CSC 4120/6120 INTRODUCTION TO ROBOTICS

MODULE 2

SENSORS

Camera, Distance Sensor, Inertial Measurement Unit (IMU) and SERVO

Exercise 1:

Go to :
https://www.dexterindustries.com/GoPiGo/get-started-with-the-gopigo3-raspberry-pi-robot/4-attach-the-camera-and-distance-sensor-to-the-raspberry-pi-robot/
Attach a Raspberry Pi Camera Directly to the GoPiGo3 Body

Result:
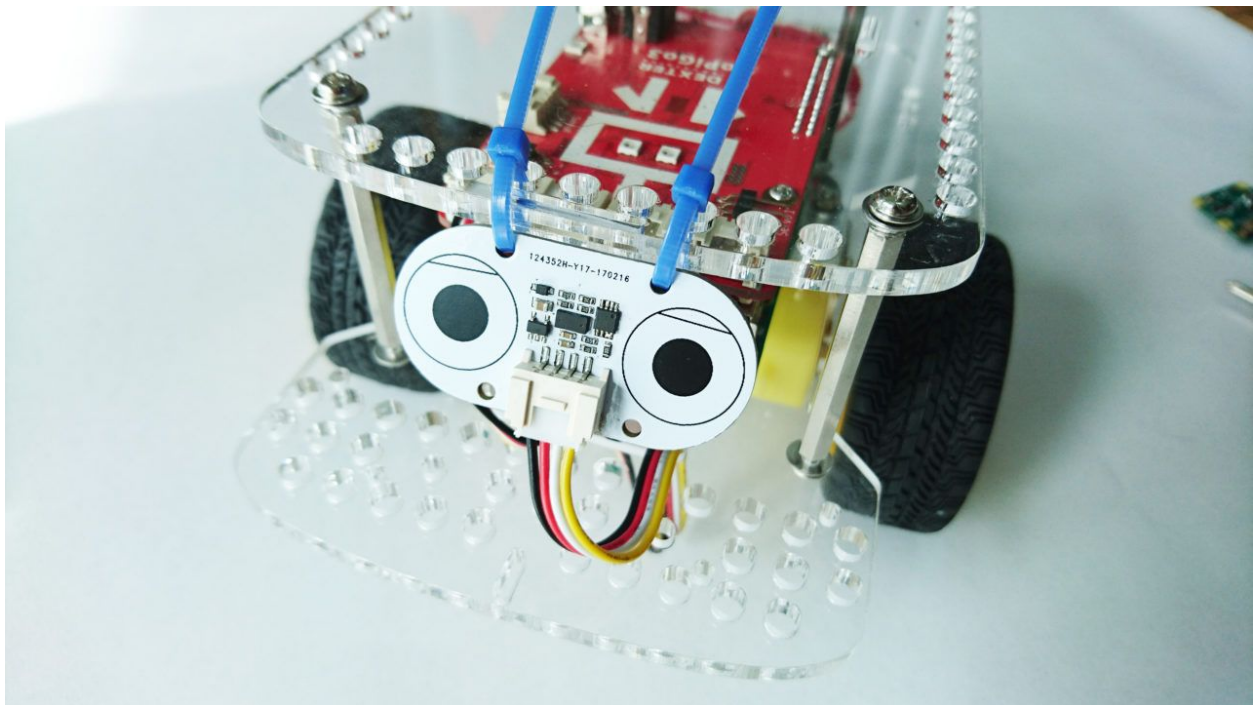Follow the instructions through and it should finally look like below.
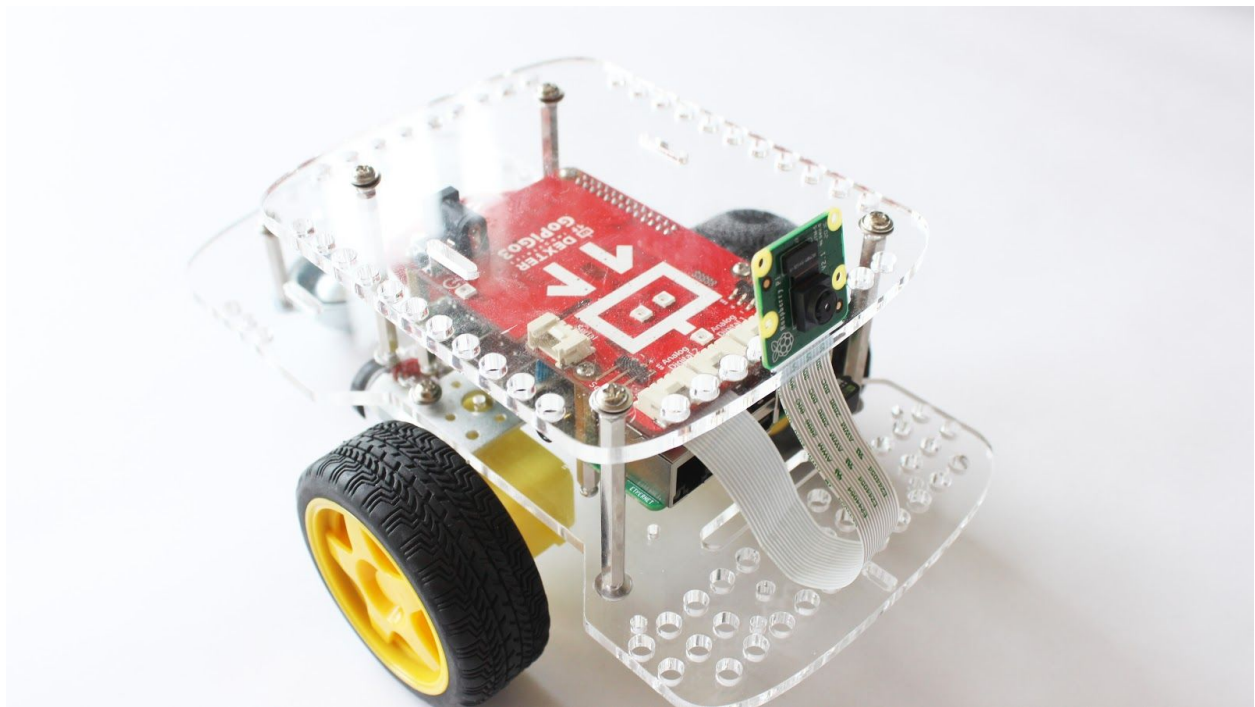
Exercise 2:

Go to :
Attach the Distance Sensor Directly to the GoPiGo3 Body

Result:
Follow the instructions through and it should finally look like below.
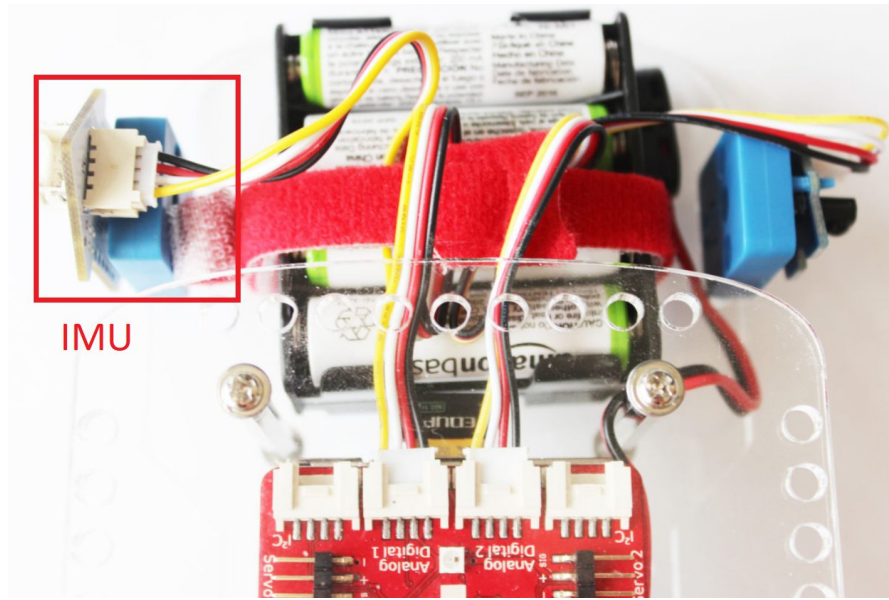

Exercise 3:

Go to :
https://www.dexterindustries.com/GoPiGo/get-started-with-the-gopigo3-raspberry-pi-robot/assemble-gopigo3-balancebot/
Go to part 11: Attach the sensors -> **Includes an Inertial Motion Sensor (IMU) (A)**
Assemble the IMU

Result:
Follow the instructions through and it should finally look like below.

IMU

Exercise 4:
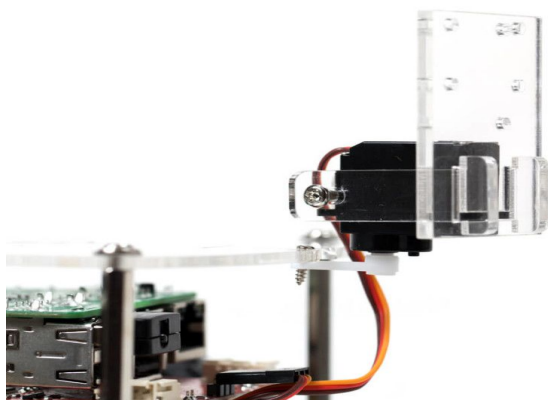
Go to
:https://www.dexterindustries.com/GoPiGo/get-started-with-the-gopigo3-raspberry-pi-robot/6-attach-the-servo-kit-gopigo3-raspberry-pi-robot/

Click on **Assemble the Servo Kit**

Result:
Follow the instructions through and it should finally look like below.

Exercise 5:

Go To Home: Examples
Run the Jupyter notebook **Taking Photos.ipynb**
Make sure to point the camera at any object before capturing the image.

Result:
The captured image will be stored in the Home folder as "photo.jpg" and displayed.
(The location and name of the photo can be changed in the script.)
The histogram for the image is plotted too.

Exercise 6:

Go To Home: Examples
Go to the Jupyter notebook **Taking Photos.ipynb**
At the end of the program, appending cells accordingly and write the code for capturing videos, saving it to the current working directory and then retrieving and displaying it in the notebook.

Result:
The video should be captured and saved first later read and displayed in the notebook.

Exercise 7:

The IMU sensor needs to be assembled and the robot needs to be calibrated once the script is run (just rotate the robot in the air till it's fully calibrated). In this exercise we make `GoPiGo3` robot follow the 4 cardinal points N,E,S and W.
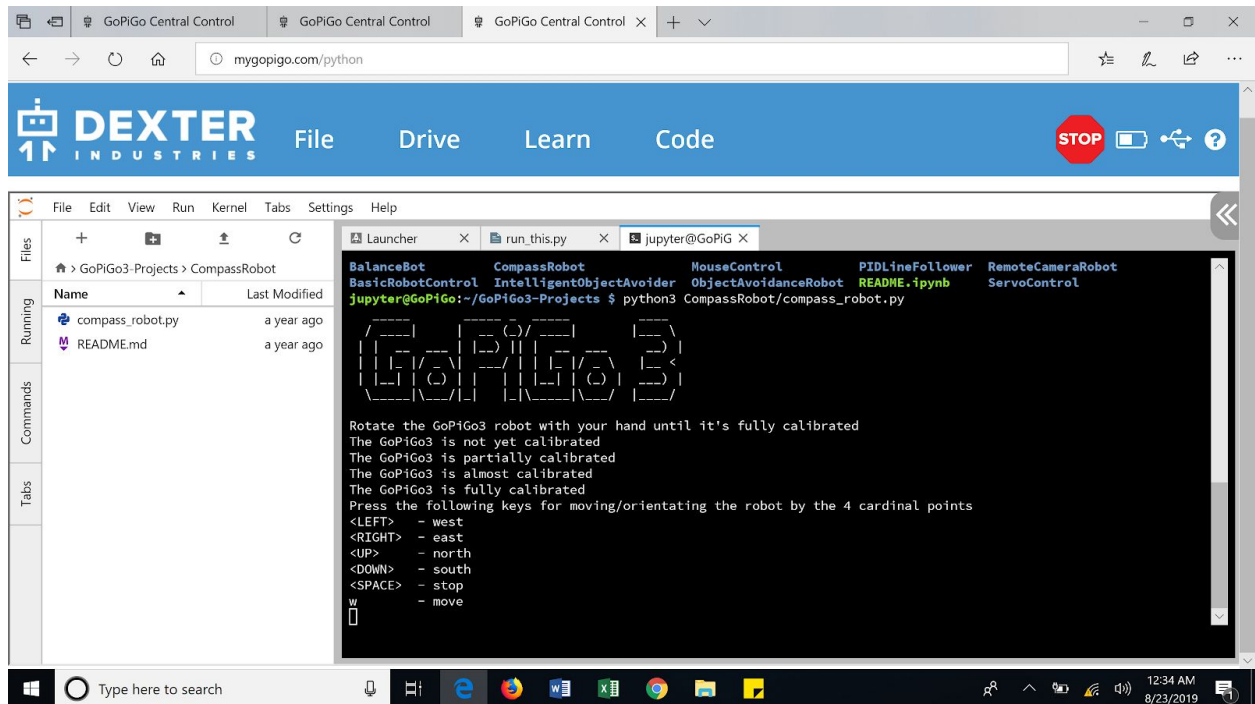
On the Terminal, type:

cd GoPiGo3-Projects/CompassRobot

python3 compass_robot.py

Result:
Console looks like this once you run the program:

Refer Support Files Module 2, Exercise 7 for the video of this program in action.

Exercise 8:

The Servo kit needs to be assembled to go ahead with this exercise.

On the Terminal, type:

cd GoPiGo3-Projects/ServoControl

python3 run_this.py

Result:
Refer Support Files Module 2, Exercise 8 for the video of this program in action.

TO BE ANNOUNCED
Assignment Exercises included for demonstration.