To setup a Raspberry Pi 5 with an iRobot Create3:

1. Set up the iCreate3 Application
    a. Hold both side buttons on the robot to start the hotspot
    b. Connect to the wifi signal starting with “Create”
    c. In your browser, go to 192.168.10.1
    d. Under the update tab, update to the most recent Humble Hawksbill version (H.2.6 as of this writing).
    e. Go to Application/Configuration and specify `rmw_fastrtps_cpp` as the RMW.
    f. Click Restart Application from the application window, even if it was already set in that way.
2. Install Ubuntu on the Raspberry Pi
a. Go to https://www.raspberrypi.com/software/ and download the Raspberry Pi Imager.
b. Select Ubuntu 24 from the imager.
c. Save it to the microUSB, then boot the Raspberry Pi.
3. In the Raspberry Pi terminal, ensure that the output from `locale` contains “UTF-8”
4. Add the ROS2 Repository

```
# enable ubuntu universe repository
sudo apt install software-properties-common
sudo add-apt-repository universe
# add ROS2 GPG key
sudo apt update && sudo apt install curl -y
sudo curl -sSL
https://raw.githubusercontent.com/ros/rosdistro/master/ros.key -o
/usr/share/keyrings/ros-archive-keyring.gpg
# Add repository to sources list
echo "deb [arch=$(dpkg --print-architecture) signed-
by=/usr/share/keyrings/ros-archive-keyring.gpg]
http://packages.ros.org/ros2/ubuntu $(. /etc/os-release && echo
jammy) main" | sudo tee /etc/apt/sources.list.d/ros2.list > /dev/null
```

Note: If you get a warning that the public key is not available, run `sudo apt-key del` followed by the key number given in the message. Then, go back to *`#add ROS2 GPG key`* and continue the process.

5. Install development and ROS tools

```
sudo apt update && sudo apt
install -y \
  python3-flake8-docstrings \
  python3-pip \
  python3-pytest-cov \
  ros-dev-tools
sudo apt install -y \
   python3-flake8-blind-except \
   python3-flake8-builtins \
   python3-flake8-class-newline
\
   python3-flake8-comprehensions
\
   python3-flake8-deprecated \
   python3-flake8-import-order \
   python3-flake8-quotes \
   python3-pytest-repeat \
   python3-pytest-rerunfailures
```

6. Get ROS2 Code

```
mkdir -p ~/ros2_humble/src
cd ~/ros2_humble
vcs import --input
https://raw.githubusercontent.com/ros2/ros2/humble/ros2.repos src
```

7. Install dependencies using rosdep (~0.5 hours)

```
sudo apt upgrade
sudo rosdep init
rosdep update
rosdep install --from-paths src --ignore-src -y --skip-keys "fastcdr
rti-connext-dds-6.0.1 urdfdom_headers" --os=ubuntu:jammy --
rosdistro=humble
```

8. Build ROS2 (several hours)

a. nano ~/.bashrc and ensure that it does not contain source /opt/ros/${ROS_DISTRO}/setup.bash

b.

```
cd ~/ros2_humble/
colcon build --symlink-
install
```

9. Install Python Stuff
   a. sudo apt install python3-serial
   b. sudo apt install python3-pip
   c.

```
mkdir -p ~/ws/src
git clone -b 2.1.0
https://github.com/iRobotEducation/irobot_create_msgs.git
~/ws/src/irobot_create_msgs
cd ~/ws
colcon build
```

10. Update .bashrc
    a. nano ~/.bashrc and add the following lines

```
export RMW_IMPLEMENTATION=rmw_fastrtps_cpp
source ~/ros2_humble/install/local_setup.bash
source ~/ws/install/local_setup.bash
export
PYTHONPATH=$PYTHONPATH:~/ws/src/irobot_create_msgs
```

Note: You can add any other needed directories to PYTHONPATH using colons to separate each directory

11. Enable SSH
    a.

```
sudo apt update
sudo apt install openssh-
```

```
server
sudo systemctl enable ssh
sudo systemctl start ssh
```

b. Find the IP address from the wifi menu. Then, you can connect using ssh username@ip address from another computer.

12. Setup GPIO pins

```
sudo apt update
sudo apt install python3-
gpiozero
sudo adduser [username]
dialout
```

13. Setup configuration files
    a. `nano /boot/firmware/config.txt` and add `dtoverlay=dwc2,dr_mode=peripheral`
    b. `nano /boot/firmware/cmdline.txt` and add `modules-load=dwc2,g_ether` after `rootwait`
    c. `nano /etc/netplan/01-network-manager-all.yaml` and add

```
network:
  version: 2
  renderer: NetworkManager
  ethernets:
    usb0:
      dhcp4: false
      optional: true
      addresses:
[192.168.186.3/24]
```