Design a Star Finder (Prototype)	Technology and the Skilled Trades Grades 9 and 10

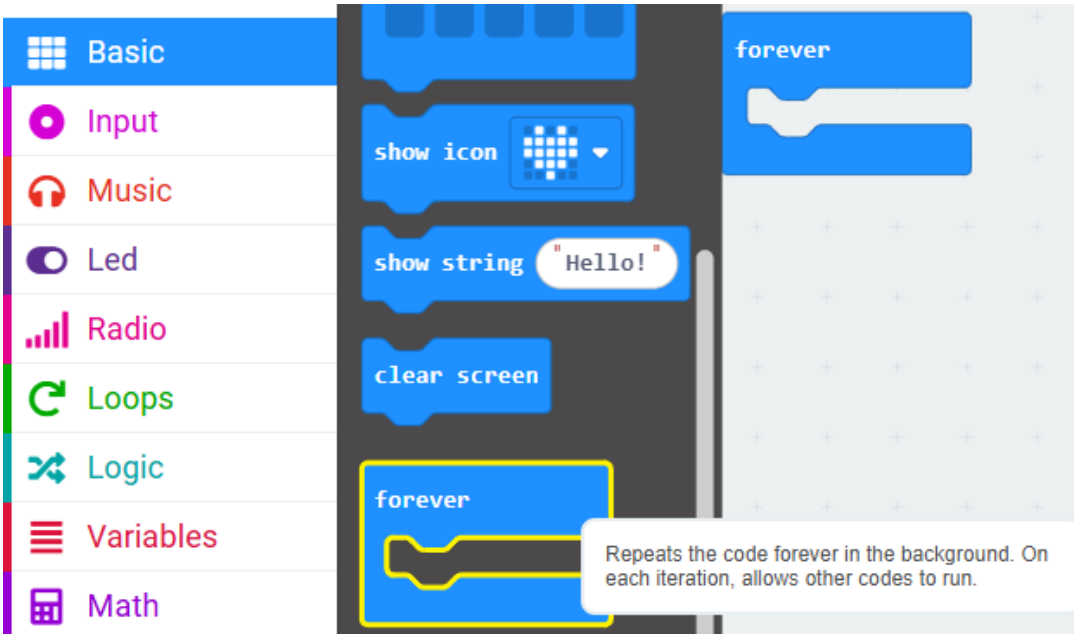
Coding Guide

Use these instructions to code your Micro:bit to be able to detect pitch and roll (rotation up and down, as well as side to side), and identify when it's pointing at the North Star's location. Before starting, go to makecode.microbit.org and log in or make an account. This will allow you to go back to your work and re-download it later if needed. Then, create a new file.

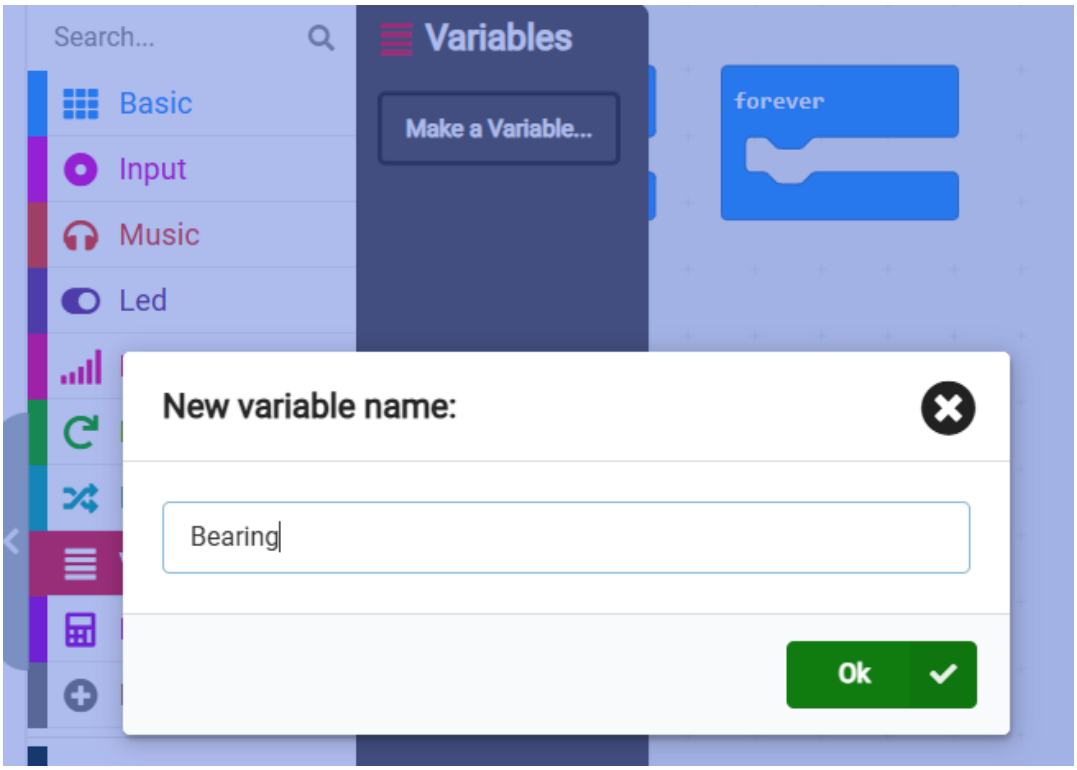
Everything written in ALL CAPITALS are the block categories in the menu. Everything written in **bold** is the name of a specific block. If you want a picture of the entire code without step-by-step instructions, please go to the last page.

Coding Instructions:

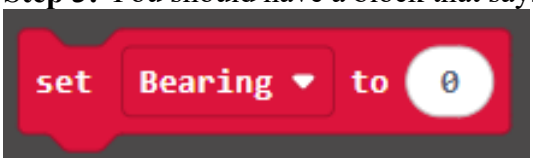
Step 1: Go to BASIC and add a **Forever Loop** block. If there is already one in your work area, then leave it and delete any other blocks you may have started with.



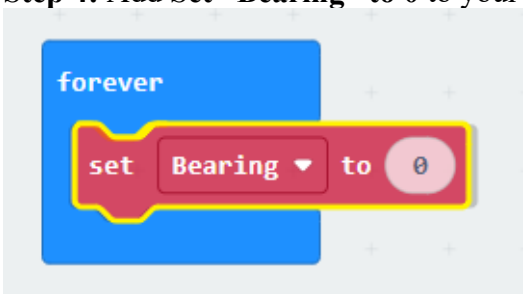
Step 2: Go to VARIABLES. Click on **Make a Variable**. Name the new variable **Bearing**.



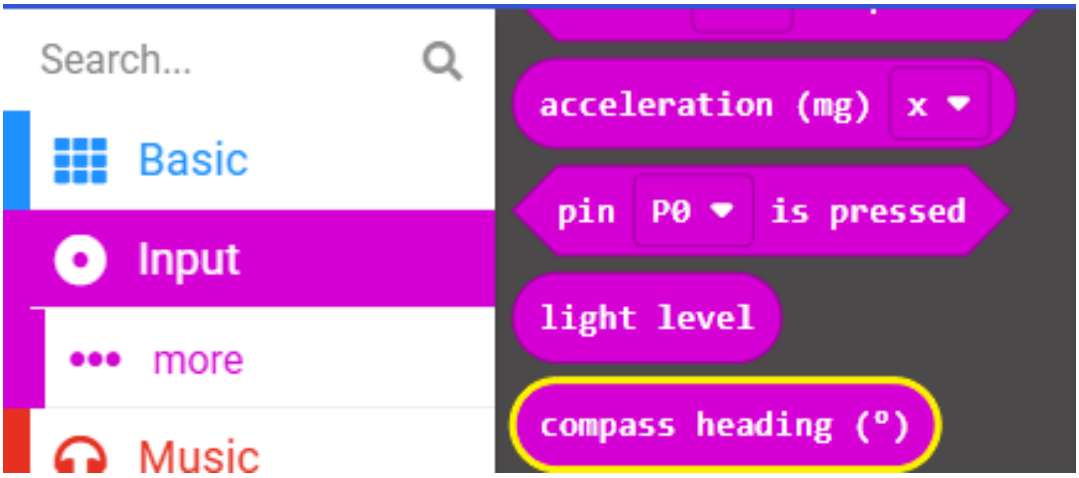
Step 3: You should have a block that says: **'Set Bearing to 0**'. This is your **Set Index** block

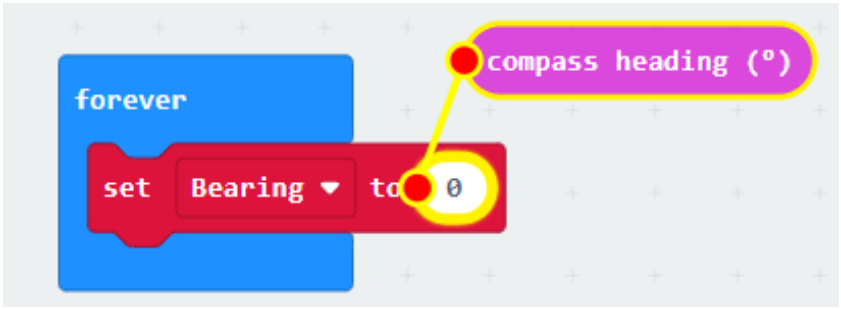


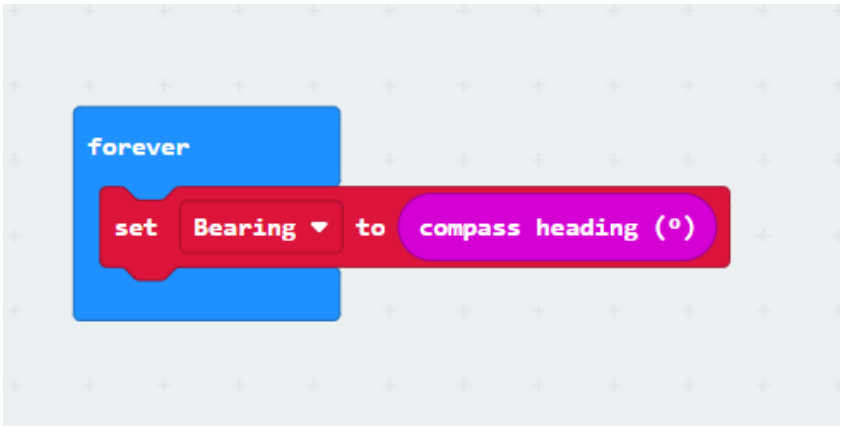
Step 4: Add **Set "Bearing" to 0** to your **Forever** block



Step 5: Go to INPUT. Add a **Compass Heading** block inside your red block, in place of the 0.

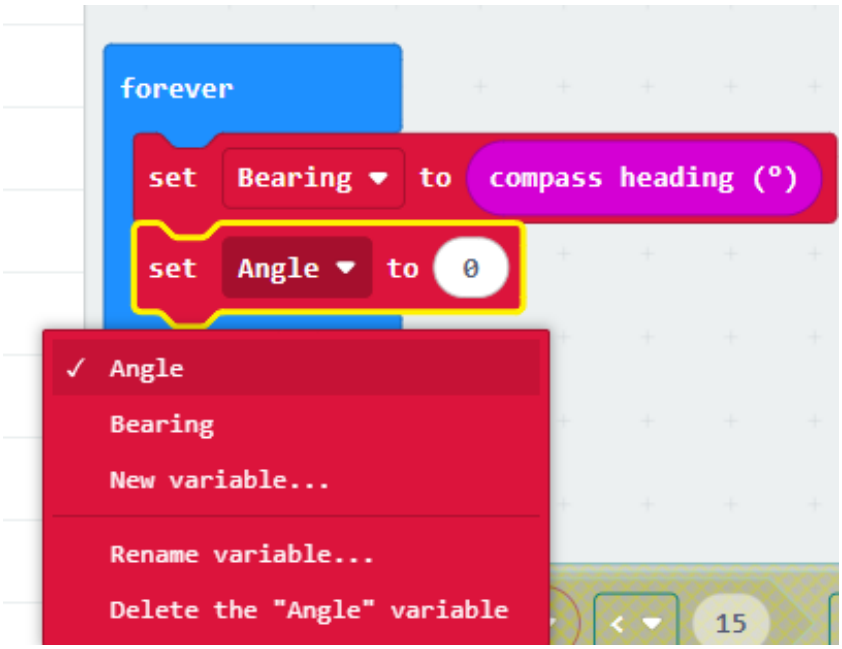




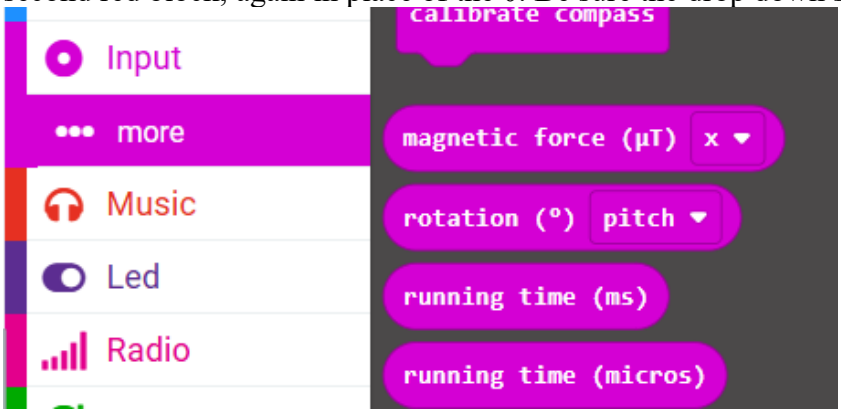


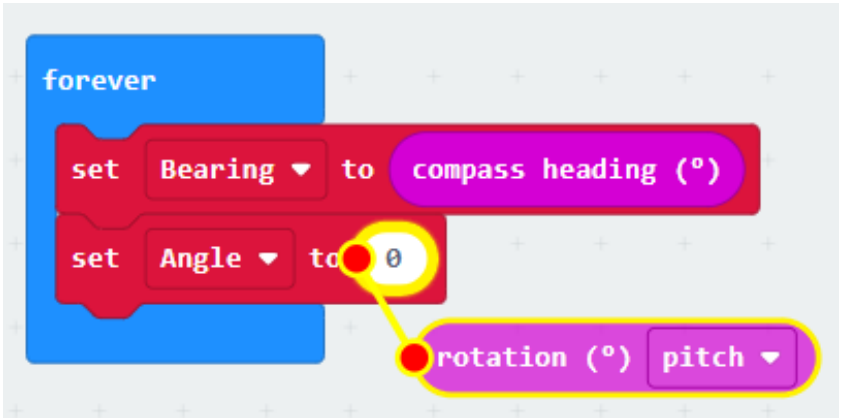
Step 5: Go to VARIABLES. Add another **Set Index to 0** block.

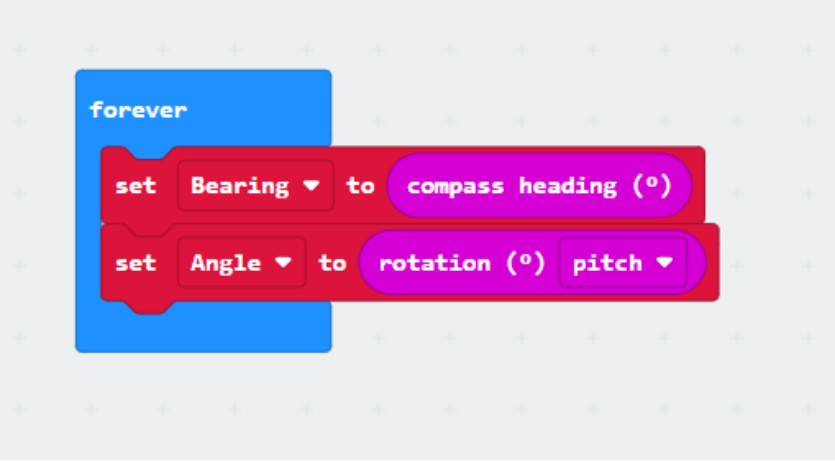
Step 6: Click the drop down and click ‘new variable’. Name it ‘Angle’. Be sure that the drop down on your second red block now says Angle.



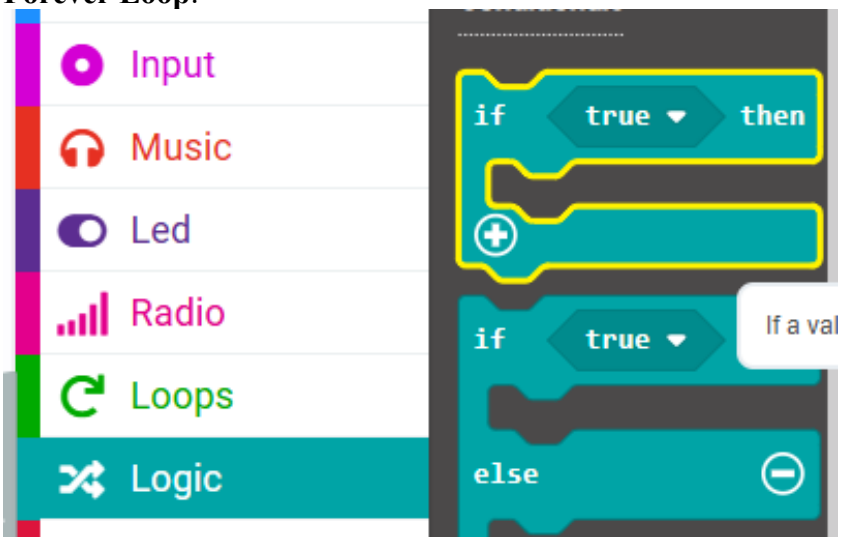
Step 7: Go to INPUT and then click 'more' from the menu. Add a **Rotation (°) Pitch** block in your second red block, again in place of the 0. Be sure the drop down says pitch.

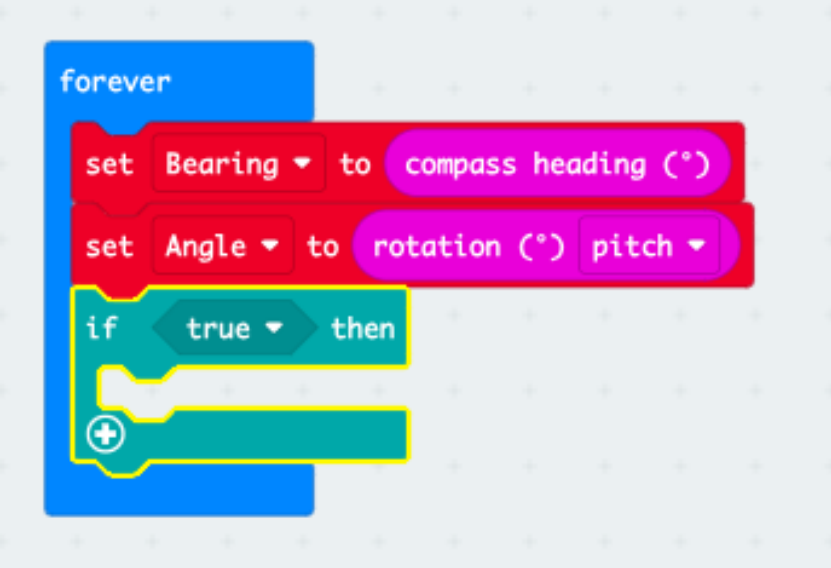




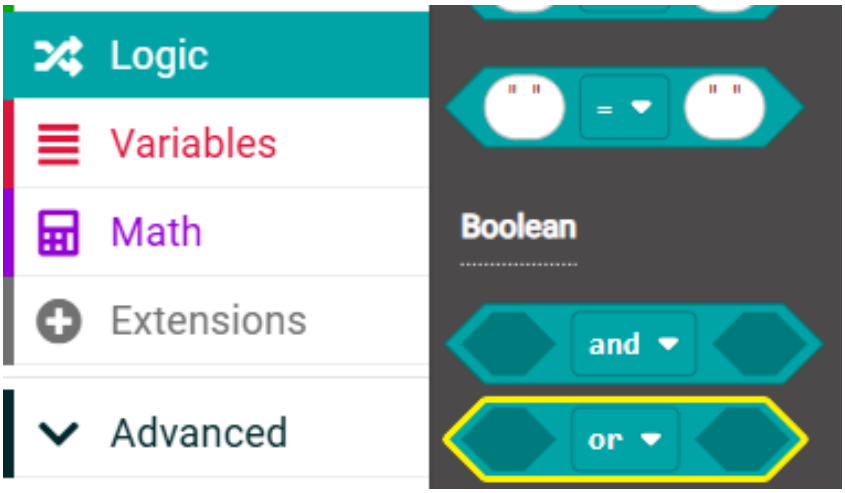


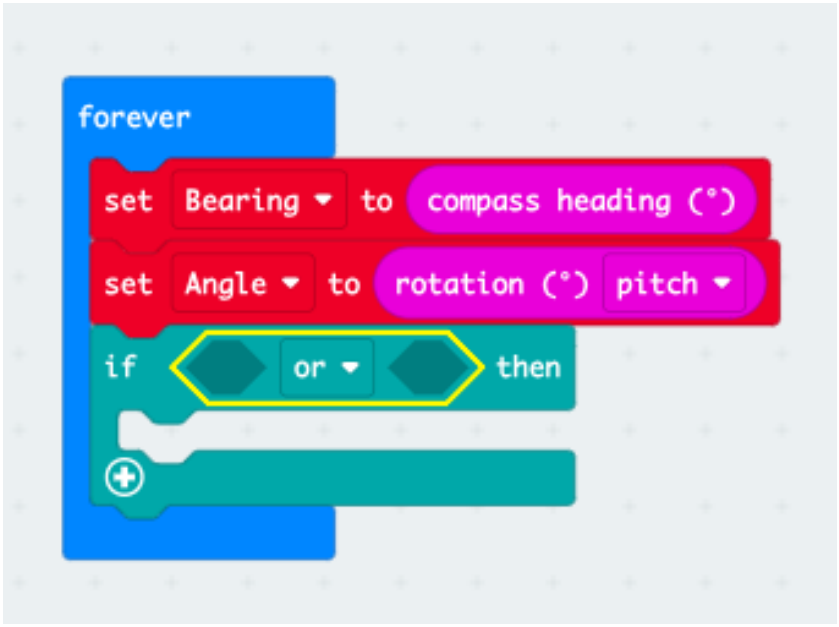
Step 8: Go to LOGIC and select **If True Then** block and add it below the red blocks, still within the **Forever Loop**.



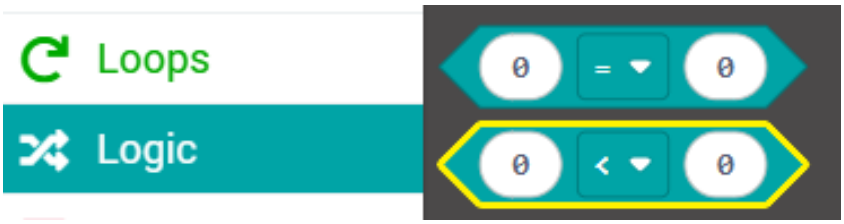


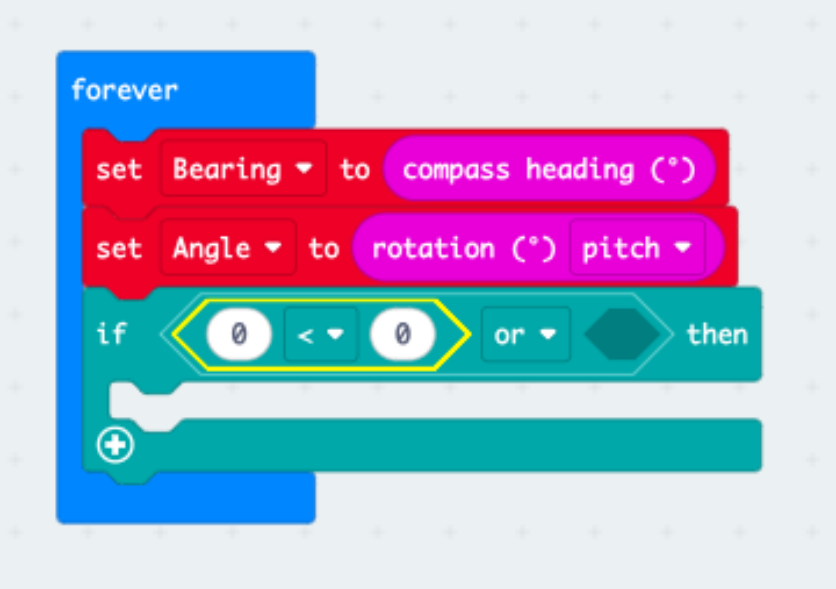
Step 9: Go to LOGIC. Add a **____ or____** block and put it in place of the 'true' spot on your **If True Then** block.





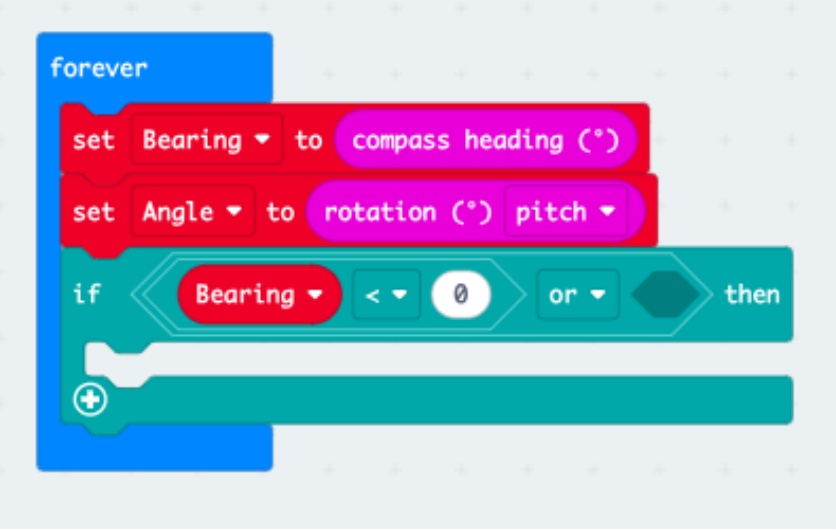
Step 10: Go to LOGIC and add a **0<0** block and put it in the place of the first empty hexagon of the **___ or___ block**.





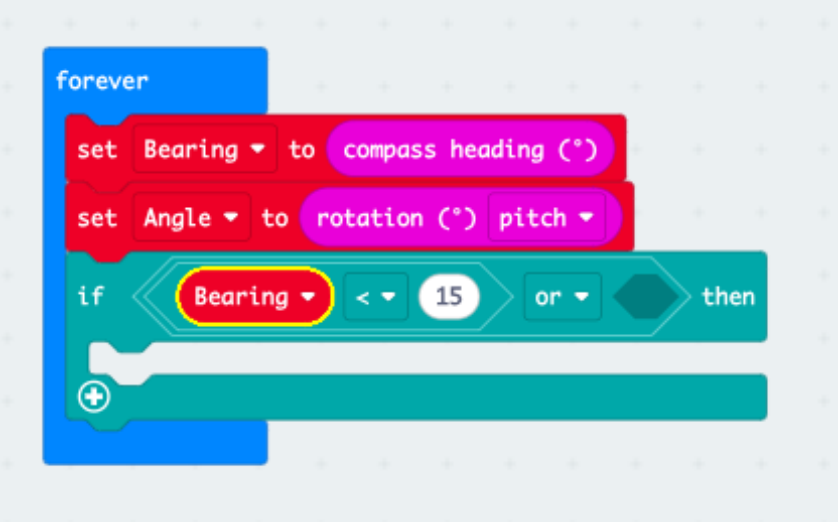
Double check the order of the turquoise blocks to the picture above.

Step 11: Go to VARIABLES and add a **Bearing** block to replace the first 0.

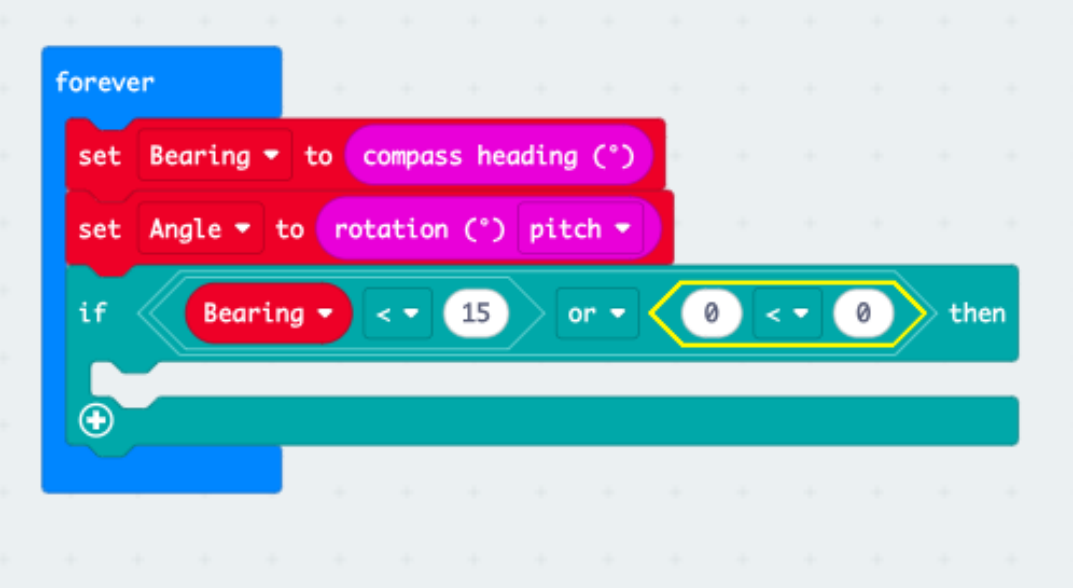


Step 12: Change the symbol in the middle to < (less than symbol).

Step 13: Change the second 0 to 15.



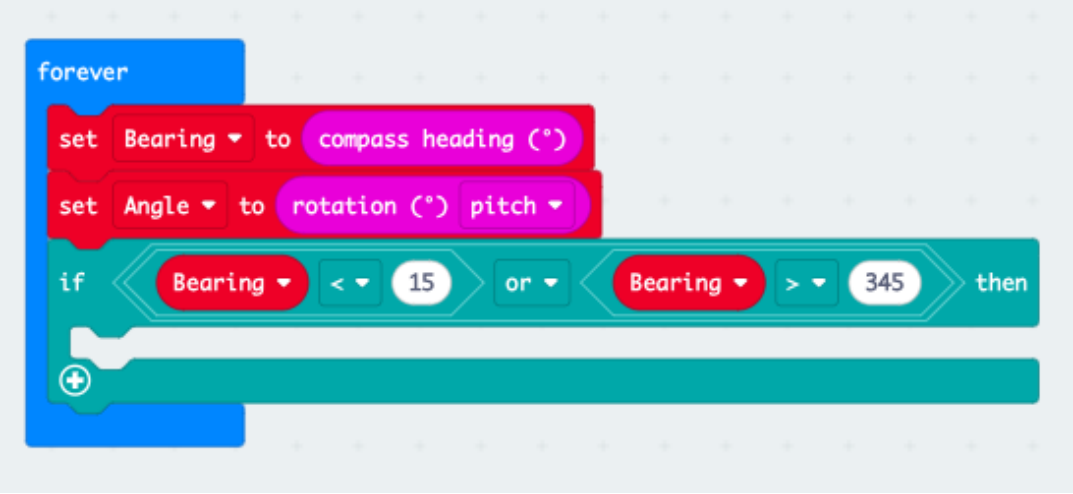
Step 14: Go to LOGIC and add another **0<0** block to the second blank hexagon.



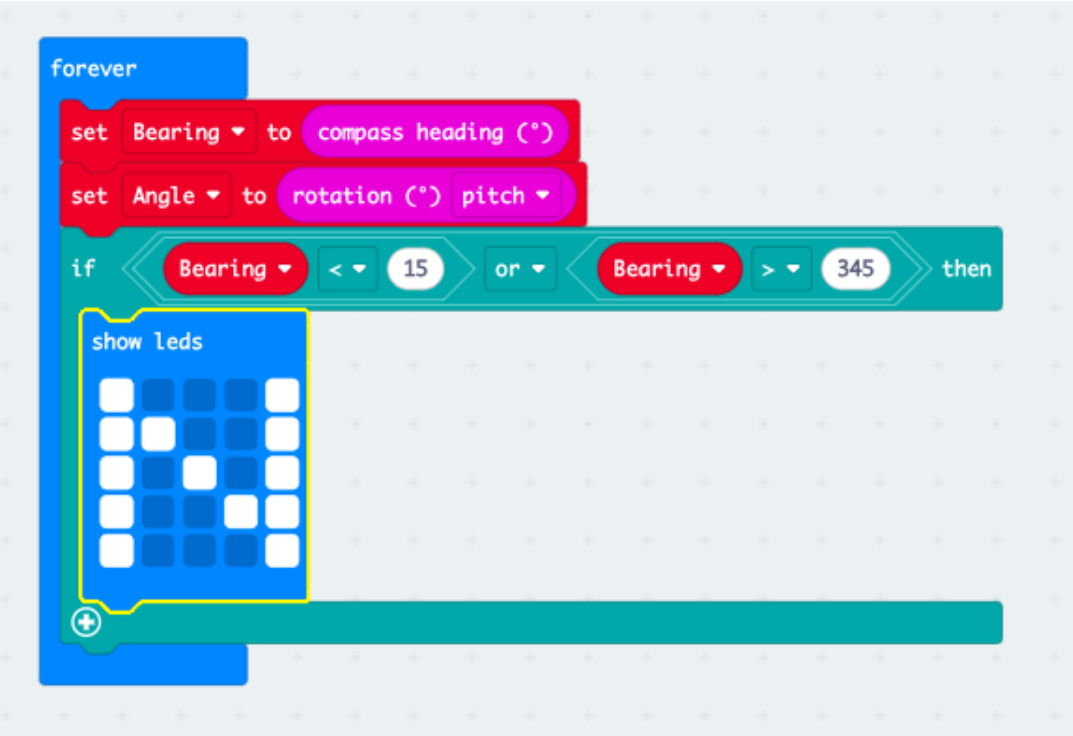
Step 15: Go to VARIABLES and add a **Bearing** block in place of the first 0.

Step 16: Change the symbol in the middle of your **0<0** block to a > (greater than symbol).

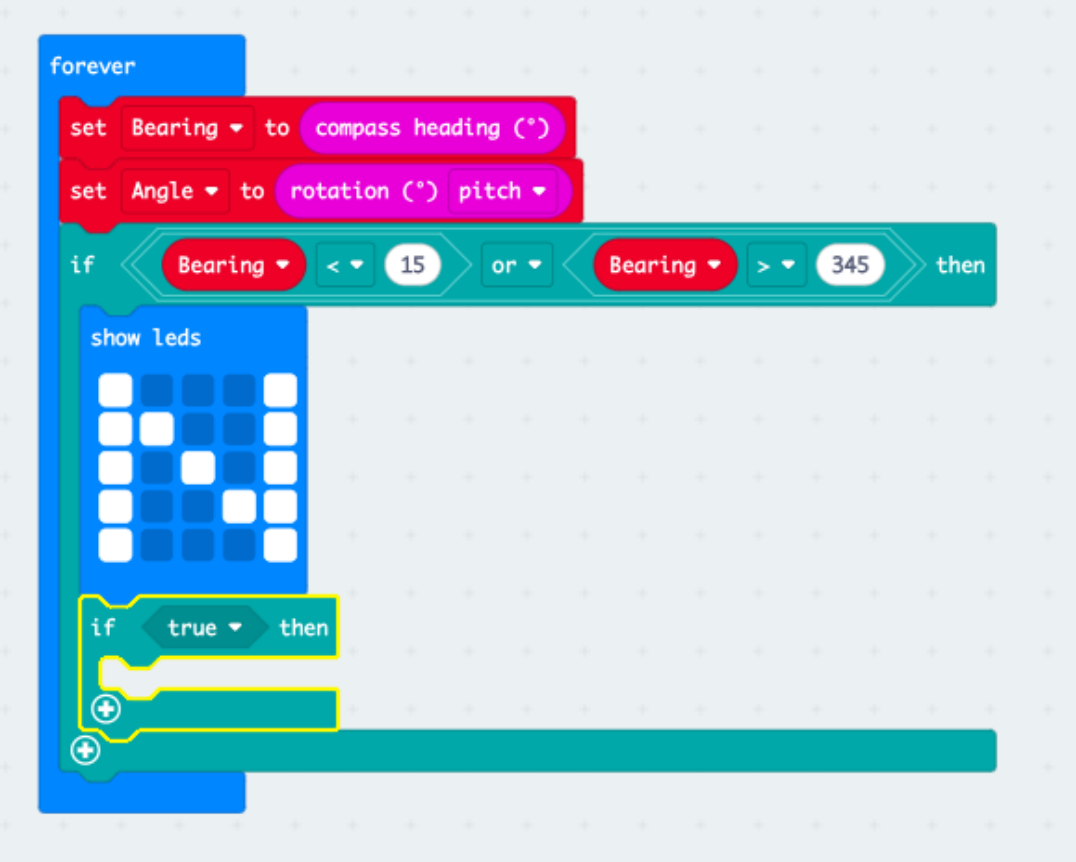
Step 17: Change the second 0 to 345.



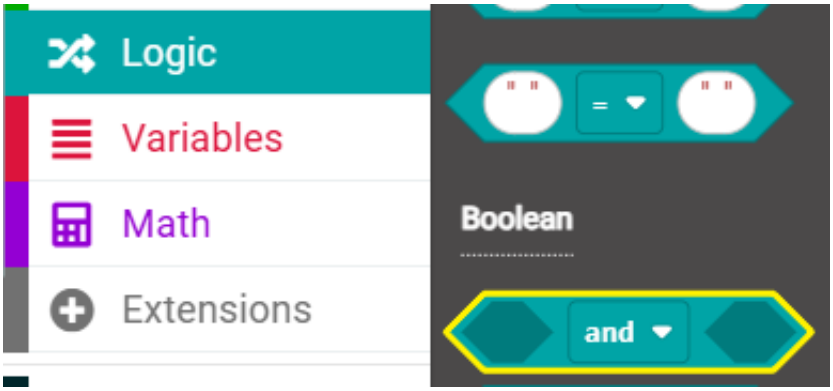
Step 18: Go to BASIC. Add a **Show LEDS** block and use the LED buttons to make an 'N'.

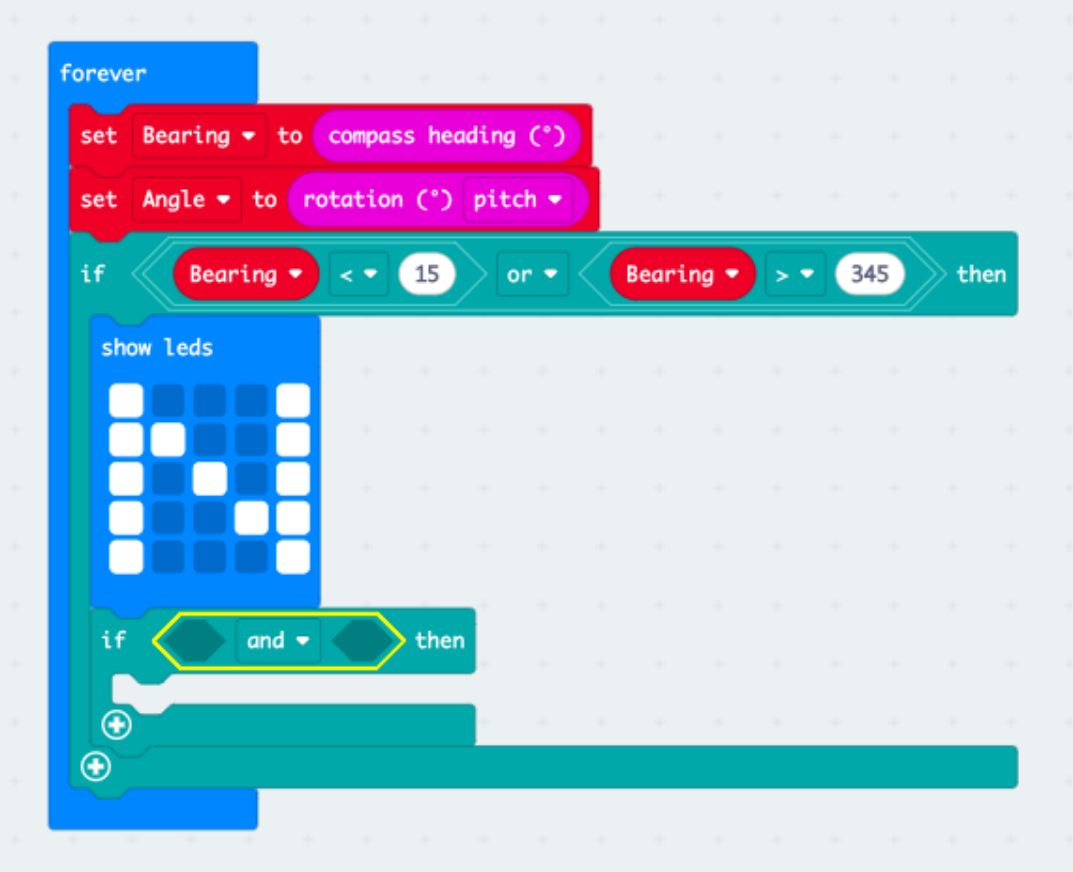


Step 19: Go to LOGIC and add another **If True Then** block, this time inside the other one (just under the **Show LEDS** block).

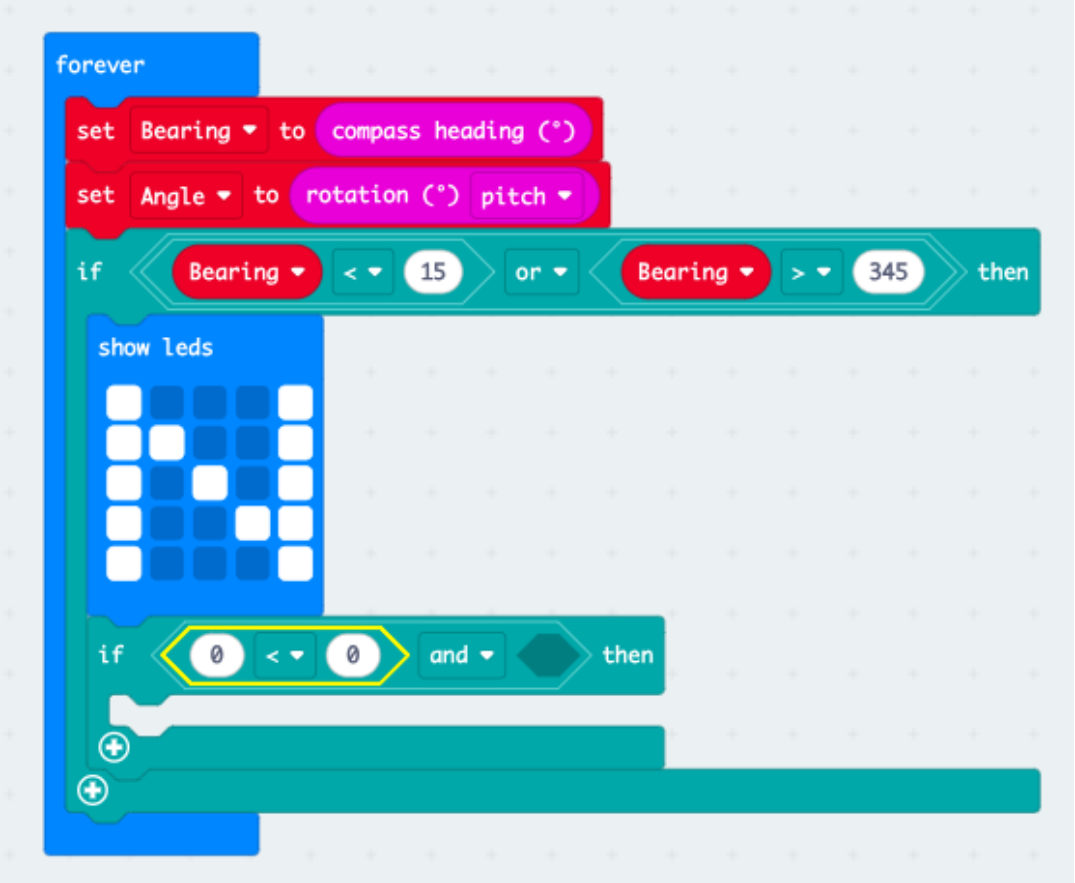


Step 20: Go to LOGIC and add a ___ **and**___ block in place of the 'true' spot.

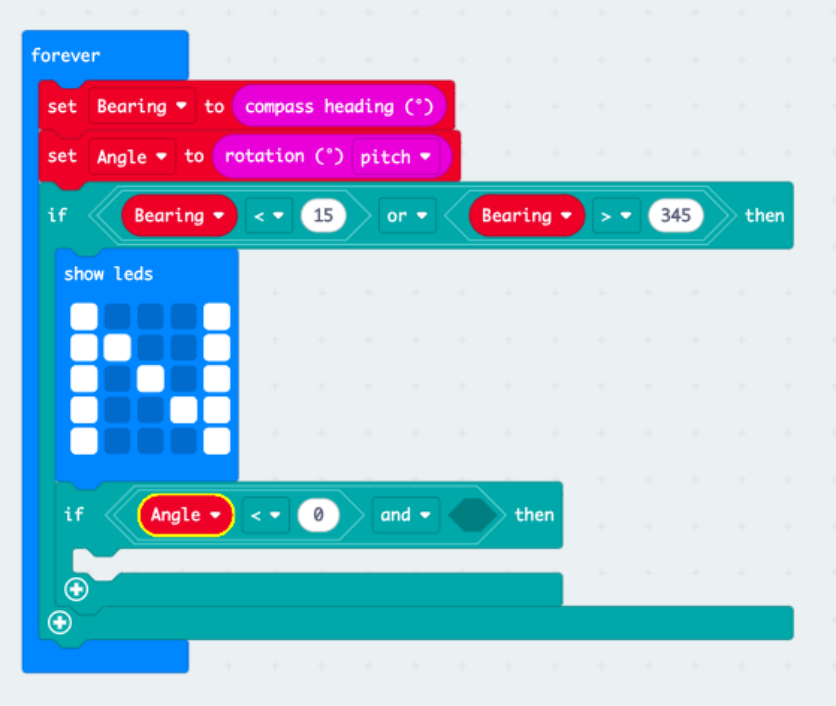




Step 21: Go to LOGIC and add a ___>___ block and put it in the first blank hexagon of your ___ **and**___ block.

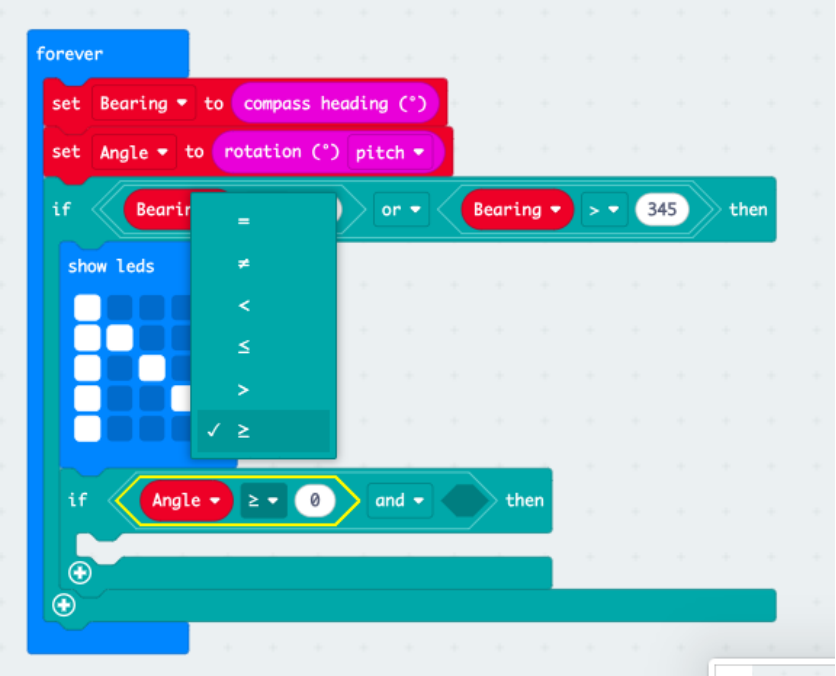


Step 22: Go to VARIABLES and add an **Angle** block in place of the first 0.

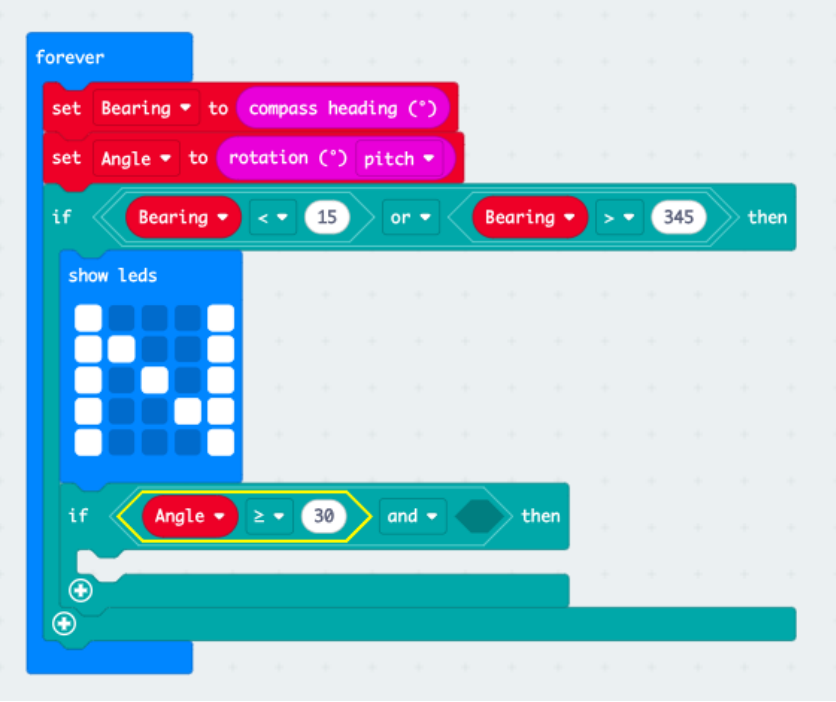


Change the first 0 to 30.

Step 23: Make sure the symbol in the middle is a ≥ (greater than or equal to).

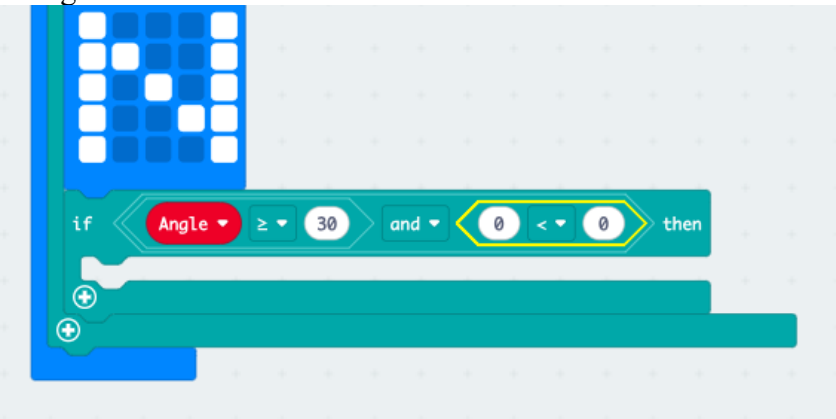


Step 24: Change the second 0 to 30.



Step 25: Make sure the ___ **and**___ block says ‘and’ in the middle, not ‘or’.

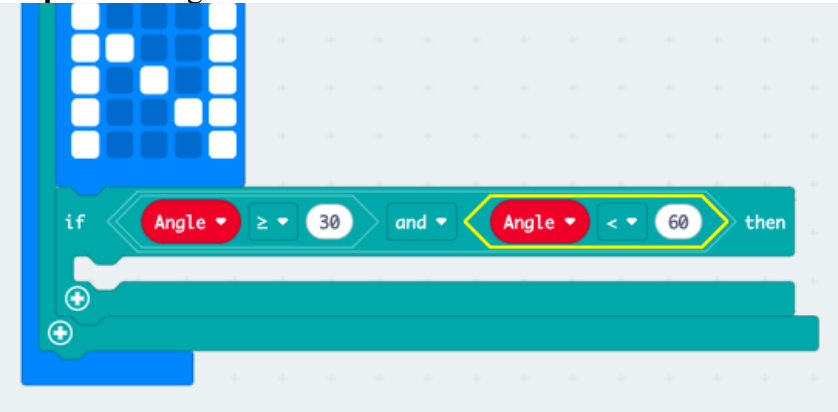
Step 26: Go to LOGIC and get another ___>___ block and put it in the place of the second empty hexagon.



Step 27: Go to VARIABLES and add an **Angle** block into the spot of the first 0.

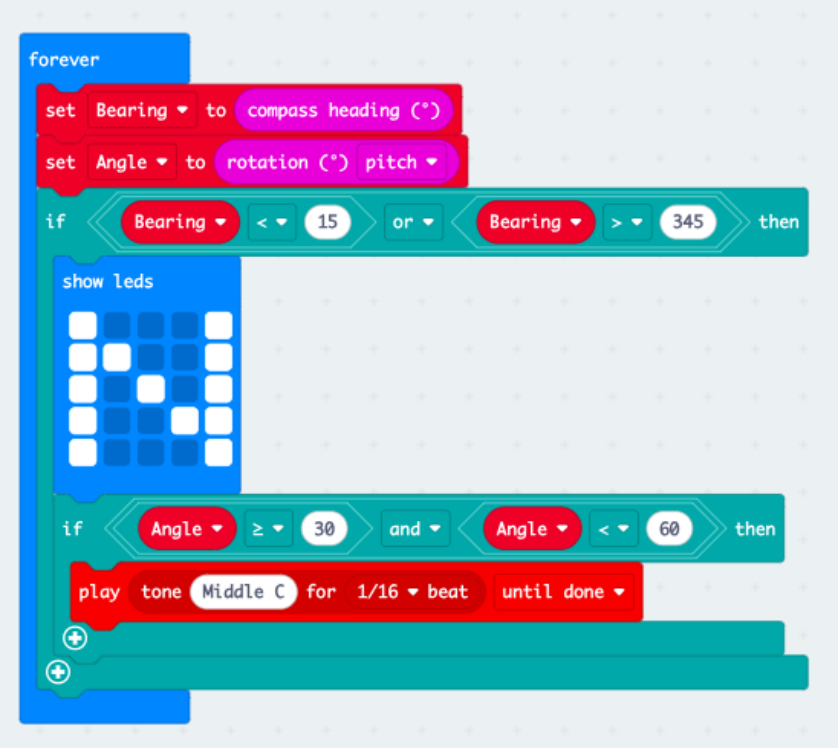
Step 28: Make sure the symbol in the middle is a ≤ (less than or equal to).

Step 29: Change the second 0 to 60.

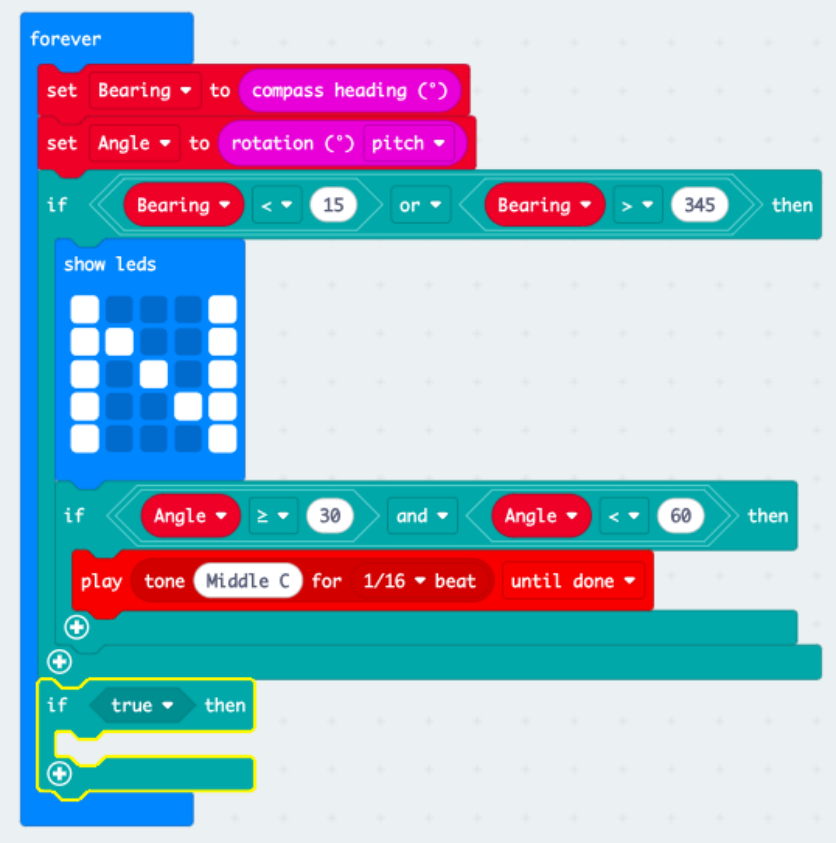


Step 30: Go to MUSIC and add a **Play Tone Middle C for 1 Beat Until Done** block and add it inside the empty **If True Then** block

Step 31: Change the tone (Middle C') to whatever you like, and change '1 beat' to '1/16 beat'.



Step 32: Go to LOGIC and add another **If True Then** block under the others (but still inside the **Forever Loop**).



Step 33: Go to LOGIC and add a ___ **and**___ block and put it in place of the 'true'.

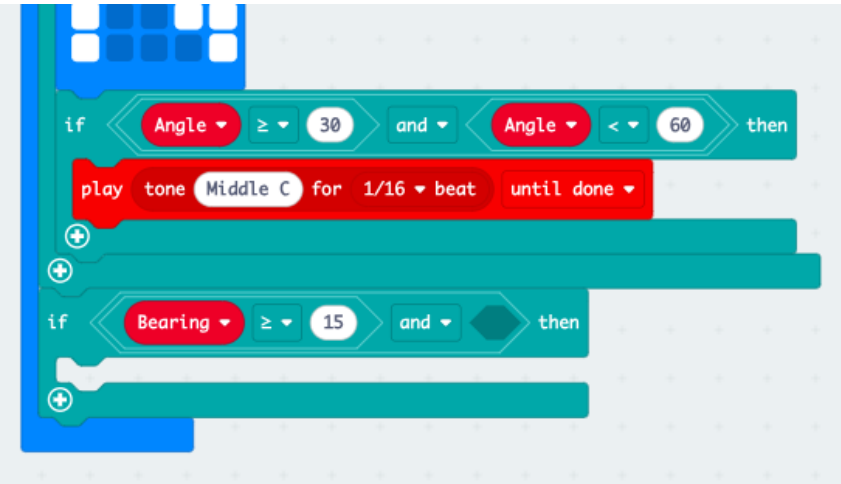
Step 34: Go to LOGIC and add a **0<0** block and put it in place of the first empty hexagon.

Step 35: Go to VARIABLES and add a **Bearing** block in place of the first 0.

Step 36: Change the symbol to ≥ (greater than or equal to).

Step 37: Change the second 0 to 15.

Step 38: Make sure the ___ **and**___ block says 'and', not 'or'.

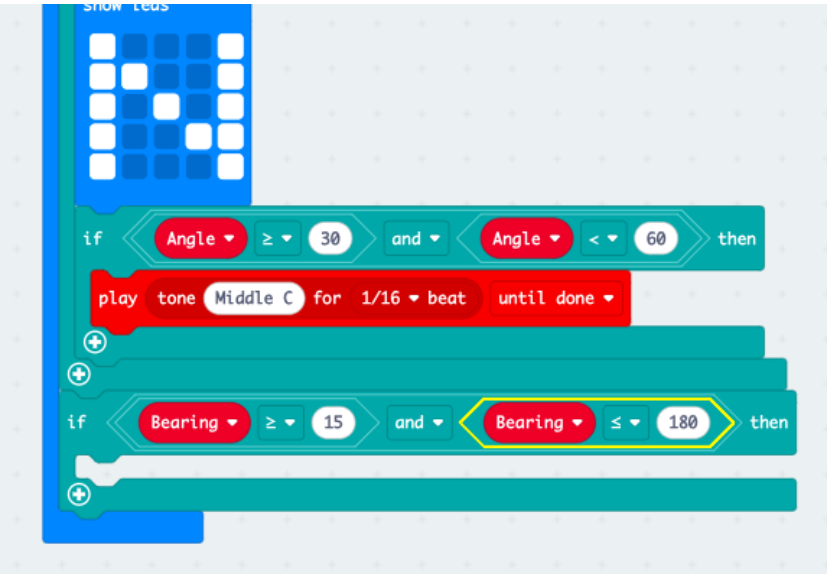


Step 39: Go to LOGIC and add another **0<0** block in place of the second empty hexagon.

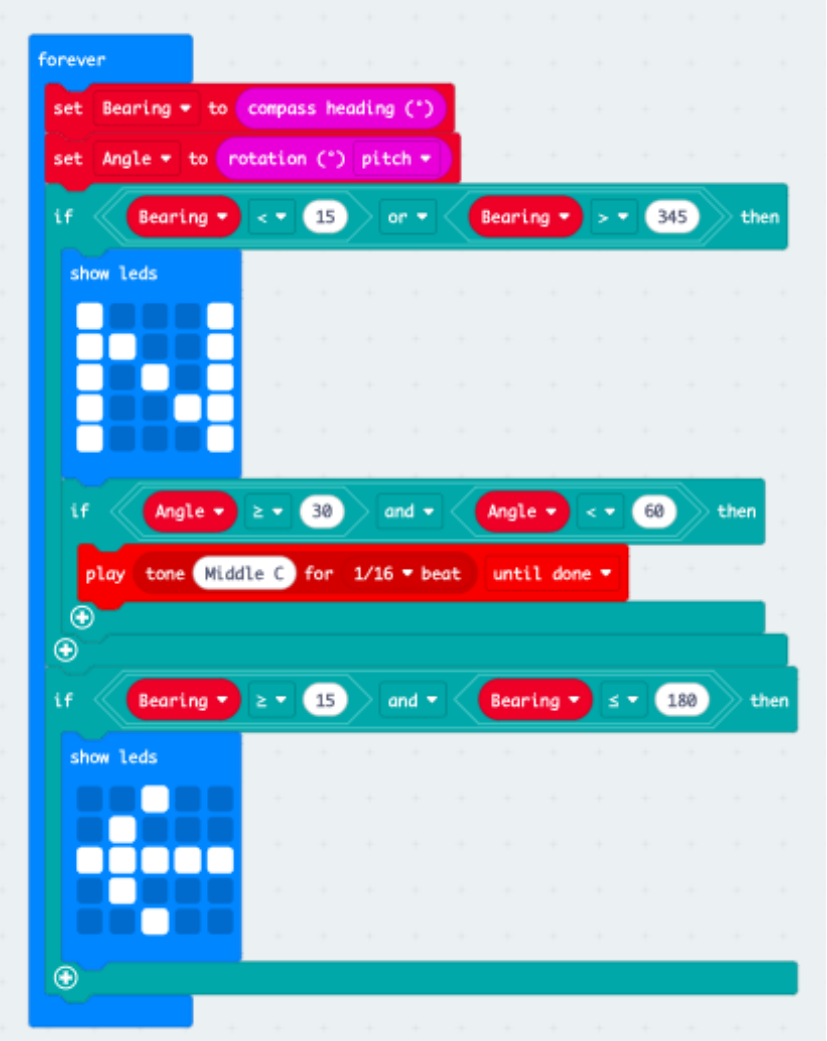
Step 40: Go to VARIABLES and add a **Bearing** block in place of the first 0.

Step 41: Make sure the symbol in the middle is a ≤ (less than or equal to).

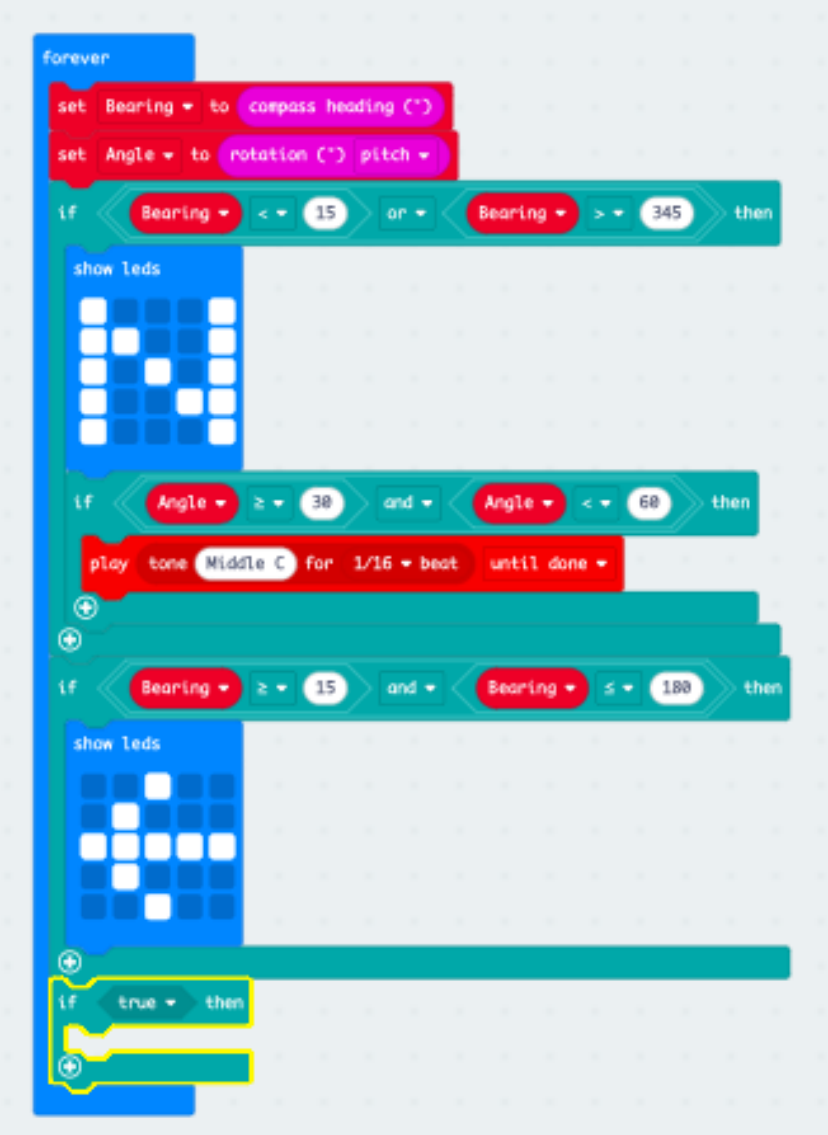
Step 42: Change the second 0 to 180.



Step 43: Go to BASIC and add a **Show LEDS** block inside the **If True Then** block and use the LED buttons to make an arrow pointing left.



Step 44: Go to LOGIC and add another **If True Then** block underneath the previous one, but still in the **Forever Loop**.



Step 45: Go to LOGIC and add a ___ **and**___ block in place of the 'true' spot.

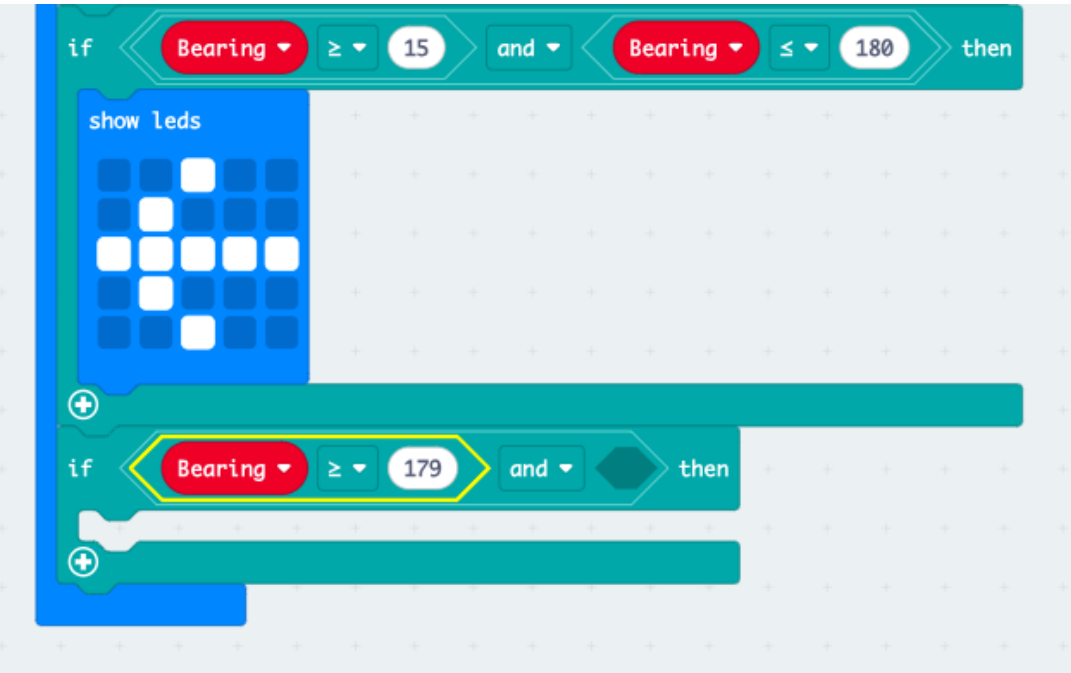
Step 46: Go to LOGIC and add a **0<0** block in the first empty hexagon.

Step 47: Go to VARIABLES and put a **Bearing** block in place of the first 0.

Step 48: Change the symbol in the middle to ≥ (greater than or equal to).

Step 49: Change the second 0 to 179.

Step 50: Make sure the ___**and** ___ block says ‘and’, not ‘or’.

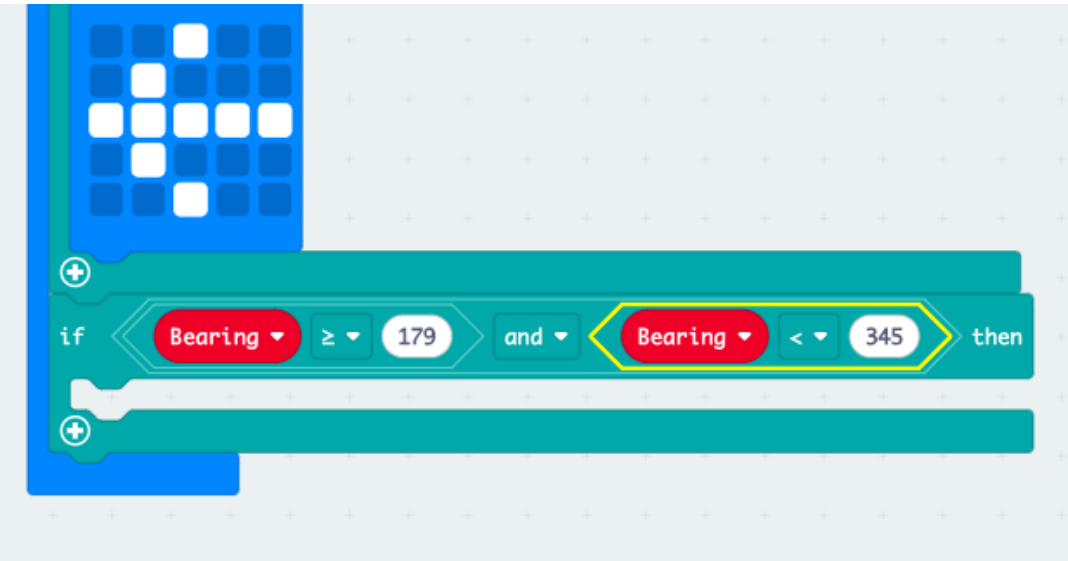


Step 51: Go to LOGIC and add a **0<0** block in place of the second empty hexagon.

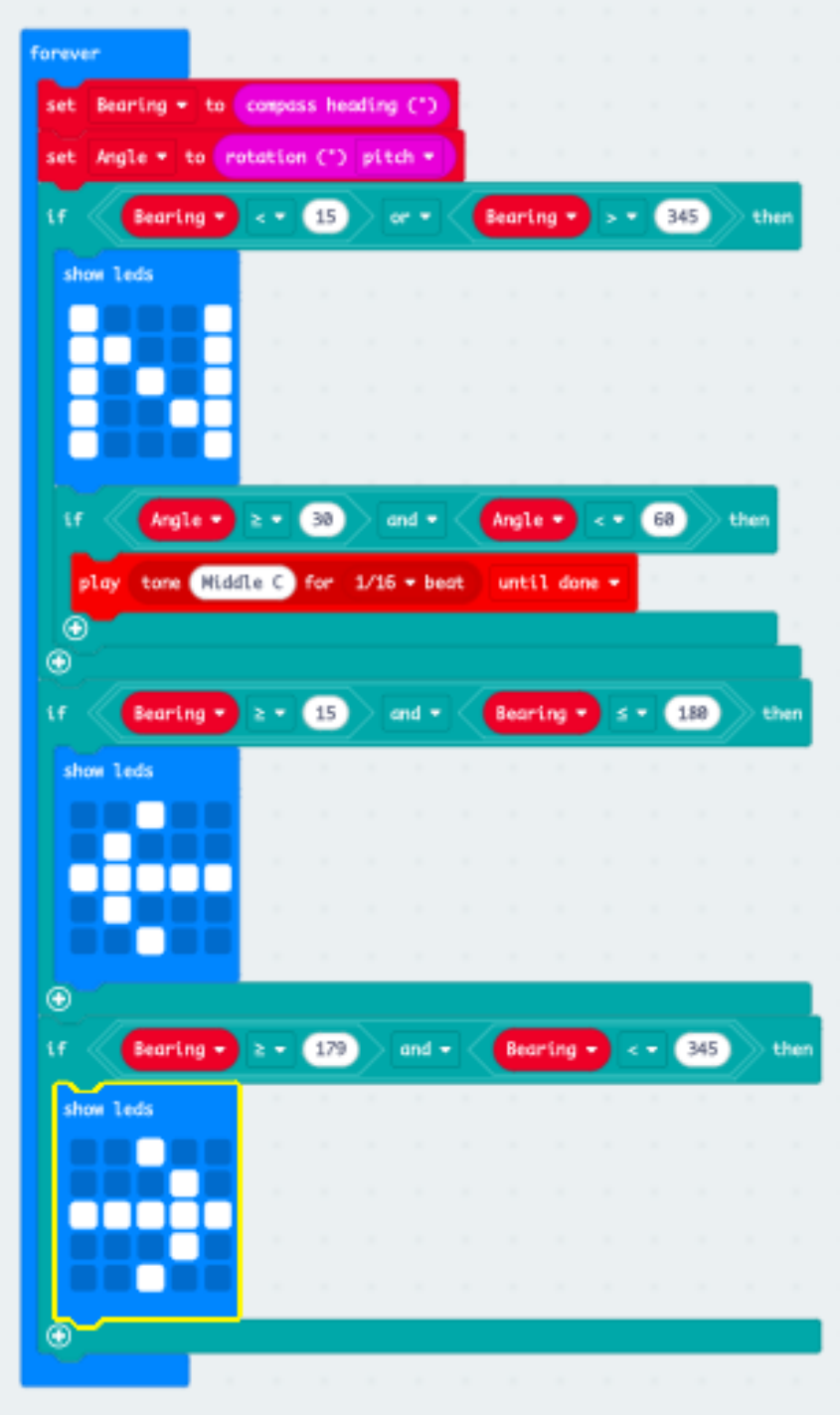
Step 52: Go to VARIABLES and add a **Bearing** block in place of the first 0.

Step 53: Make sure the symbol in the middle is a ≤ (less than or equal to).

Step 54: Change the second 0 to 345.



Step 55: Go to BASIC and add a **Show LEDS** block inside the empty **If True Then** block. Use the LED buttons to make an arrow pointing right.



This is the completed code. Now all there is to do is connect your Micro:bit, download the code to it, and test it out!