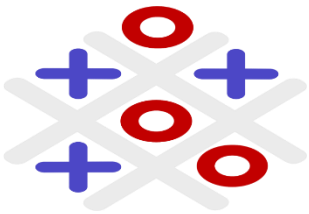
TicTacToeBot



A remote operated Tic-Tac-Toe playing robot submitted to the

2023 McMaster Engineering Competition

Senior Design Challenge

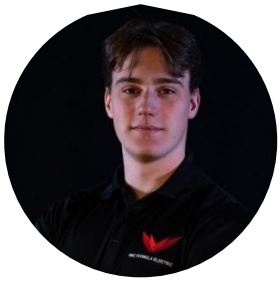
> “Design and manufacture a vehicle to compete in a tournament-style obstacle course, relaying to win an advanced tic-tac-toe style game.”

Our Team:

Three and a Half Mechs

Aidan Goodyer
Software Engineering
Level III

Jasan Rubes
Mechanical Engineering
Level III



Grayson Wood
Mechanical Engineering
Level III

Jared Ducharme
Mechanical Engineering
Level III

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Objectives

- Compete and Win Against Other Teams
- Small, Lightweight, and Fast Design
- Fully Wireless System

Constraints

- Max 2 Breadboards
- Max 2 ESP32 Modules
- Max 1 Motor Driver
- Bot cannot touch course boundaries.

Bill Of Materials

- 1x Ball Bearing Wheels
- 2x ESP8266 + cables
- 1x Foam poster board
- 1x 9-gram servo
- 2x Motors
- 2x Motor Wheels
- 2x 9V batteries + 2 connectors
- 1x L298N motor driver
- 1x Breadboard Jumper cables
- Sticks Craft cabinet Resistor Box
- 1x Pipe Cleaner
- 6x Rubber Bands
- 5x Wooden Skewers
- Duct Tape
- Masking Tape
- Hot glue gun & glue sticks
- Lined Paper
- 7x buttons

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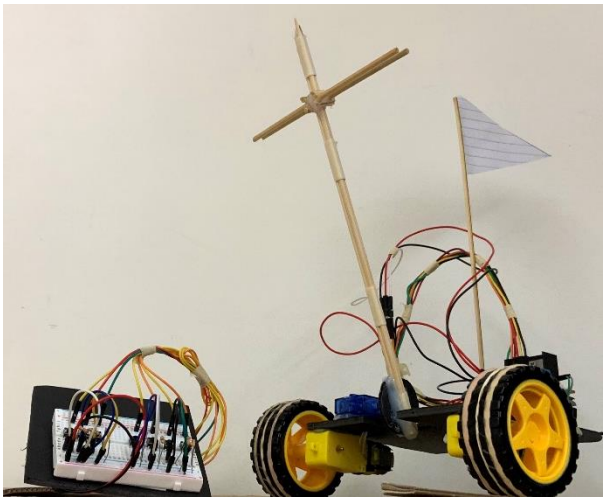
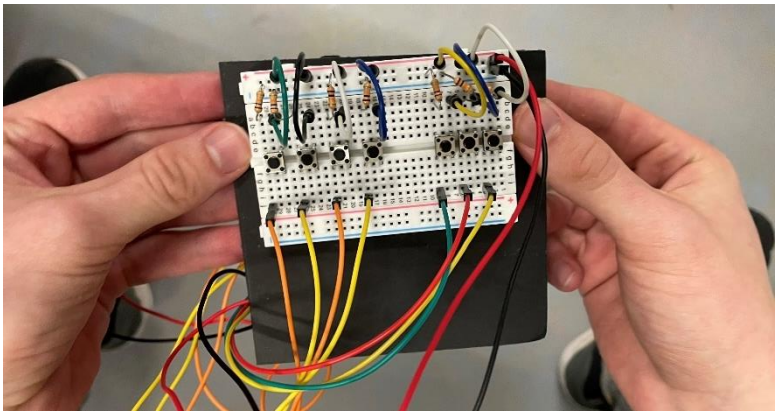
Presenting Our

Final Design



The TicTacToeBot

The Controller



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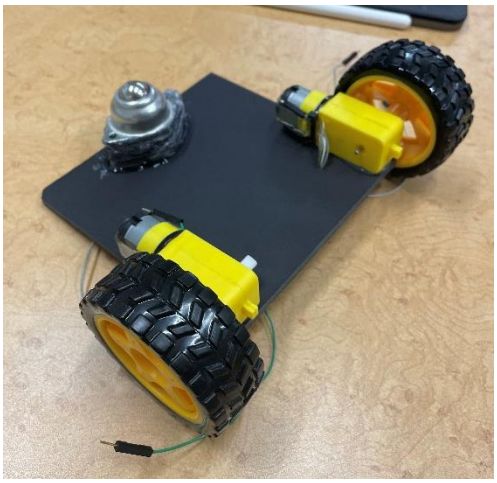
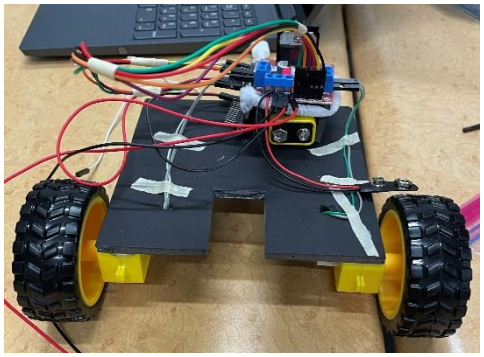
Our Design

Components

The Base



- 3 Points of Contact
- 360-degree Spinning
- Small area
- Effective use of material
- Ease of component removal



The Lever

- Long reach
- End-Point Rotation
- Compact center of mass
- Simple and Efficient

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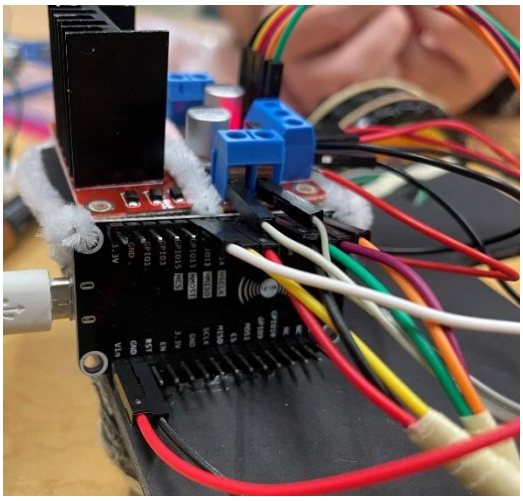
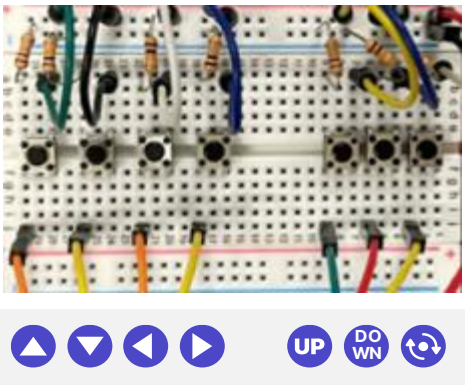
The Brain



- ESP32 Module
- Facilitates wireless Communication
- Reduced Interference
- Pin-Accessible Mounting Point



The Controller

- Directional Control
- Lever Elevation Buttons
- Dedicated Spin Button
- Low Latency Polling

The Code

- Fault Tolerant
- Modular
- Facilitates Wi-Fi Communication

https://github.com/agoodyer/TicTacToeBot

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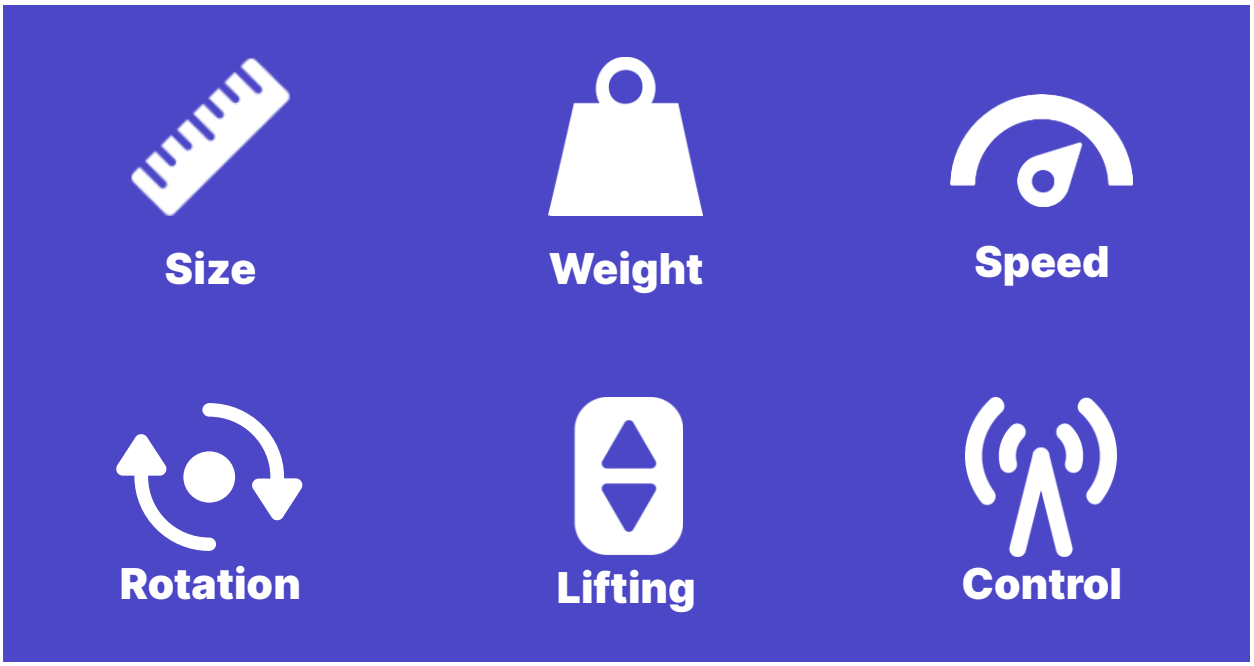
Our Design

Justification



Being the smallest, lightest, and fastest bot in the competition, the TicTacToeBot design is purposefully minimalistic in design.

Featuring a dedicated **SPIN** button, the TicTacToeBot can make nimble direction changes by rotating its wheels in opposing directions, similar to a tank turn.

The TicTacToeBot opts for a fully wireless Wi-Fi enabled robot and controller system, to make the bot as independent as possible.

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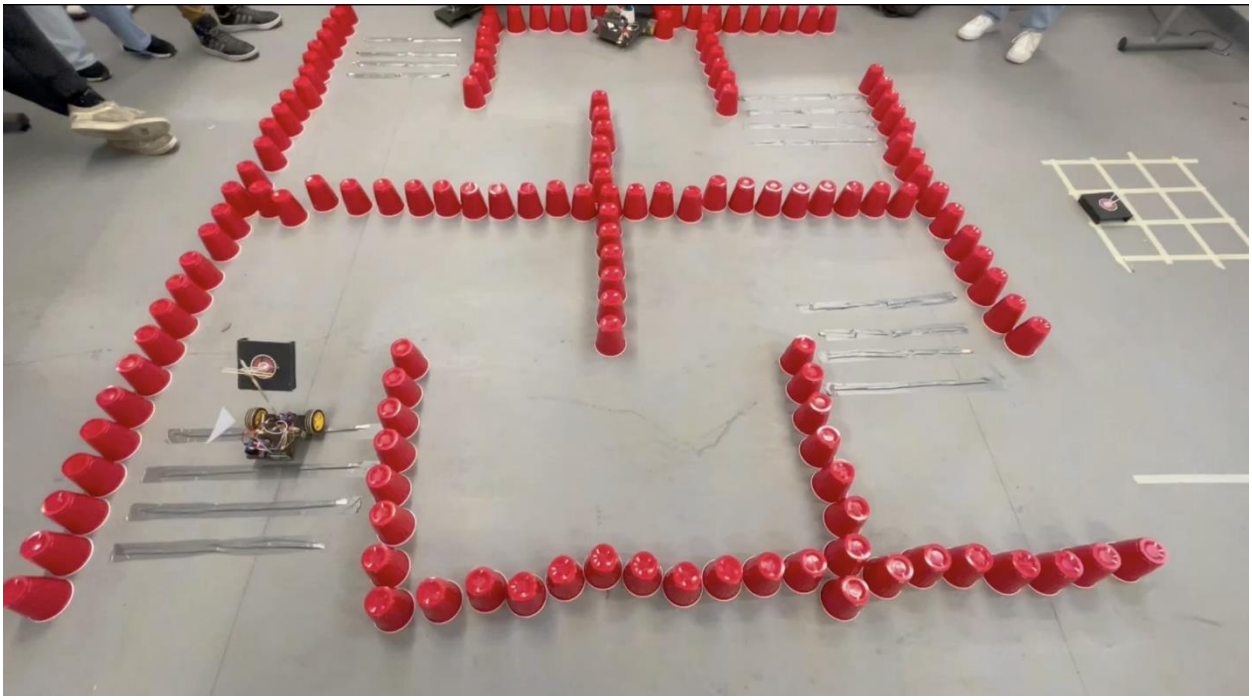
TicTacToeBot

In Action



A Clip of TicTacToeBot Traversing the Course

★ Achieved **Fastest Time-To-Complete** of Any Competing Team

★ Placed **2nd Overall** in the Competition ($200 Prize)

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