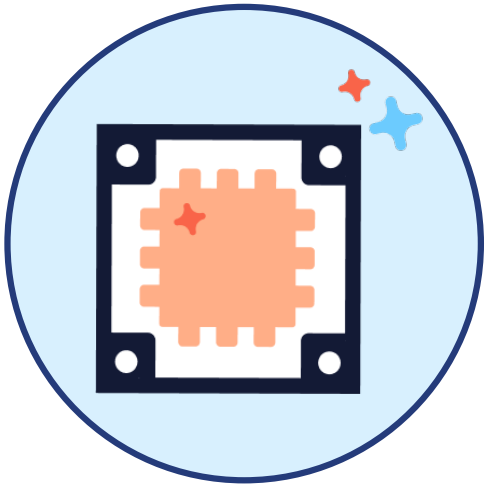
MOONHACK 2023

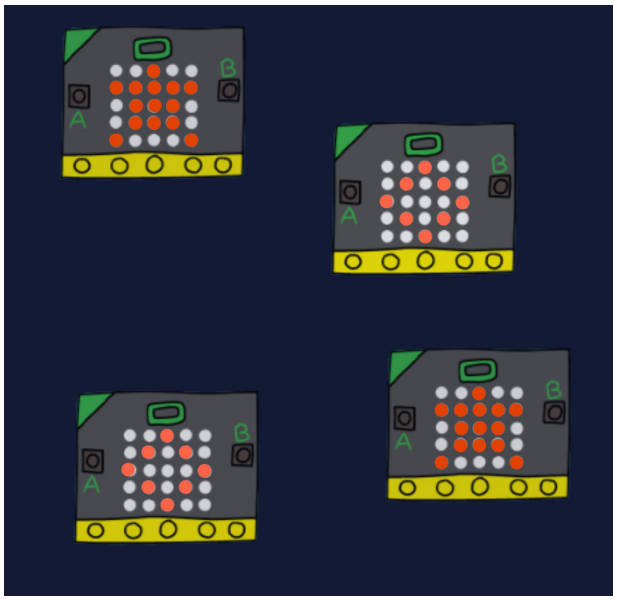
CONSTELLATION



Use Micro:Bits to create a sparkling constellation.

INTRODUCTION

Code Micro:Bits to become sparkling stars that can be used to design a constellation.



What you will need

HARDWARE

A computer with internet access

Micro:Bits and power sources - minimum of 2 but the more you can use the better it will look! Check out our YouTube channel for a demonstration.

SOFTWARE

MakeCode Editor

What you will learn

- How to create your own **function**
- How to use the **radio**
- How to **control LED brightness**

Additional notes for educators

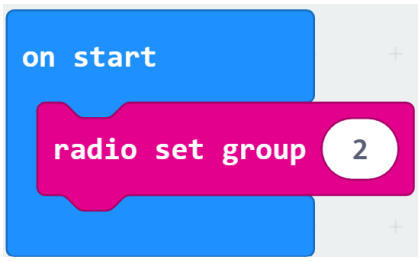
Check out our blog post for this project with tips, curriculum and supporting material at medium.com/@codeclubau

Visit our YouTube channel for a code along video

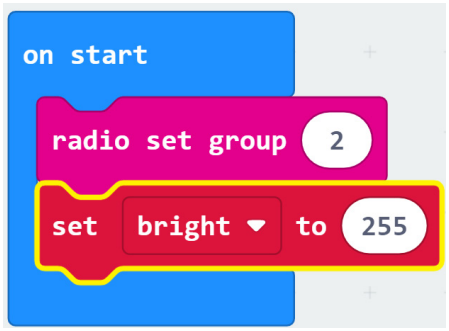
STEP 1 - SETTING UP COMMUNICATION

Open MakeCode Editor. Click the button to create a new project. Call the project 'constellation'

Start your first algorithm with the event on start. Inside this add a radio block and set the radio to group 2. This ensures our Micro:Bits are all on the same radio channel.



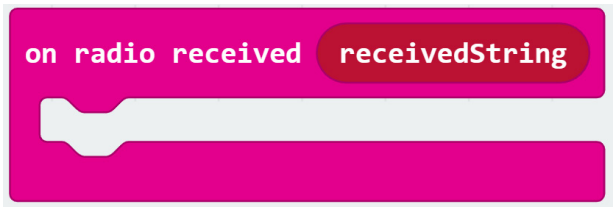
In the variables menu click the make a variable button and call the variable bright. Now add a block to set bright to 255. This is the highest setting.



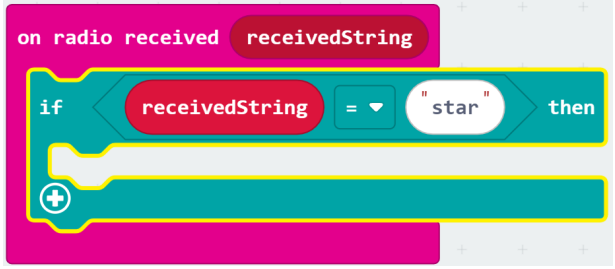
Start a new algorithm with the input on button A pressed. Inside this from the radio menu, add a block to radio send string and call it star.



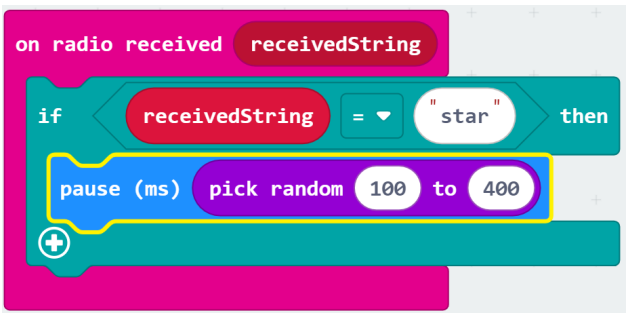
Start a new algorithm with a block from the radio menu, on radio received receivedString.



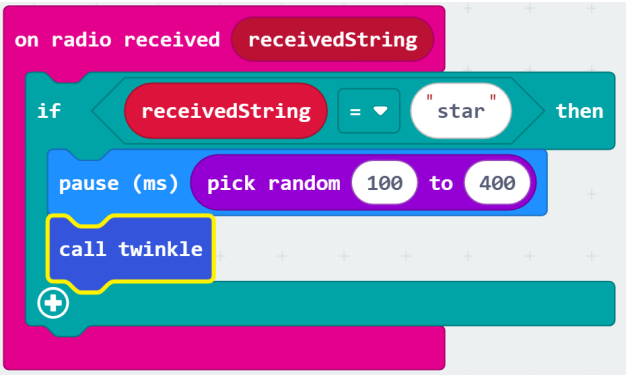
From the logic menu add an if then block. Inside this place the logic comparison block =. **Make sure you choose the bottom block that has " " in the bubbles, not the number 0.** Click on the receivedString bubble in your radio block and drag it onto the if then block. Then type star on the other side.



From the basic menu add a pause block and from the math menu add in a pick random block, adjusting the numbers. This will make our stars start twinkling at random times.



Click on the Advanced menu, then Functions. Make a function and call it twinkle by typing inside the code block. We are going to use this to create our own code block - twinkle. Click done. This will add a new event. Click back on the function menu to add in the call twinkle block.

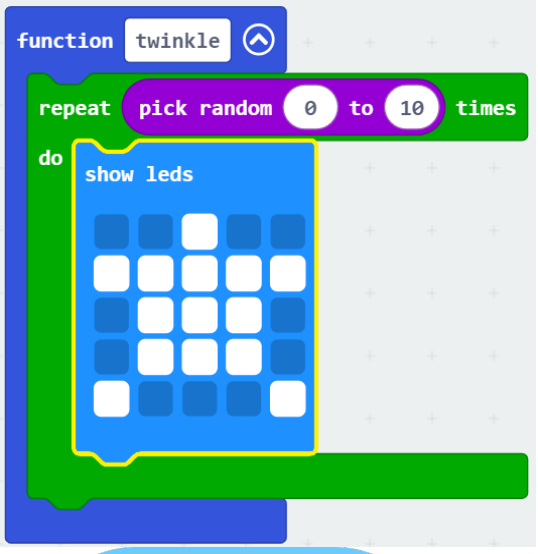


STEP 2 - CREATING THE TWINKLE

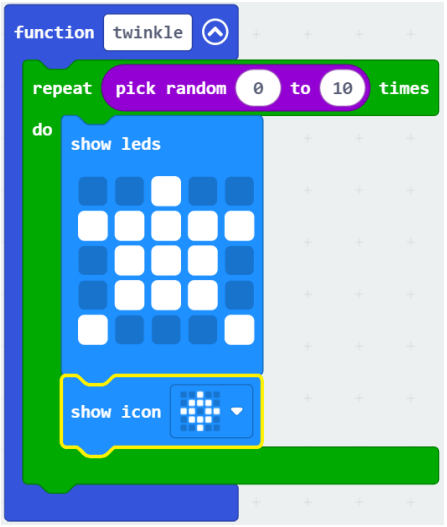
Inside your function block add a repeat loop. Inside add a math block to pick random.



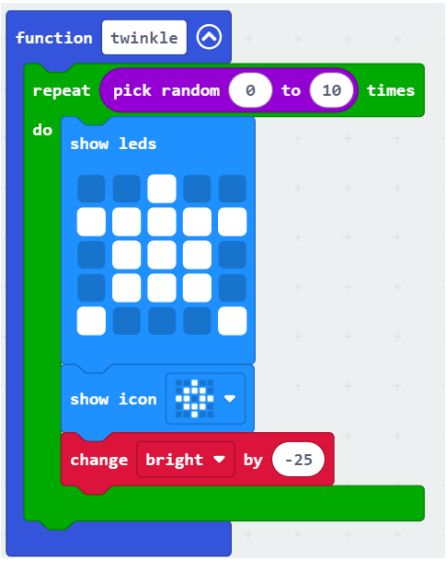
Add a basic block to show leds. Create your own design that looks like a star.



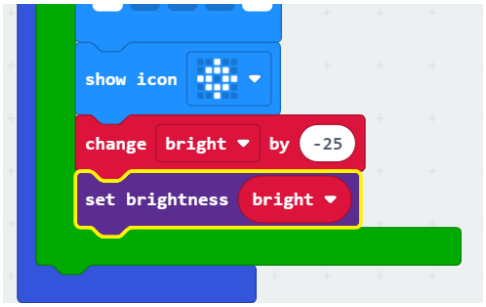
Add a show icon block and choose an image that will flash like a star.



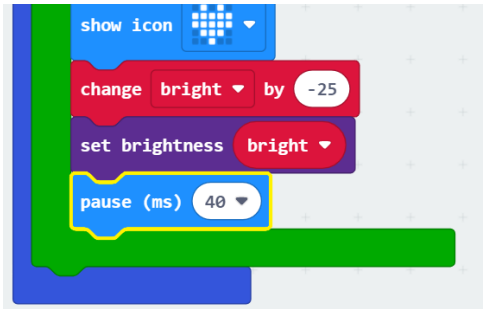
From the variables menu add a block to change bright by -25. This will make our star slowly dim.



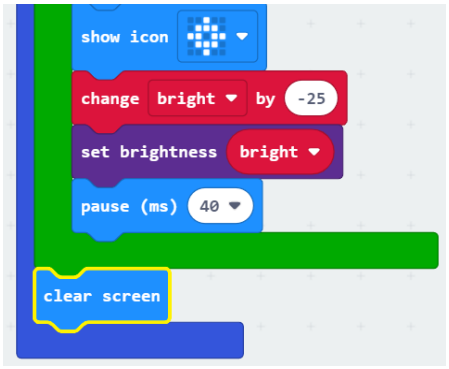
In the Led menu click on more (under the LED menu button). Then add the set brightness block and from variable add in the bright bubble. In the repeat loop this holds the brightness at the new value.



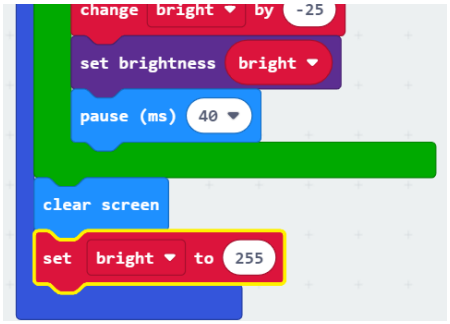
From the basic menu add a pause block.



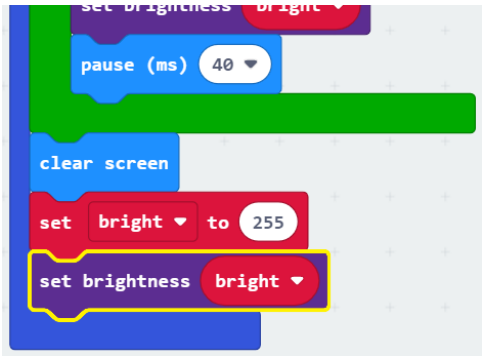
Under the repeat loop add a clear screen block. These blocks will reset the Micro:Bit.



Add a block to set bright to 255.

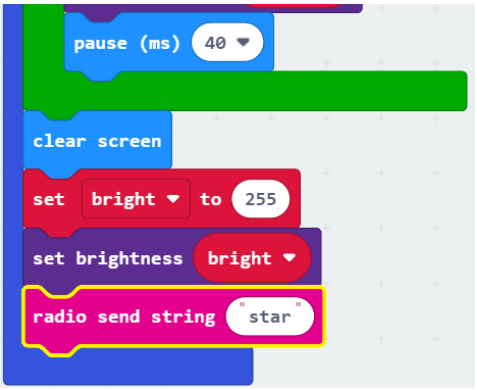


Use the Led more menu to set the brightness to bright.



From the radio menu add a block to radio send string star.

In this algorithm the Micro:Bit is flashing and slowly fading like a star and then resetting itself. It will send the radio signal to start another Micro:Bit twinkling.



Download your hex program and copy it to your Micro:Bits. **Remember, the more Micro:Bits that you can load the code to, the better your constellation will look!** When they are all loaded with the same program, click button A on one Micro:Bit and watch your stars twinkle! You can also run the program in the editor with 2 Micro:Bits on screen to see it run.

Challenges:

Create a constellation

Grab some cardboard or paper materials and create the ‘space background’ for your stars to shine through. Arrange your Micro:Bits to poke through the cardboard so just the LED panel is showing and then watch your night sky put on a show. What name and story can you create for your constellation?

Choreography

The Micro:Bits currently run a program that is based on random timings and random number of repeats for flashing images. Can you adjust the program so that it is more choreographed or more controlled for how the stars twinkle in your constellation?

Mimicking a constellation

Research a constellation in the sky and code your Micro:Bits to mimick this constellation. Consider how you will run programs to represent the different brightness of each star in the constellation and how you can create the background using paper and cardboard to create the shape of the constellation.

Congratulations you’re a Moonhack changemaker! You can try one of our other projects or try one of the challenges.

Don’t forget to talk to an adult about registering your participation and downloading your certificate at moonhack.com

