

Ubuntu 24.04 & ROS2 Jazzy Installation Guide

All projects must be programmed using Python 3 and *Robot Operating System 2 (ROS 2) Jazzy* on *Ubuntu 24.04 LTS (Noble Numbat)*. A physical installation of Ubuntu 24.04 and ROS 2 Jazzy is highly recommended. However, if you are using Windows or macOS, this document also provides a general guide at the end.

1 Installing Ubuntu 24.04 LTS

1.1 Physical Installation

For a physical installation of Ubuntu 24.04 LTS, please follow all the steps in the guide:

- <https://ubuntu.com/tutorials/install-ubuntu-desktop>

Make sure to download and install Ubuntu 24.04 LTS using `ubuntu-24.04.3-desktop-amd64.iso`, which can be obtained from:

- <https://releases.ubuntu.com/noble/>

2 Installing ROS2 Jazzy in Ubuntu

2.1 Update Ubuntu and Install Ubuntu Packages

Ubuntu 24.04 LTS comes with Python 3.12 as the default version, which will be used for grading course projects. Before installing ROS 2 Jazzy, make sure Ubuntu 24.04 LTS is updated to the latest version by opening a terminal (Ctrl+Alt+T) and typing:

```
sudo apt update && sudo apt upgrade -y
sudo snap refresh
```

Install the required Ubuntu packages, making sure to include the development packages:

```
sudo apt-get install build-essential gcc make cmake
```

(Optional) You may install additional packages, e.g., the `vi` text editor:

```
sudo apt install vim
```

2.2 Install ROS2 Jazzy

After installing and testing your Ubuntu packages, follow this guide to install ROS 2 Jazzy **Desktop Install** using `ros-jazzy-desktop`:

- <https://docs.ros.org/en/jazzy/Installation/Ubuntu-Install-Debs.html>

This guide provides explanations for each command. Make sure to follow all the steps, as skipping any step may cause problems when using ROS 2.

After installing ROS 2 Jazzy, you can start with the ROS tutorials at the Beginner level to learn ROS 2 and test your Jazzy installation:

- <https://docs.ros.org/en/jazzy/Tutorials.html>

2.3 Install Gazebo Harmonic for Robot Simulation

Gazebo is one of the most widely used high-fidelity simulation environments in robotics and is fully integrated with ROS. ROS 2 Jazzy is compatible only with Gazebo Harmonic. When `ros-jazzy-desktop` is installed, Gazebo Harmonic is included by default.

To install or reinstall Gazebo Harmonic, you may follow the guide in the section “*Setting up a robot simulation (Gazebo)*”.

- <https://docs.ros.org/en/jazzy/Tutorials/Advanced/Simulators/Gazebo/Gazebo.html>

The Gazebo installation guide provides explanations for each command along with many additional details. For brevity, you may first install Gazebo in ROS 2 Jazzy by typing the following in the terminal:

```
sudo apt-get install ros-${ROS_DISTRO}-ros-gz
```

Then, test Gazebo by opening a terminal and typing:

```
gz sim
```

Additional instructions for using and testing Gazebo in ROS are provided in the following Gazebo tutorial guide.

- <https://gazebosim.org/docs/harmonic/tutorials/>

3 Installing ROS 2 on Windows or macOS

If you want to use WSL on Windows, you can follow the tutorial here to install it.

<https://docs.ros.org/en/jazzy/Installation/Windows-Install-Binary.html>

To run ROS 2 on macOS, you can build it from source. The following tutorial will guide you through the installation process.

<https://docs.ros.org/en/jazzy/Installation/Alternatives/macOS-Development-Setup.html>

It is **not** recommended to use a virtual machine to run ROS 2, as it often performs too slowly for effective debugging and assignment implementation.