Line Follower Evaluation

In this evaluation, I am going to be discussing my applied technology project which was a car that followed a line when placed on top a track, using a Microbit to run it. I will discuss what I did well, what problems I encountered and what I did to overcome them, what I would have done differently if I were to redo the project all over again, what I have learnt for my leaving cert project which I will be doing next year, along with how I made the project and what steps I took to complete it.

How I made the Line Follower

This process consisted of the following steps:

1. Using the CAD website Onshape, I made a base, wheels, and motor holders.
2. I printed out two motor holders using a 3D printer. The wheels and base were cut out on a laser cutter.
3. I soldered and made a circuit consisting of resistors, motors, light dependent resistors and a Kitroniks board.
4. I screwed my motor holders and the Kitroniks board in place on the base, along with attaching the wheels to the motors.
5. I coded the Microbit on the Microbit website to give values for the light dependent resistors, when placed on the track. I took down 24 different values.
6. I used those values collected to make a second code, this time for the motors. The threshold of the values would make the car turn left, turn right, or go straight.
7. I tested the car on the track, adjusting the threshold where necessary until the car could pick up the bends/turns on the track.

What I did well

- The Onshape design for my motor holders and base were well made, the motor holders were accurately sized and held the motors in place efficiently. The base had a good amount of space for all components.

- Producing the second code was difficult, but I eventually got the threshold values for the LDR right after a bit of chopping and changing.
- The schematic diagram for the circuit was easy to understand and I made the circuit well, with all components soldered correctly.

What problems I faced and how I overcame them

- My main problem started when my soldered cable to my left motor chipped off about a class before the due date. However, I was able to quickly deal with the problem by soldering on the remaining part of the loose cable in the circuit.
- At first, my project could not detect the bends well enough, but after changing the threshold on the code, it could go around them on my 4th attempt.
- My base was correctly sized, but not for the Kitroniks board. I was still able to screw it into place using the open bar in the middle of the base.

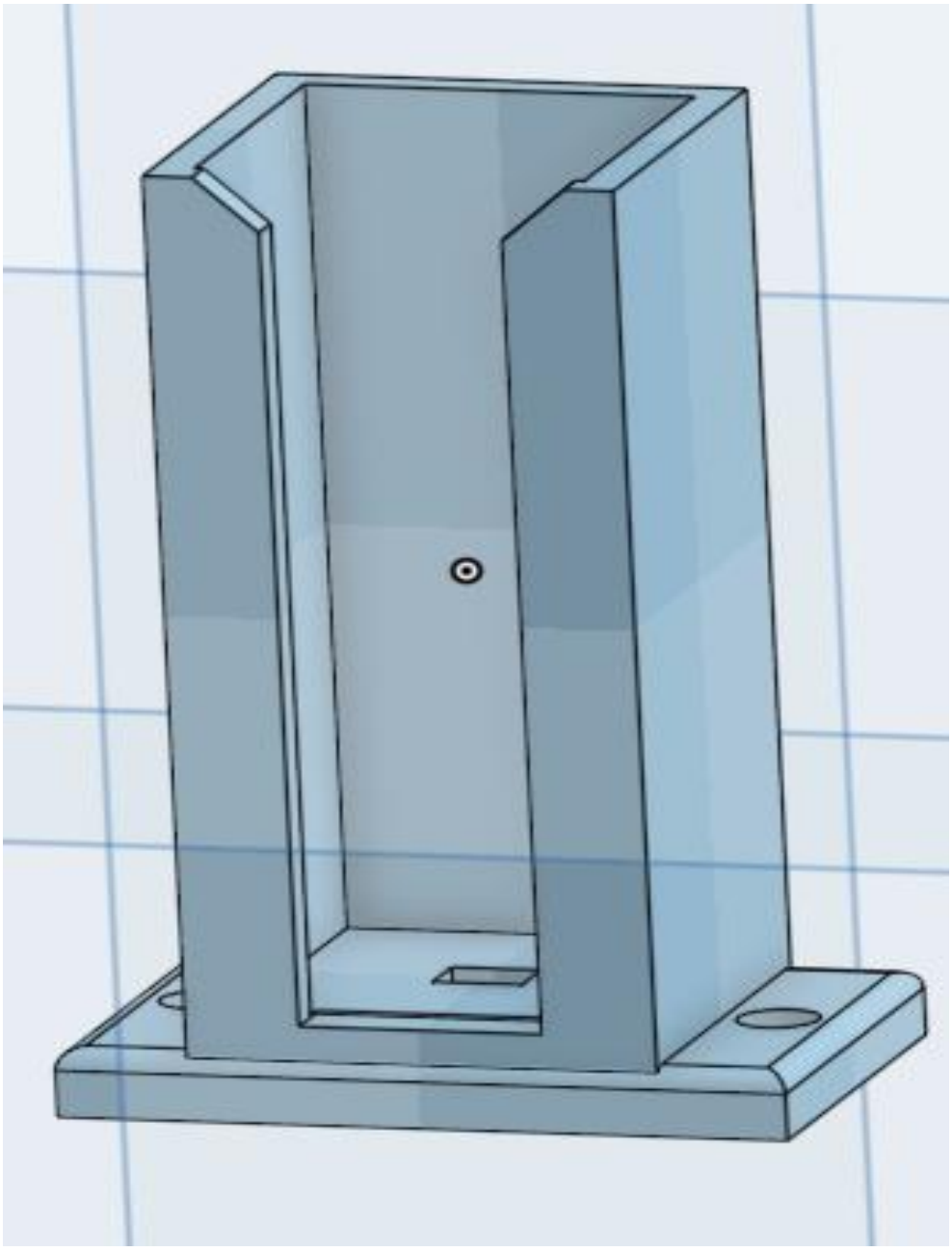
What I would have done differently

- I would have taken more time to size the bar on the base so that the Kitroniks board would have had a better place to screw in. I did not size the bar correctly.
- I would have made two extra holes in the back of the motor holders to secure them in even more just for that extra bit of security, so they do not slip up when attaching the wheels.
- I would have done my soldering differently, organizing my cables better to make the circuit better managed and more aesthetically pleasing.

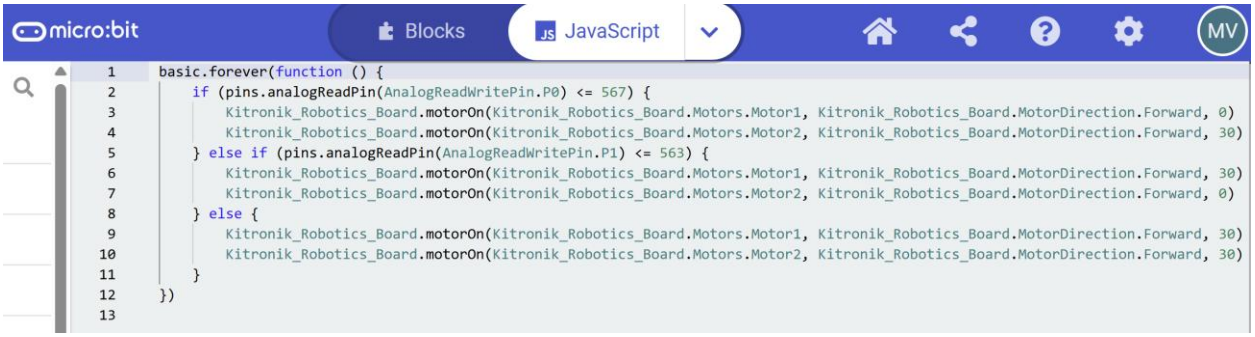
What I have learnt for my leaving cert project

In conclusion, I have learnt a lot from this project that will help me next year with the leaving cert. First, I have never used Onshape before this year and I feel I have improved in my skills, the motor holders being my best piece of work. I have also learned how to code using a Microbit, I have used it before for the junior cert, but never really coded it myself for an actual project unlike this time. I feel like these two things will help me for next year as I can use them to design my project and make sure everything goes to plan. This applies for both the project physically (Onshape) and electronically (Microbit). Most importantly, planning will be essential for next year before I start the project so that I do not run out of time.

Motor Base:



Code:

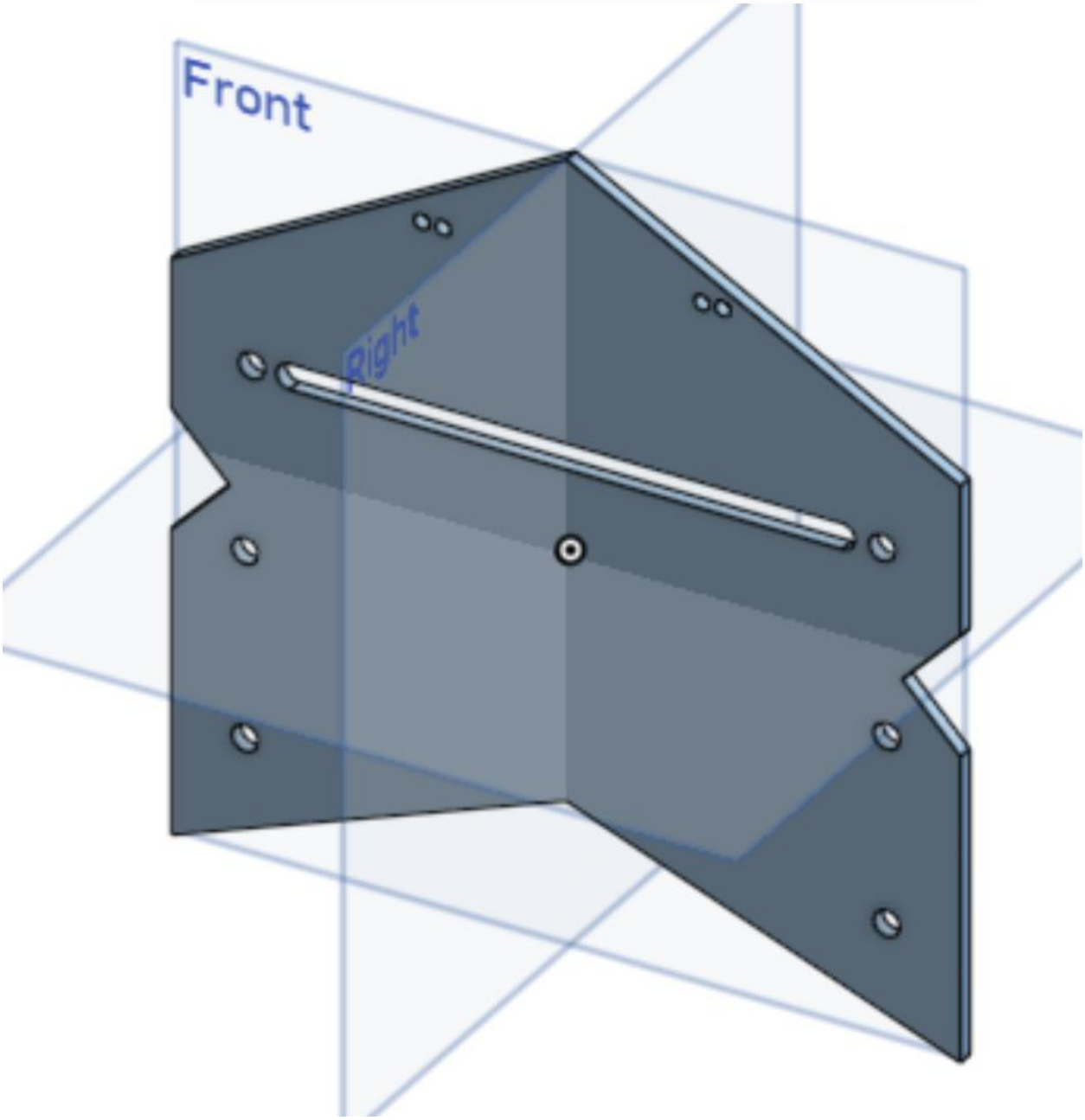



```
basic.forever(function () {
    if (pins.analogReadPin(AnalogReadWritePin.P0) <= 567) {
        Kitronik_Robotics_Board.motorOn(Kitronik_Robotics_Board.Motors.Motor1, Kitronik_Robotics_Board.MotorDirection.Forward, 0)
        Kitronik_Robotics_Board.motorOn(Kitronik_Robotics_Board.Motors.Motor2, Kitronik_Robotics_Board.MotorDirection.Forward, 30)
    } else if (pins.analogReadPin(AnalogReadWritePin.P1) <= 563) {
        Kitronik_Robotics_Board.motorOn(Kitronik_Robotics_Board.Motors.Motor1, Kitronik_Robotics_Board.MotorDirection.Forward, 30)
        Kitronik_Robotics_Board.motorOn(Kitronik_Robotics_Board.Motors.Motor2, Kitronik_Robotics_Board.MotorDirection.Forward, 0)
    } else {
        Kitronik_Robotics_Board.motorOn(Kitronik_Robotics_Board.Motors.Motor1, Kitronik_Robotics_Board.MotorDirection.Forward, 30)
        Kitronik_Robotics_Board.motorOn(Kitronik_Robotics_Board.Motors.Motor2, Kitronik_Robotics_Board.MotorDirection.Forward, 30)
    }
})
```


```
input.onButtonPressed(Button.A, function () {
    basic.showNumber(pins.analogReadPin(AnalogReadWritePin.P0))
    basic.pause(1000)
})
input.onButtonPressed(Button.B, function () {
    basic.showNumber(pins.analogReadPin(AnalogReadWritePin.P1))
    basic.pause(1000)
})
basic.forever(function () {

})
```

Vehicle base:



Wheel and motor: