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Instructions for use of the Prototype

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# Step One - Prerequisite Instructions

The developed prototype can only be used using a Linux based operating system, ideally the same one used during development, Ubuntu Jammy Jellyfish 22.04. Virtualisation can be used, however is untested and may produce non-standard results.

## 1.1 Installing ROS

ROS installation guide provided by the “ROS 2 Documentation: Humble” (Open Robotics, ND) outlines the necessary commands to install ROS software, and will be presented in this document.

### 1.1.1 Setup Sources

The following commands will need to be typed into the terminal, and will add the ROS 2 apt repository:

1. sudo apt install software-properties-common
2. sudo add-apt-repository universe
3. sudo apt update && sudo apt install curl -y
4. sudo curl -sSL [https://raw.githubusercontent.com/ros/rosdistro/master/ros.key -o /usr/share/keyrings/ros-archive-keyring.gpg](https://raw.githubusercontent.com/ros/rosdistro/master/ros.key%20-o%20/usr/share/keyrings/ros-archive-keyring.gpg)
5. 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 $UBUNTU\_CODENAME) main" | sudo tee /etc/apt/sources.list.d/ros2.list > /dev/null

### 1.1.2 Installing ROS 2 Packages

The following commands will install the necessary packages to use ROS 2:

1. sudo apt update
2. sudo apt install ros-humble-desktop-full

In the event the second command doesn’t work, please try:

1. sudo apt install ros-humble-desktop
2. sudo apt install ros-dev-tools
3. sudo apt install ros-humble-gazebo-ros-pkgs

### 1.1.3 Installing Colcon

The following command will install colcon, which is used to build ROS packages and will be required to build the prototype.

1. sudo apt install python3-colcon-common-extensions

# Step Two – Building The Prototype

## 2.1 Step Guide

1. Source the ROS 2 setup script with:
   1. source /opt/ros/humble/setup.bash
2. Download the prototype file and place it into the home directory and open it in the terminal using the command:
   1. cd cet300finalprototype
3. Build the prototype package with:
   1. colocon build --symlink-install

# Step Three – Using The Prototype

If Stage One, and Two are complete this stage will be the only one necessary going forward to use the prototype.

1. Open a new terminal and repeat the command in Step Two 2.1 to enter the prototypes working directory.
2. Source the prototypes ROS 2 setup script:
   1. source install/setup.bash
3. Run the prototypes Swarm Manager to begin using it:
   1. ros2 run prototype start\_menu

# Useful Information on using the Prototype

* In the terminal the simulation launch terminal can be closed using CTRL + C, this will close the terminal and shutdown the simulation in the event the swarm is an unresponsive state.
* CTRL + C can also be used to close the start menu which can be reopened using the command shown in Stage Three 3.1.
* The first time the simulation is ran it is likely to run into issues due to Gazebo’s loading time, if this happens the simulation should be shut down and reopened from the Swarm Manager
* The simulation world is editable using the models provided by Gazebo, this will not have an affect on the prototype and only that instance of the simulation.

# References

OpenRobotics, ND, “ROS 2 Documentation: Humble”, Available at: <https://docs.ros.org/en/humble/Installation/Ubuntu-Install-Debians.html> (Accessed: 01/05/2024)