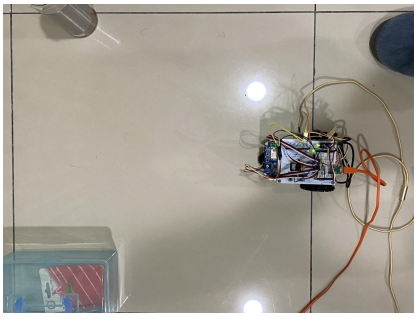
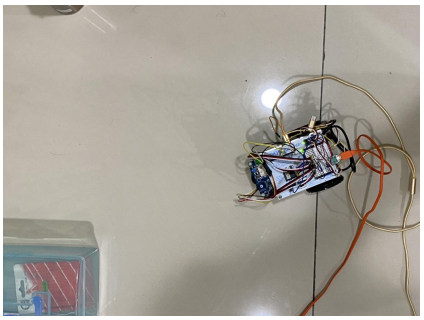
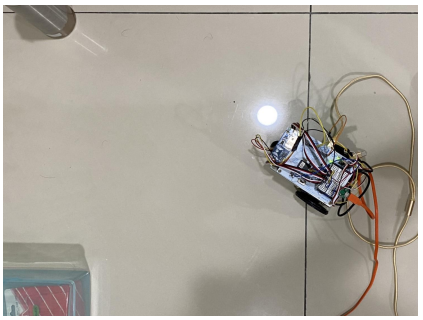
Davis 109006201
https://github.com/davizjc/Embedded-System-Lab-Hw5.git
周志偉

Homework 5 Boe Bot Car

1. LaserPING (PING) and BB Car
    a. For my project to work I have to put the bb car 51 cm away from a background and the two object 50 cm from the car. (this value can be change in the code if we want the object to be detected in a longer distance.)
    b. The BB car will be placed in the middle between the two objects, and the ping will be read, which will read the background. I wrote my code so that the BB car will turn left and when it detects an object closer than 50 cm it will stop and print out the actual distance. Then it will turn right after, but during this the thread will sleep for 3 seconds so that it will turn the car until the ping detects the background instead of an object. I will continue to read the ping until the car stops at a second object and print the second object distance.
    c. I have also edited the BBCar.cpp for this homework assignment so that when it turns, only one wheel is moving forward and backward so the position of the BBcar won't move forward.


Car position at middle


Car will turn left until it detect an object


Car will turn right until it detect an object

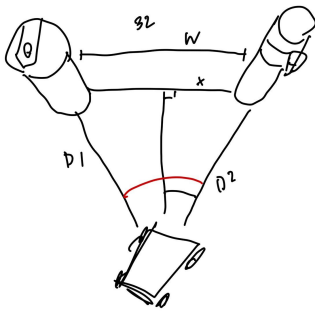
```
Ping = 47.351151
 object on the left has a distance of = 47.488350
go right
Ping = 44.538551
 object on the right has a distance of = 44.555698
```

Using the measure app on my phone the actual distance is pretty similar to the distance the ping reads

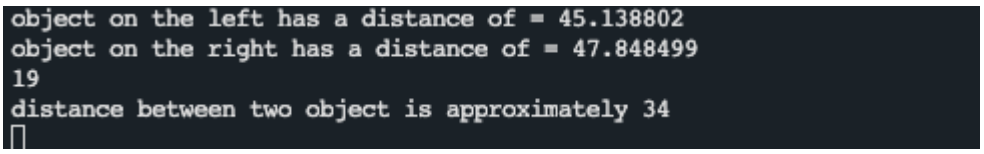
EDITED VERSION

The real distance measure is around 32 cm, I have use the angle the wheel turn to multiply with the distance of the object on the right to get the distance between the two objects

I measure the red angle when the car detect an object on the left until the right. Then I take that angle and divide by 2 assuming that the car is in them middle if i split the angle in half I can use sin { black angle) multiply by d2 to get the X and the W should be x multiple by 2



.



2. Line Following and Positioning of BB Car
    a. Since I wire the servo and the QTI sensor the opposite way from lab 13 my code will be kinda different a little bit. The four qti pins will be read and will output a pattern. When the pattern is 8 it moves right, when it 1 it goes left, and when both of the middle sensors read 6 it goes forward. Since my servo is wired in the opposite direction for it to go forward I use car.goStraight(-50); instead of car.goStraight(50);. To fix when the pattern (0) doesn't read anything or when the 4 sensor is completely out of the track I set the bb car to move backward. When the pattern is 15 or the 4 qti is on a black track, my bb car will stop for 5 seconds, record a checkpoint, and continue forward. At the four checkpoint it will stop completely and print the distance and break out of the while loop.