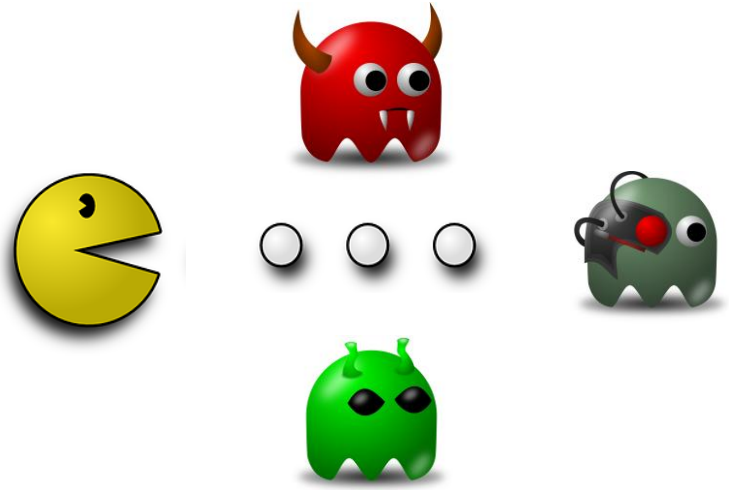
CreositySpace

Connecting Kids to STEM Through Entrepreneurship

My STEM Explorer Notes™

Coding Whisperers

Can you create your own video game?



STEM Explorer:

Useful Phrases for Having Constructive Discussions

Asking Clarifying Questions

Can you be more specific?
Can you explain your answer further?
Can you give an example?
Can you please explain your thinking?
Can you repeat what you said?
Could you rephrase that?
Could you say that one more time?
What is your evidence?
Can you give me another example, so I can understand?
Can you tell me more?
Why do you think that is important?
Why do you think that happened?
What if the opposite were true?

Adding to an Idea

I agree with _____ because _____.
I agree with _____.
I agree with _____ and I also think _____.
I agree with _____ and, would like to add _____.
I agree, and I have an addition: _____.
I believe this is true because _____.
I know that too because _____.
I have something to add; _____.
I think you are right, and I also think _____.
I would like to add to that idea.
This reminds me of _____ because _____.
Yes, that makes sense, and I would also like to add _____.

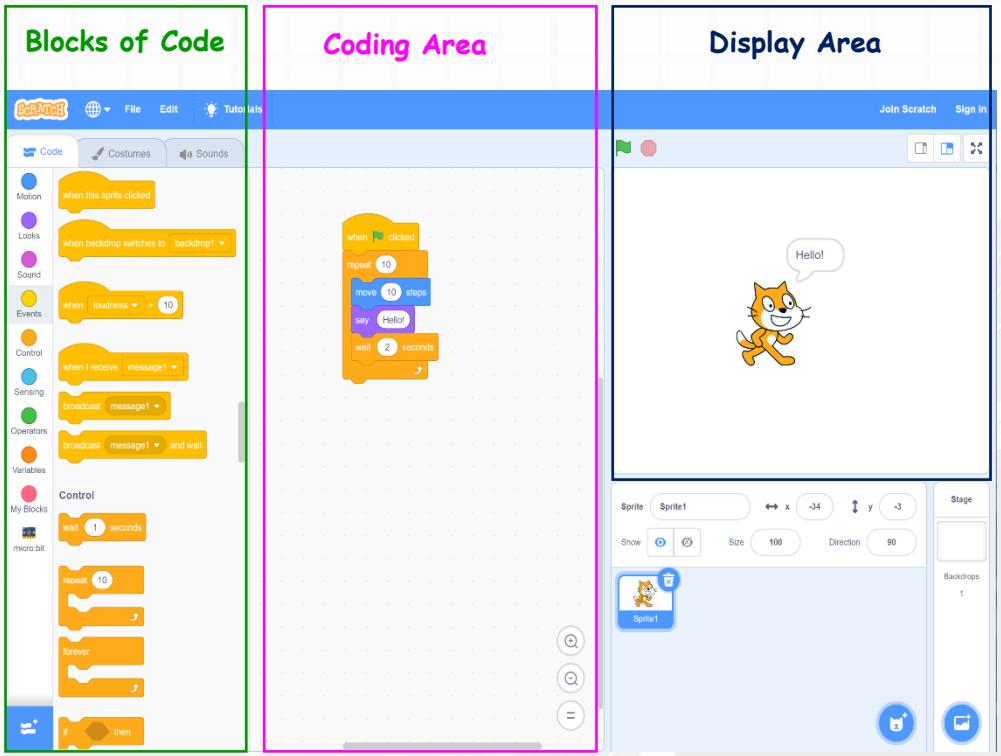
Respectfully Disagreeing with an Idea

Could you explain, because I have a different idea.
I disagree with that idea because _____.
I disagree with your reasoning because _____.
I disagree with _____ because _____.
I have completely different opinion on that.
I respect your opinion and _____.
I respect your point, and in my opinion _____.
I respectfully disagree because _____.
I see your reasoning and disagree with some of the idea because _____.
That's a good point, and _____.

Welcome to SCRATCH!

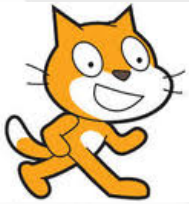
SCRATCH is a *drag-and-drop* coding program developed by people at MIT. SCRATCH allows everyone to write code using *blocks*, instead of words and symbols, so you do not have to worry about getting the coding *grammar* (called syntax) perfect.

This is your SCRATCH workspace.



To write a program you drag **blocks of code** into the **coding area** and connect them. When you click on your program in the **coding area** it plays in the **display area**.

There are a lot of different things you can do with SCRATCH. Let's warm-up by having Scratch the cat perform a few tasks.



Task 1

1. Move Scratch the cat forward 10 steps
2. Turn Scratch the cat 15 degrees
3. Have Scratch the cat play the sound meow

(Hint: To get the code to start, click directly on it.)

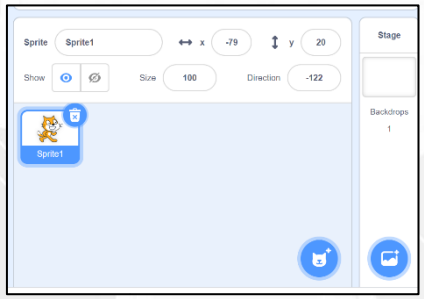
Task 2

Have Scratch the cat complete the above sequence ten times with a one second wait between each repeat.

Task :

Can you move Scratch the cat back to the top left corner and have him stand up straight?

(Hint: Use the mouse and/or the controls in the bottom right corner.)

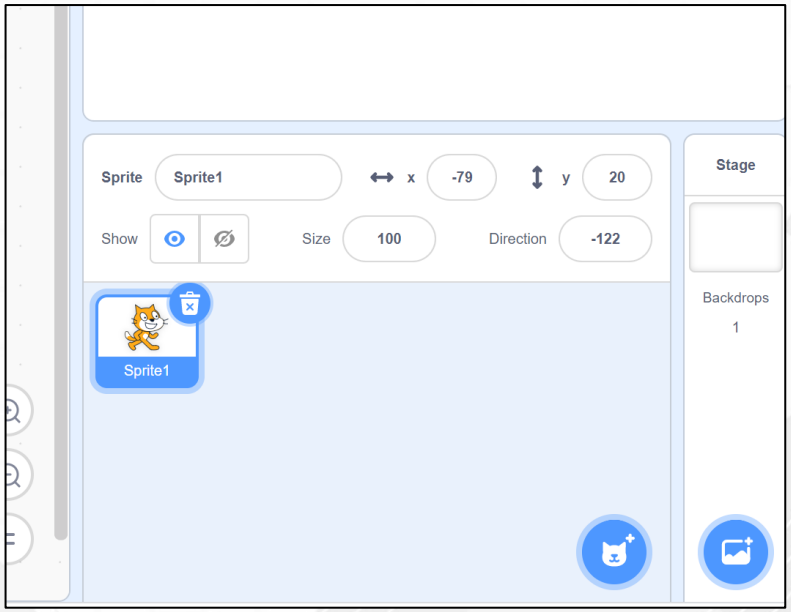


Task 4

Can you put an outfit onto Scratch the cat or turn him into another animal? *(Hint: Look under the Costume tab.)*

Task 5

Can you add another character or sprite? Can you change the background? *(Hint: Look at the options in the bottom right corner.)*



Use this space to write down some notes about using SCRATCH.

1 Click on the green flag or the code to start the program.

2 Click on the stop sign to stop the program.

3 To disconnect blocks, you must pull them down.

4 Each sprite has their own code window.

5 Drag code to the column on the left to get rid of it.

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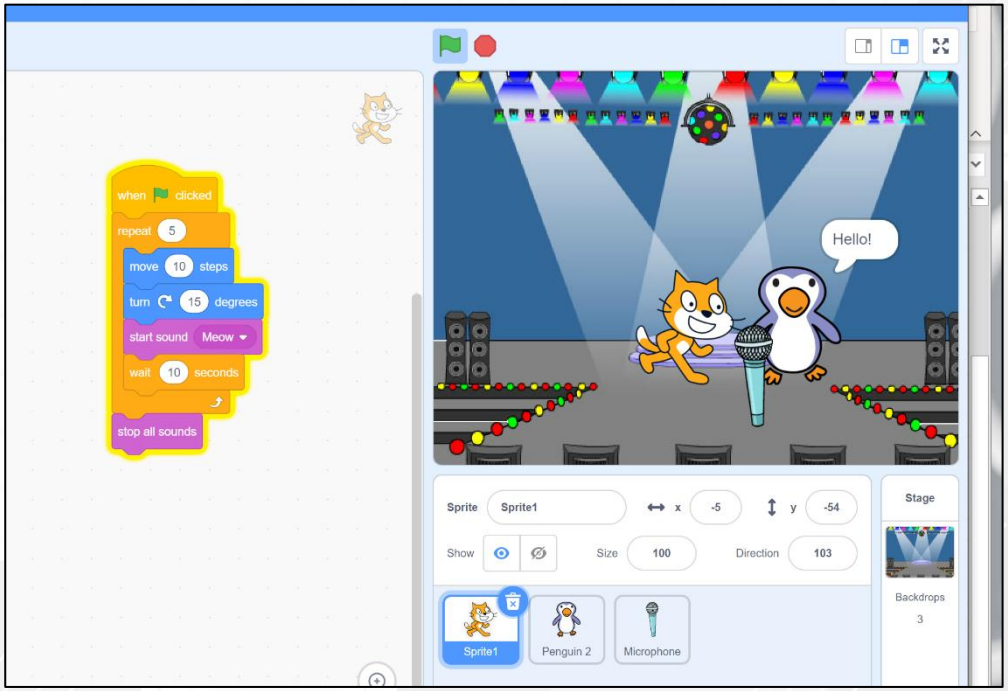
Animation Time

Now it is time to create your own animation. You get to choose the details of your animation, but it must include the following things:

- ✓ At least two characters (or sprites)
- ✓ Some motion
- ✓ Some sound
- ✓ A background that is something other than white

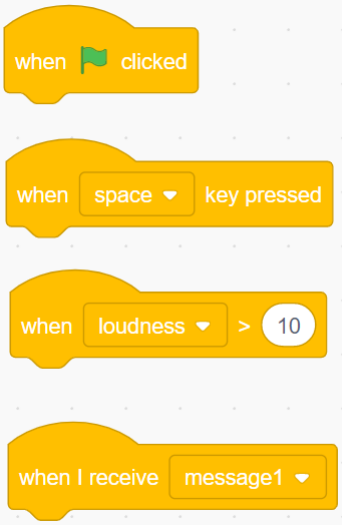
Here is an example.



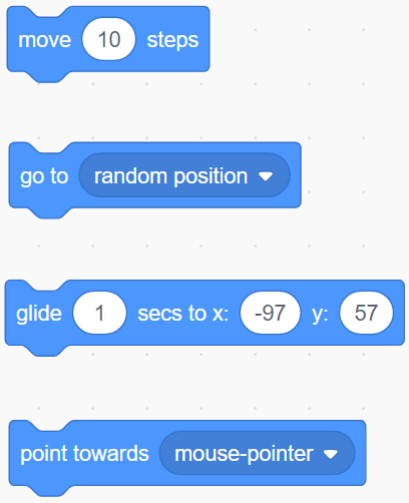
You can use this space to plan out your animation or you can dive right in. The next page has some useful blocks of code you can use.

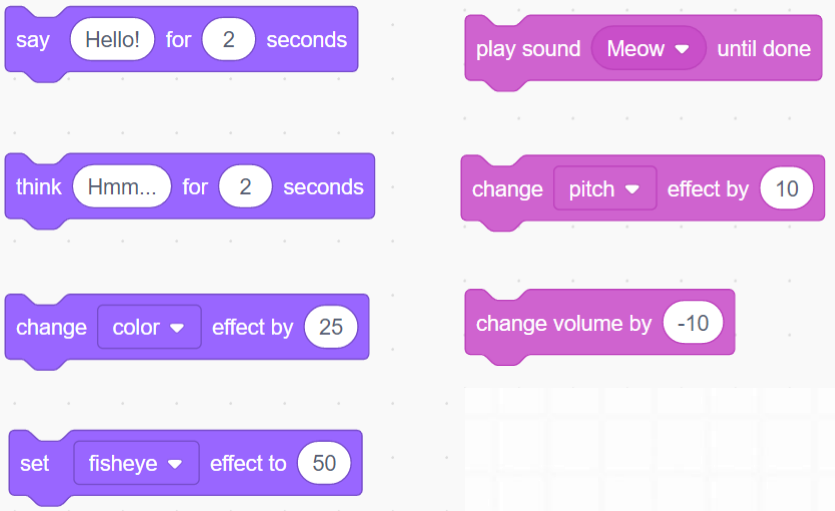
Some Useful SCRATCH Blocks

Getting Started

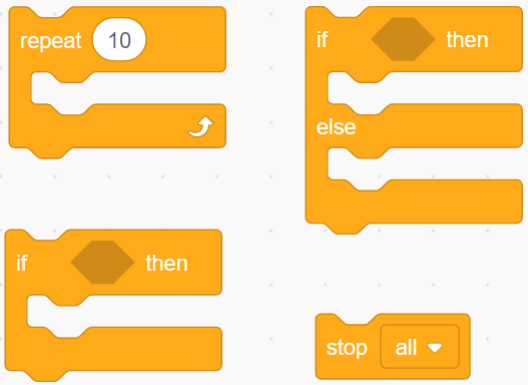


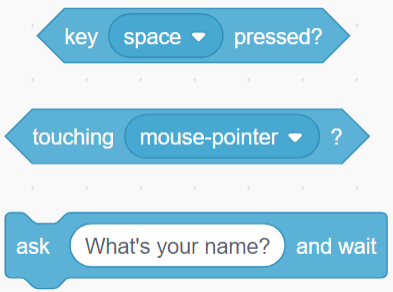
One Step Actions

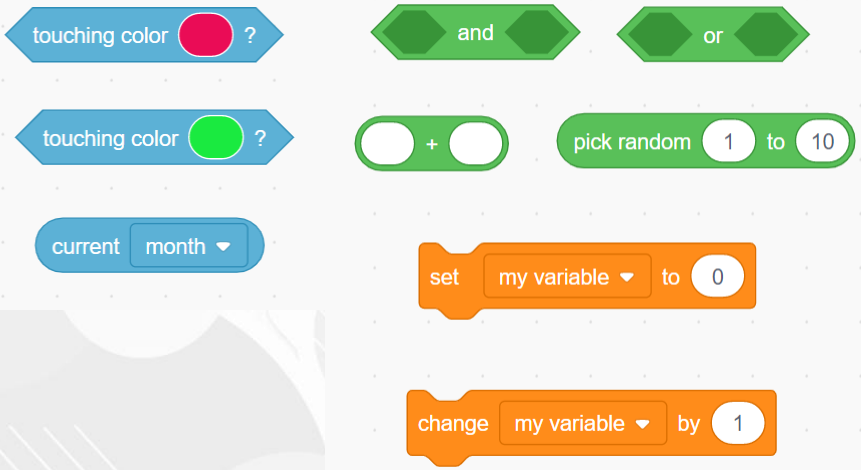




More Advanced Actions





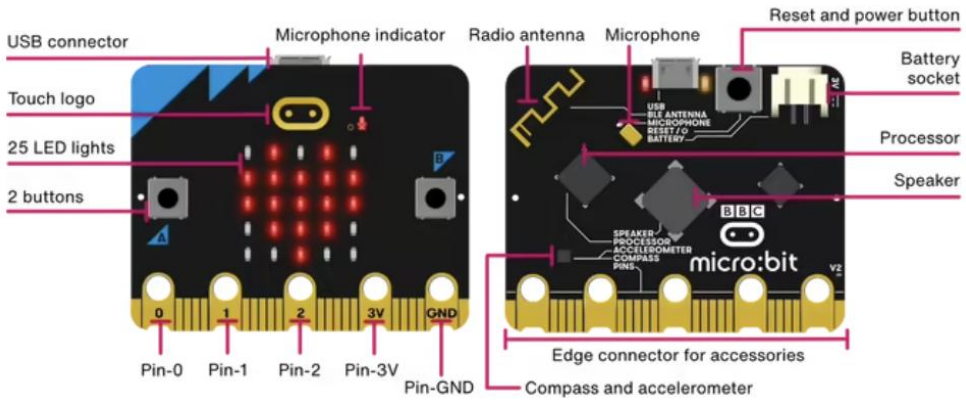


These are just some of the SCRATCH blocks you can use. There are many more waiting for you to test them out!

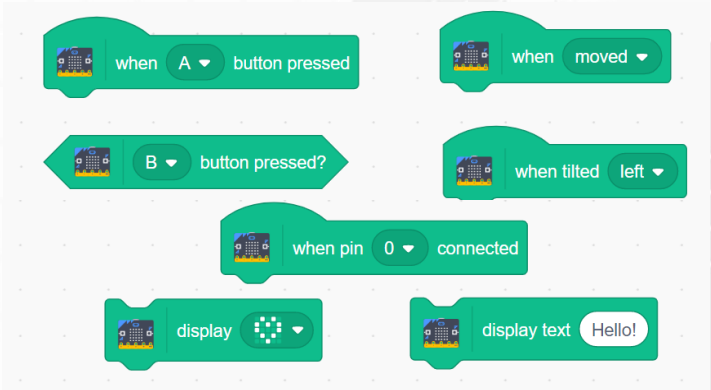
Introducing the BBC micro:bit

The BBC micro:bit is like a fancy controller that you can program to do a lot of different things. It has buttons (like a video game controller), a motion sensor (like airplane controls), and can act like a communication bridge between your SCRATCH code and the outside world.

The layout of the BBC micro:bit



You can control the micro:bit in SCRATCH by dragging different blocks into the coding area. Here are some of the mirco:bit blocks.

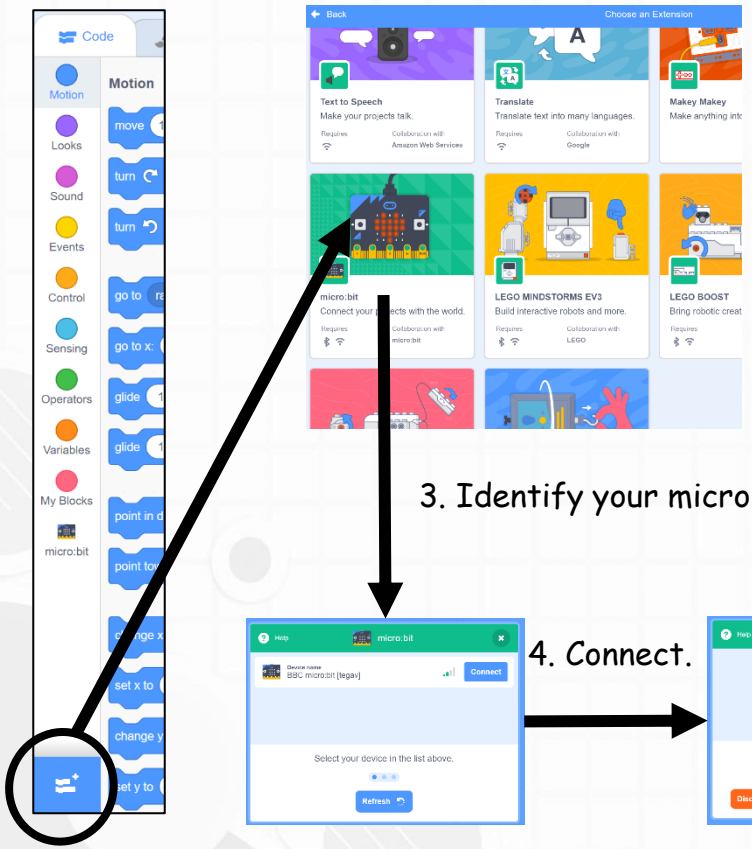


Making sure SCRATCH can see the BBC micro:bit

It is important to make sure SCRATCH and the micro:bit are properly connected.

1. Select the extensions tab.

2. Select the micro:bit extension.



If you run into problems, there are some troubleshooting suggestions on the last two pages.

Let's get some practice using the BBC micro:bit.

The LED display

Can you…

- light up a heart on the LED display?
- have the LED display show your name?
- change the LED display by connecting a pin?

Controlling a sprite (or character)

Can you…

- control Scratch the cat by pressing a button on the micro:bit?
- control Scratch the cat by moving the micro:bit?
- control Scratch the cat with a command started by a pin?

Integrating the micro:bit into your animation

Can you…

- use either the A or B button in your animation?
- use the *jump* or *shake* function in your animation?
- use pin 2 in your animation?

Use this space to write down some notes using your BBC micro:bit.

1 Never connect the ground and 3V pins.

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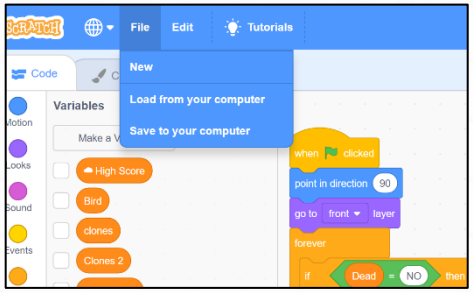
Can You Hack Flappy Bird?

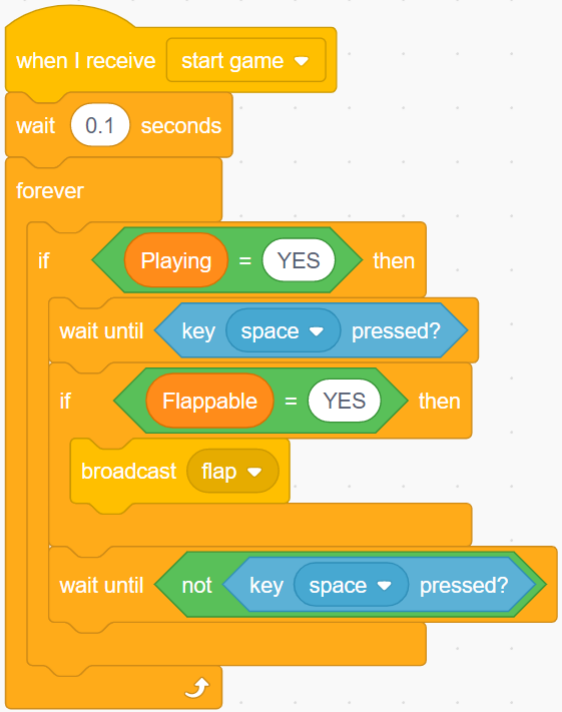
To load Flappy Bird, go to ***File/Load from your computer*** and select the **Flappy Bird Scratch Edition.sb3**. It should be on your desktop.

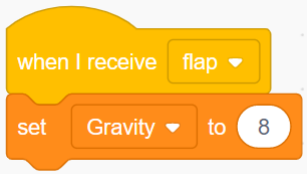


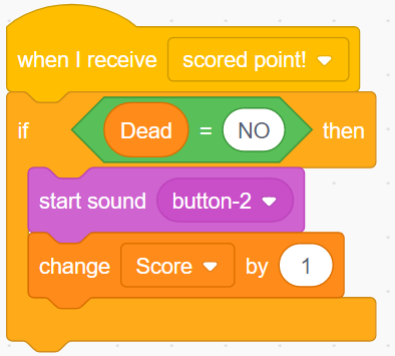
By changing the code, you can change the way the game is played (and scored). Can you make the following changes?

1. Ensure that you get a new high score as soon as you clear the first obstacle.
2. Make it easier for the Flappy Bird sprite to get through the obstacles.
3. Change how the Flappy Bird sprite flaps:
    - Use a different keyboard key
    - Use a motion on the BBC micro:bit
    - Use a button on the BBC micro:bit
4. Can you add something to the Flappy Bird code that shows your score on the BBC micro:bit display?

Here are some pieces of the Flappy Bird code that might help you with your modifications.







You can use this space to keep track of your favorite hacks.

Time to Design Your Video Game

Before you jump into designing your video game it is helpful to do some planning for the game's storyline. You can revise your plan as you go along but it is important to have a place to start.

Some questions you should think about are:

- ✓ What is the goal? How do you win?
- ✓ Where does the game take place?
- ✓ How many characters are in the game?
- ✓ How does the game end—do you need to win, or can you die?

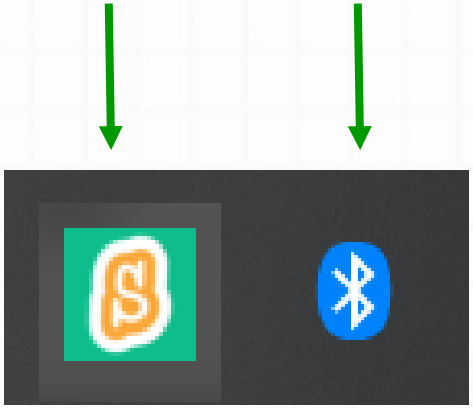
What are some other details about the storyline of your video game?

You can use the space on the next few pages to sketch out your video game. You might want to go back and forth between your sketches and your code—or not—either way is okay, just pick a strategy that works for you!

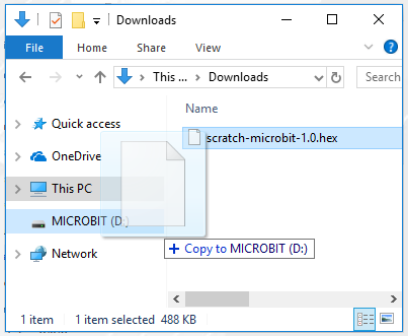
Troubleshooting the BBC micro:bit with SCRATCH

Make sure the BBC micro:bit has power through a USB connection to the computer.

Make sure SCRATCH link and Bluetooth are active.

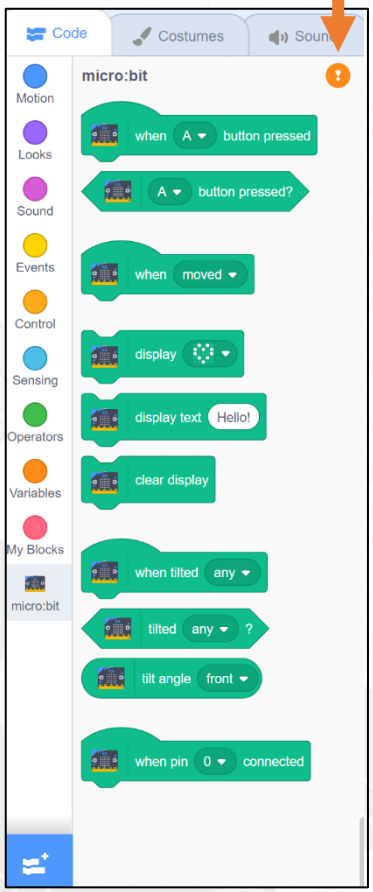


Make sure the SCRATCH micro:bit hex is installed on your BBC micro:bit.

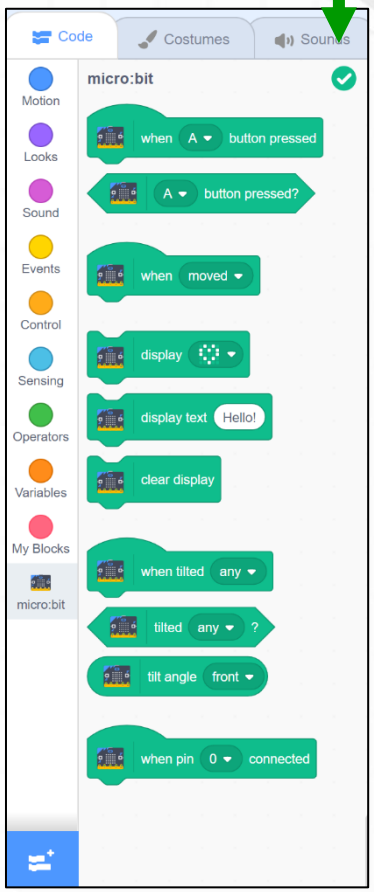


Make sure SCRATCH sees the BBC micro:bit.

Orange means NOT connected



Green means connected



Go to www.scratch.mit.edu/microbit for download links and more details.