Learning Debugging skills through mBot Mega

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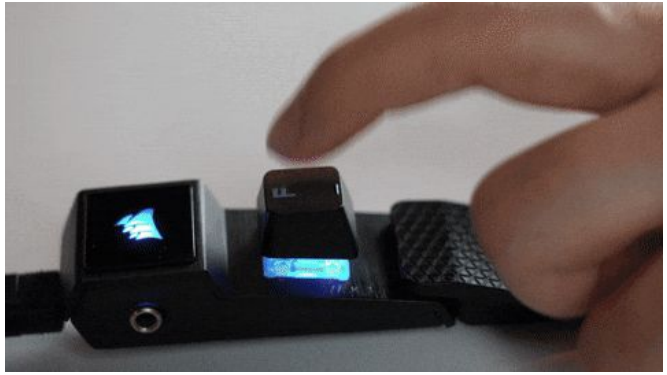
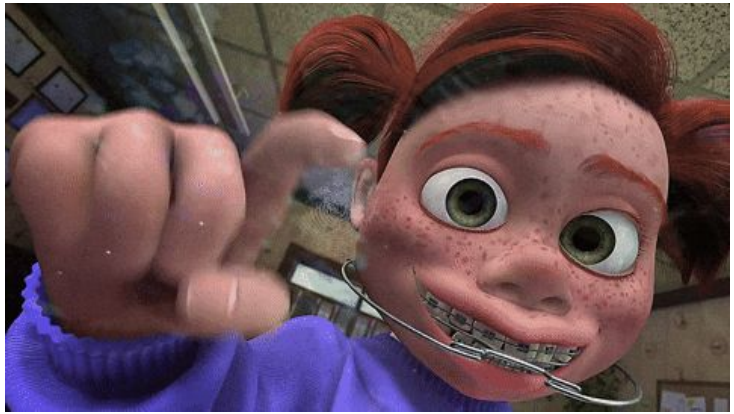
TAP Program

What is TAP?

- Technology Ambassador Program.
- A hands-on STEM experience tied to GGC outreach which is open to **EVERYBODY**!!
- Teams of 3-4 collaborate with faculty to create and showcase a tech project.
- Goal: Explore, master, and teach cutting-edge technologies!

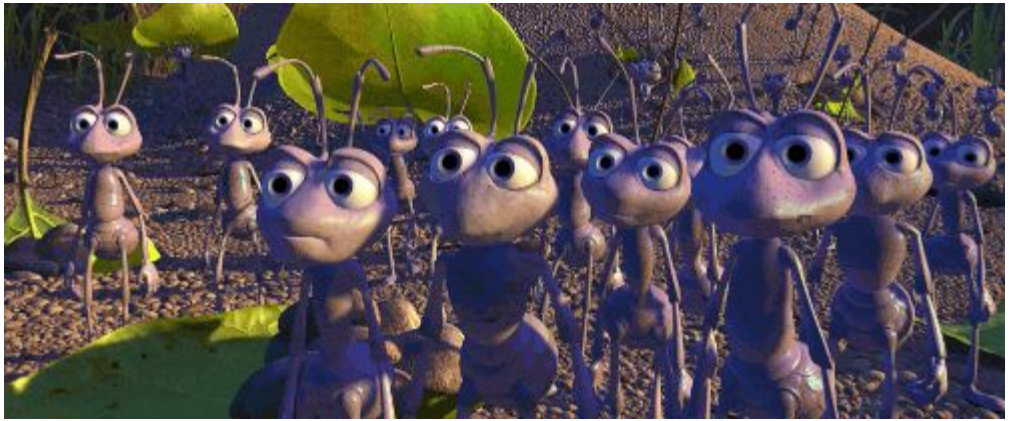




Pre-Survey

https://bit.ly/3RvoOLy

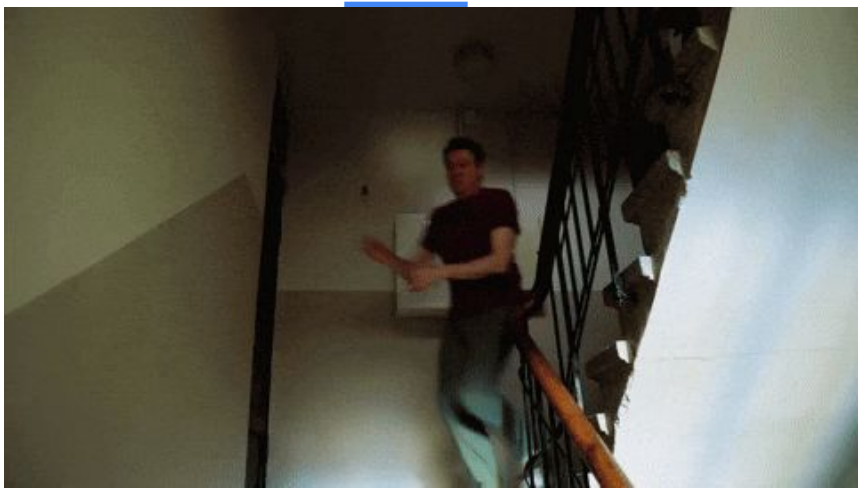
What is Debugging?



Be a Code Detective!

When your program crashes, gives wrong output, or won’t run, debugging helps find and fix the "bugs."

What are the steps to Debugging



Steps

1. **Identifying the bug**
2. **Finding the cause**
3. **Fixing the bug**
4. **Testing**

What a Bug Can Do...

The 2013 Amazon Marketplace Pricing Glitch

A decimal error caused products to be listed at 1/100th of their price (e.g., a $500 TV for $5).

Amazon had to honor many orders, leading to estimated losses in the millions.

Goals

- This workshop geared for participants of any level knowledge in IT.

- To teach Debugging through the Mbot

mBot Mega - what is it?

- The mBot Mega is an advanced STEM robot kit designed for coding, robotics, and AI learning.

- It supports both block-based and text coding, making it suitable for learners of all levels.

Technology Used

1. mBot Mega (one per group)
2. Tablets (with the mBlock app installed)
3. Preloaded Scratch program with incorrect code

Back... Panda mB...

Looks
Motion
Sens...
Events
Control
Oper...
Exten...

Technology Used

Hands-On Learning with mBot – Students get to apply what they learn in real-time by programming

Trial and Error Problem-Solving – By correcting preset errors in the code, students practice debugging, an essential skill in coding

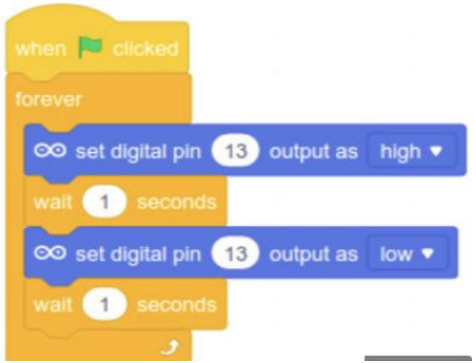
Visual Programming with mBlock – mBot's own Scratch drag-and-drop interface.

Upload Live

What will be taught

Debugging: fixing mistakes in programs. In the real world, many programs have bugs that make software run incorrectly.

Finding and **fixing** these bugs is an important skill.

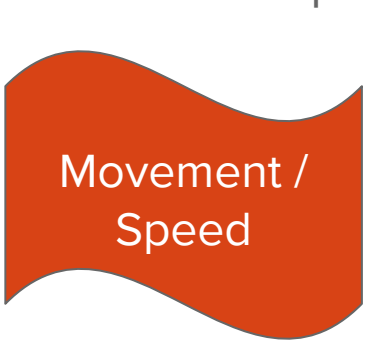


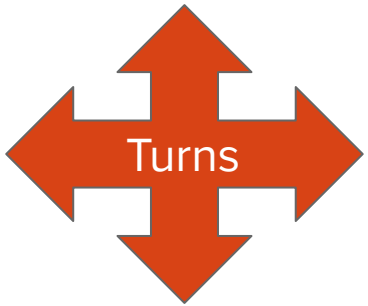
Each Mbot will come with **block-based code** that doesn't work properly, giving you the chance to **analyze** each block and **solve** the problem.

Workshop

How This Will Work

The workshop will consist of three focused stations using the mBot Mega





Towards the end of the workshop, there will be a track challenge where participants must successfully navigate the course.

Group Assignment for Debugging Concepts

1. Divide into three groups, each focusing on one debugging concept:
    - Group 1: Light display debugging
    - Group 2: Speed and distance adjustments
    - Group 3: Correcting turning angles
2. Using code snippets with errors related to each group’s focus, identify errors and correct them.

When () Clicked

This block is used to start a script when the green flag at the top of the Scratch interface is clicked.

It is often used to initialize a project, set up variables, or begin animations.

Station #1 - RGB

RED, BLUE, GREEN

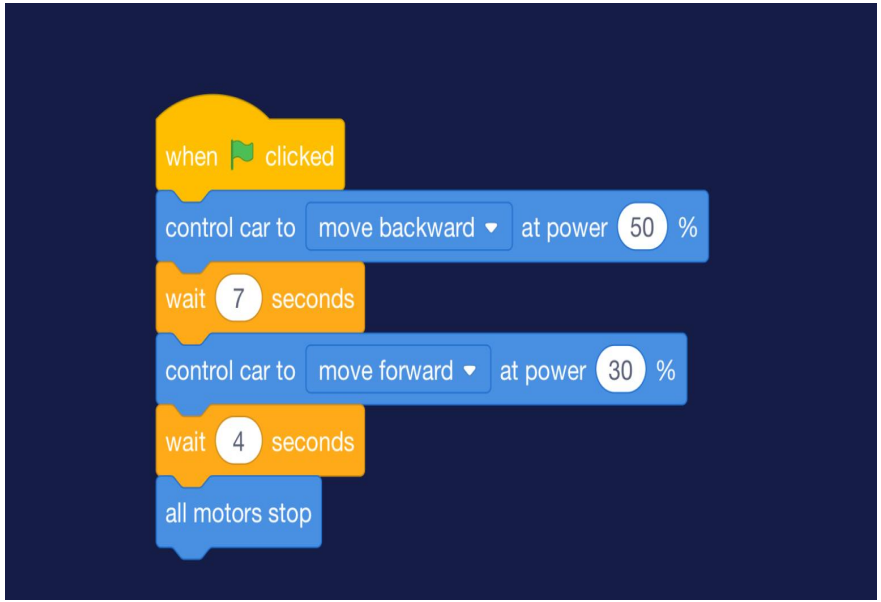
Where numbers represent

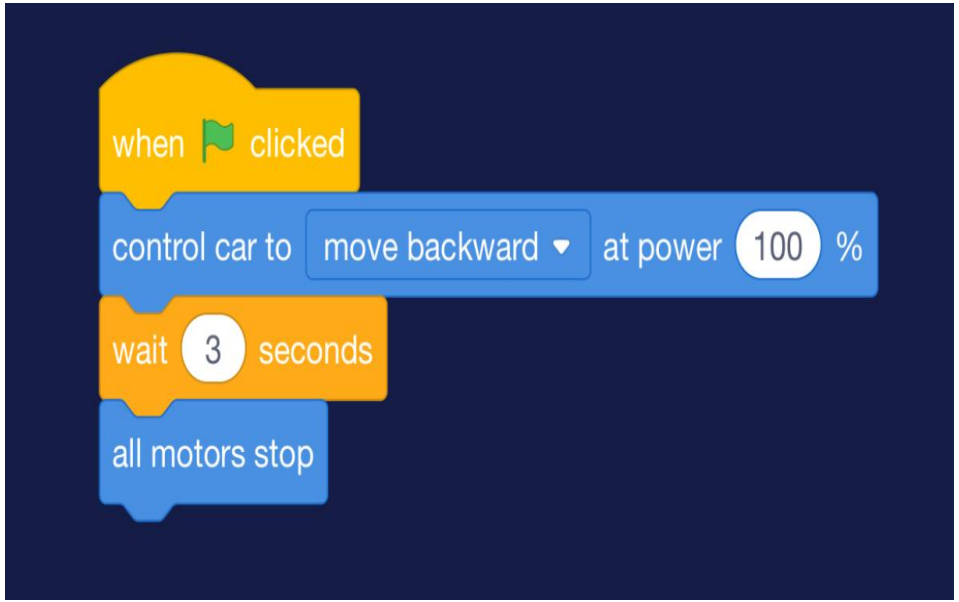
the brightness

Set the sequence to go from red, orange, to green

Station #2 - Speed

:



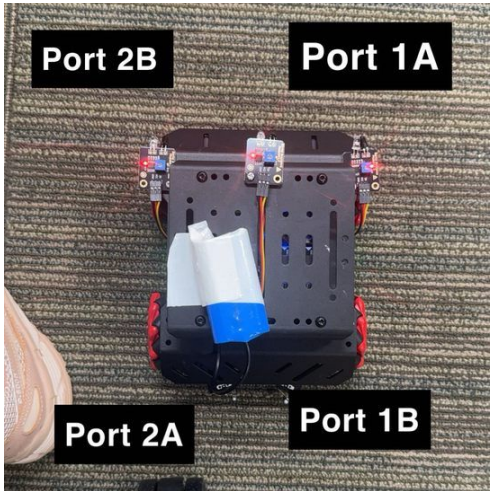


mBot Motors

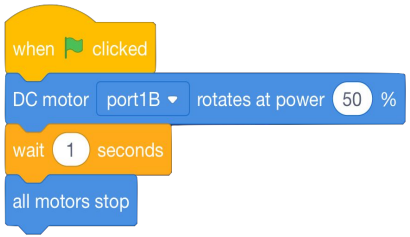
The mBot Mega's motors work based on speed values

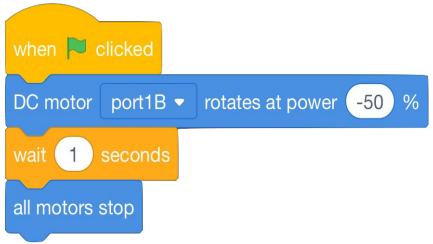
- Positive values (+) ➔ The motor moves forward.
- Negative values (-) ➔ The motor moves backward.
- **Zero** (0) ➔ The motor **stops**.

Front of mBot



Back of mBot

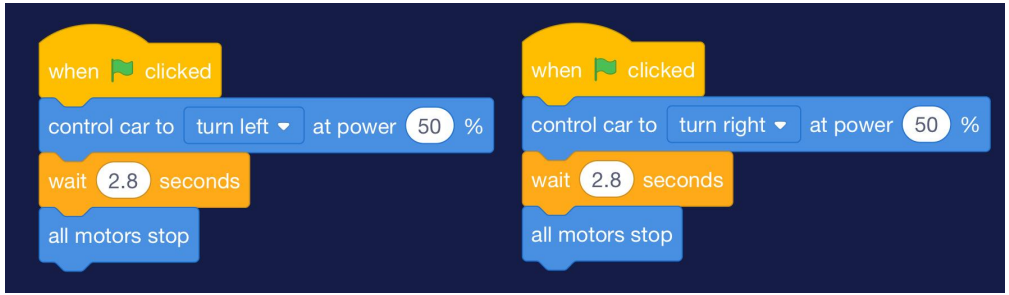




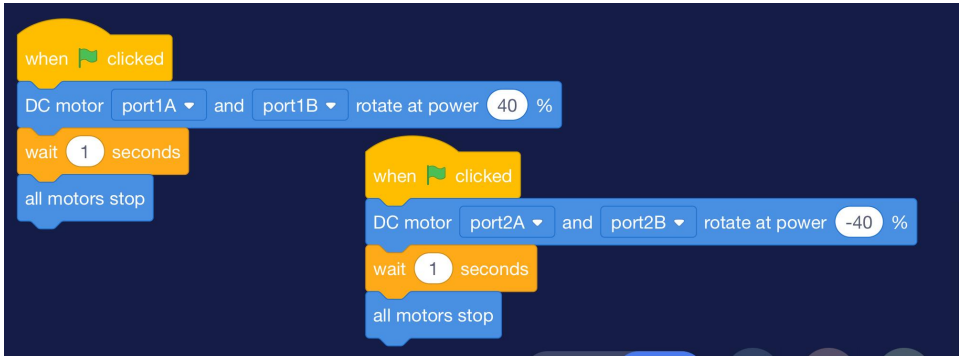
Test it out! Use the code snippets to test all the motors and the positive / negative values.

Station #3 - Turns

Side to Side Movements (keeps the bots orientation)



Left & Right Turns (changes the bots direction)



Mixed Group Collaboration

1. Come up with a team name.

2. Using mBlock apply debugging knowledge to write functional code for the mBot.

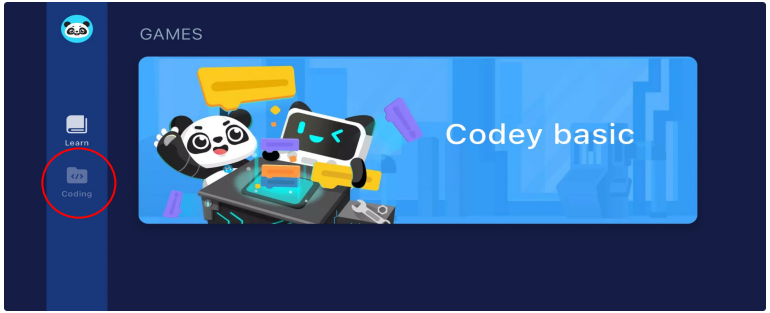
3. Use the flowchart as reference, but as a team, develop your code.

Make sure to test code on the mBot and adjust if necessary!

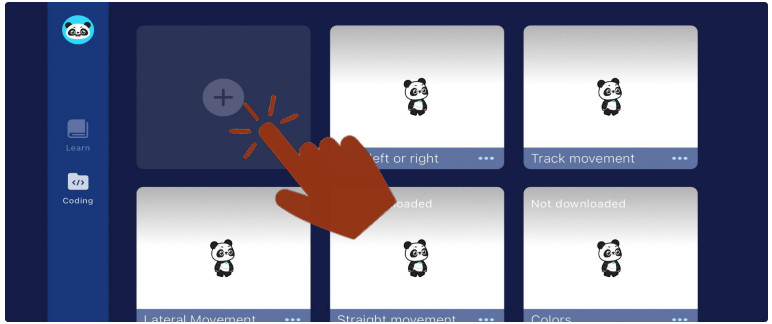
Grab a tablet

Locate mBlock software

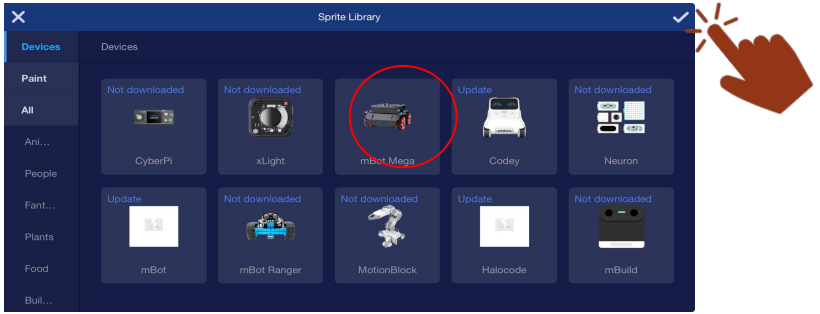
1. Tap the Coding tab

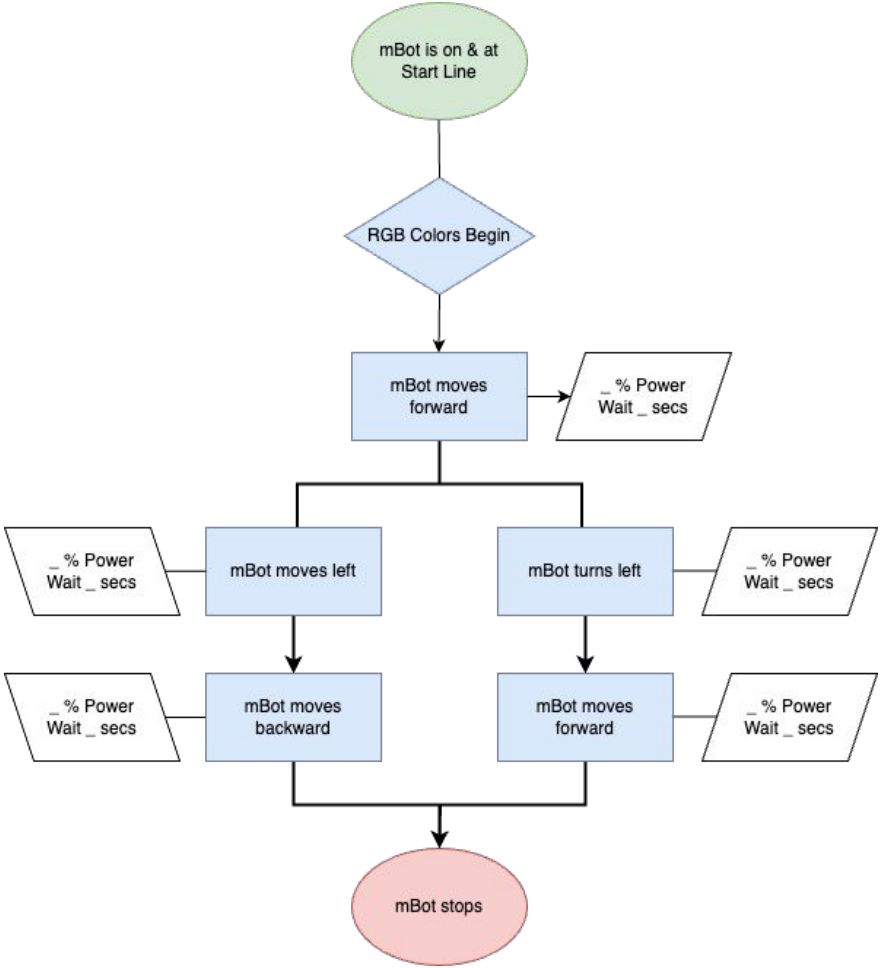


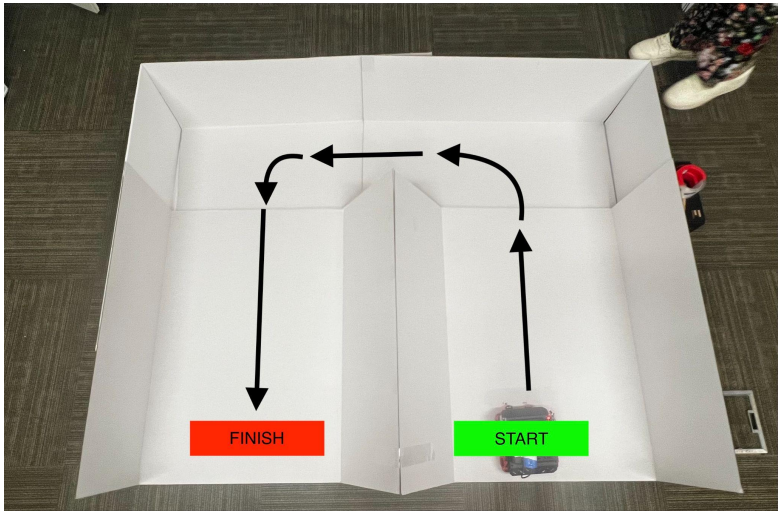
2. Tap the + button



3. Tap mBot Mega, select check mark







Track Algorithm

An **algorithm** in programming is a set of instructions that tells a computer how to solve a problem or achieve a goal.

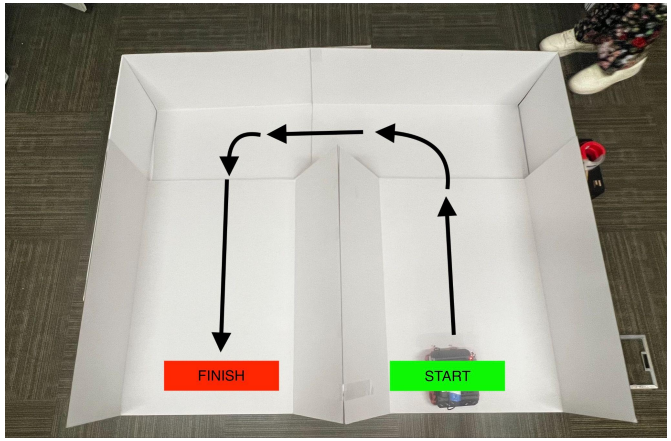
Testing and Demonstration

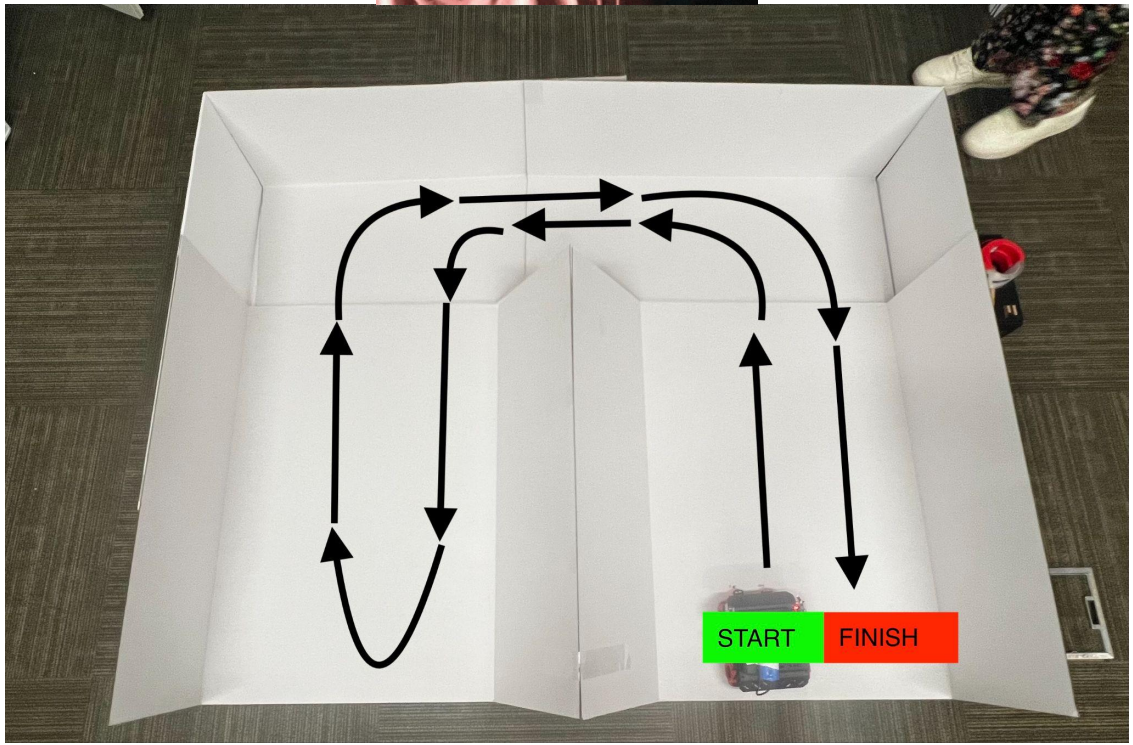
1. Put your final code to the test and demonstrate the mBot navigating the track.

Team that completes track in fastest time wins.

Oh you're done?....

Feeling brave??.....





Track (Level 2)

Add or create new code for mBot to turn and exit track

Post-Survey

https://bit.ly/42dKOPU

Questions?