

This is our logbook the we'll keep track of everything we do.

Week 1:

Day 1, Monday (9:00 AM): We meet up at each others house to plan our science fair project. We're both feeling excited and a bit nervous because our goal is to build a robot that follows a line, a picks up objects. We have a solid plan in mind, and we've already made a list of the parts we need.

9:30 AM: We head over to Amazon and order the following:

- Microcontroller (Arduino)
- Motors (DC motors and servos)
- Wheels
- Line sensors (infrared sensors or light sensors)
- Motor driver (to control the motors)
- Battery (to power the robot)
- Chassis (plastic for the robots body)
- Wires (to connect parts)
- Breadboard (for testing connections)
- Servo/Gripper (for picking up by the robot)
- Small objects (to be picked up by the robot)
- Jumper wires (for connecting components)
- Screws, tape, hot glue, soldering iron (to assemble parts)
- Castor wheel

Friday

And now we wait for the delivery.

Day 5, Saturday

(9:00 AM): The materials get delivered so we meet up again. We're both excited to get started, we immediately begin assembling the robot's chassis, which we 3D printed. By 1:30 PM, we've mounted the motors onto the frame, and we start connecting the motor controller to the motors, then we wire the Arduino Uno. We mount the IR sensor on the front, making sure it's positioned to detect obstacles ahead of the robot.

11:30 AM: We double-check the wiring to ensure everything is connected properly. After making sure all the components are securely attached, we power up the robot to test it. Unfortunately, we ran into our first issue: the motors don't respond, and the sensor doesn't detect anything. We're both confused, so we take a break to clear our heads.

Day 2 (Sunday, 11:20 AM): We go back to each other's houses and try fixing the robot. By now, we're pretty sure the motor controller is the culprit, as it doesn't seem to be sending power to the motors. After checking

the wiring again and verifying that the Arduino is properly programmed, we still can't get the motors to work.

12:10 PM: We test the sensor separately with a simpler program, but it's still not responding. We start to suspect that either the sensor wiring is wrong, or the program for it isn't working properly.

1:00 PM: We take a step back and decide to go over all the documentation for the parts we bought. We watch a couple of YouTube tutorials about wiring up DC motors with the motor controller and the Arduino Uno. By 2:00 PM, we try a new approach and rewire the system, taking extra care to follow the tutorials closely. This time, the motors respond, but the sensor is still unresponsive.

Week 2:

Day 8 (Monday, 9:00 AM): After a week of back-and-forth troubleshooting, we finally pinpoint the issue: the motor controller was malfunctioning because it wasn't receiving the correct voltage.

We decide to replace it with a new motor controller we ordered online, along with a few other components we thought might improve the robot's performance.

- More jumper wires - to ensure secure connections
- Stronger batteries - to make sure the robot gets enough power for all components
- Battery charger - just in case it runs out of battery

10:30 AM: With the new plan and the external power supply in hand, we start wiring everything again. By 12:00 AM, we'd set up the new system, and wrote a test program for the motors. We power up the new system, and we wrote a test program for the motors. We power up the system, and the light turns on. We're both feeling happy.

11:50 AM: We move on the code, but it isn't working. At first, we suspected the code might be the issue but we later figured out nothing was wrong with it. However, the Arduino shows it's connected to the laptop, but nothing responds. An error message pops up saying it's not in sync and

cannot connect. We try connecting the setup to several different laptops, but despite the connection showing as established, nothing works. After spending two hours troubleshooting, we think it might be the cable causing the issue, but since there's no time to get a new one, we're stuck with this one, as it wouldn't arrive in time!

Week 3:

Day 15 (Wednesday, 9:30 AM): We're not feeling too confident right now because the code still isn't working. The lights on the robot turned off, so we added more power by connecting two batteries, but then the robot started smoking. We quickly disconnected everything and took a little break because we're both a bit scared. After the break, we gathered our thoughts and decided to refocus. The robot still isn't working.

10:00 AM: We add a PWM motor driver to control the speed of the motors more effectively. We also test out different programming techniques to make the robot stop

or turn when it detects an obstacle. By 1:00 PM, we have the basics of autonomous movement in place. The robot moves forward, but when it detects an obstacle, it stops and backs up. We're close, but not quite there yet.

2:30 PM: We both suggest we add more sensors for better obstacle detection. We order a second IR sensor to improve the robot's ability to detect and react to its environment.

Week 4

Day 22 (Monday, 10:00 AM): We receive the new sensors, and it's time to test them. The second IR sensor will be placed on the other side to help with better line detection. We easily take off the one old sensor in the middle of the robot and move it to the right to place the new one on the left, and were hoping it'll help the robot navigate more easily.

12:00 PM: After several hours of adjustments, the second sensor finally sticks on. By 2:30 PM, we try to connect a battery, but

further, we decide to take a step back and reflect on everything we've done so far. It's frustrating, but at least we've learned a lot about trouble shooting, problem-solving, and working together as a team. We remind ourselves that the journey itself has been valuable, and no matter the outcome, we've gained experience we can carry forward. With the clock ticking, we prepare ourselves to present our project with the knowledge we've gained—even if things didn't go as planned.

Day 40 (Thursday 9:48): We tried to code the robot again but it did not work so we booked an appointment with our advisor to help us. He told us we needed a new Arduino board because of the last incident that happened with the smoke. We got a new board and started coding again. It turned on and it started working from one wheel. One of the sensors were not working so we fixed it and we thought everything was ok but then the robot wouldn't drive. I plugged the robot into the Chrombook and only one wheel started moving.