Neato(R) Turtle ROS2 Humble Install & Run Cheatsheet   by Ross Lunan (arlunan@ieee.org)
/Users/Ross/Documents/ROS Projects/Botvac-ROS2

Based on Neato Turtle by Camp Peavy
Note: These scripts assume navigation2 is installed from Debian Repository and map.yaml files are saved at /home/ubuntu/Desktop/maps where Username = ubuntu > change these scripts if username is different
Location to save maps: mkdir -p /home/ubuntu/Desktop/maps
Location for Game Controller configuration .yaml files: mkdir -p /home/ubuntu/Desktop/config
Location for usb_cam configuration param210.yaml file: mkdir -p /home/ubuntu/Desktop/usb_cam/config

For Server RasPi, to copy config files from

INSTALL
cpeavy2/botvac_node https://github.com/cpeavy2/botvac_node

On WORKSTATION

```
sudo apt install build-essential sudo apt install ros-humble-xacro sudo apt install python3-rosdep
sudo apt install ros-humble-navigation2 ros-humble-nav2-bringup
sudo apt install top tree
```

Optional gamepad: sudo apt install teleop_twist_joy

On ROBOT

```
sudo apt install build-essential sudo apt install ros-humble-xacro sudo apt install python3-rosdep
sudo apt install top
```

Optional gamepad: sudo apt install teleop_twist_joy
Optional WebCam: sudo apt install ros-humble-usb-cam

```
$ mkdir -p botvac_ws/src
$ cd botvac_ws/src
git clone https://github.com/cpeavy2/botvac_node.git
git clone https://github.com/cpeavy2/neato_robot.git
git clone https://github.com/kobuki-base/cmd_vel_mux.git
git clone https://github.com/stonier/ecl_tools

cd ..
$ rosdep update
$ rosdep install --from-paths src --ignore-src -r -y
```

And finally, go back to your workspace directory and compile the code.

```
$ cd ~/botvac_ws
$ botvac_ws
   colcon build

source ~/botvac_ws/install/setup.bash        # sources setup.bash for current session
echo 'source ~/botvac_ws/install/setup.bash' >> ~/.bashrc       # sources setup.bash for future
sessions. Use your own ROS workspace.
```

Set RasPi Serial Permissions

```
$ sudo adduser user $(stat --format="%G" /dev/ttyACM0 )
```

RUN (ssh into Robot RasPi)
ROBOT RPI4

With cable plugged between USB Ports on RasPi Robot and Neato Botvac Diagnostic port (ls -l /dev/ttyACM0)

```
$ ros2 launch botvac_node botvac_base.launch.py
```

Optional provided ps4.config.yaml or f710.config.yaml are saved to /home/ubuntu/Desktop/config folder

```
$ ros2 launch teleop_twist_joy teleop-launch.py config_filepath:='/home/ubuntu/Desktop/config/
ps4.config.yaml'

$ ros2 launch teleop_twist_joy teleop-launch.py config_filepath:='/home/ubuntu/Desktop/config/
f710.config.yaml'
```

WORKSTATION Launch SLAM Toolbox, rviz & Teleop in separate windows

```
$ ros2 launch nav2_bringup bringup_launch.py use_sim_time:=False autostart:=True map:=/home/user/
Desktop/maps/map.yaml slam:=True
$ ros2 launch nav2_bringup rviz_launch.py

$ ros2 run teleop_twist_keyboard teleop_twist_keyboard
```

OR

```
PS3/4 Joystick on RemotePC Press Share-PS Button to Pair. Check /dev/input/jsX with jstest-gtk
Plugin Bluetooth USB Dongle - Connect PS4
$ ros2 launch teleop_twist_joy teleop-launch.py joy_dev:='/dev/input/js0'

OR

$ ros2 launch teleop_twist_joy teleop-launch.py config_filepath:='/home/ubuntu/Desktop/config/
ps4.config.yaml'

$ ros2 launch teleop_twist_joy teleop-launch.py config_filepath:='/home/ubuntu/Desktop/config/
f710.config.yaml'

topic DIAGNOSTICS (In separate windows)
$ ros2 topic echo /joy
$ ros2 topic echo /cmd_vel
$ ros2 topic info /cmd_vel

Save the MAP
$ ros2 run nav2_map_server map_saver_cli -f /home/ubuntu/Desktop/maps/map --ros-args -p
save_map_timeout:=5000.0

Kill the Toolbox and rviz by closing Terminal Window with CTRL-c

Relaunch SLAM

$ ros2 launch nav2_bringup bringup_launch.py use_sim_time:=False autostart:=True map:=/home/ubuntu/
Desktop/maps/map.yaml

$ ros2 launch nav2_bringup rviz_launch.py
Click 2D Pose Estimate and place robot on map
Set Navigational Goal

Waypoint Navigation
Click "Waypoint/Nav Through Poses Mode", Click 2 or 3 "Nav2 Goal" , Click "Startup"

rqt DIAGNOSTICS
$ rqt_gui Select Plugins - Topics - Node graph - Visualization
$ rqt_graph

When Done: On the RasPi Robot, STOP the botvac_node with ctrl-C .
```