Robotics Lab #1 - Procedure

Robotis Burger Assembly

1. Follow the booklet inside the ROBOTIS Turtlebot3 box.
    a. DON'T over tighten the bolts since in the case of faulty wiring or hardware misconfiguration the bot may need to be taken apart.
    b. Follow the figure on pg.21 to insert the M2.5 nuts into the PCB Supports before connecting them to the Waffle Plate.
    c. Make sure to position the motors as labeled in the instructions booklet.

PC Setup (Jetson)

1. Follow the ROBOTIS e-Manual instructions for ROS Melodic - https://emanual.robotis.com/docs/en/platform/turtlebot3/quick-start/
2. If there is a failure when installing ROS follow the installation guide referenced in the instructions and use ***sudo apt install curl***
3. Network Configuration codes
    a. Write down the IP address to use in a later step.
    b. If network connection fails, try downloading wireless tools with command ***sudo apt install wireless-tools***
    c. Next, type in ***sudo netplan -debug generate*** to uncover any discrepancies with the connection. If an error occurs, fix it accordingly, if nothing is returned, continue.
    d. Next, type in ***sudo netplan apply*** in order to ensure the network is applied.
    e. Use ***ifconfig*** to check the connection. Connection should specify something other than "127.0.0.1" under wlan0 after inet.
    f. If the ***nano ~/.bashrc*** fails:

- type in ***sudo apt install nano*** to manually install the package
- ALWAYS after making changes to the BASH file follow up with the command ***source ~/.bashrc***
- if ***nano ~/.bashrc*** outputs a blank file that reads "Error reading lock file … Not Enough Data To Read" use the command: ***sudo find -type f-name "*.swp"*** to locate the file.
- remove the file using the output from the previous command using ***rm*** such as: ***rm ./..bashrc.swp***

SBC Setup (R-Pi)

1. Download Raspberry pi 3B+ ROS Melodic image.
2. If using a native Linux laptop download R-Pi Imager with ***sudo install rpi-imager***. To enable SSH and configure WIFI on R-Pi Imager follow this video (skip to Hidden Settings).
3. SKIP steps 3.2.4 and 3.2.5 on ROBOTIS instructions.
4. Open the netplan directory by typing ***sudo nano /etc/netplan/50-cloud-init.yaml***
5. If the network configuration codes(sudo netplan apply or sudo netplan generate) cause the following error "inconsistent indentation" return to step 4. The format should be as seen below, with each new line starting under the third letter of the previous line and a space after the password colon.

```
access-points:
  WIFI_SSID:
    password: WIFI_PASSWORD
```

6. For the NEW LDS-02 Configuration specify LDS -01.

OpenCR Setup and Connection to SBC (R-Pi)

1. If the OpenCR Setup ROBOTIS instructions fail
    a. When exporting, change ***export OPENCR_MODEL=burger*** to ***export burger=burger*** and when uploading firmware change ***$OPENCR_MODEL.opencr*** to **$OPENCR_burger.opencr**
    a. If packages don't download properly download packages for Jestson to R-Pi.

Bringup (Jetson)

Testing Operation (Jetson)

1. If teleop error occurs return to the SBC Setup page and expand the Manual SBC Setup Instructions at the bottom. Complete steps 13 and 14.

Jetson Login:

User: burger

Password: wildcat

R-Pi Login:

User: ubuntu

Password: turtlebot