Microbit Robotics Beginner Level 1

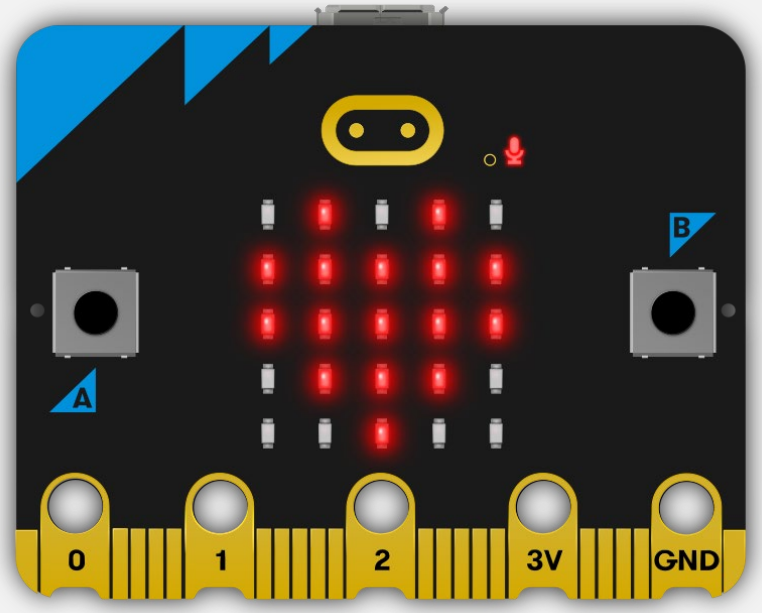
Lesson 2

Makecode Programming

Presented by Advanced Superlogic Team

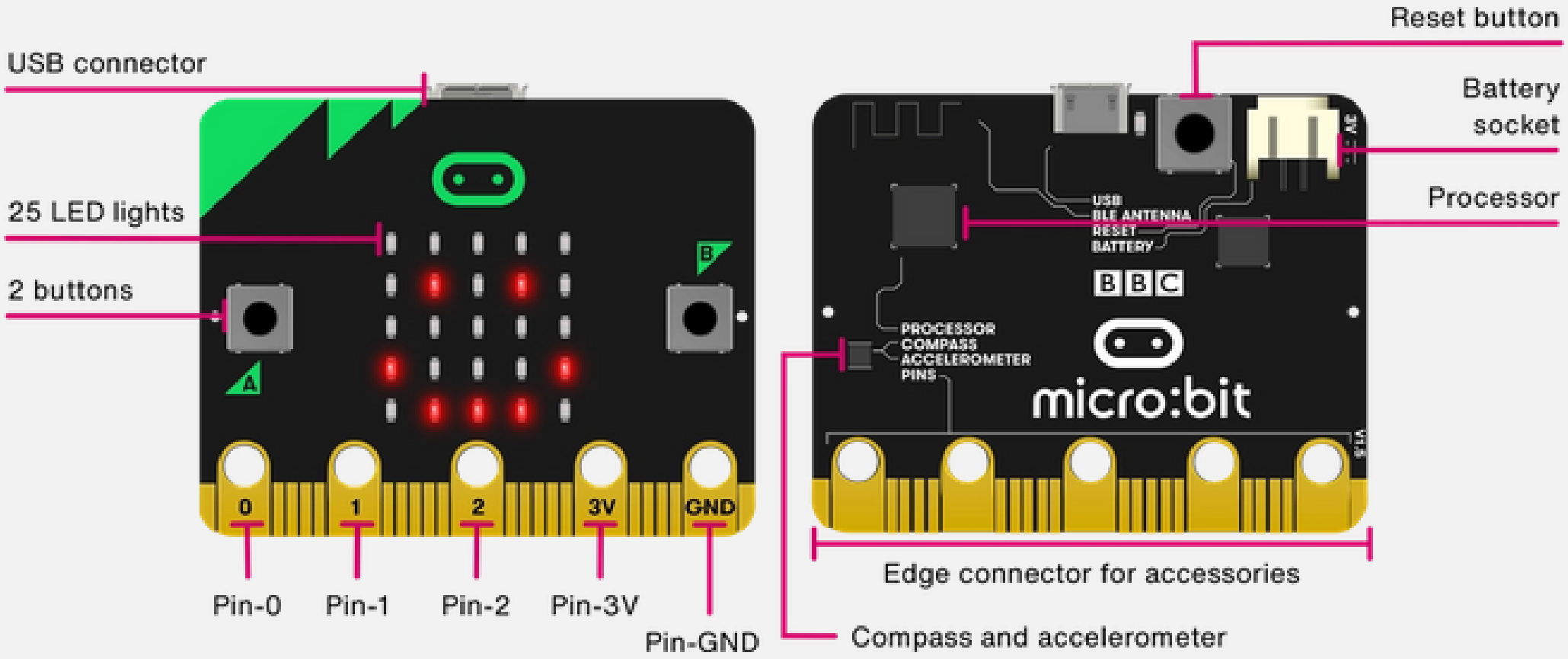
Review previous lesson

What is a Microbit?

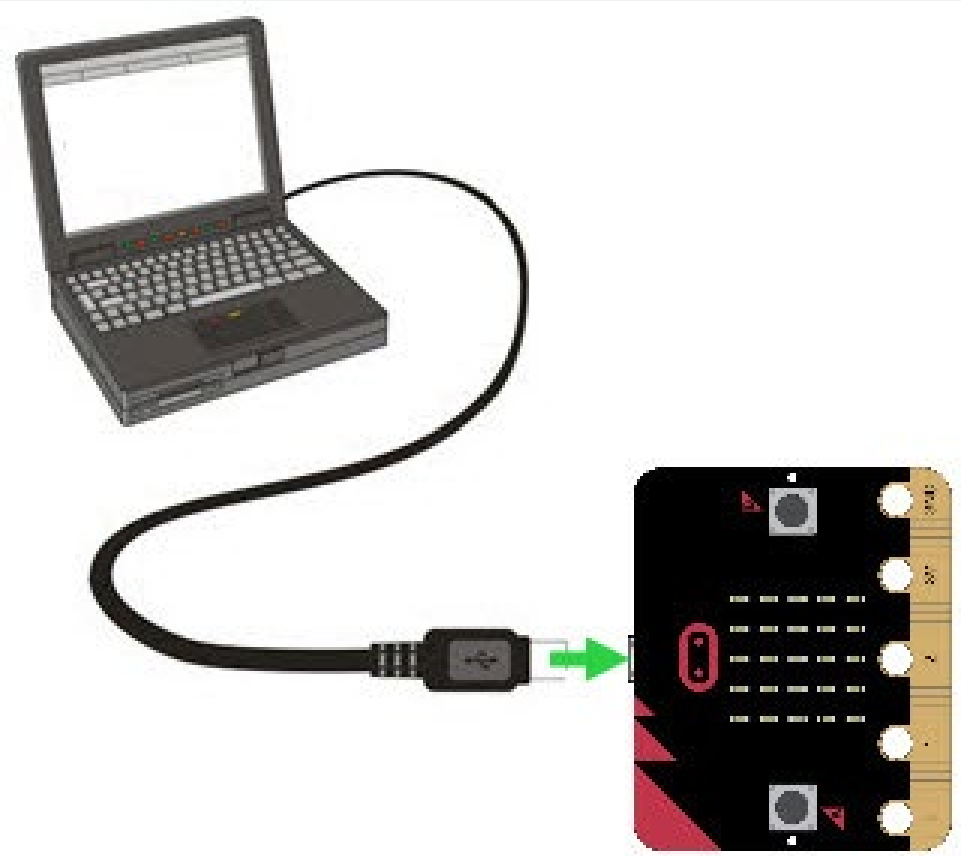


The BBC micro:bit is **a pocket-sized computer that introduces you to how software and hardware work together**. It has an LED light display, buttons, sensors and many input/output features that, when programmed, let it interact with you and your world.

The Microbit Hardware and electronic components

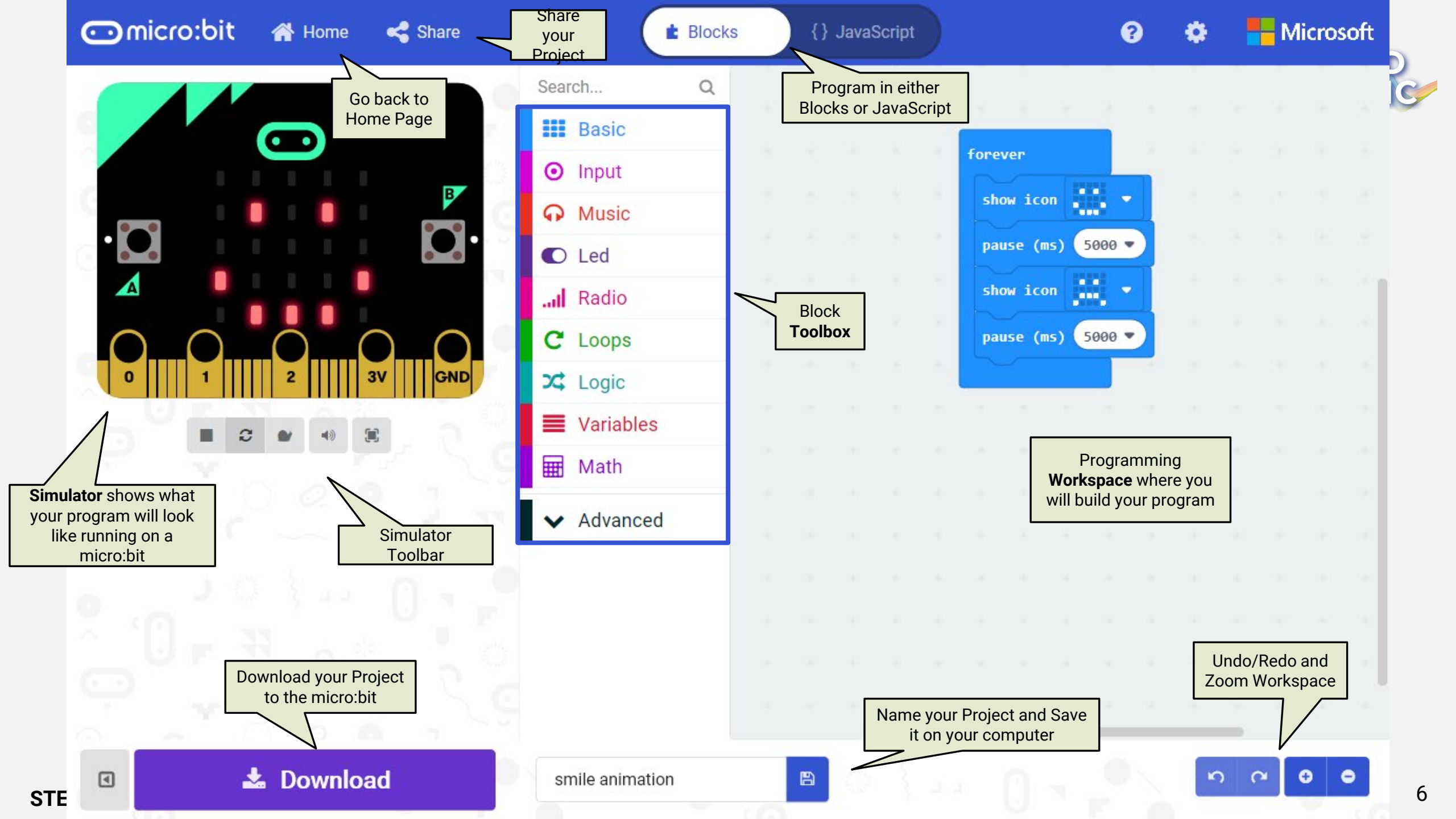


How to program our Microbit?

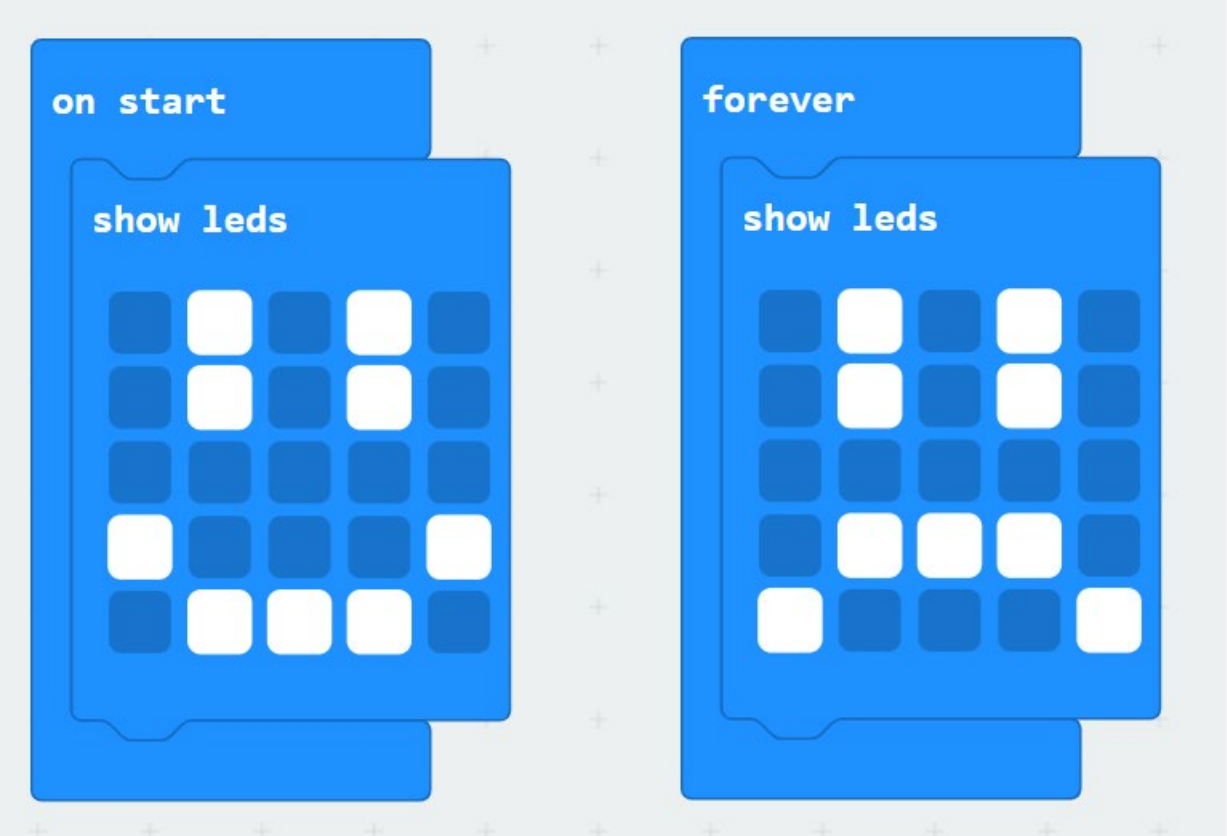


It is not possible to program directly on the micro:bit.

Instead, **a program is created on another computer and then uploaded to the micro:bit using a USB cable or wirelessly using Bluetooth**.


micro:bit
Home
Share
Share your Project
Blocks
{ } JavaScript
Microsoft
Go back to Home Page
Program in either Blocks or JavaScript
Search...
Basic
Input
Music
Led
Radio
Loops
Logic
Variables
Math
Advanced
Block Toolbox
forever
show icon
pause (ms) 5000
show icon
pause (ms) 5000
Simulator shows what your program will look like running on a micro:bit
Simulator Toolbar
Programming Workspace where you will build your program
Download your Project to the micro:bit
Download
Name your Project and Save it on your computer
smile animation
Undo/Redo and Zoom Workspace

Event & Response

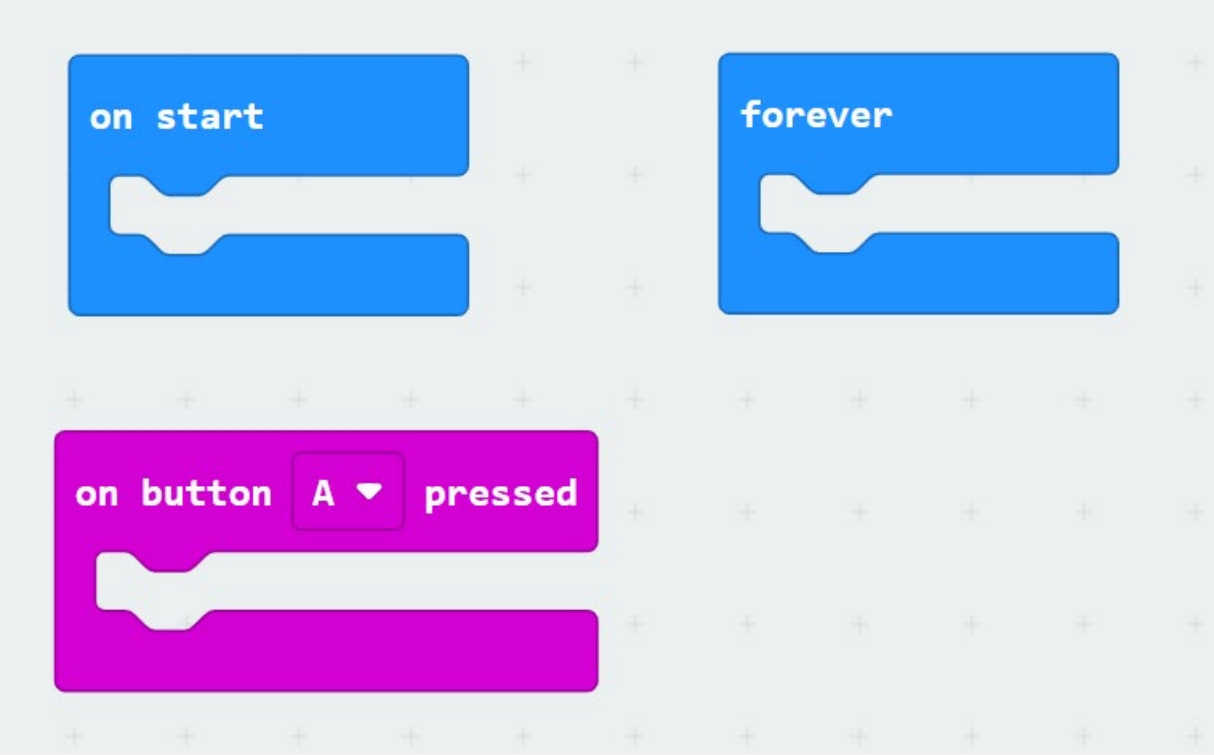


[on start]

This program is run only once after your microbit is powered up.

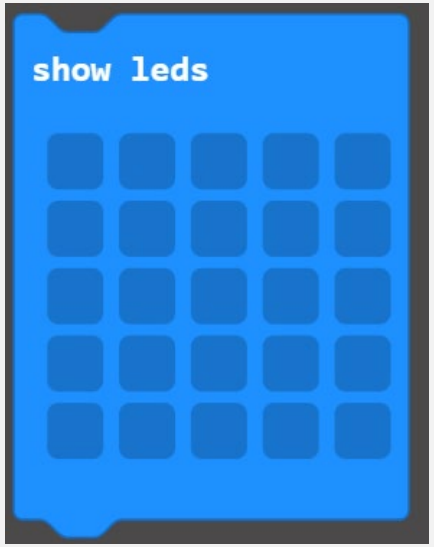
[forever]
This program is run in a forever loop without stopping once your microbit is powered up.

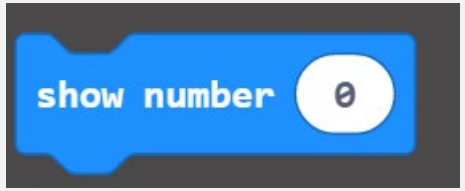
Event & Response

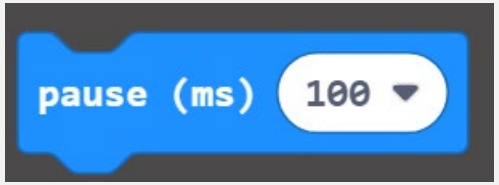


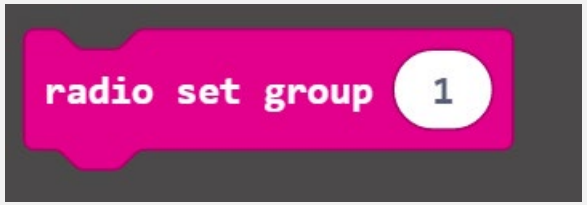
Events block type & pattern.

Event & Response



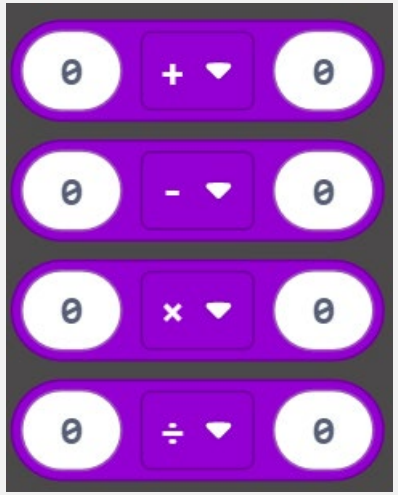


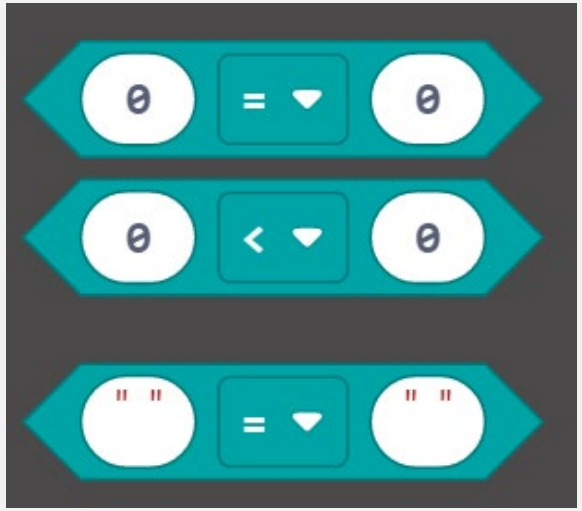


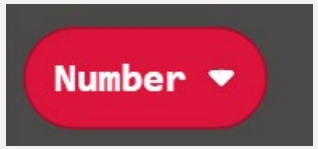


Response block type & pattern.

Event & Response





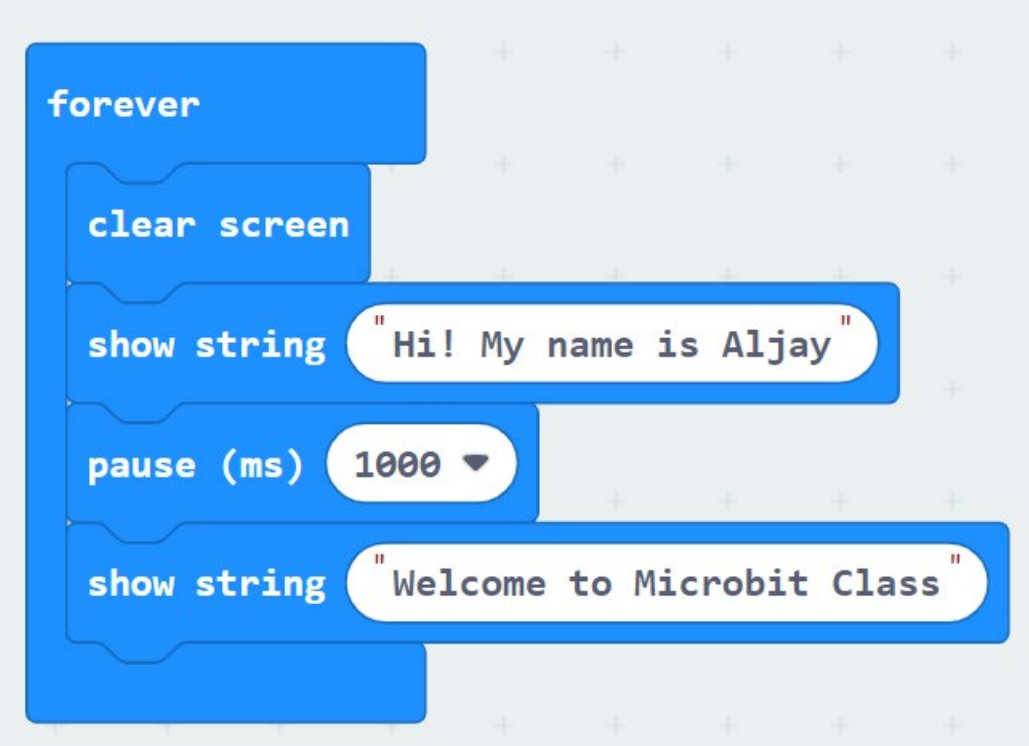


These are operators blocks or variable blocks

Basic LED Programming

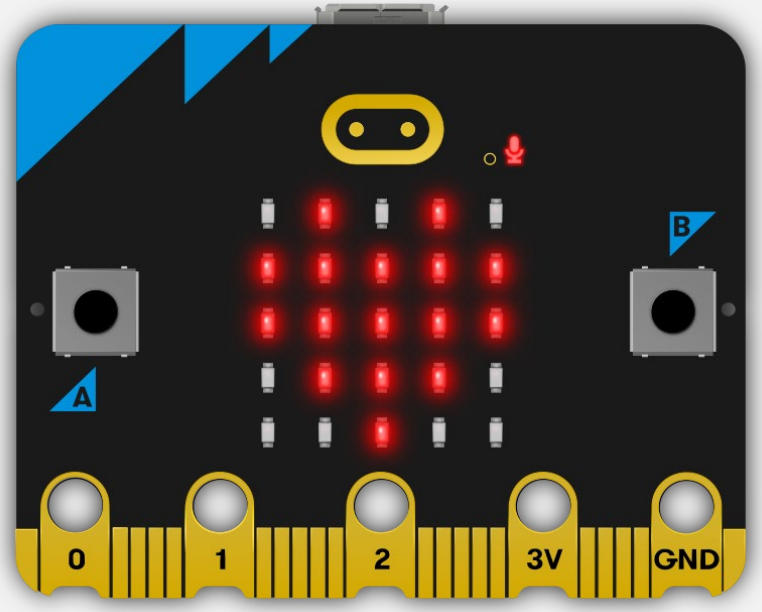
You can program the LED using show icon or show leds blocks with the pause blocks.

Basic LED Programming – Show strings and numbers



We can use show string or show number to display the words and numbers we want on the LED.

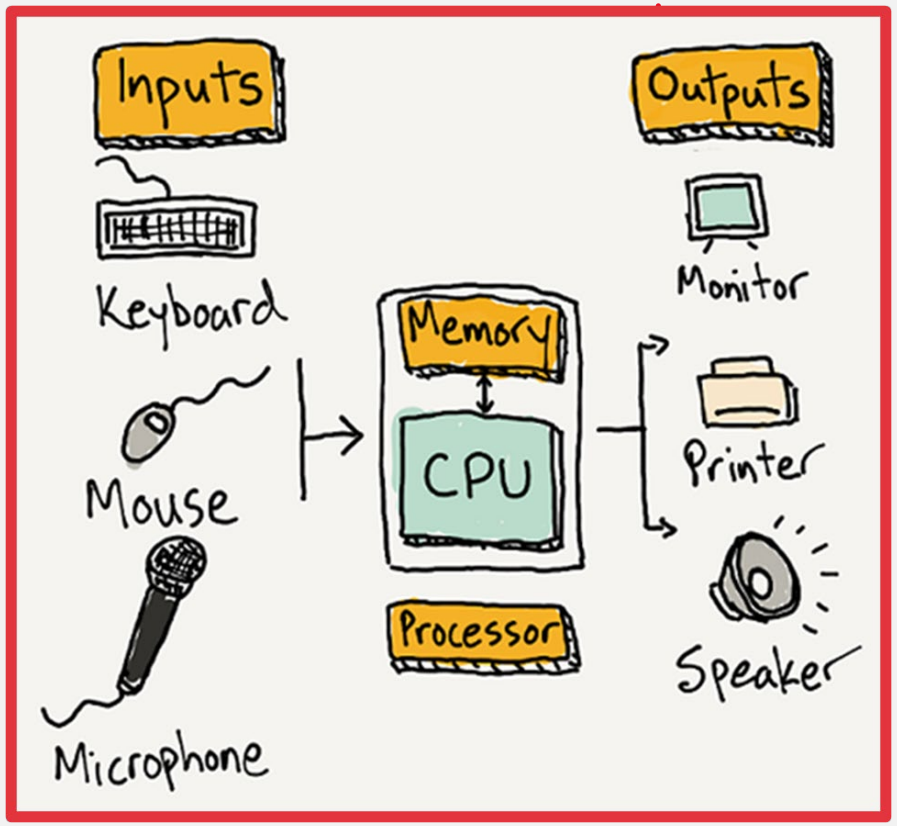
What we did last week?



Use your microbit to display:

1. Your name
2. Your age
3. Your height
4. Your weight
5. Your birth date

Input vs output - What is a computer?

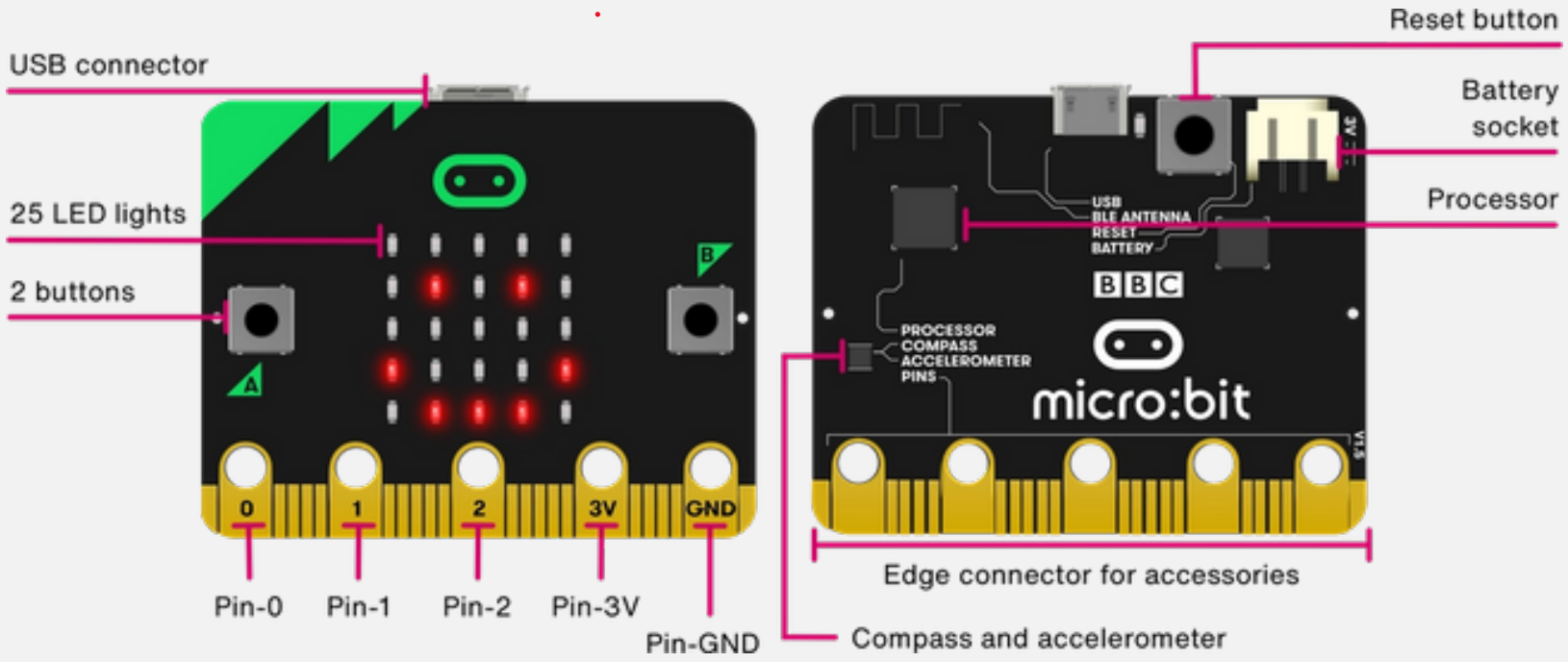


There are four main parts to a computer:
Processor: It's what the computer uses to process and transform information. Also known as the CPU (central processing unit).
Memory: How the computer remembers things. There are two types of memory:

- **RAM (random access memory)** -The computer's short-term memory
- **Storage (hard drive)** - The computer's long-term memory

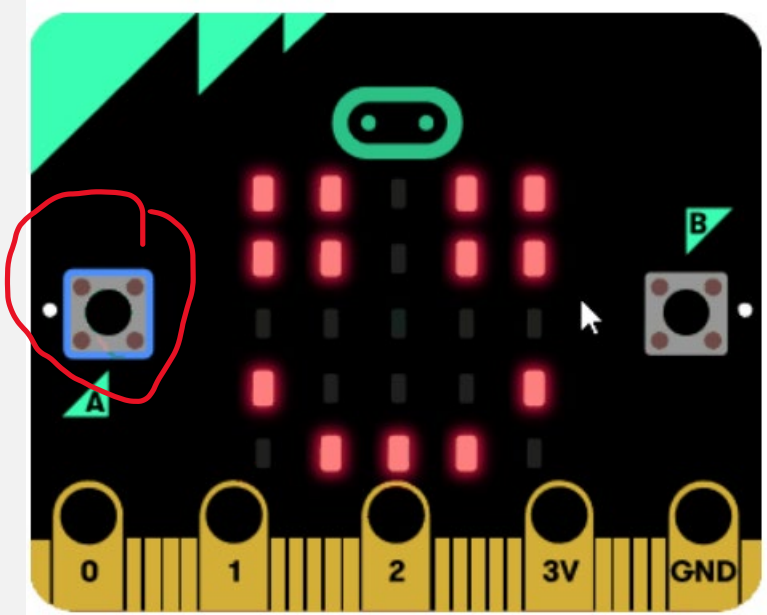
Inputs: How a computer takes in information from the world.
Outputs: How a computer displays or communicates information.

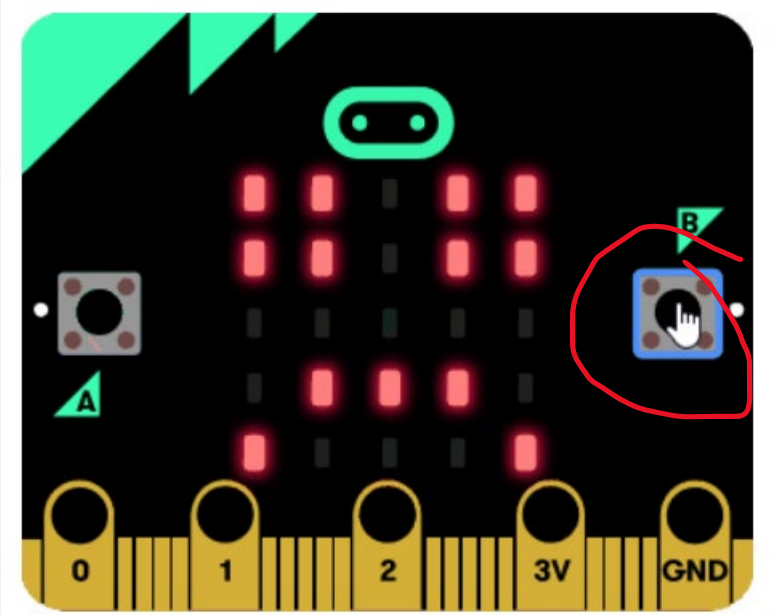
Input vs output



Which parts of microbit are input and which parts of microbit are outputs?

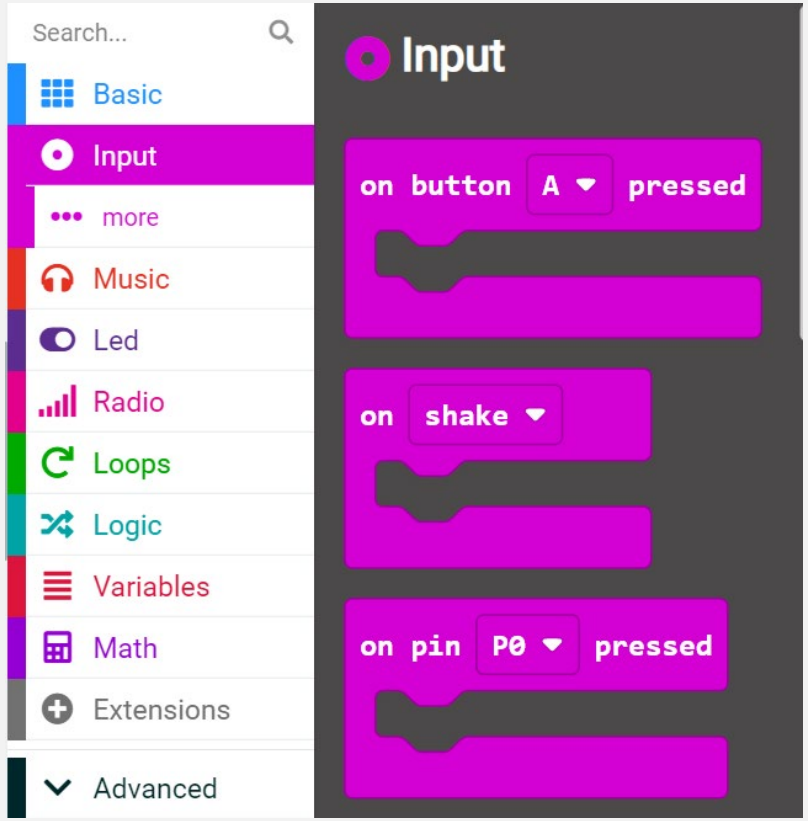
Input vs output





Now we want to do a smiley face challenge, when we press button A, it will show a smiley face, but when we press button B, it will show a sad face,

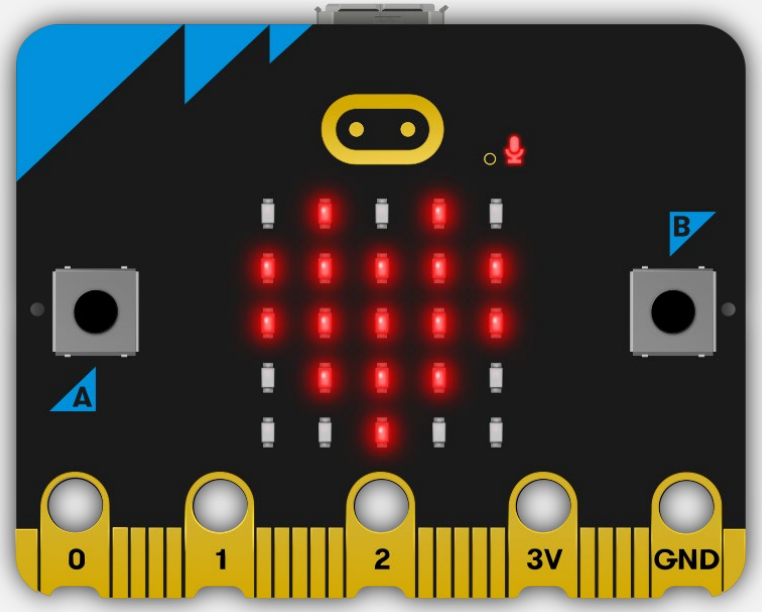
Input vs output



From the input category, you can see that there is a “On button A pressed”.

We are going to use this as the events to trigger to show either Smiley or sad face.

Input vs output – Challenge



Can you program at least 10 different events to show different display?

*Show different number for different events.

Do a quick self-check of your knowledge…

1. Do you understand basic function of Microbit?
2. What is the difference between “On Start” & “Forever”?
3. What is event and what is response?
4. How to program the 5 x 5 LED on Microbit?
5. What is input and output on Microbit?

Today's Topic

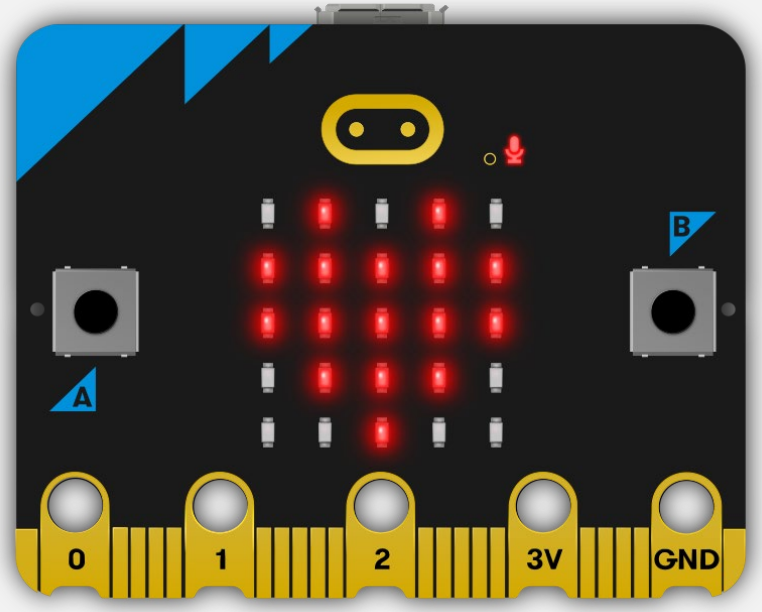
1. Send message via radio
2. Music Blocks
3. Make your Micropet
4. Conclusion

Learning Outcome

1. Able to send message via radio from Microbit to Microbit
2. Able to program microbit to play music
3. Able to program and customize your digital pet on microbit

Send message via Radio

Send message via Radio – from Microbit to Microbit

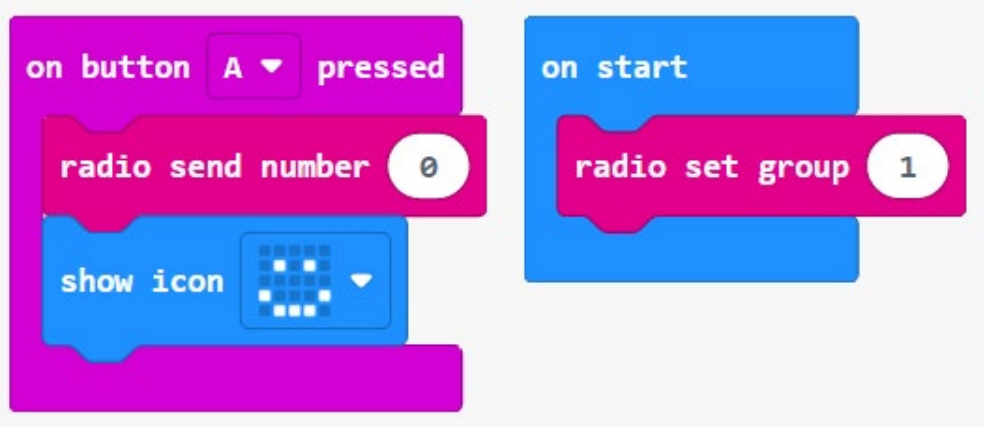


Radio – wave frequency can be sent and received from microbit, hence, we can use this function to communicate between microbit.

Mood Radio Project

This project uses the radio to share your mood with other micro:bits. When you press A, your friends will see a smiley face. When you press B, they will see a frowny face.

Mood Radio Project

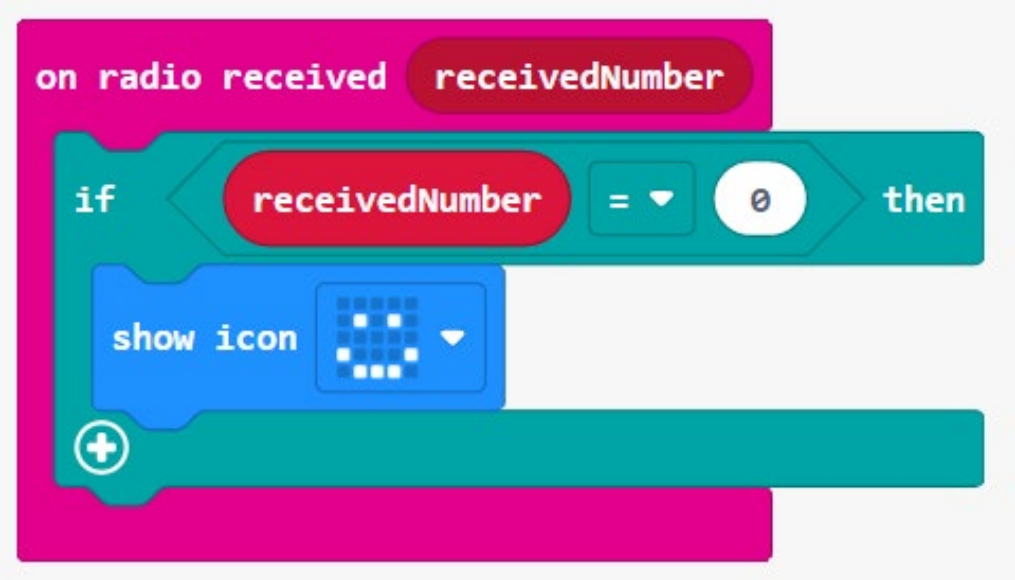


Sending a smiley

The micro:bit can't understand mood but it is pretty good with numbers. In fact, it can send numbers between micro:bits using the radio antenna, just like a phone can send text messages.

Let's add blocks that send a number when button A is pressed. We assume that 0 is the "mood code" to send for smiley.

Mood Radio Project



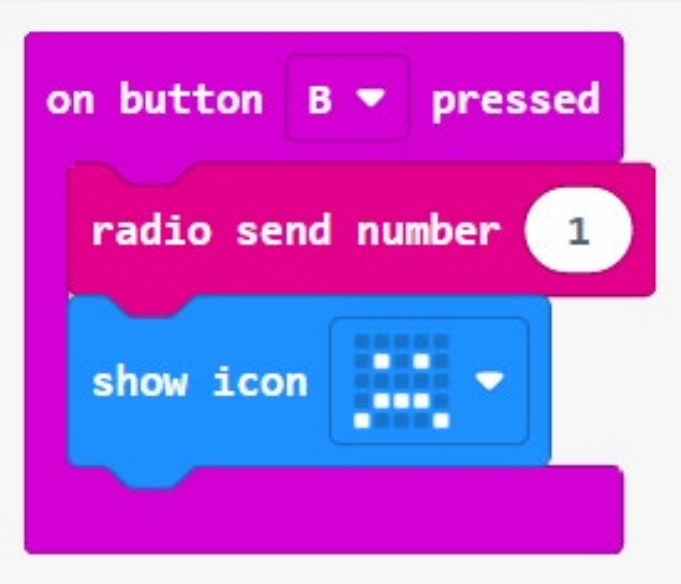
Receiving a smiley

We add a on received number block that will run code whenever a new “mood” message comes in.

The receivedNumber variable contains the numeric value that was sent.

Since we’ve decided that 0 is smiley, we add a conditional if then statement to show this icon.

Mood Radio Project – Sending Frowny



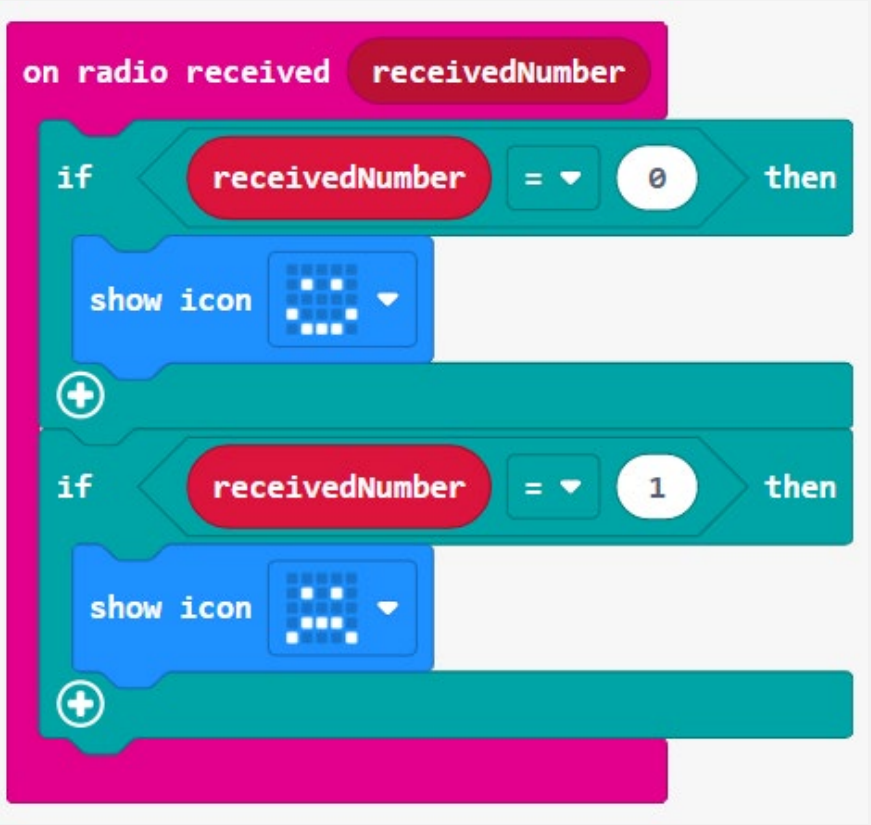
Sending a frowny

Adding another mood to our messaging app done in a similar way.

We decide that the “mood code” of 1 means frowny.

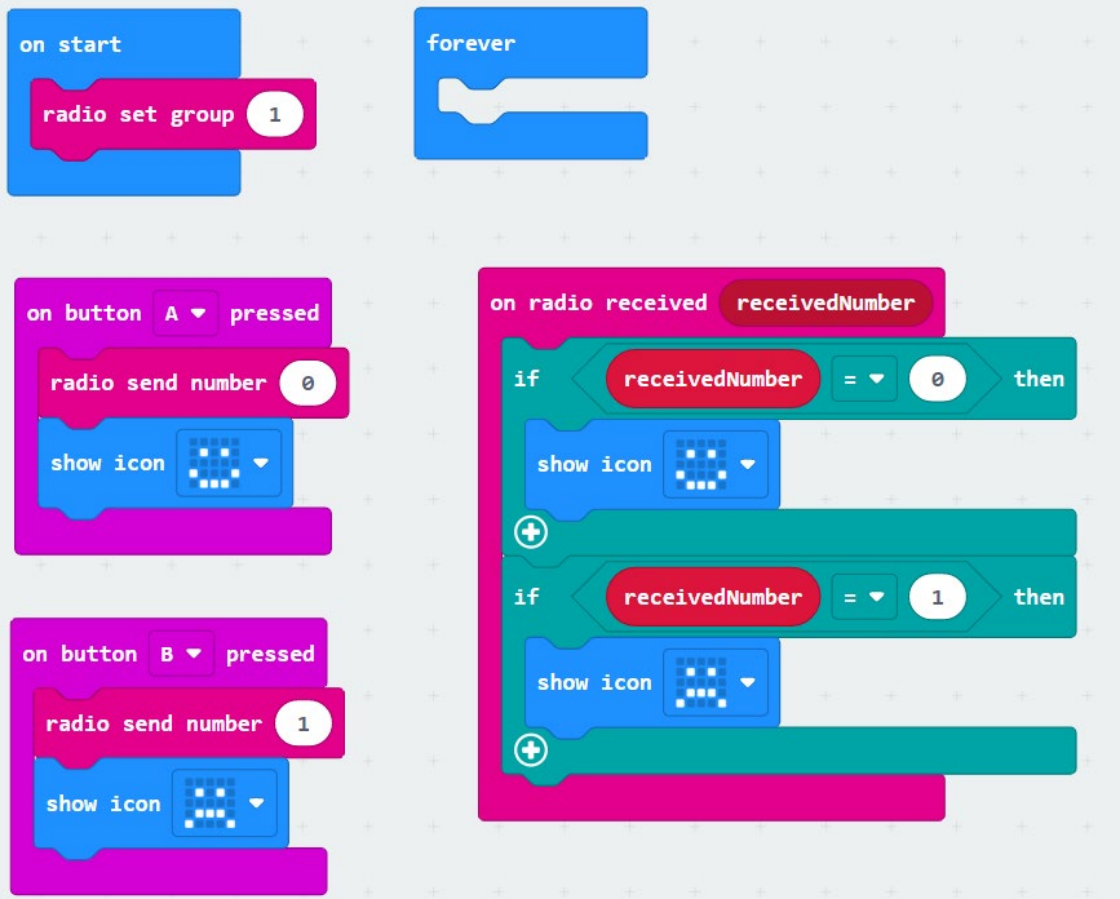
We can add a B button event that sends that code.

Mood Radio Project – Finalizing



If the on received number block, we add another conditional if then statement to handle the frowny “mood code”.

Full Code in your Microbit



This is the full coding scripts for your microbit sending message via radio project.

Radio group – channel from 0 to 255

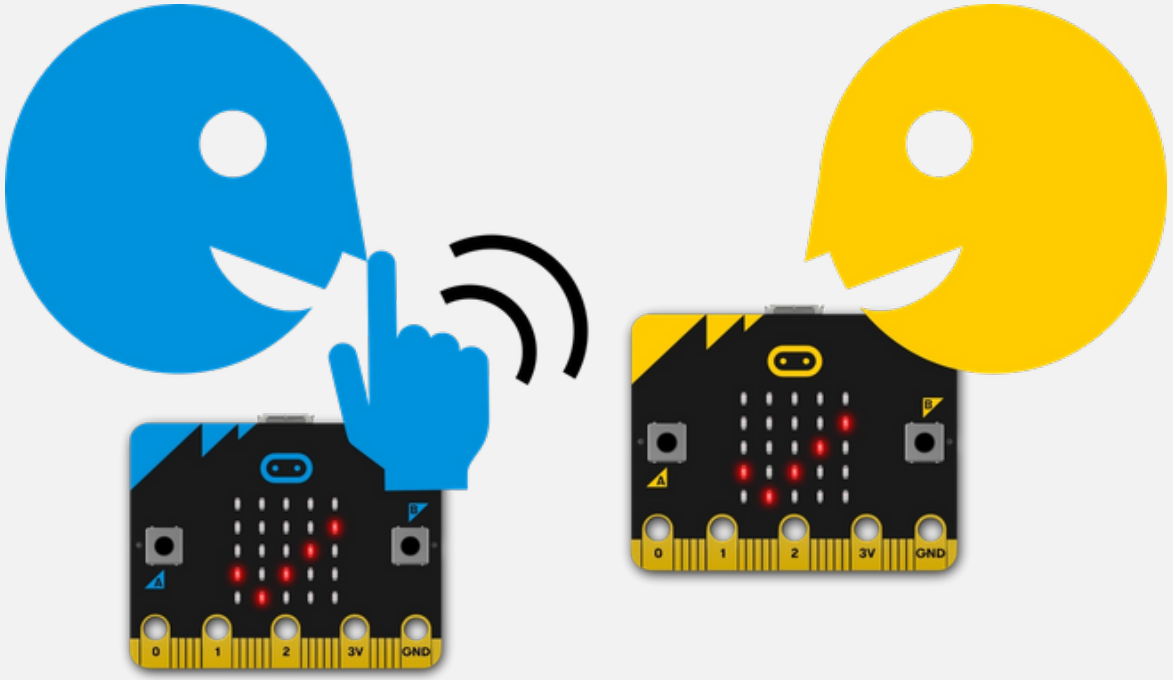
If you are to send your message to your friend, you must make sure your friend is using the same radio group.

Microbit can cater for channel from 0 to 255, which is 256 channels for 2 microbit to communicate with each other.

Mood Radio Project – Download and try it

Yay you have completed your program, faster download and try it with your friend.

Activity – Send secret codes to your friend (15 min)



Pair up with your friend and make it to 2 in 1 group, then select a channel for both of you.

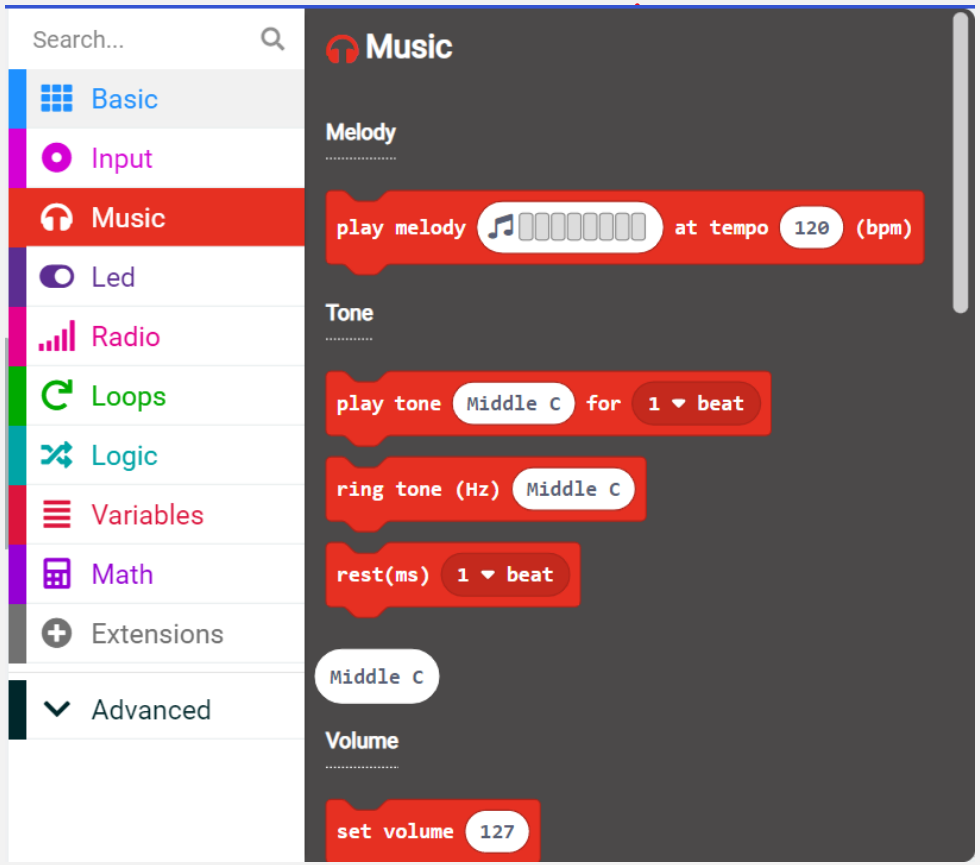
Try giving different events (at least 5 events) to send some secret code to your friend and don't let other people know what you're sending.

(activity time - 15 minutes)

It’s time for a break (5 minutes)

Music Blocks

Music blocks

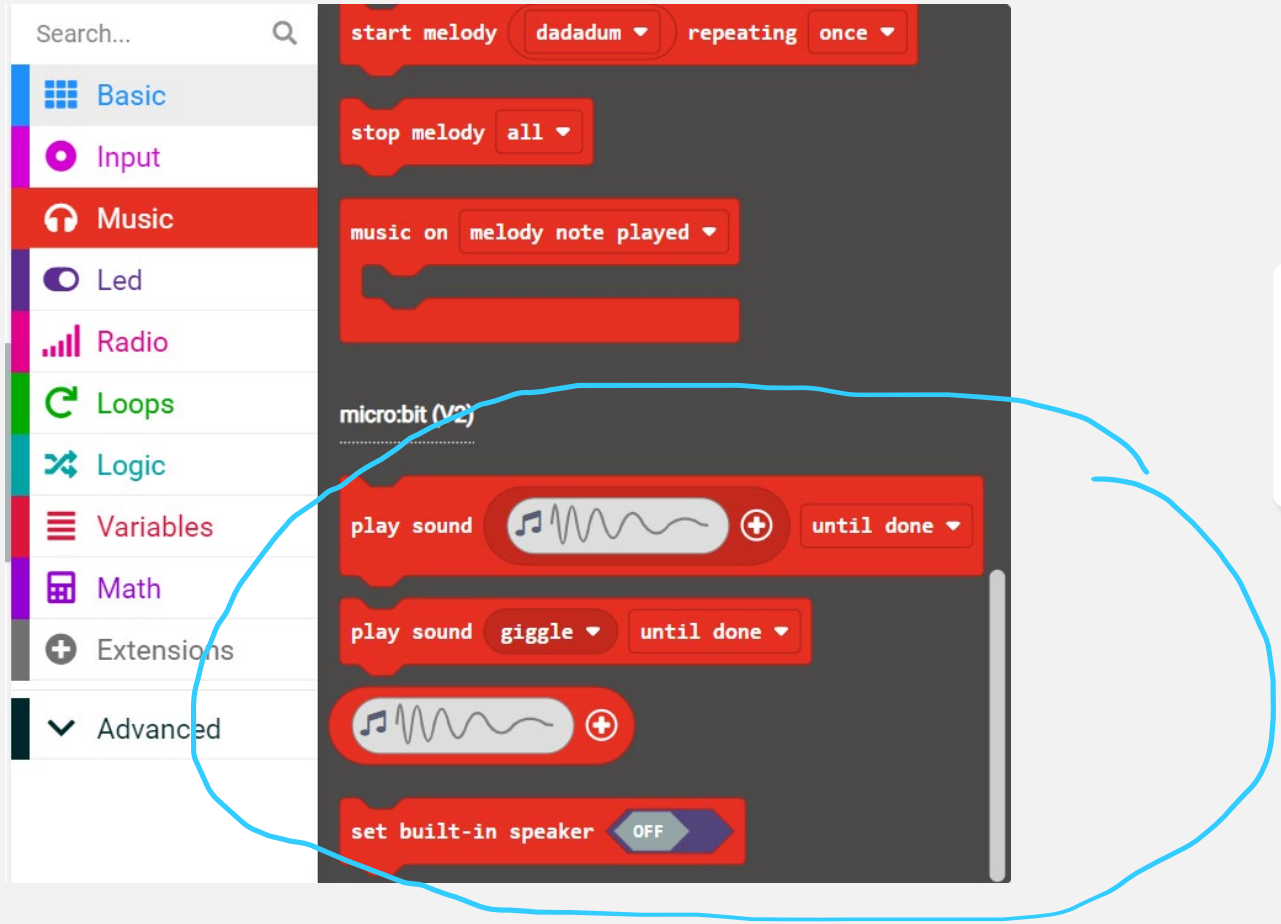


Music block is for microbit to play music or melody.

If you are using Microbit V1.0, there's no built-in speaker, so you need to connect to external speaker in order to play music.

But if you are using Microbit V2.0, there's a built-in speaker on the back, so you can straight play music without needing an external speaker.

Music blocks



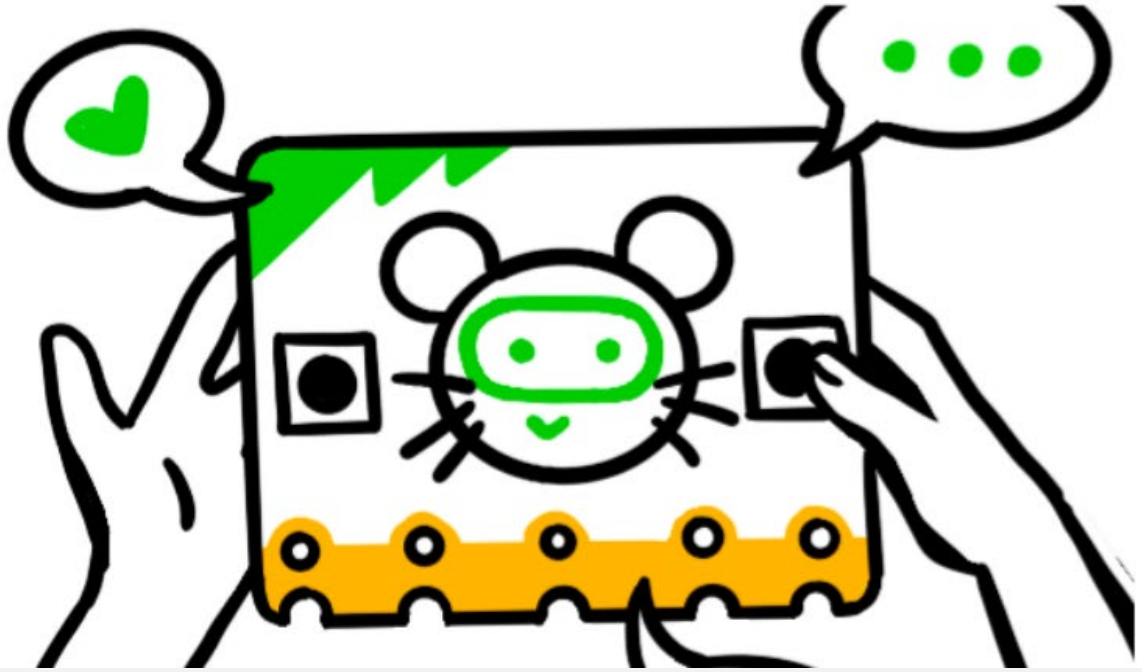
You can compose your own melody or use play sound to make your microbit fun and interesting.

Micropet Project

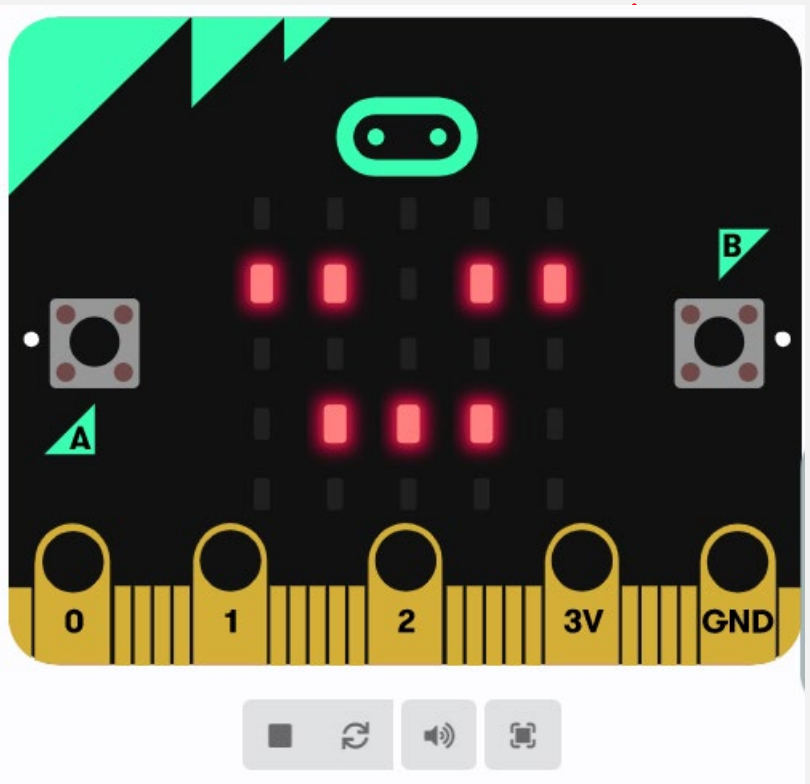
Make your own micropet

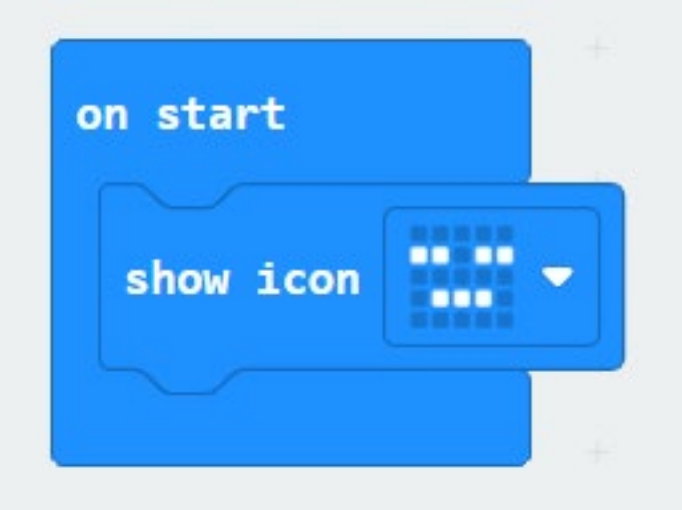
Pet Hamster

👋 Meet your new pet hamster, Cyrus 🐹

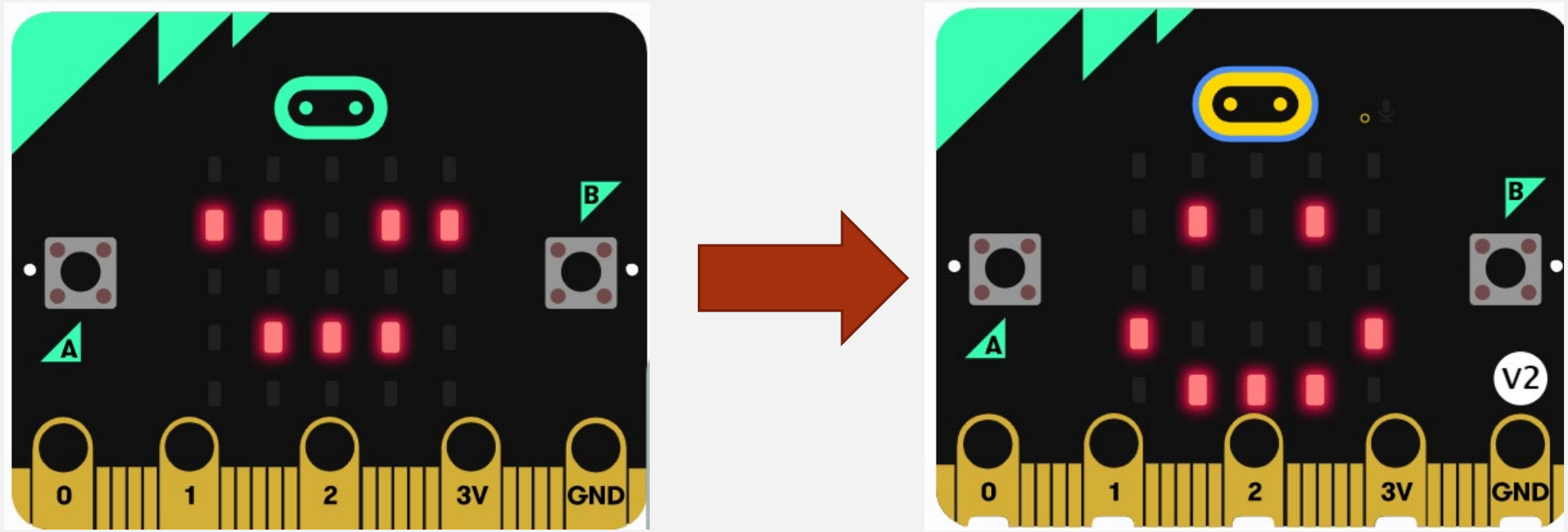


Make your own micropet - example



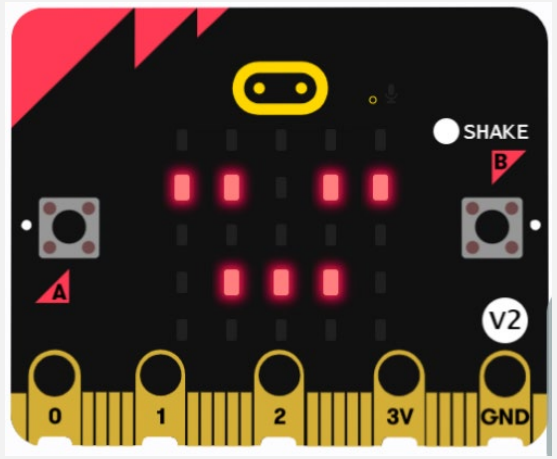


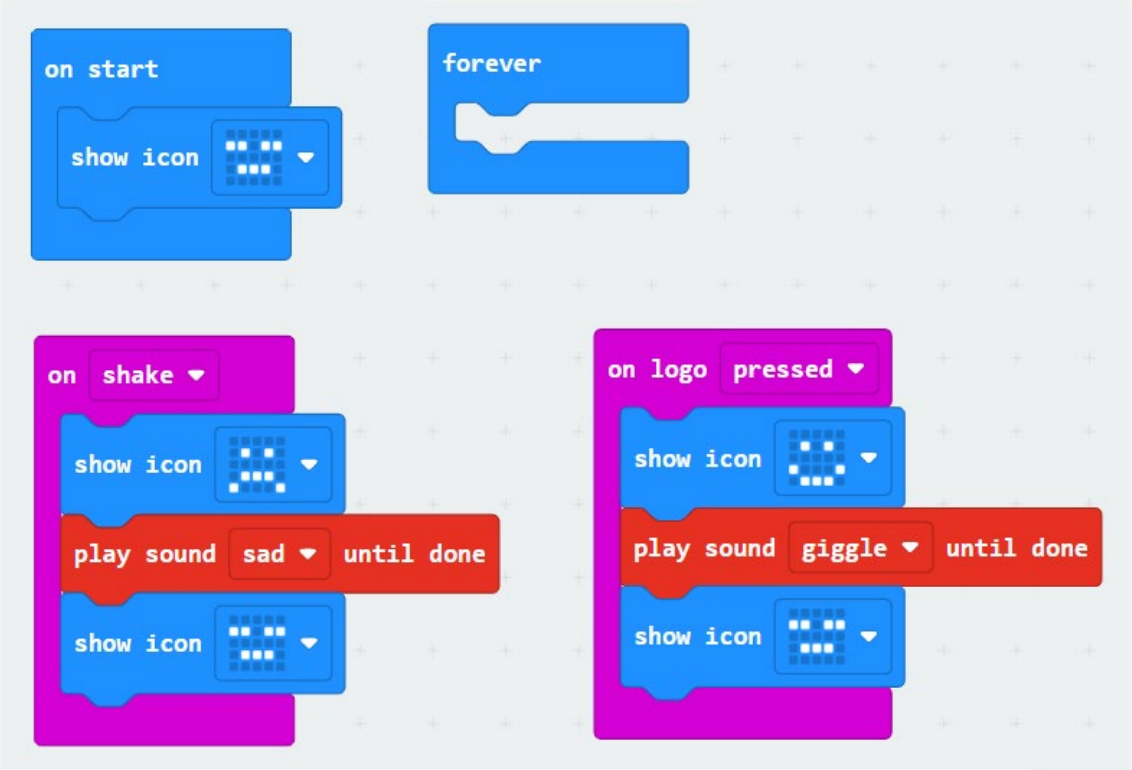
Make your own micropet - example



When an event happened, it will turn into another face

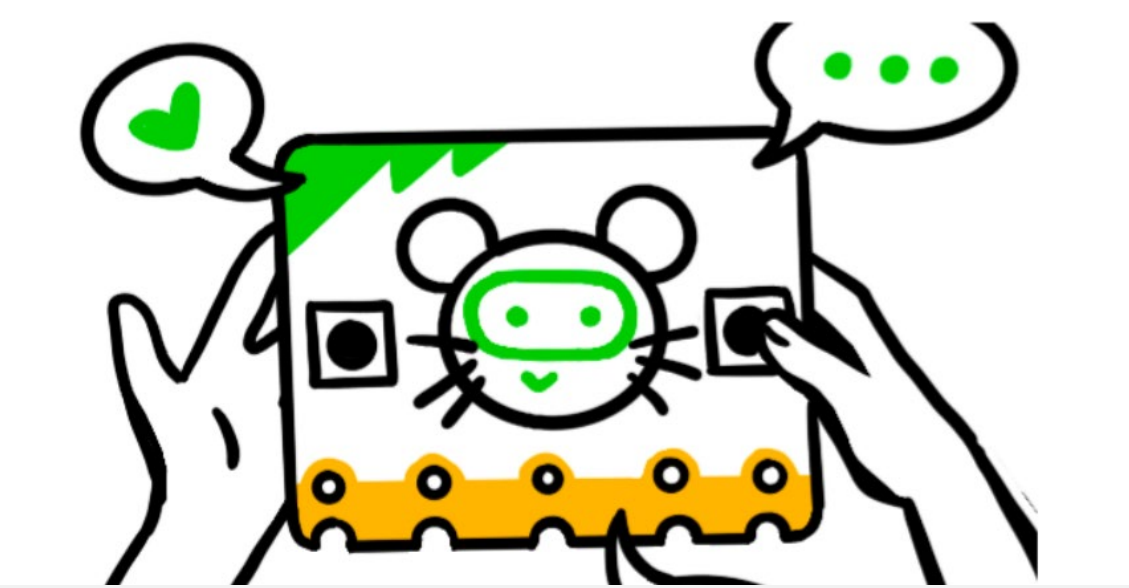
Make your own micropet - example





This is one of the example to program your micropet, you can add more events and do more animation and sound effect to make it more fun.

Challenge - Make your own micropet



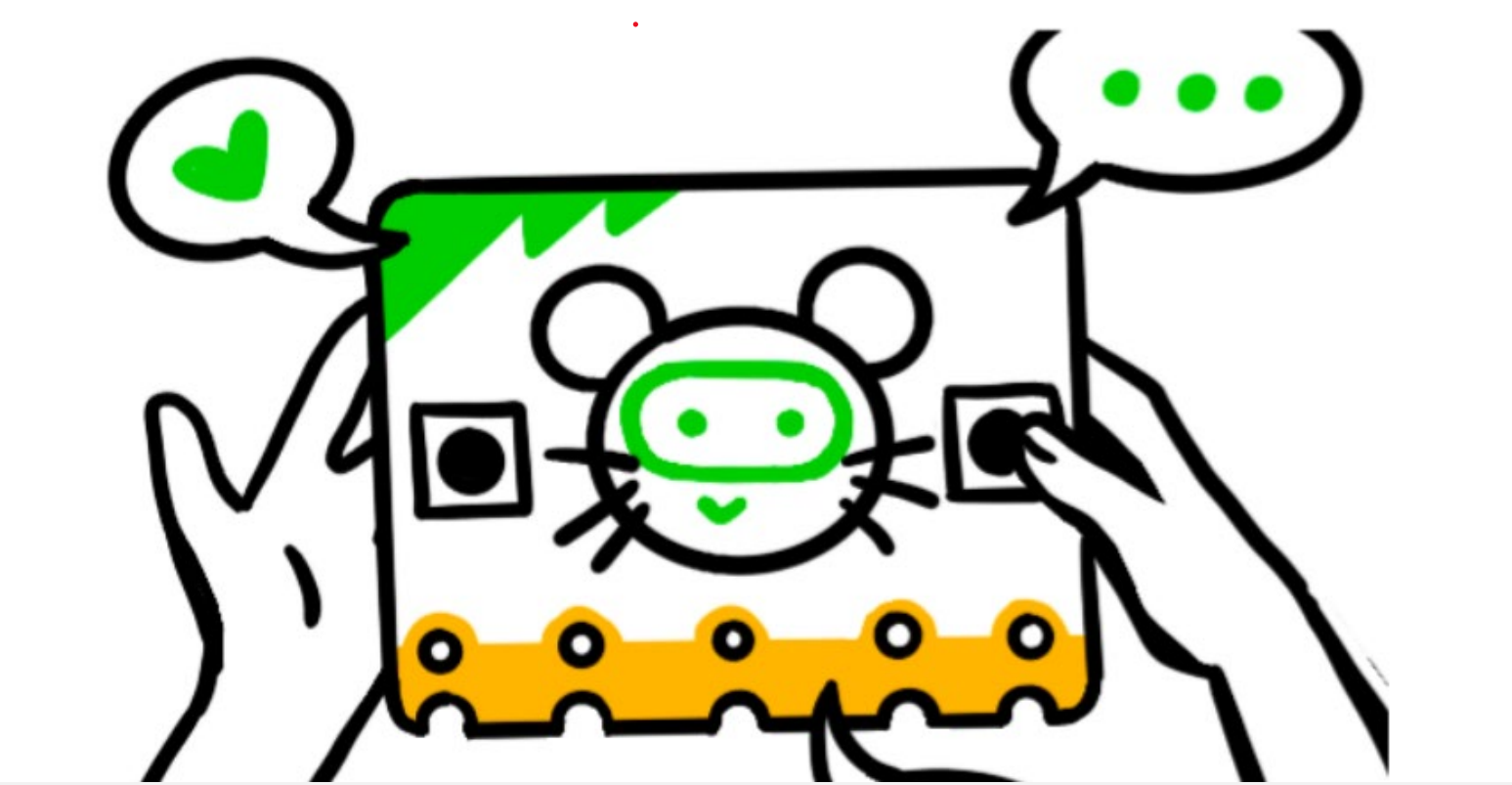
Let's make our own micropet.

Tips:

1. Startup with a face icon
2. Try to use on [shake] or button pressed or similar type of event for the interactions.
3. You can add more animation for the response and add sound effect to it. And also make sure after each interaction, it will go back to the starting face.

(20 minutes)

Presentation – Share with us about your micropet



Do a quick self-check of your learning outcome…

1. Can microbit interact with another microbit?
2. How to send message via radio from Microbit to Microbit?
3. Can Microbit V1.0 play music without external speaker?
4. How to make your micropet?

Any Questions?

Thank you :)