

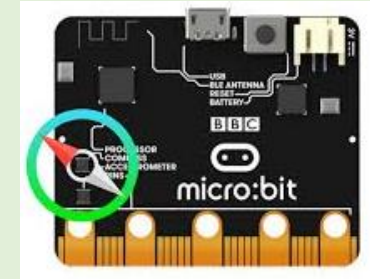
Compass Heading and Calibration (optional)


Objectives:

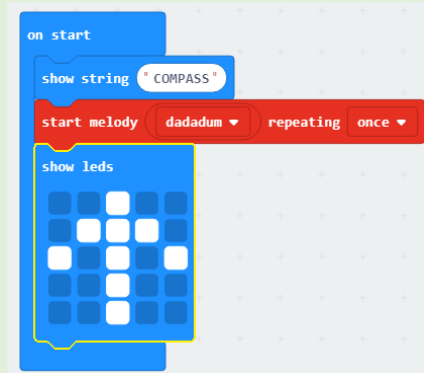

Explore the compass feature of the micro:bit.


Create a simple digital compass.

1. Open Microsoft MakeCode Editor <https://makecode.microbit.org/#>
2. Start a New Project +
3. Title the project: Compass Heading and Calibration
4. Follow the **What** and **How** directions to learn about the compass features of the micro:bit.



 **Did you know?** The micro:bit measures the **compass heading** from 0 to 359 degrees with its **magnetometer** chip. Different numbers mean north, east, south, and west.

What am I doing?	How am I doing it?
<p>Create a sound, title, and/or image on the on start block.</p> <ul style="list-style-type: none"> This step can be optional, but can act as a signifier that something has been loaded onto the micro:bit. Add a sound (choose a tone or a melody). Add an icon or image (your choice). 	<p>on start</p> <p>Basic > show string "COMPASS"</p> <p>Music > (choose a tone or melody)</p> <p>Basic > show leds or show icon</p> 
<p>Calibrate the compass.</p> <ul style="list-style-type: none"> You must calibrate the compass before taking readings. Failure to do so will produce garbage results. The calibration runs a fun little game to help the device work out where it is in relation to the Earth's magnetic field. Use the on button pressed A + B block to set up the calibration. 	<p>Input > on button A + B</p> <p>Input > more > calibrate compass</p> 

<p>Use logic blocks and show led blocks to create a visual of the compass reading.</p> <ul style="list-style-type: none"> To create a continual compass reading display, use the forever block. Create a variable called degrees and set to compass heading. Use the logic if/then and comparison blocks to create condition for each cardinal direction with the coordinating degrees: <p style="text-align: center;"> $N < 45$ $E < 135$ $S < 225$ $W < 315$ </p>	<p>on forever</p> <p>Variables > make a variable > degrees</p> <p>Variables > set degrees to</p> <p>Input > compass heading (place in set degrees to block)</p> <p>Logic > if/then/else</p> <p>Variable > degrees (place in if/then block)</p> <p>Basic > show string > (N) (place in the open location after then)</p> <p>Basic > more > show arrow > North (Click on the (+) to add a conditional statement for each cardinal direction and repeat the last two steps for each.)</p> <p>Else:</p> <p>Basic > show string > (N)</p> <p>Basic > more > show arrow > North</p> 
<p>Download to the micro:bit.</p>	<p>Connect the micro:bit to the USB port on the computer using the USB cable. Find the microbit-Compass Heading and Calibration.hex file in the downloads folder. Drag and drop onto MICROBIT (D:) – this will be located under This PC.</p>
<p>Use the micro:bit as a compass.</p>	<p>Connect the micro:bit to a power supply to use. After the on start signifiers, a prompt will ask you to tilt the micro:bit around until a circle of pixels is drawn on the outside edges of the display. This will calibrate the compass. Should you think the compass needs to be recalibrated during use, press the A + B buttons to recalibrate the compass.</p>



What do you think? Why did you use the following numbers (N < 45, E < 135, S < 225, W < 315) to represent the cardinal directions?