1부

SBC Setup

- # ROS1
  Raspberry Pi 3B+

  https://www.robotis.com/service/download.php?no=1738
  https://www.raspberrypi.com/software/   **Raspberry Pi Imager**
  ```
  sudo apt install rpi-imager
  ```

- # ROS2
  Raspberry Pi 4 4G

  CHOOSE OS > Other general-purpose OS > Ubuntu >
  Ubuntu Server 22.04.2 LTS(64-bit)

- Find IP Address on Raspberry
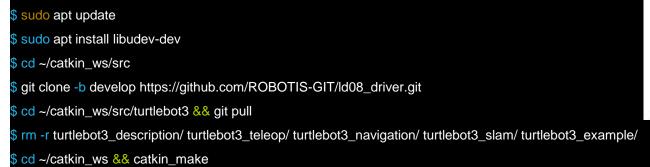
```
$ ifconfig
```

- PC

```
$ ssh pi@192.168.X.X

// default password : turtlebot
$ sudo apt-get install ntpdate
$ sudo ntpdate ntp.ubuntu.com

$ sudo raspi-config
// Advanced Options > Expand Filesystem

$ nano ~/.bashrc
export ROS_MASTER_URI=http://{IP_ADDRESS_OF_REMOTE_PC}:11311
export ROS_HOSTNAME={IP_ADDRESS_OF_RASPBERRY_PI_3}
// save

$ source ~/.bashrc
```

- ## LDS-02 Setup (no need for ROS2)

```
$ sudo apt update
$ sudo apt install libudev-dev
$ cd ~/catkin_ws/src
$ git clone -b develop https://github.com/ROBOTIS-GIT/ld08_driver.git
$ cd ~/catkin_ws/src/turtlebot3 && git pull
$ rm -r turtlebot3_description/ turtlebot3_teleop/ turtlebot3_navigation/ turtlebot3_slam/ turtlebot3_example/
$ cd ~/catkin_ws && catkin_make
```

```
$ echo 'export LDS_MODEL=LDS-02' >> ~/.bashrc


$ source ~/.bashrc
```

- Login(ubuntu / ubuntu)

- Wifi Setup

```
$ sudo nano /writable/etc/netplan/50-cloud-init.yaml
```

```
network:
  version: 2
  renderer: networkd
  ethernets:
    eth0:
      dhcp4: yes
      dhcp6: yes
      optional: true
  wifis:
    wlan0:
      dhcp4: yes
      dhcp6: yes
      access-points:
        WIFI_SSID:
          password: WIFI_PASSWORD
```

- Automatic Update setting

```
$ sudo nano /etc/apt/apt.conf.d/20auto-upgrades


APT::Periodic::Update-Package-Lists "0";
APT::Periodic::Unattended-Upgrade "0";

// save

$ systemctl mask systemd-networkd-wait-online.service
$ sudo systemctl mask sleep.target suspend.target hibernate.target hybrid-sleep.target

$ reboot
```

- ROS2 Install

```
$ sudo apt-get update
$ sudo apt-get upgrade
$ wget https://raw.githubusercontent.com/orocapangyo/turtlebot/main/Tutorial/02-Week/robert/install_ros2_humble_rpi.sh
$ chmod 755 ./install_ros2_humble_rpi.sh
$ bash ./install_ros2_humble_rpi.sh
```

- ## Install ROS2 Package

```
$ sudo apt install python3-argcomplete python3-colcon-common-extensions libboost-system-dev build-essential
$ sudo apt install ros-humble-hls-lfcd-lds-driver
$ sudo apt install ros-humble-turtlebot3-msgs
$ sudo apt install ros-humble-dynamixel-sdk
$ sudo apt install libudev-dev
$ mkdir -p ~/turtlebot3_ws/src && cd ~/turtlebot3_ws/src
$ git clone -b humble-devel https://github.com/ROBOTIS-GIT/turtlebot3.git
$ git clone -b ros2-devel https://github.com/ROBOTIS-GIT/ld08_driver.git
$ cd ~/turtlebot3_ws/src/turtlebot3
$ rm -r turtlebot3_cartographer turtlebot3_navigation2
$ cd ~/turtlebot3_ws/
$ echo 'source /opt/ros/humble/setup.bash' >> ~/.bashrc
$ source ~/.bashrc
$ colcon build --symlink-install --parallel-workers 1
$ echo 'source ~/turtlebot3_ws/install/setup.bash' >> ~/.bashrc
$ source ~/.bashrc
```

- ## USB Port Setting for OpenCR

```
$ sudo cp `ros2 pkg prefix turtlebot3_bringup`/share/turtlebot3_bringup/script/99-turtlebot3-cdc.rules /etc/udev/rules.d/
$ sudo udevadm control --reload-rules
$ sudo udevadm trigger
```

- ## ROS2 Domain ID Setting

```
$ echo 'export ROS_DOMAIN_ID=30 #TURTLEBOT3' >> ~/.bashrc
$ source ~/.bashrc
```