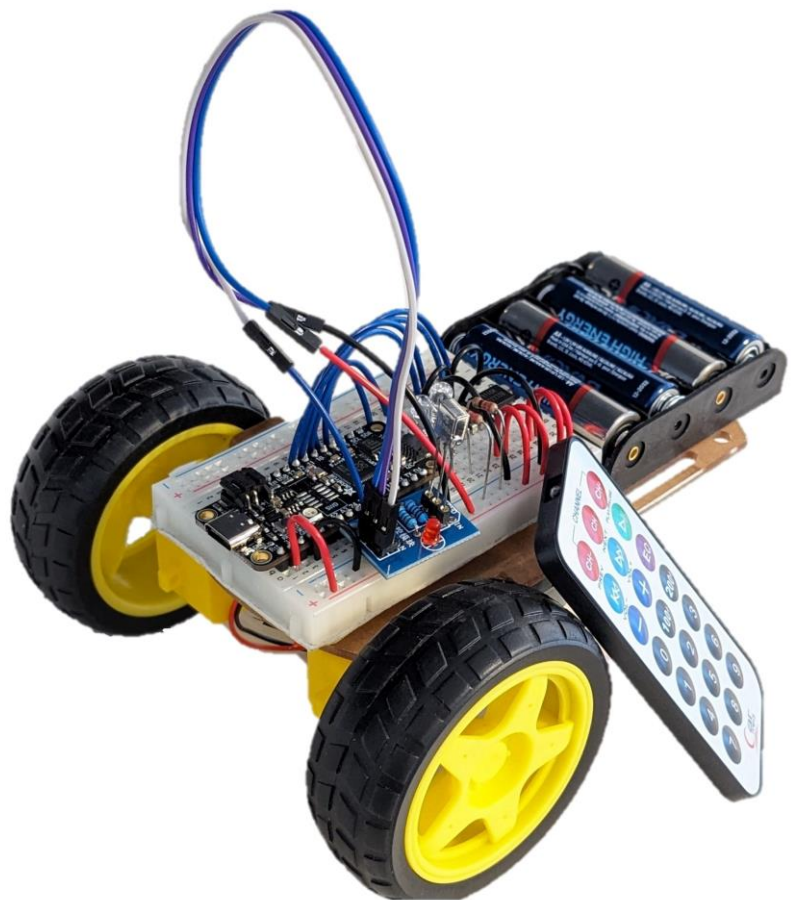


// OBSTACLE AVOIDANCE ROBOT CAR CURRICULUM

In this course we will be building and programming an obstacle avoidance robot car from scratch. If you have ever seen a robot vacuum cleaner (like a Roomba), this follows the same base principles just without the vacuum. It is a fantastic introduction to the interactions between mechanical design, electrical circuits and programming.

Key concepts:

- Programming
- Electrical Circuits & Components
- Ultrasonic Distance Sensors
- Servo Motors
- DC Motor Control
- Battery Packs
- Autonomous Logic



Week 1 - Introduction to Robotics

- What's in your kit; contents review
- Your first electrical circuit (making an LED light up)

Week 2 - Introduction to Electronics

- How to use a breadboard for prototyping circuits
- How electricity works
- How to use buttons & switches in a circuit (manual LED control)

Week 3 - Introduction to Programming

- Setting up your coding environment on your laptop
- Adding your microcontroller to your circuit
- Make your LED blink automatically from a program (instead of switches & buttons)

Week 4 - Intermediate Circuits

- Combine different kinds of buttons & switches with various LEDs and electrical components to see how they interact
- How to make multicoloured LEDs change colours

Week 5 - Programming Logic

- How to display numbers on a 7-segment LED
- Using our microcontroller to count
- How to organize your program code
- Variables, conditional statements and loops

Week 6 - Advanced Electrical Circuits

- Different kinds of motors & how they work
- Build a circuit for our motor
- Write a program to control the motor (forwards, backwards, stop) automatically

Week 7 - Introduction to Distance Sensors

- How an ultrasonic sensor works
- Build a circuit for our sensor
- Write a program to use our sensor to measure the distance to an object

Week 8 - Introduction to Servo Motors

- How a servo motor works
- Build a circuit for our servo motor
- Write a program to use our servo motor (go to a specific direction)

Week 9 - Car Build

- Assemble the car kit
- Mount all of your sensors & motors so they can interact
- How to use a battery pack to power our car (so that it doesn't need to be connected any more)

Week 10 - Writing our Final Robot Program (Part 1)

- How to structure our program logic
- Incorporate all our motor and sensors

Week 11 - Writing our Final Robot Program (Part 2)

- Continuation of week 10
- Implement the logic that will make our robot work
- Adding more functions and tweaking our program

Week 12 - Writing our Final Robot Program (Part 3) + Bonus

- Finalize our obstacle avoidance program
- Customize your car! Add different LEDs and buttons