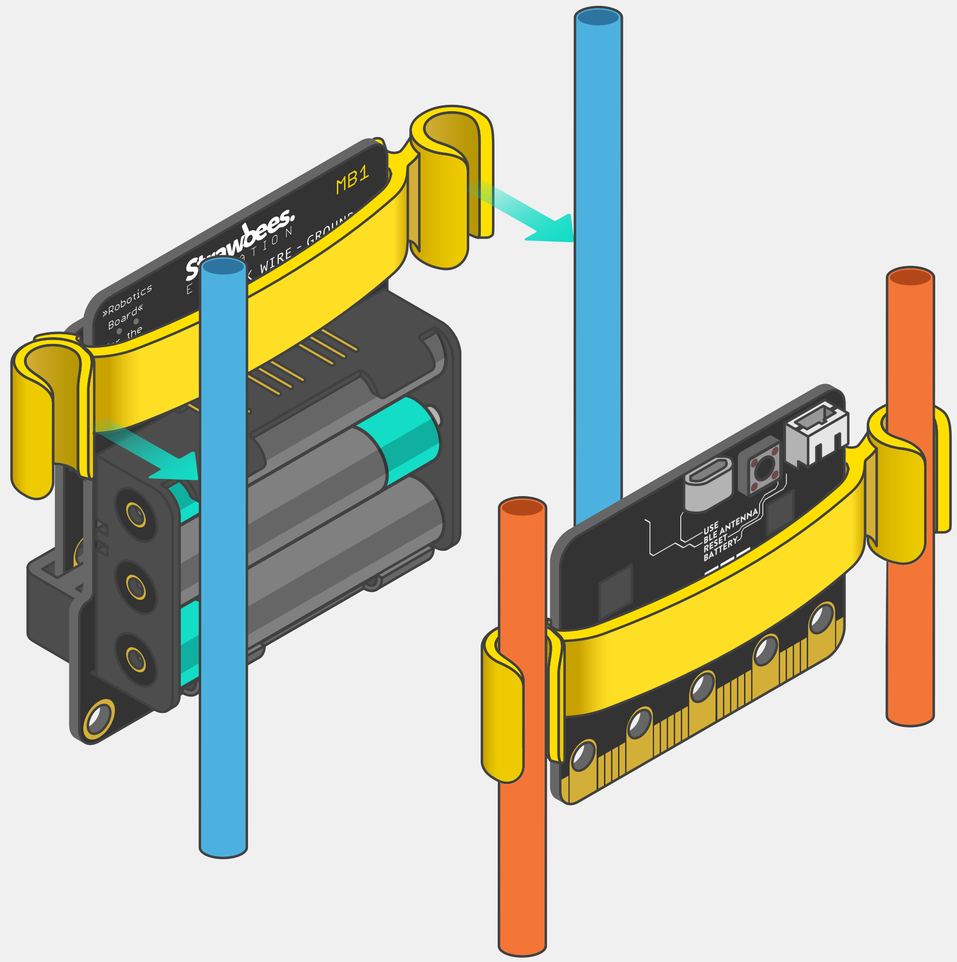
1. Snap on to the Robotics board or onto the micro:bit itself



OR

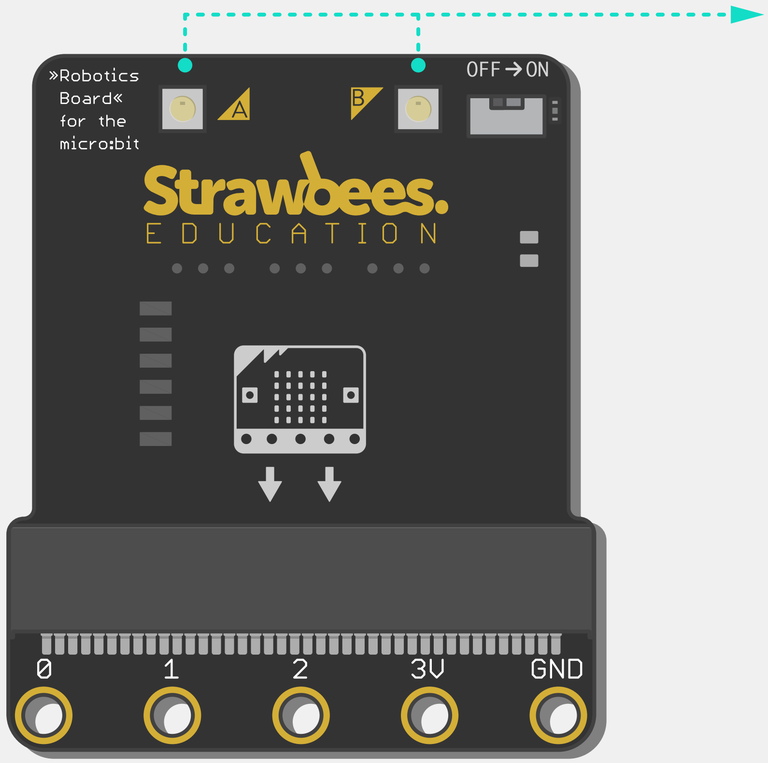


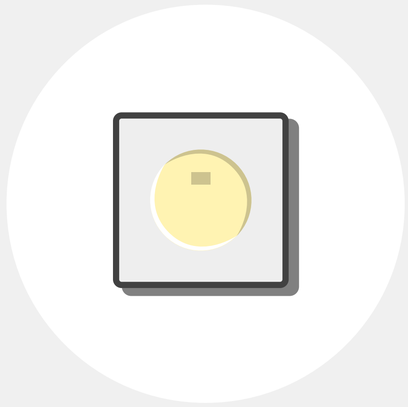
2. Connect Clip to straws



RGB LEDs

There are 2 RGB LEDs on the board and you can program them using the MakeCode editor.

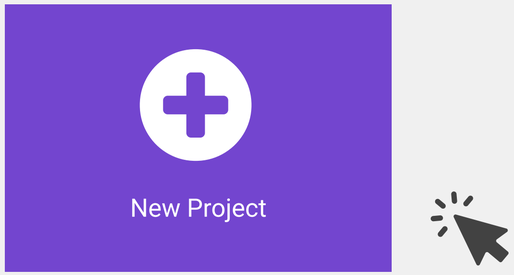


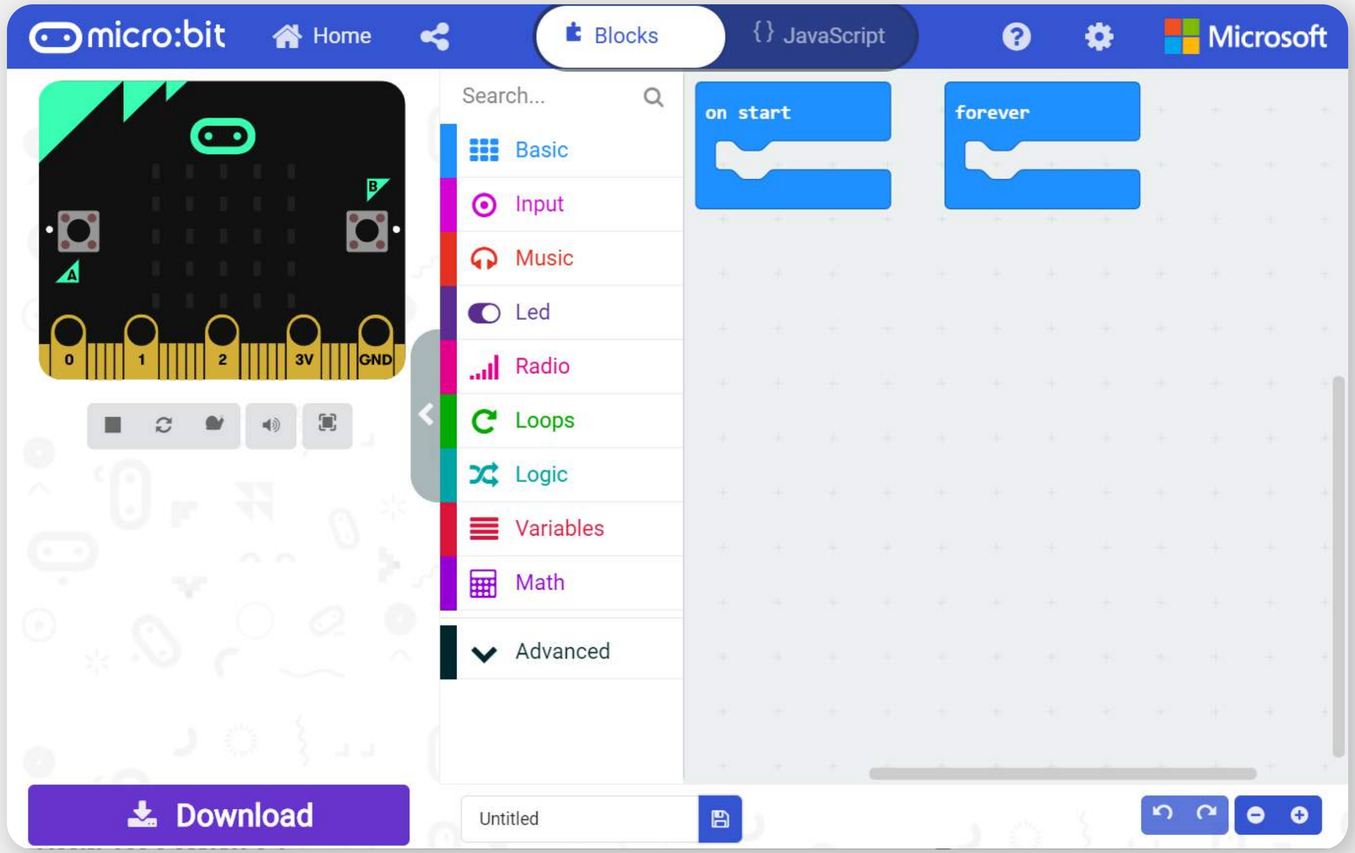


WHAT IS MAKECODE?

MakeCode is a way to program your micro:bit directly from the browser. It has support for the Robotics Board.

You can open the MakeCode editor by going to: makecode.microbit.org and click New Project

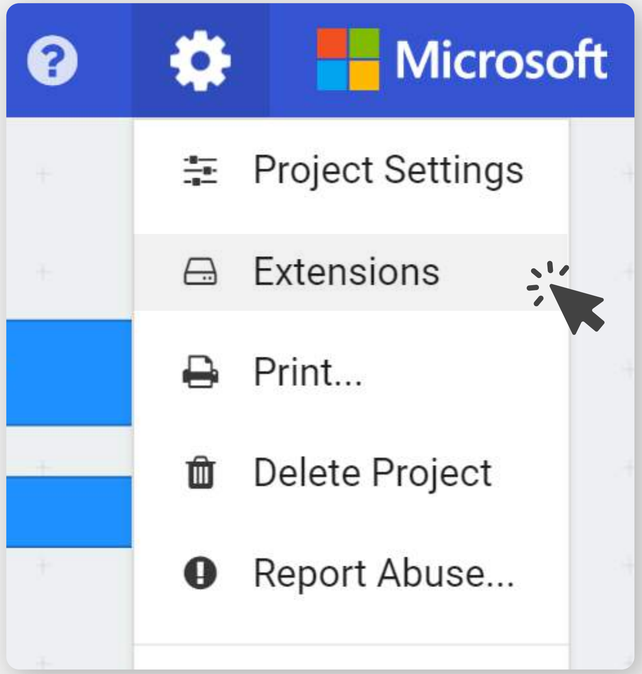




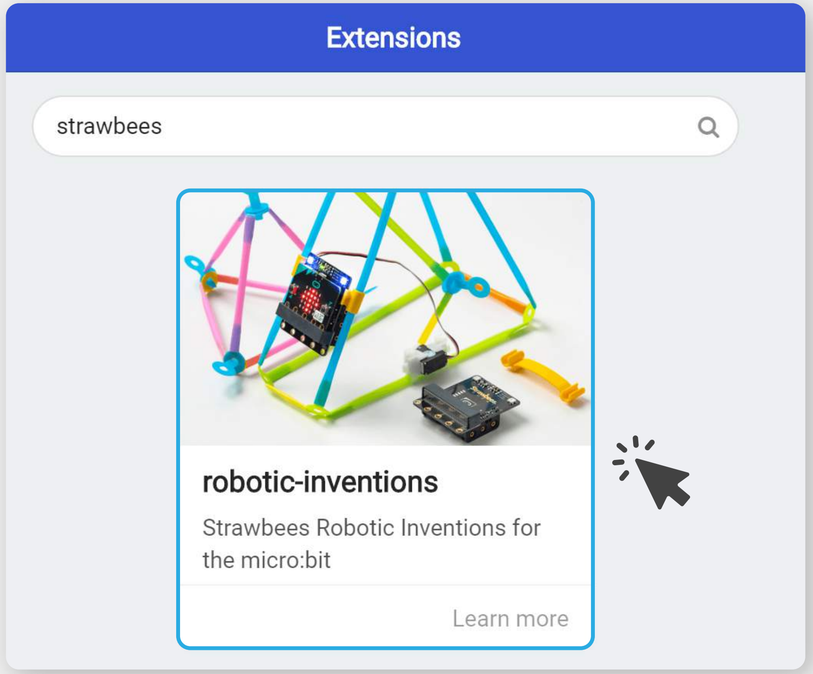
INSTALLING THE STRAWBEES EXTENSION

To use the Robotics Board with make code, you should add the Strawbees Extension to your project like this:

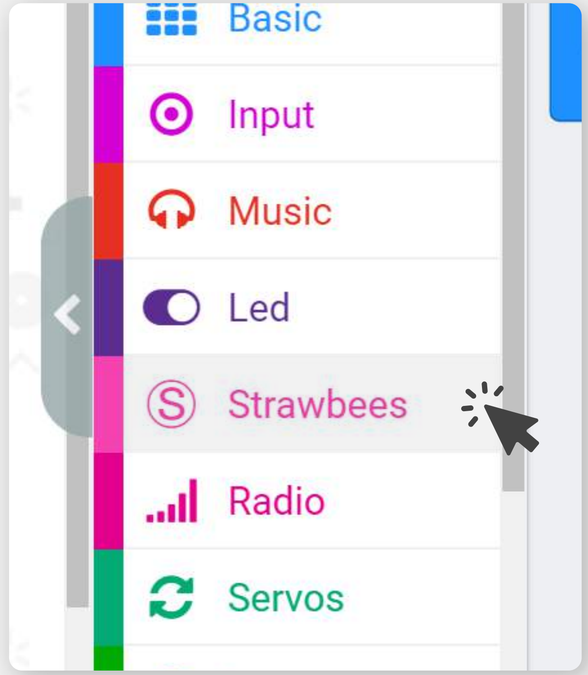
1. Click **Extensions** under Settings:



2. Type in Strawbees in the Search bar, press enter and click on **robotic-inventions**.



3. Strawbees will now appear with your MakeCode editor.



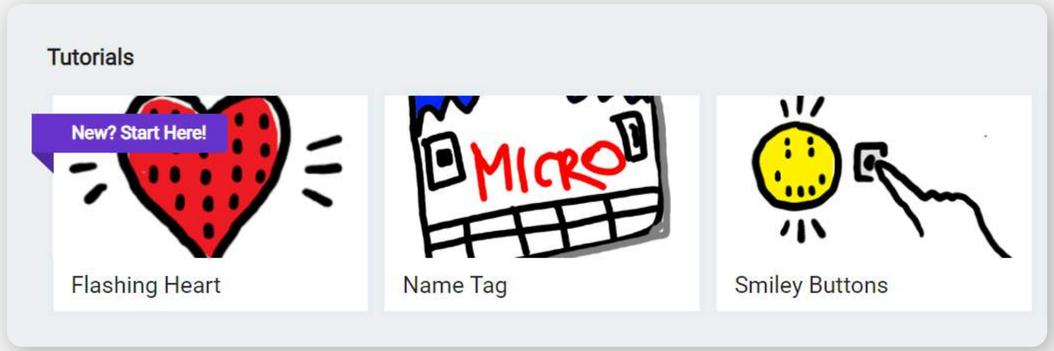
GETTING STARTED WITH MAKECODE

If you have never used Makecode before we suggest that you become familiar with the basics before moving on to program with the Robotics Board.

Best places to get started are:

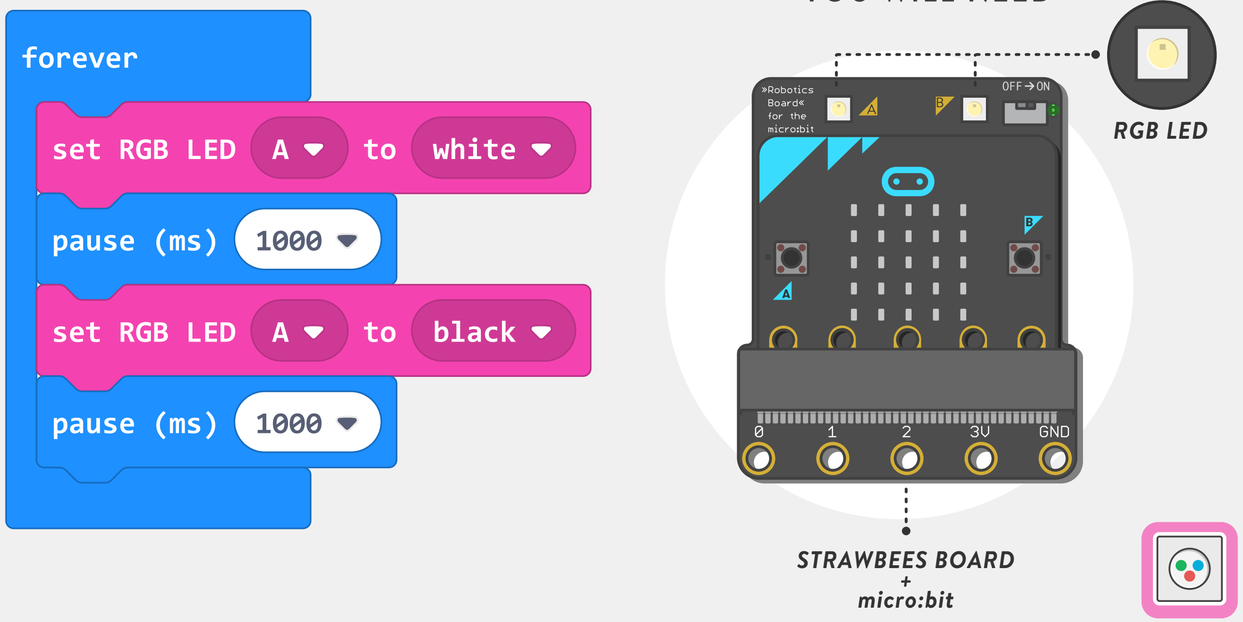
1. www.youtube.com/watch?v=ZegjmbyBUs8

2. "Tutorials" section on https://makecode.microbit.org



WHAT ARE CODING CARDS?

BLINK



makecode.microbit.org

Coding cards are small snippets of code that can be used to explore different concepts.

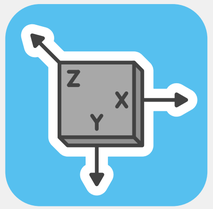
They are not meant to be used as they are but for you to tweak the numbers and combine the cards to get the expected result.

You can find the coding cards on Strawbees Learning and at the Robotic Inventions' Makecode "learn more" page.

https://learning.strawbees.com/product/microbit/
https://makecode.microbit.org/pkg/strawbees/pxt-robotic-inventions

WHAT ARE CODING CARDS CATEGORIES?

Coding cards are grouped by hardware in use.

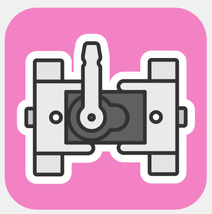


Accelerometer

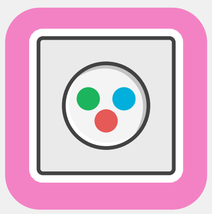
Light Sensor

Button Press

Radio Receiver



Servo Motor

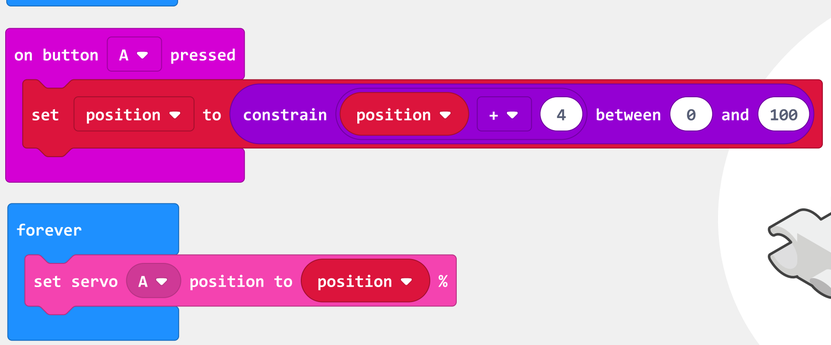


RGB LED

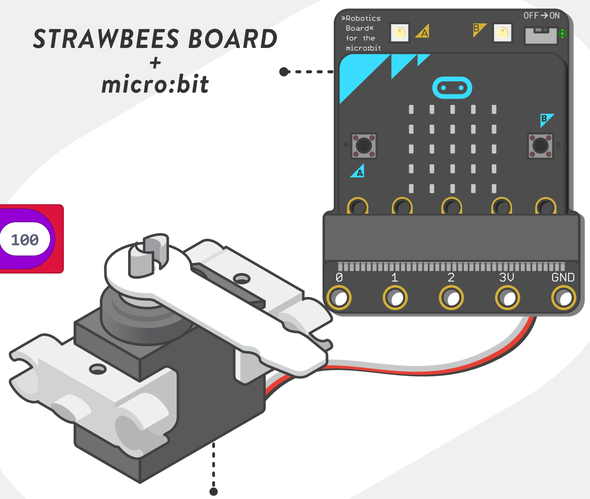
Radio Transmitter

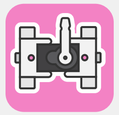
HOW TO TWEAK CODING CARD: BASIC CARD

GRADUALLY CHANGE POSITION



YOU WILL NEED

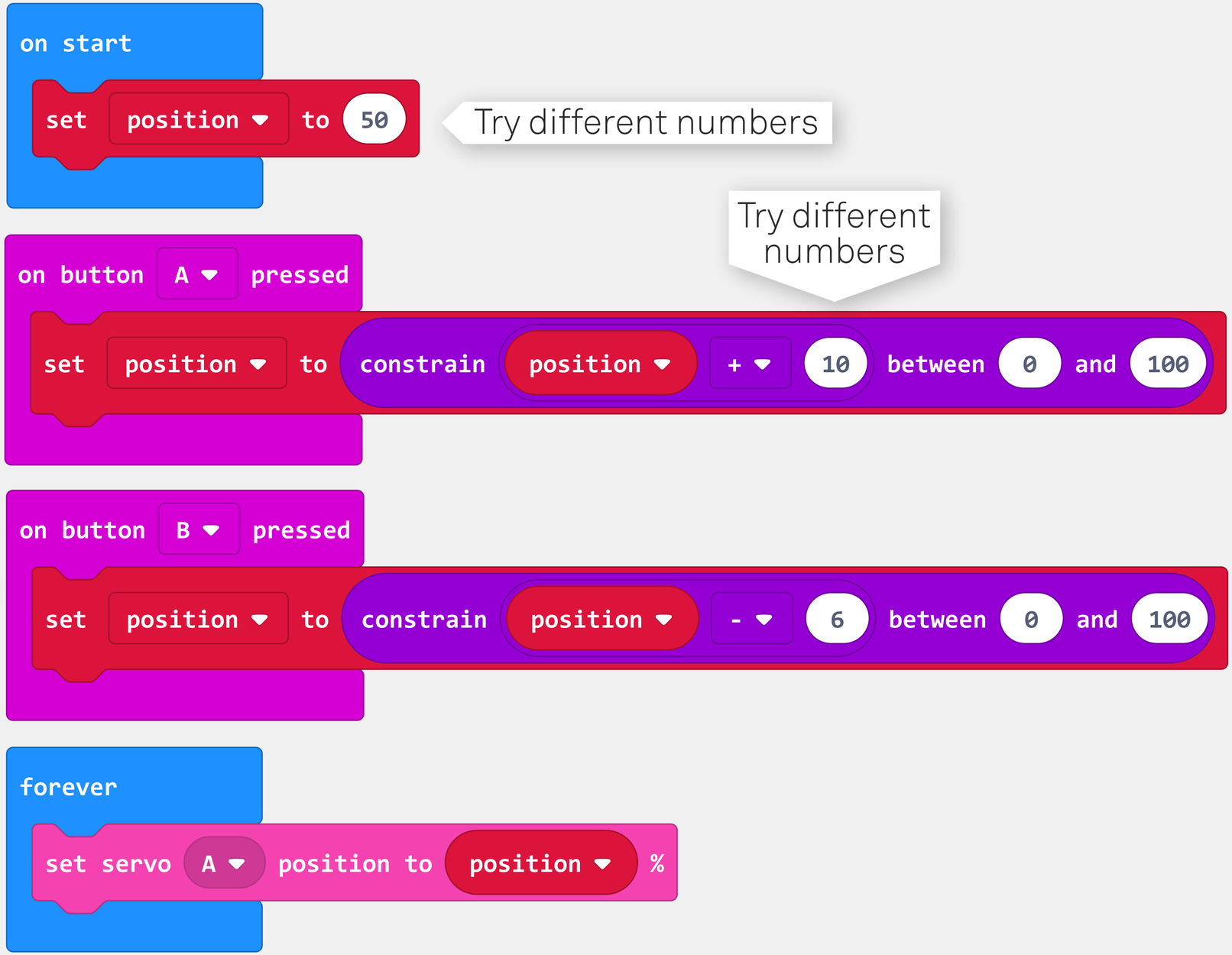




makecode.microbit.org

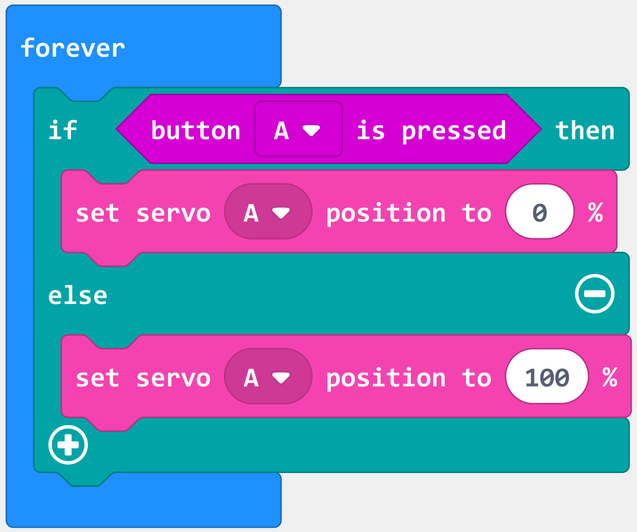
Basic card

HOW TO TWEAK CODING CARD:

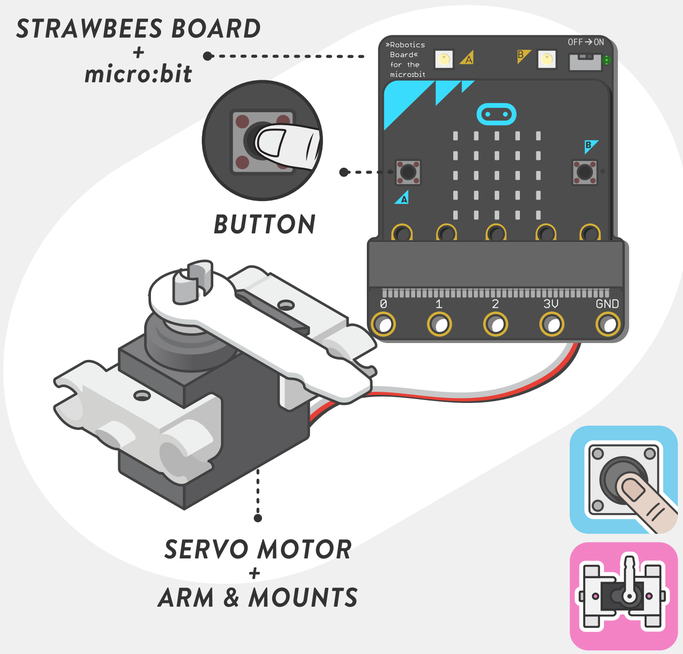


HOW TO COMBINE CARDS
CODING CARD A

CHANGE POSITION WHILE PRESSING BUTTON



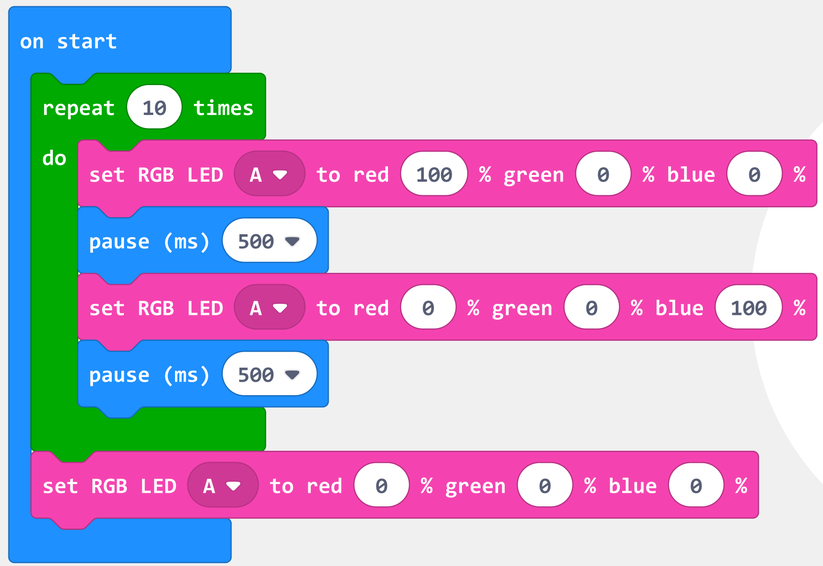
YOU WILL NEED



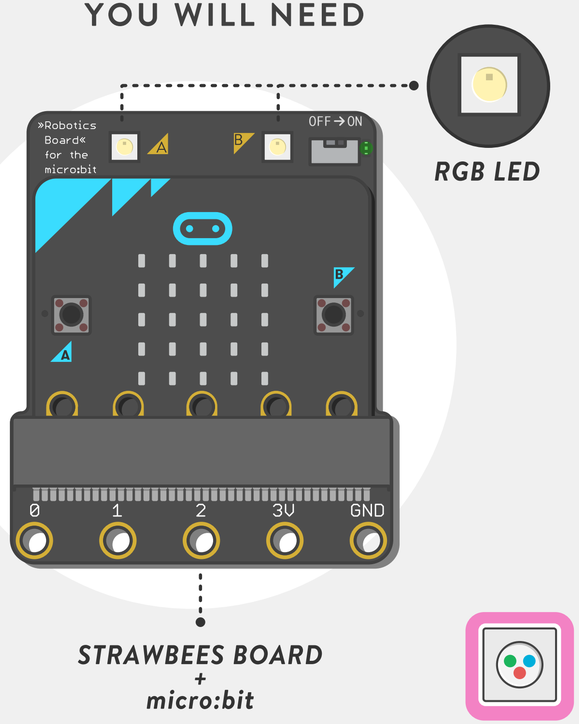
makecode.microbit.org

HOW TO COMBINE CARDS: CODING CARD B

CHANGE COLOR 10 TIMES



YOU WILL NEED



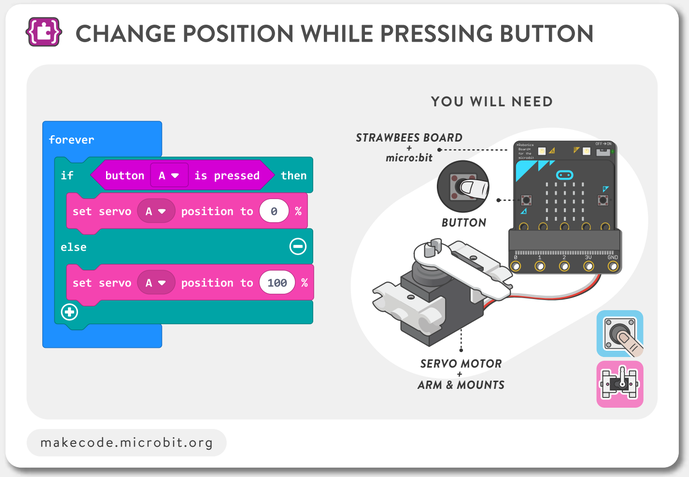
RGB LED

STRAWBEES BOARD + micro:bit

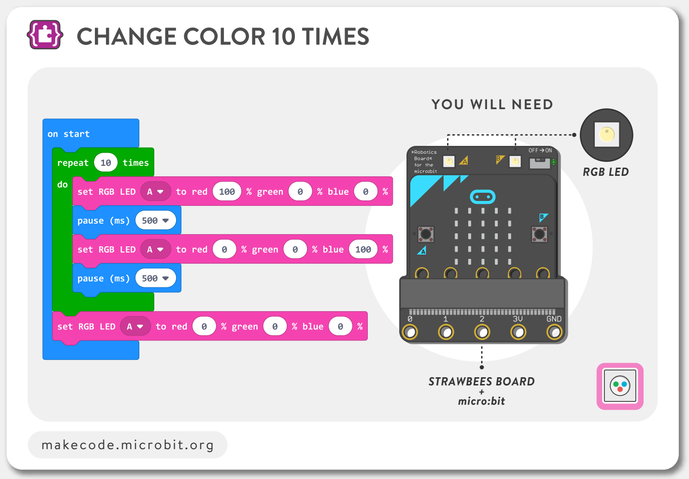
makecode.microbit.org

HOW TO COMBINE CARDS: CODING CARD A + B

CODING CARD A



CODING CARD B



How would you name this card?

```
forever
if button A is pressed then
    set servo A position to 0 %
    repeat 10 times
    do
        set NeoPixel A to red 100 % green 0 % blue 0 %
        pause (ms) 500
        set NeoPixel A to red 0 % green 0 % blue 100 %
        pause (ms) 500
else
    set servo A position to 100 %
    set NeoPixel A to red 0 % green 0 % blue 0 %
```

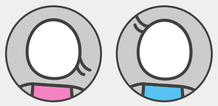
GRADUATED!

Now you know how to:

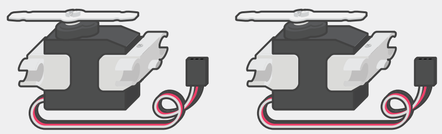
- Assemble the Strawbees Robotics Board for the micro:bit.
- Use a battery to power the micro:bit.
- Use motors with the Robotics Board and the micro:bit.
- Connect the micro:bit to Strawbees structures.
- Installing and Getting Started with the Strawbees MakeCode extension.
- Use the micro:bit Coding cards.

Next steps:

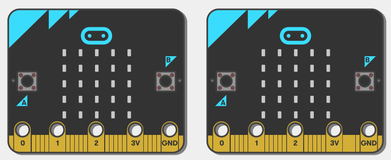
Pick an Activity from the Learning Platform to build



Pair with a friend to program a complex project



Make a project with two motors



Use two micro:bits in the same project