Guide to Develop and Operate on Robot 106:

The 106 Robot requires successful communication between three devices: Raspberry Pi with Berry IMU sensor, Jetson Nano, and ESP32s that control the motors. All components depend need to be on the same wifi network:

Username: **DownRobotRoom**
Password: **robotsRcool**

Once connected, below is a guide to successful communication with each of the following components:

Raspberry Pi:

Purpose:

- Send the movement controls to the ESP32's (which control the motors)
- Estimate the location of the Pi based on the Kalman's filtered IMU sensor data
- Use a PID to make the robot's movements more precise

Powering the Pi:

The Pi is powered by the default micro-usb cable on the top left. It also contains an ethernet cable to the router (bottom right) and a connection to the GPS (top right)

Interfacing the Pi:

The Raspberry Pi is programmed to automatically run the code. To connect to the pi from a computer, type the following command into your device's terminal:

ssh osmo-bot@192.168.1.120

You will be prompted to enter a password. The password is '**robot'.** After successfully entering you can remotely control the Pi. The program files is stored in the following directory:

~/program

You may access it by typing '**cd program**' into the terminal window, you can also use the command '**ls**' to see all the files in this directory.

****Please avoid making changes to the central program directory if you would like to develop. Create your copy the directory and edit the files there****

Copying the directory:

1. Return to the root directory by using the following command '**cd ..**'
2. Type this command to copy the program directory: '**cp -r program yourname_program**'

```
osmo-bot@robotpi:~ $ cd program
osmo-bot@robotpi:~/program $ cd ..
osmo-bot@robotpi:~ $ cp -r program yourname_program
```

If you have any trouble with the commands, the pi's operating system is **Linux.** You may look up **Linux Commands** to help you interface with the Pi's terminal.

Once the directory is copied, you make any necessary changes to your directory.

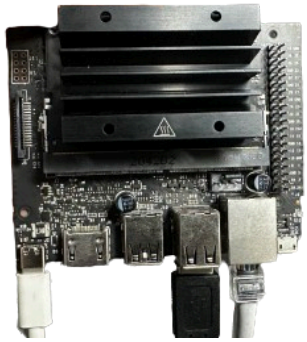
Jetson Nano:

Purpose:

- Use an object detection model to perceive humans
- Use an object detection model to perceive road segments
- Send the camera frames to the Pi to display on the interface
- Send the coordinates of human and road detections to the Pi to navigate movements

Powering the Jetson Nano:

The Pi is powered by the default USB-C cable on the bottom left. It also contains an ethernet cable to the router (bottom right) and a connection to the GPS (bottom right).



Interfacing with the Jetson Nano:

Similar to the Pi. The Jetson Nano program is already configured to run on start up. The file name is "**script.py**". If you wish to change it, copy the script into another script and run it using the command "**python3 yourname_script.py**"

If you have any trouble with the commands, the pi's operating system is **Ubuntu.** You may look up **Ubuntu Commands** to help you interface with the Nano's terminal.

ESP32s

The ESP32's have already been programmed and connected to the motors and will not need to be modified.