



Wildcat Code

OBSTACLE AVOIDANCE

LEARNING TOPICS:

Variables

Logic Statements

If Then, Else Statements

Sonar Sensors

Loops, While Loops

MATERIALS:

Micro:bit

CuteBot

Computer

Internet Access

INTRODUCTION:

In this lesson you will be making a self-driving car, capable of dodging obstacles.

Before starting with the activity, have students answer the introduction questions below:

- How do you think the cute bot might be capable of object avoidance?
- What types of blocks do you think we might use today?

VOCAB:

Next, let's discuss some Micro:bit and computer science terminology:

Program – An algorithm that has been coded into something that can be run by a machine.

If, then, else Statements – Compares two or more sets of data and test them for a result. If results are true, then do (what you make the program do if results are true), else do (what you make the program do if results are false).

Variable – A value that can be changed and stores information that can be accessed.

Bug – Part of a program that does not work correctly.

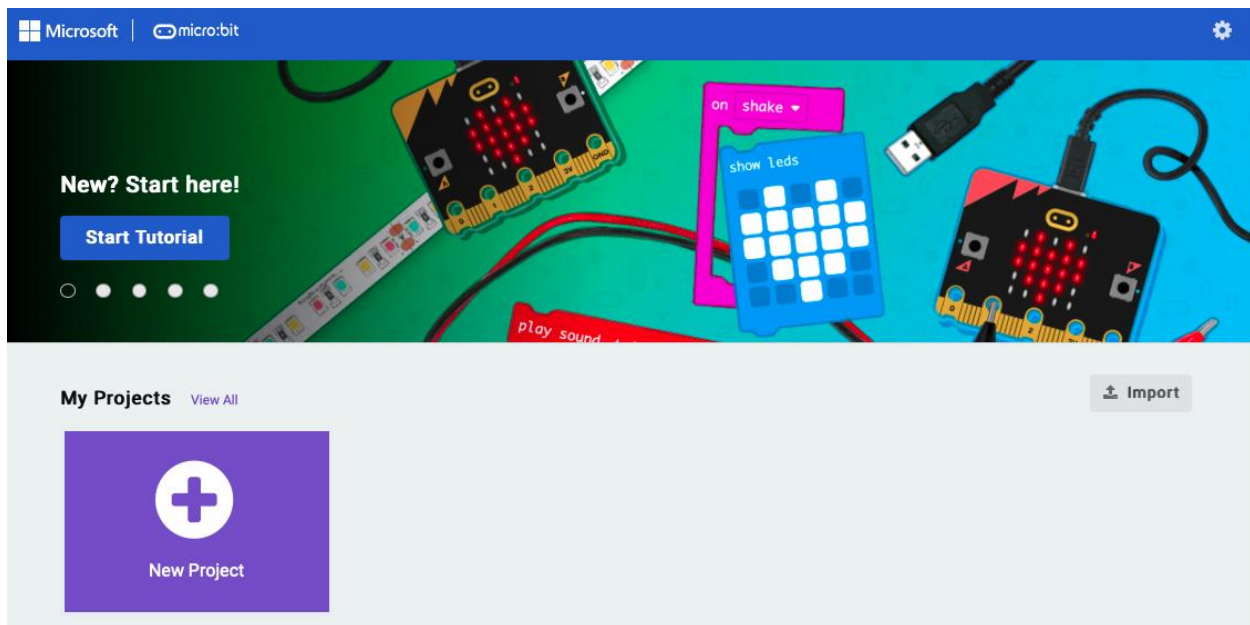
Debugging – Finding and fixing errors in a program.

Loop – A chunk of code that will run over and over based on conditions put in place by the user

INSTRUCTIONAL CONTENT:

Let's get started! First, click or type the following link "<https://makecode.microbit.org/>" which will take you to today's activity on the Micro:bit website.

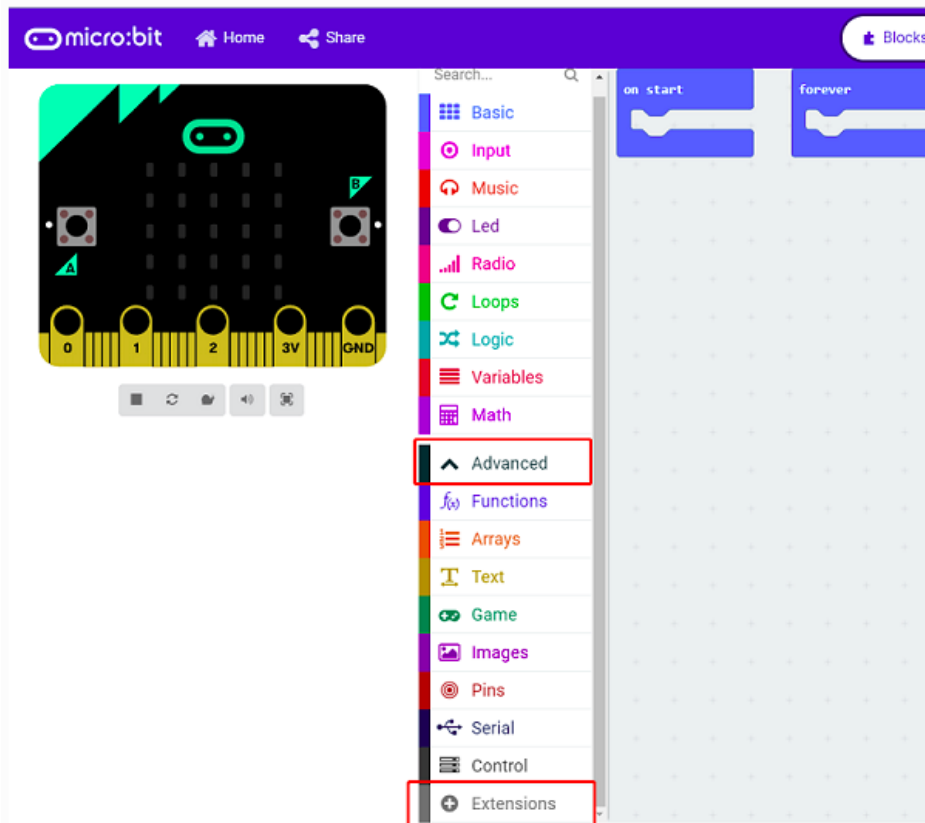
Review both the Micro:bits and the MakeCode tool with students if needed.



Once students have their MakeCode program loaded, have students click on “**New Project**”. Name the project “Hot Potato”.

Step 1

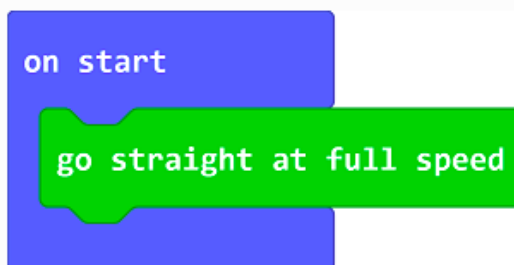
Click the "Advanced" to see more choices in the MakeCode drawer.



In this step we are setting the microbit up to understand command specific to the cutebot!

Step 2

Drag "go straight at full speed" brick into the `On start` brick.



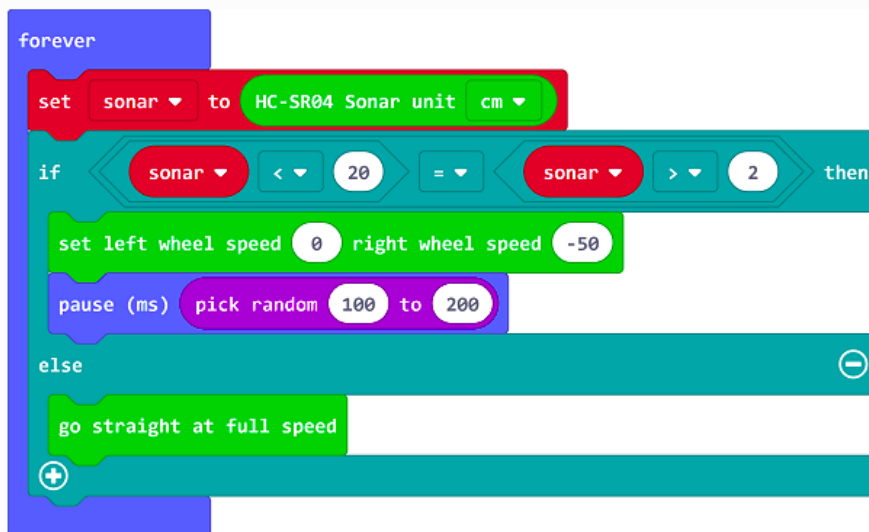
This will make the robot go straight at full speed as soon as the program starts

Step 3

Set a **Sonar** variable to save the detected **Cm** value in the **Forever** brick.

If the detected value is between **2** and **20** which means there is obstacle being detected in front 20cm far, set the left wheel speed to **0** and right to **-50**, make a right turn at a random to complete an obstacle avoidance.

If not, move forward at its full speed.



This step can be broken up into a few **pieces**:

- Use sonar to check distance
- Based on the value read from the sonar sensor:
 - If there is less than 2cm in front of the robot
 - Make a hard turn by setting one of the wheels to max
 - Otherwise go straight at full speed.

Step 4

Allow student to play with the program and see what other behavior they can come up with for their robots, how can we use loops to traverse a predetermined path? (I.E looping straight & right 3 times would make a square.)

LEARNING OUTCOMES:

By completing this activity, you will learn:

- How sonar distance probes work
- Logic Statements
- Loops

CLOSURE:

Reflect with students on the following questions:

- How could you modify the program to make it your own? What changes would you make?
- How do you think our program differs from real life electric cars ?

REFERENCES:

Micro:bit Makecode. (n.d.). Retrieved September 16, 2021, from <https://makecode.microbit.org/>

ElekFreaks. (n.d.). Retrived May 18, 2022 from

<https://www.electfreaks.com>