

Shake that Micro:Bit!

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Please Help Professor Brown

- This class is new to Professor Brown.
- He needs to know how he's doing. That will help students in future classes.
- It will help *you* see how much you are learning as we go along.
- Please answer a 10-question survey.
- This is *not for a grade*.
- Put your computer number, not your name on it.
- Put your grade (6th, 7th, 8th) on it.
- If you're not sure, pick the answer that seems best.

The Plan !

In the next few weeks we will

- Work together on Micro:Bit projects at first.
- Work in teams on independent projects.
- Learn as we go along!

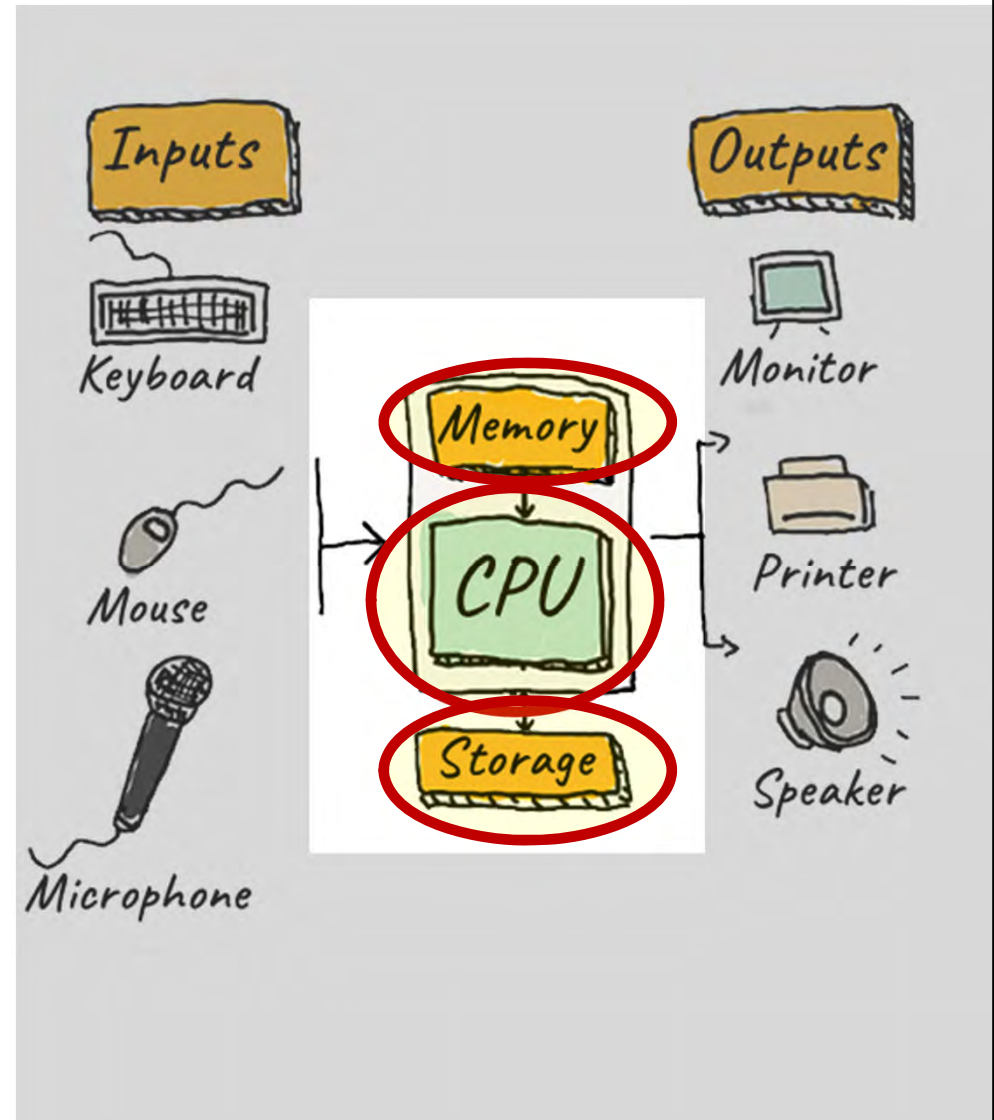


What is a Computer?

- A computer is a machine.
- It takes simple actions in response to commands.
- The commands can be stored, to be used over and over.
- The stored commands are called a *program*.
- Programs are written in computer *code*.

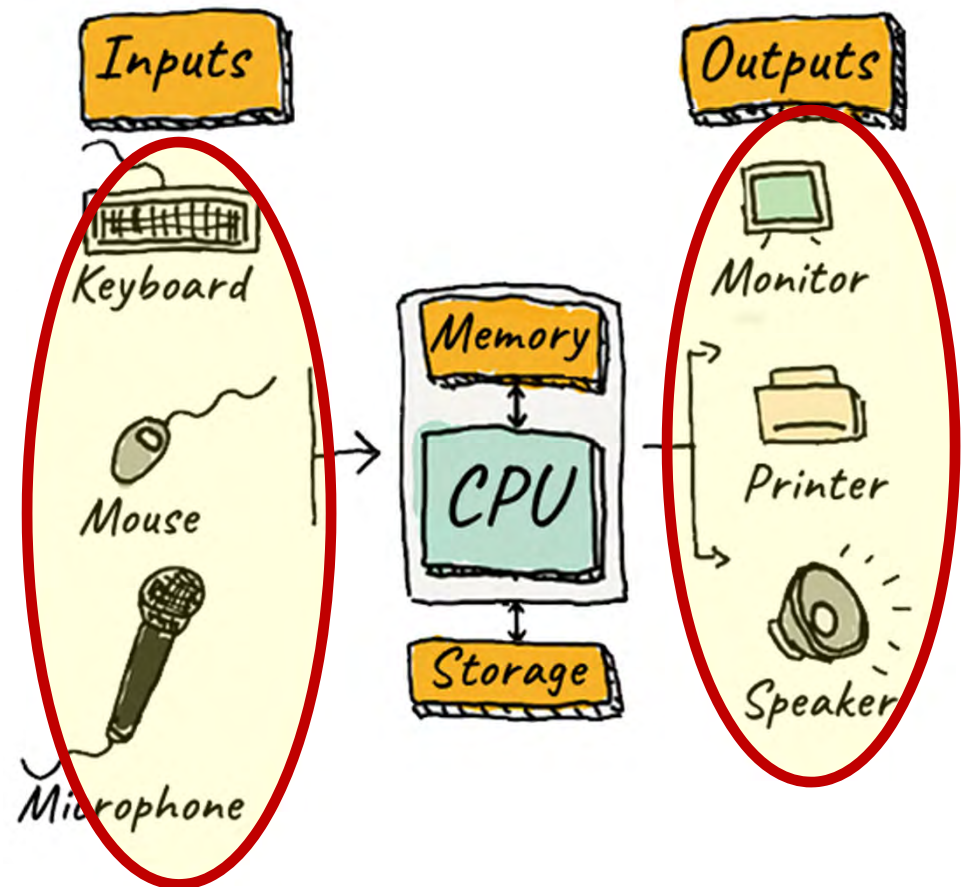
The CPU and Memory

- The ***CPU*** executes commands, one at a time.
- The ***memory*** holds the program and its data. Called ***RAM***.
- ***Storage*** holds programs and data. ***Hard disk, SSD, or flash*** memory.



Input and Output

- ***Inputs*** are processed by the CPU as commanded by the program.
- ***Outputs*** are produced by the CPU as commanded by the program.
- There are different kinds of ***devices*** for input and output.

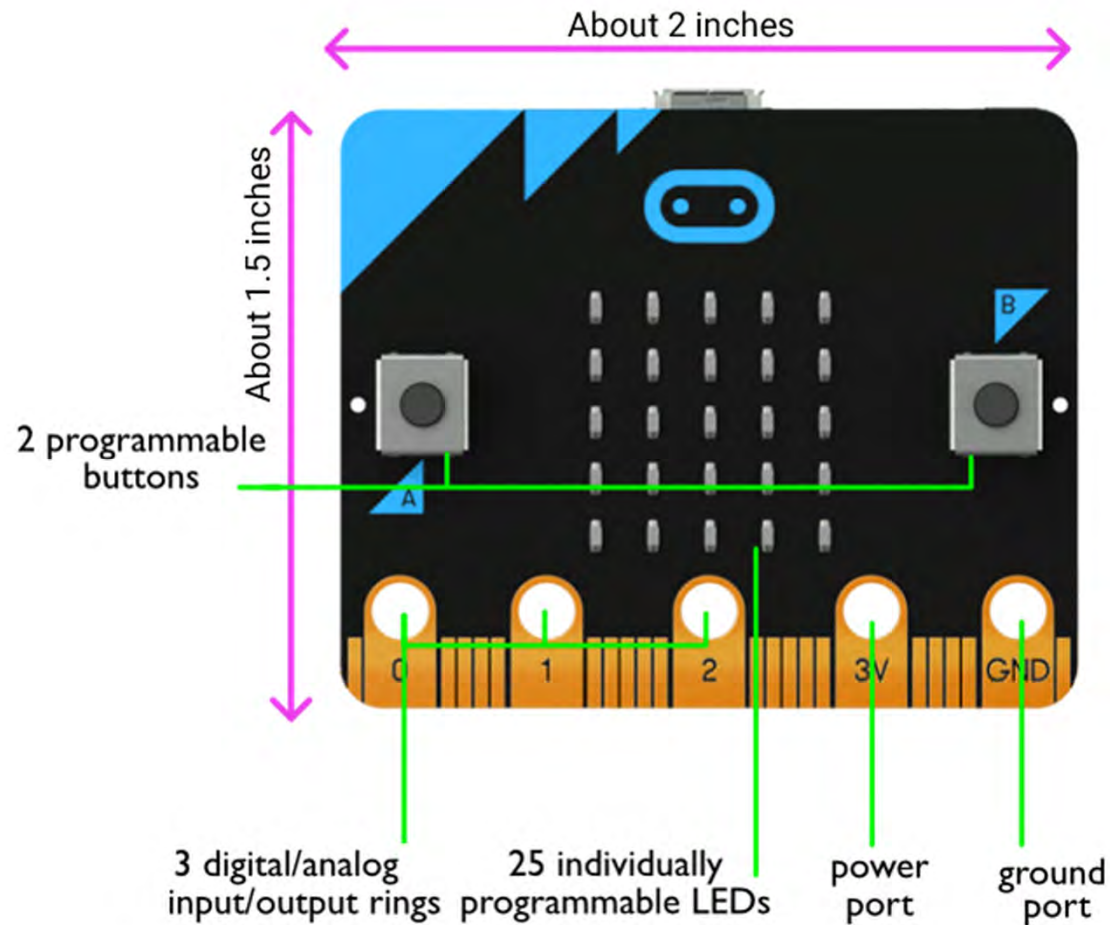


Another Way to Think

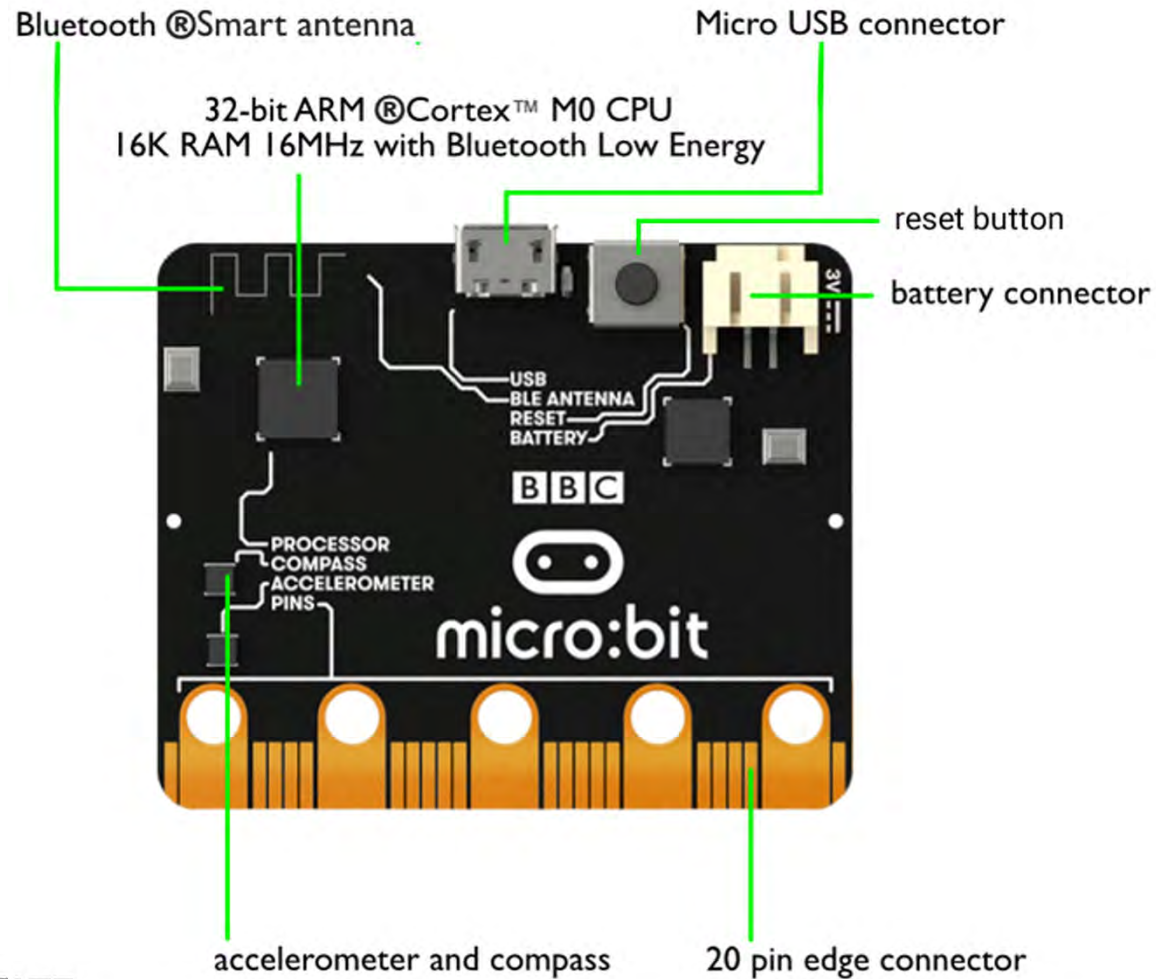
- Computers receive *inputs*.
- Inputs are *processed* by a *program*.
- Which produces the *outputs*.



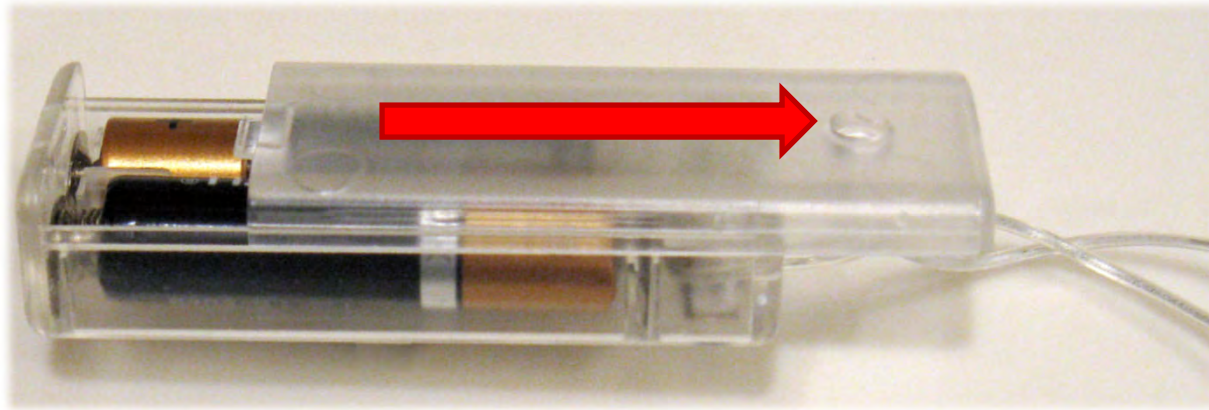
Exploring the Micro:Bit



Exploring the Micro:Bit



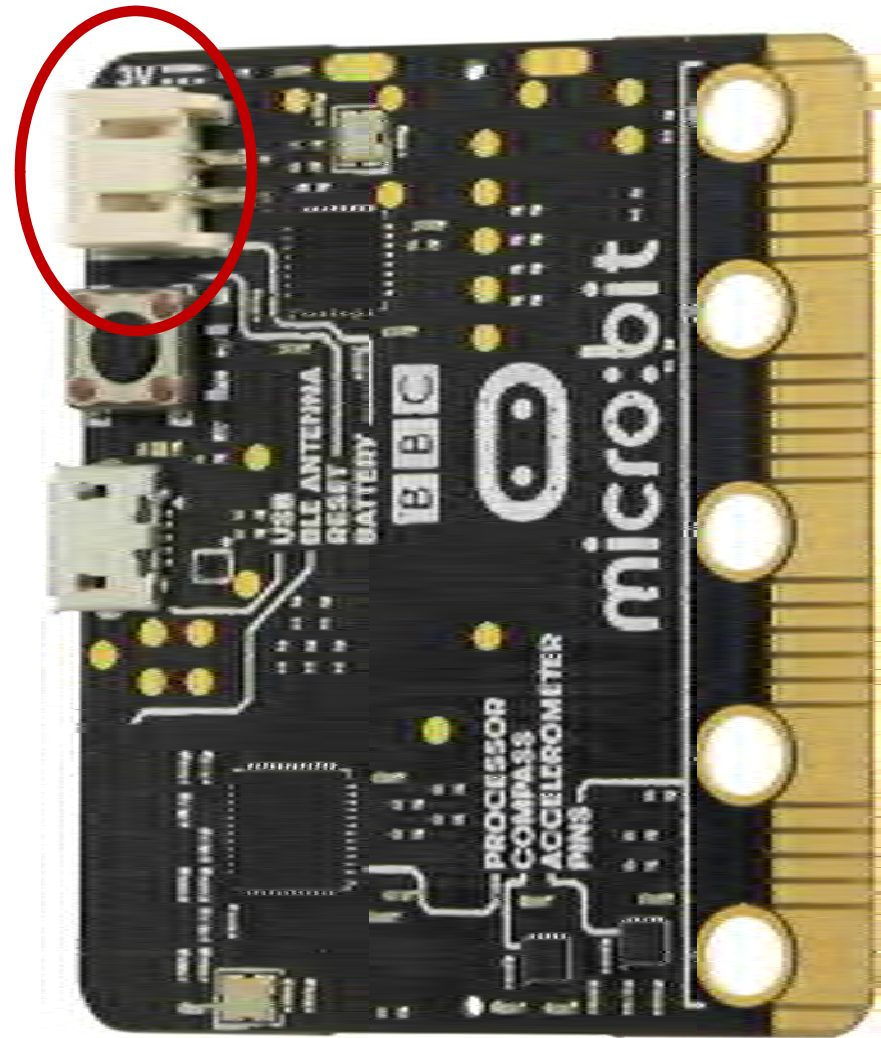
Let's Explore: Install Batteries



- Slide the top of the case in the direction of the two wires.
- Install two batteries.
- Slide the top back into place.

Connect the Battery Pack

- Carefully plug the battery pack into the Micro:Bit.
- Look at the pins closely; it will only go one way.
- Don't force it.
- Turn the switch on if necessary.
- What happens?



Explore !

- Watch the Micro:Bit.
- See an arrow? Push a button.
- Gently shake the Micro:Bit
- Push the “Reset” button; it’s next to the battery connector. What happens?
- Let it sit quietly until you see two red dots, one flashing.
- Try tilting the Micro:Bit in several directions.

What Did You Observe ?

- Many things happened during your exploration.
- Can you name some of them?

Unplug the Battery Case

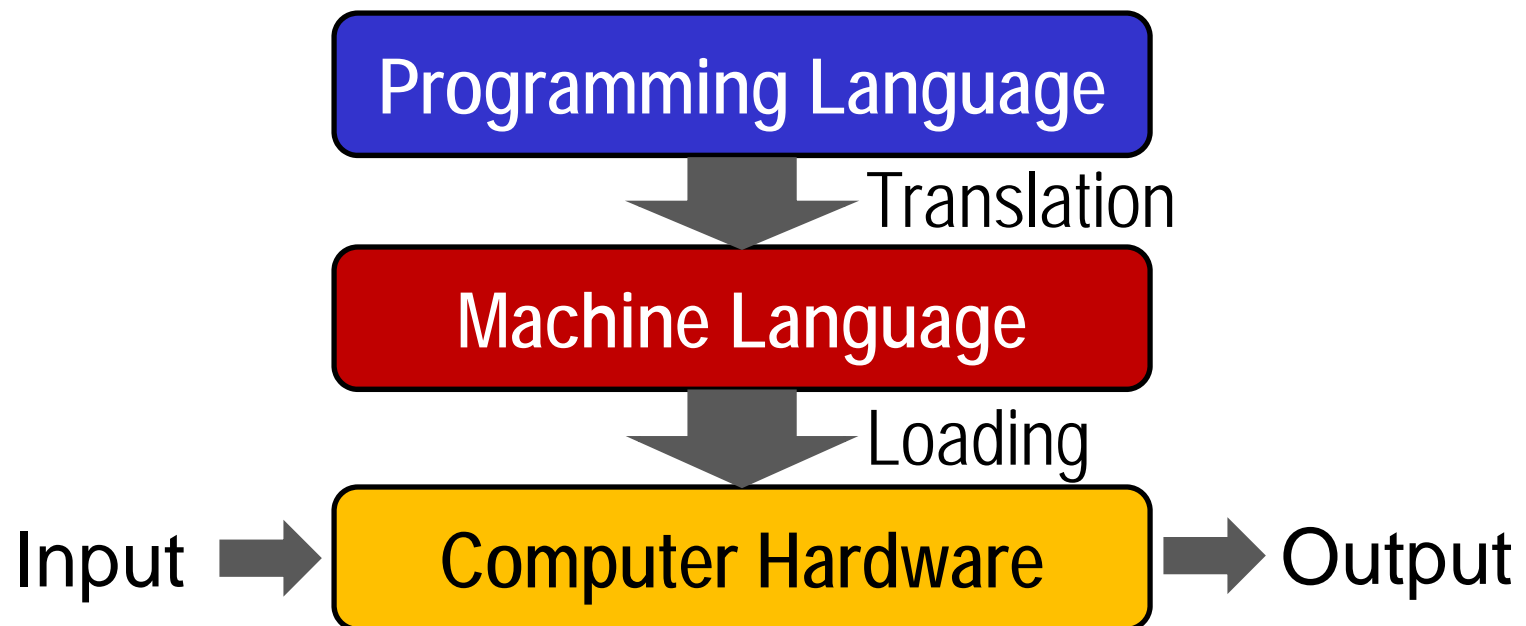
- Hold the plug by the tiny plastic part.
- If you pull on the wires, they'll break off inside the plug!
- Put the case back in the box.

Computers, Humans, and Languages

- Humans speak English (Or Spanish, or French, or Japanese...)
- Computers understand only strings of ones and zeros, called *machine language*.
- Humans write for computers in highly-structured languages called *programming languages*.

Translation to Machine Language

Programming languages must be *translated* to ones and zeros for the computer.



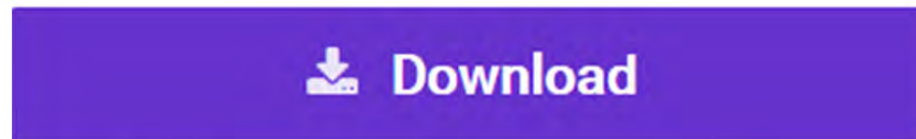
A Program of Your Own

Algorithm:

- When Button A is pressed,
- Display a smiley face on the LEDs.
- Wait two seconds.
- Turn all LEDs off.

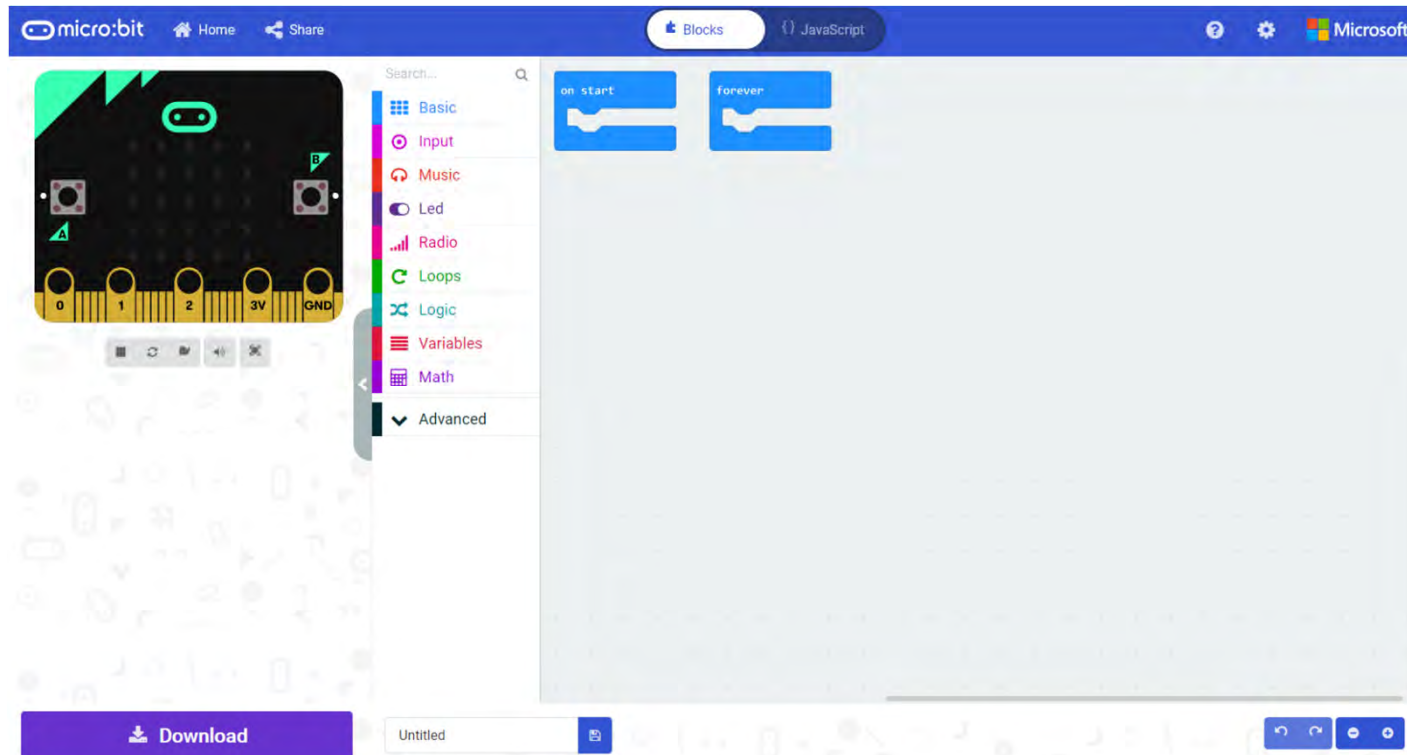
A Program of Your Own

- Open a browser and go here:
<https://makecode.microbit.org/>
- Click the purple “New Project” box.
- Raise your hand when you’re there.
- Give your project a name: Remove “untitled” and type “smile” in the box.



The Makecode Editor

The screen looks like this.

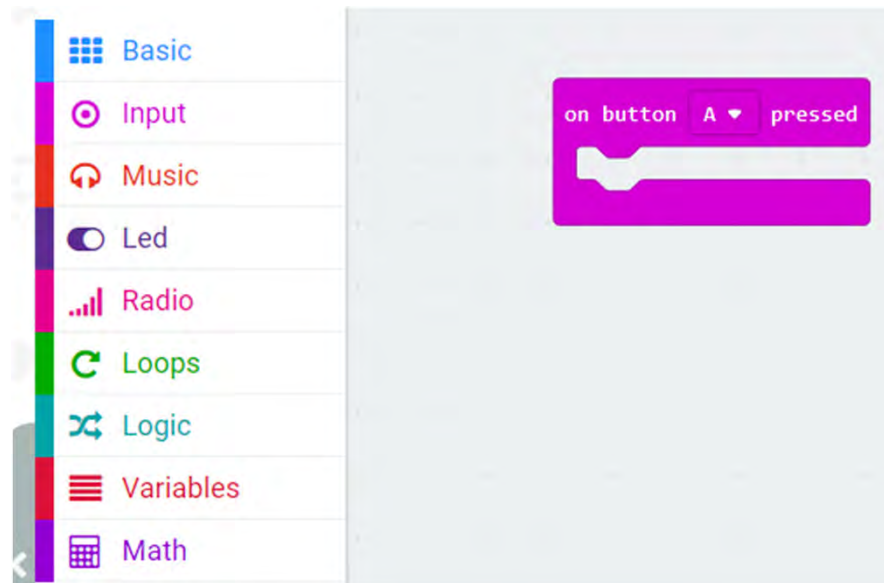


Clear the Workspace

- Drag anything in the workspace to the left until a trashcan appears.
- Drag the item into the trashcan.
- Raise your hand when you're there.

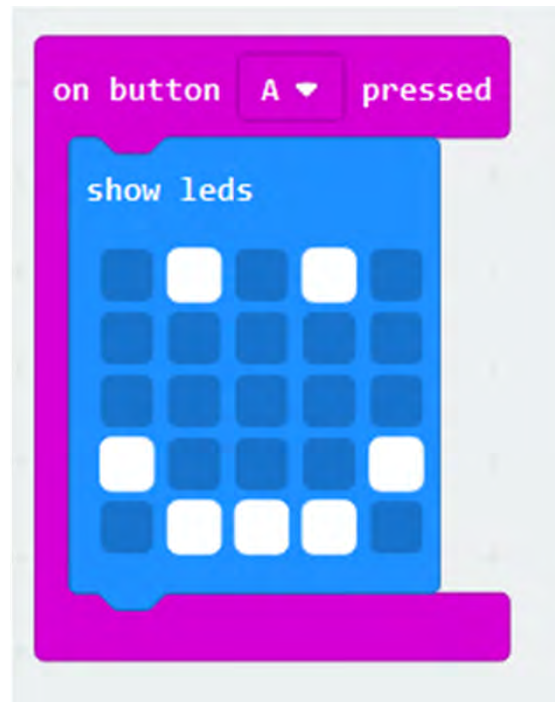
Assemble Blocks into a Program

- From “Inputs” drag “on button pressed” to the workspace.



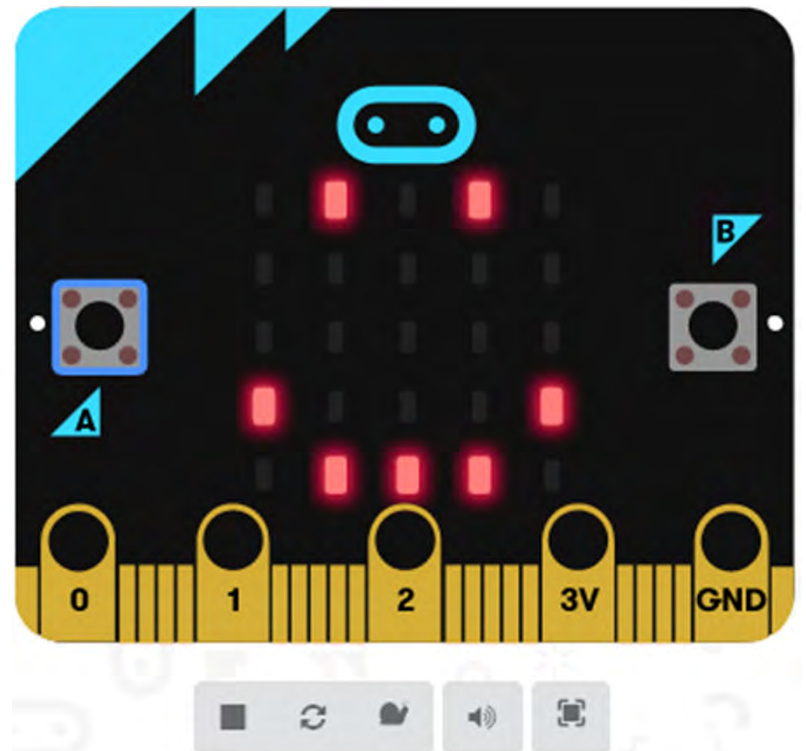
Assemble Blocks into a Program

- From “Basics” drag a “show LEDS” block inside the “on button pressed” block.
- Click the LED squares to make a “robot smiley.”



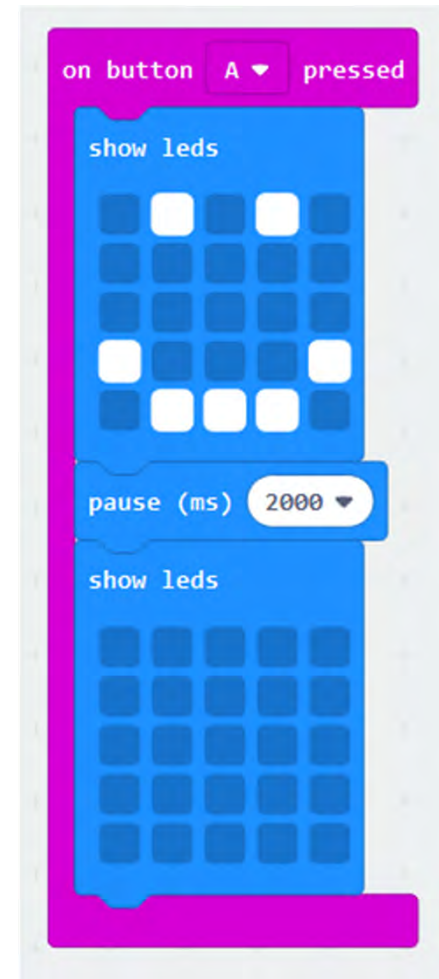
Test Your Work So Far

- Mouse-click the “restart” icon on the left.
- Click the “A” button.
- Watch the smile!



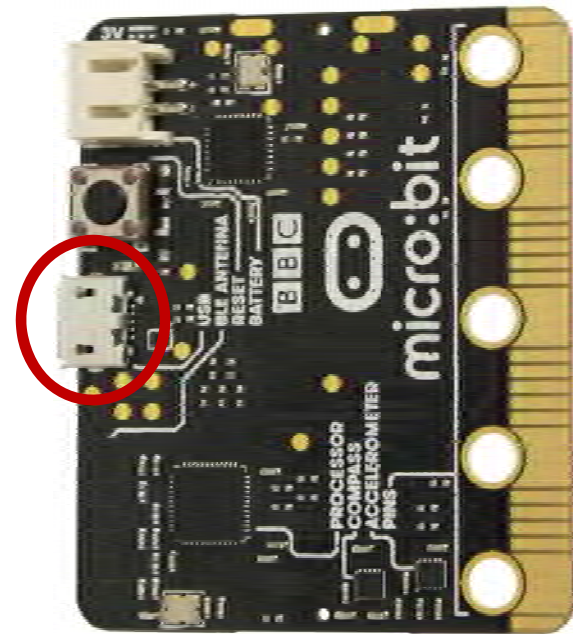
Complete Your Program

- Drag a “pause” block from Basics and place it after the Smile LED.
- Set the time to 2 seconds.
- Drag another “show LEDs” block after the pause.
- Turn all LEDs off in that one.



Get Your Micro:Bit Ready

- Plug the small end of the USB cable into the Micro:Bit.
- Plug the other end into your laptop.



Save and Load Your Program

- Click the “Download” button.



- Save the file on the desktop.
- Open the “Computer” folder and drag the file to the Micro:Bit drive.



Run Your Program

- When the yellow light stops blinking, press button A.
- What happens?
- Press it again.
- Try the “Reset” button on the other side.
- Try button B.

Thought Challenges

- What happened to the earlier program, the one we ran at the beginning of class?
- Right! The Micro:Bit can only hold one program at a time.
- Why didn't we need the battery?
- Right again! The Micro:Bit is getting power from the laptop through the USB cable.

Programming Challenge

- Can you change your program so that button B shows a frowny face?
- *Hint:* You will need a separate button block. Put it beside the block for button A.
- They will not “attach” to each other.

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