LEARNING BY COMPETING

## M3 – Ultrasonic Follow Robot

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- In this session, we'll program our robot to follow one closely object and how use the information supplied by ultrasonic sensor to perform actions

- This session refers to the third module of our training – Upper Intermediate Level

- At the end, you will be capable to create your own codes for Micro:bit robot

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The Module 3 will focus on <u>Ultrassonic Sensor – How measure distances and how use this information</u>

Summary:

• The Ultrassonic Sensor

• How measure distances and how this work

• Variables

• Reading Accurence Tecniques

• Program a robot to follow an object
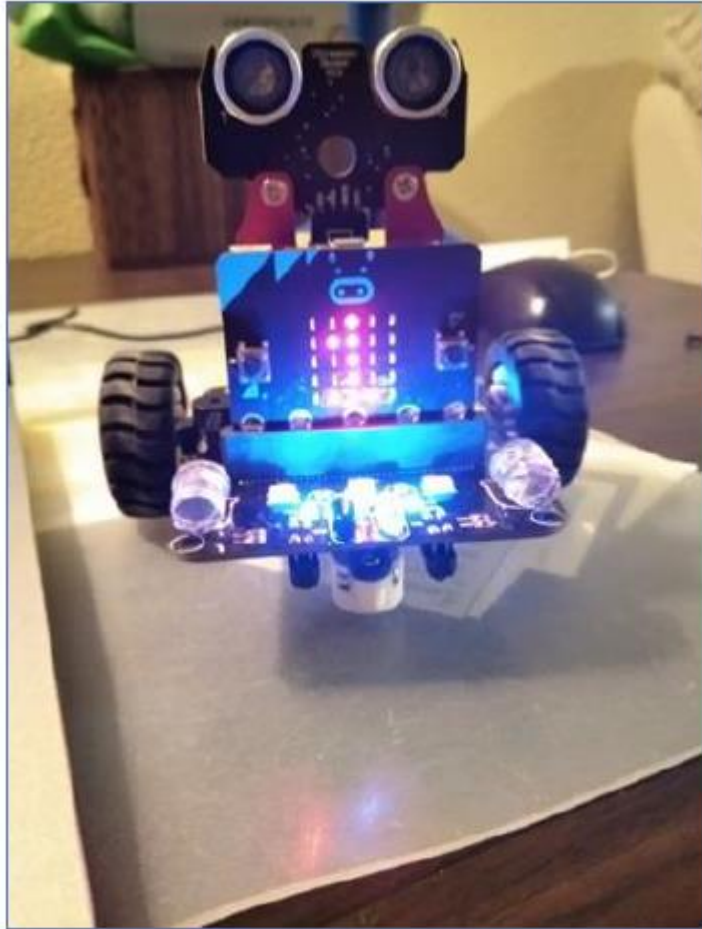
1. Your Robot previously built

2. PC or Laptop

3. USB Cable

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Ensure you have all the material needed before you start!
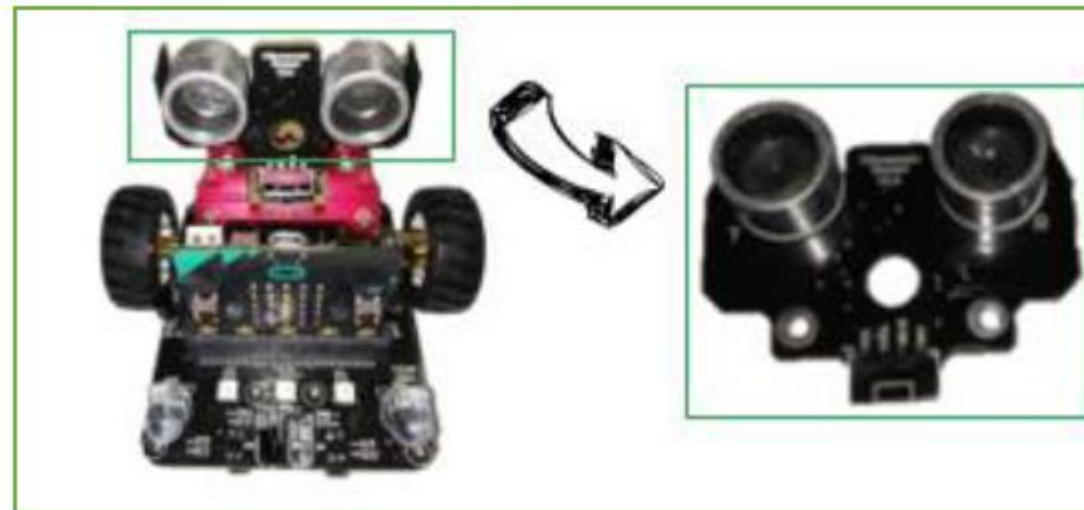
If someting is missing please tell us.

LET'S START
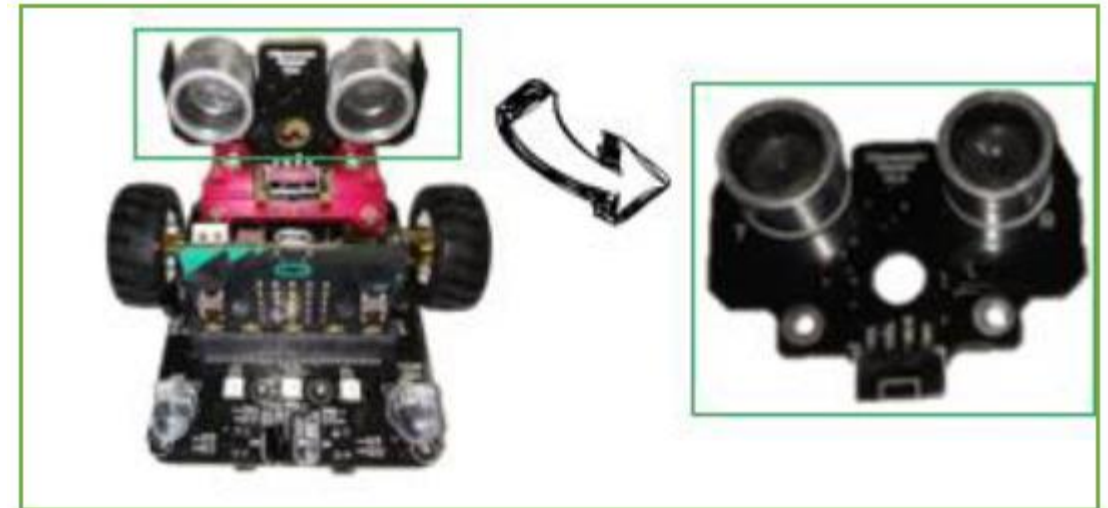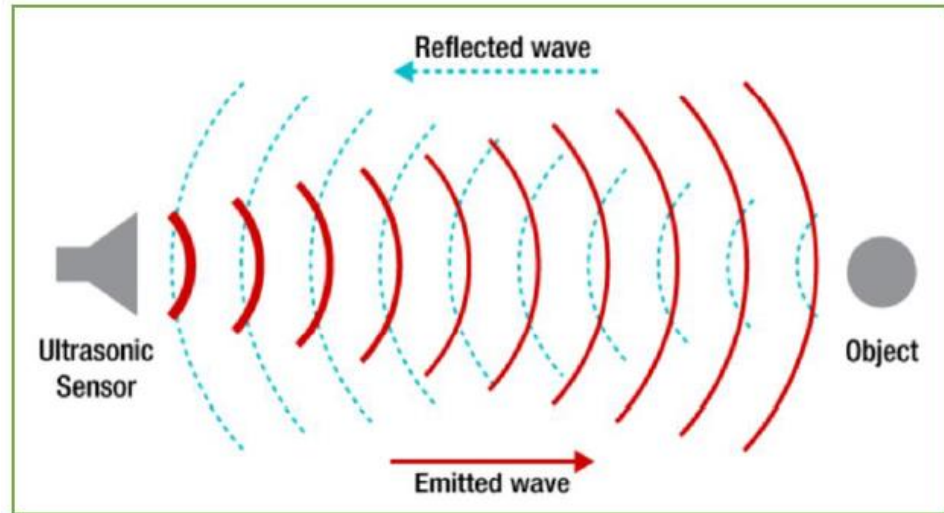
The ultrasonic sensor consists of a sensor that can measure distances between an object or a wall and itself.

Like a line sensor, the ultrasonic sensor sends a sound signal from the transmitter and waits to receive it back in the receiver.

This sound has a frequency so high that we can't listen.

Reflected wave

Emitted wave

Ultrasonic Sensor

Object

Sometimes, to perform a code with an upper grade of complexity, we need our robot to read and save values or simply count events.

To do that, we must tell our robot to save some space in its internal memory to save the information which is called
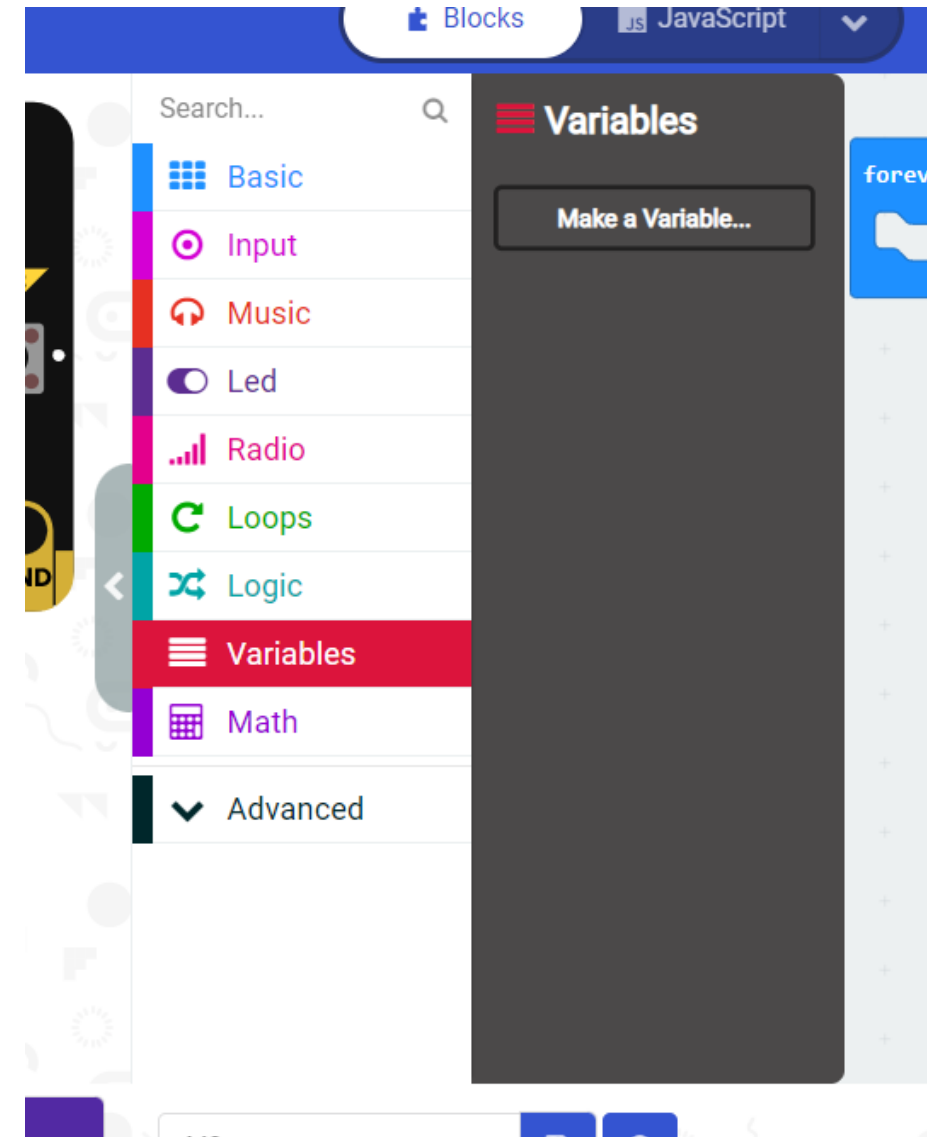
"**Variables**" (it's like a box)

How can we create a Variable?

1ˢᵗ step:

Go to the "**Variables**" and press "**Make a Variable**"

How do we create a Variable?

2nd step:

Give it a **name** to identify easily

New variable name:
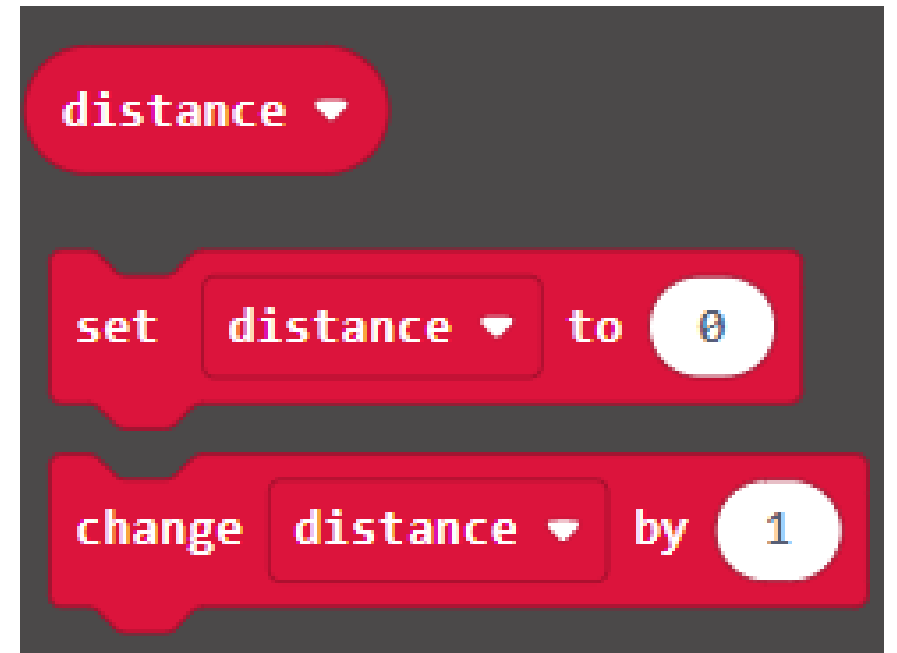
distance

Ok ✔

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How do we create a Variable?

So, this variable will be used to store the measure of distance from our ultrasonic sensor.

Only after that we'll use during our code.

So, How do we create a Variable?

Block of variable

Define the value of variable to (number)

Increase the value of our variable in (number)
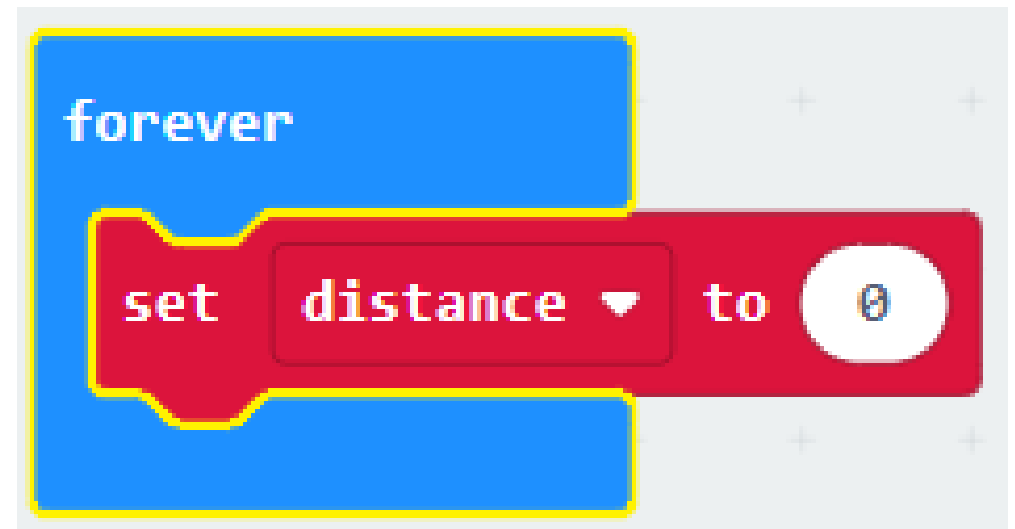
distance ▾

set distance ▾ to 0

change distance ▾ by 1

And now, how do we measure the distance?

- 3rd step:

Set our variable

To do this, we must drag and drop the "Set distance" block to the forever block.

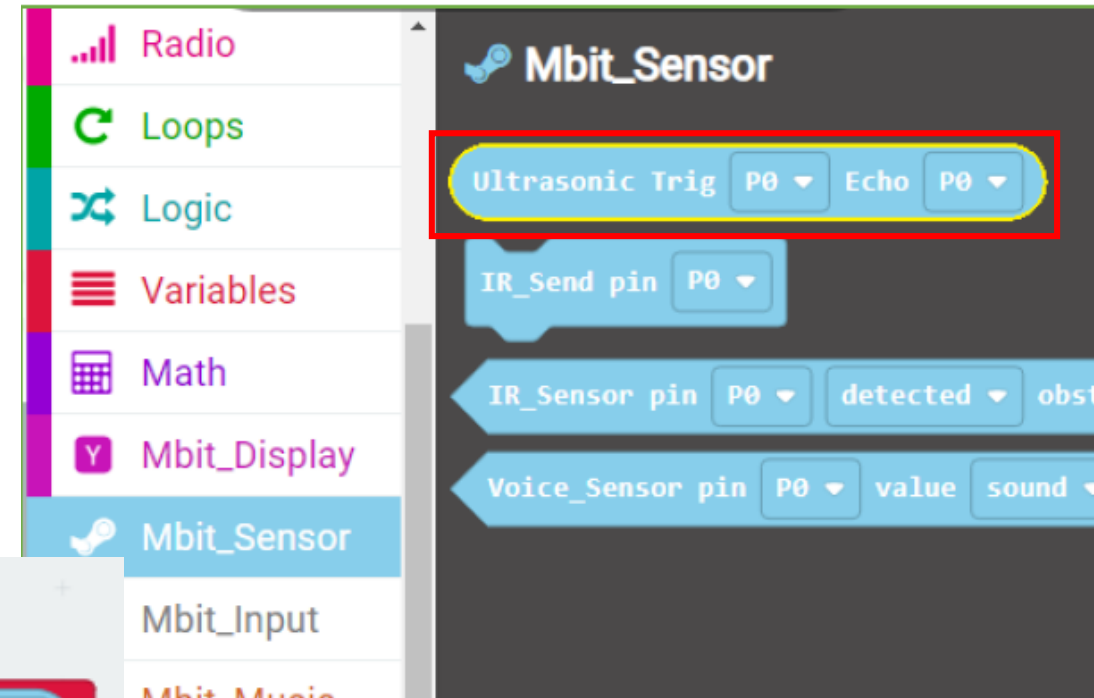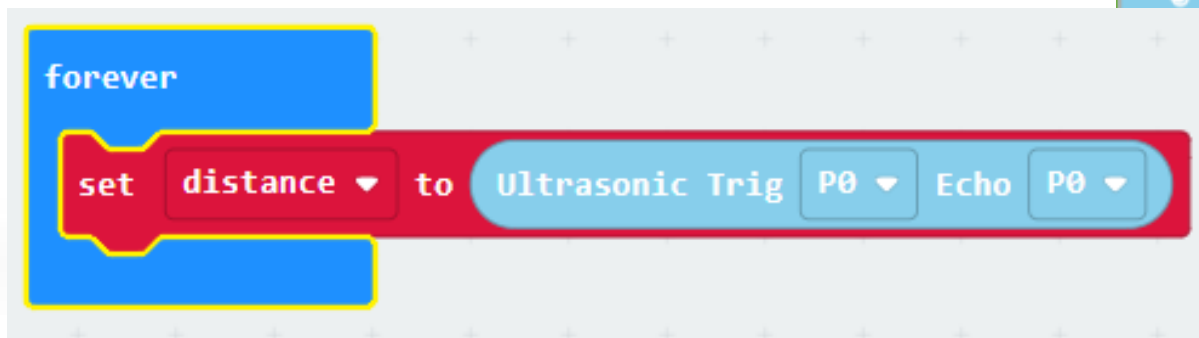*And now, how do we measure the distance?*

- **4ᵗʰ step:**

Set with the value read in the sensor

Go to the "Mbit" section and take the "Ultrasonic" block

Place it into the set block

Like this!

And now, how do we measure the distance?

5th step:

Change the **trig pin to P14** and **the Echo pin to P15** respectively.

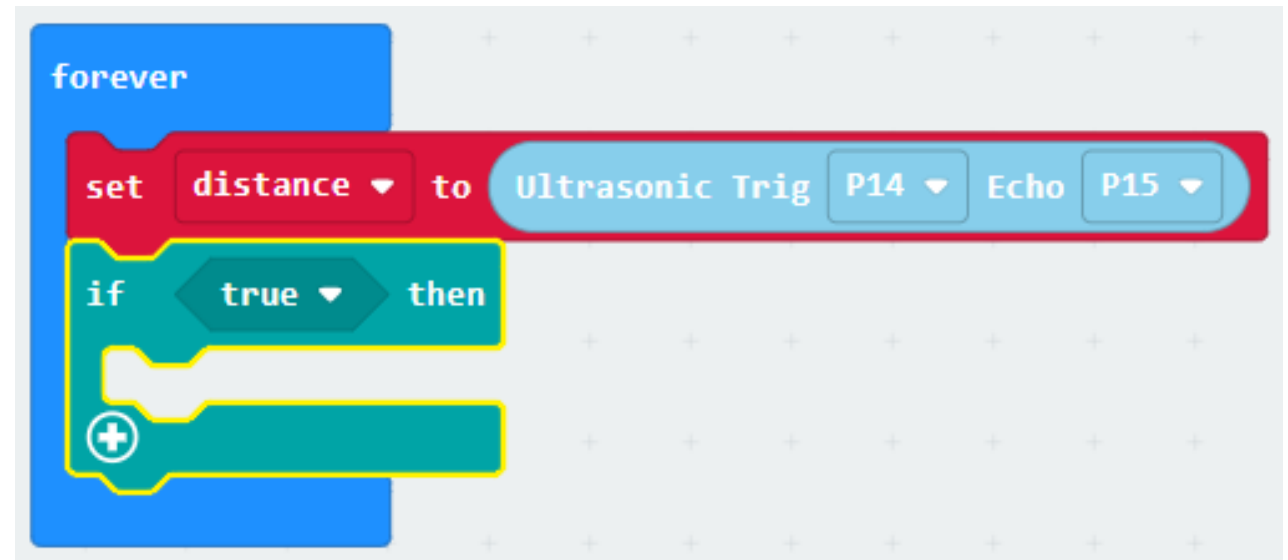Those are the standard pins for the Micro: bit Robot Module we are using.

Like this!

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We have measures now!!

It is the time to create the conditions for our robot to follow on the field.
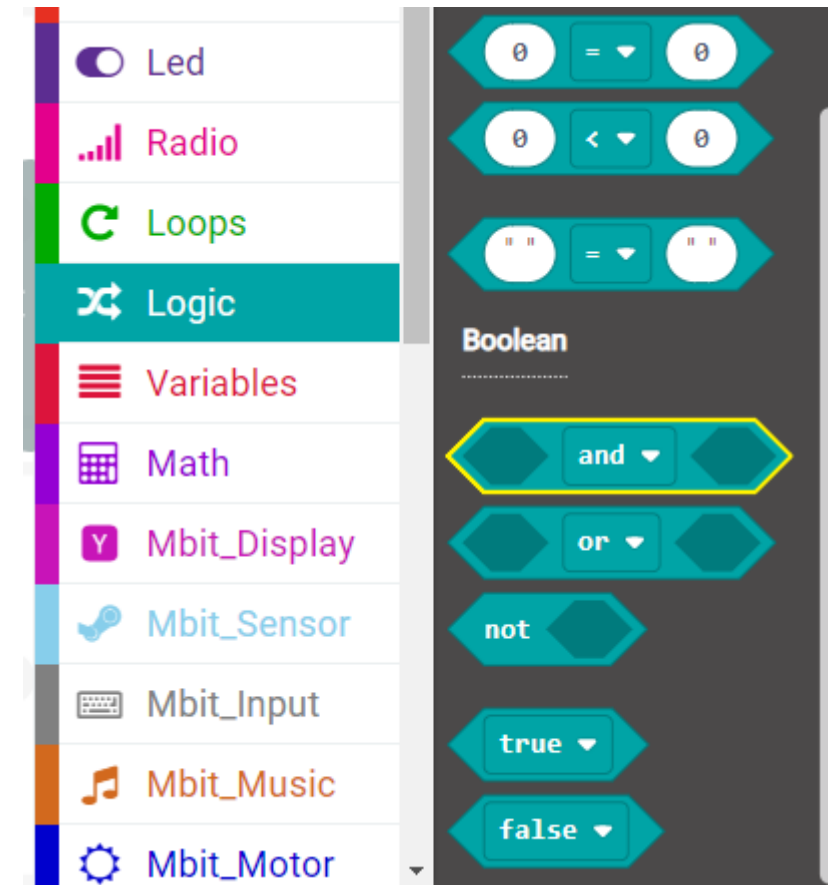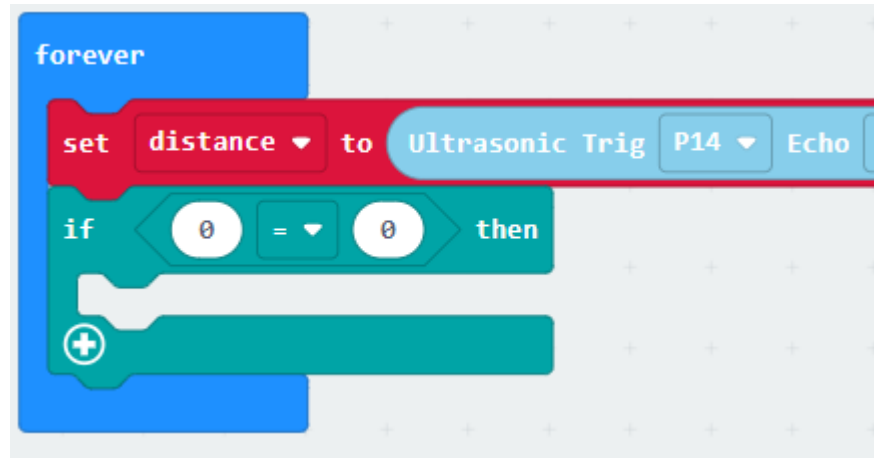
Begin to set an "if" condition inside the "forever" block.

We have measures now!

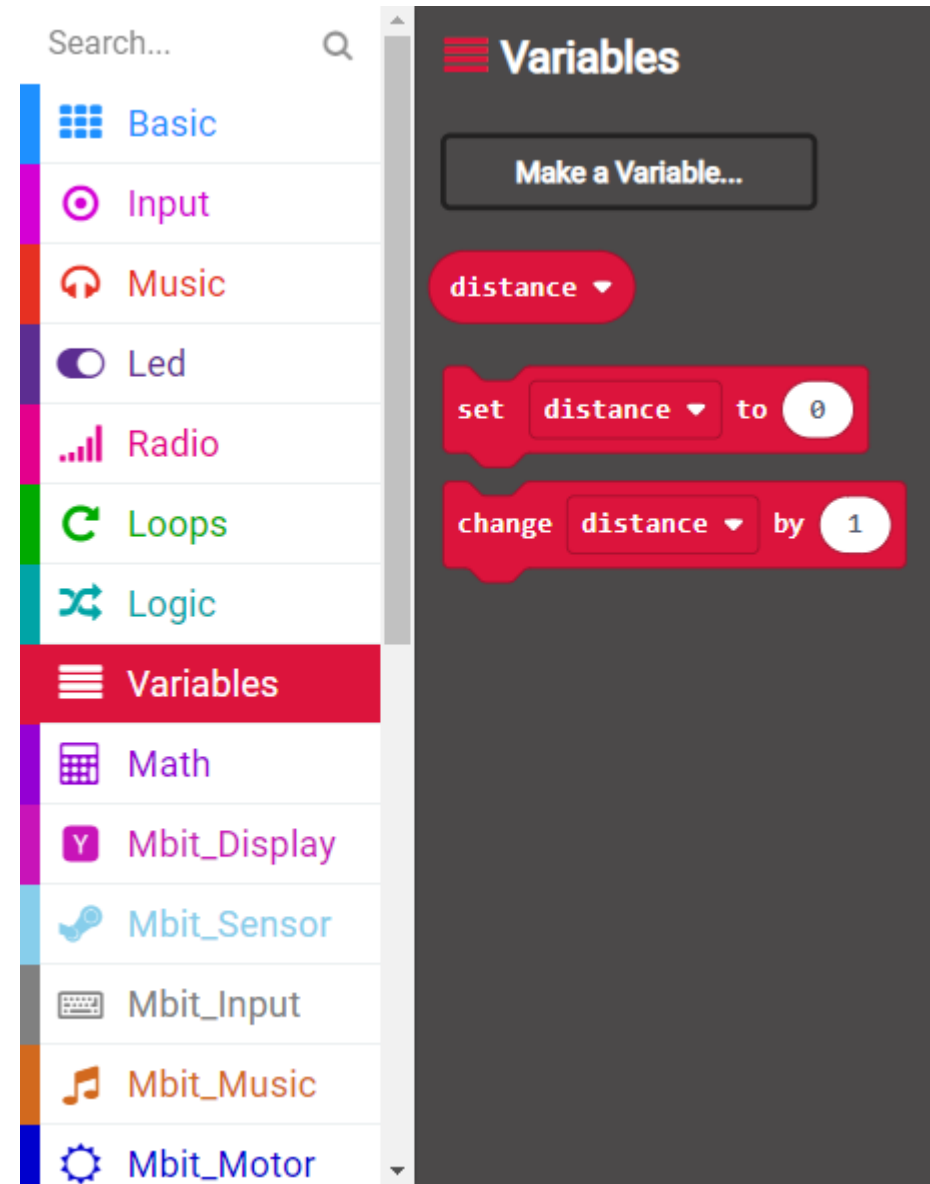Get to the "Logical" section, select a comparison and drag it to the if condition.

We have measures now!

Go to the variable section and drag a **"distance"** block to the "if" condition created in the previous steps.

Well done!

At this point, since you want the robot to follow an object, we will have to change the comparison values. Depending on the distance of the objects that you want to follow you can define the minor or equal value. To follow close objects, you must change the value to 20 (means 20 cm approximately).

Well done!

To verify this condition, we'll place one instruction for the robot to move forward.

With this, it's created a kind of "Follow me" instruction.

Like this!

Attention!!

We must put the STOP's block on the end, for safety!

WELL DONE!

TRANSFER YOUR CODE FOR THE ROBOT AND TEST IT

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Thank you for your attention

Feel free to improve your code