**Python Virtual Environment (venv) Setup Guide**

A virtual environment allows you to create an isolated space for your Python projects so that dependencies for one project don’t affect another.

**📦 1. Create a Virtual Environment**

In your terminal, navigate to your project folder:

cd path\to\your\project

Then run:

**✅ Windows (PowerShell or CMD)**

python -m venv venv

**✅ Mac/Linux**

python3 -m venv venv

This will create a folder named venv in your project directory.

**⚡ 2. Activate the Virtual Environment**

**✅ Windows**

**PowerShell:**

.\venv\Scripts\Activate.ps1

If you get an **execution policy error**, run:

Set-ExecutionPolicy -Scope Process -ExecutionPolicy Bypass

Then activate again:

.\venv\Scripts\Activate.ps1

**Command Prompt (CMD):**

venv\Scripts\activate

**✅ Mac/Linux**

source venv/bin/activate

After activation, your terminal prompt will change to show:

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(venv) your/path>

**📦 3. Install Packages**

You can now install Python packages inside the virtual environment using pip.

**📌 (a) Install a single package**

pip install package\_name

Example:

pip install django

**📌 (b) Install multiple packages from a requirements.txt**

If your project has a requirements.txt file:

pip install -r requirements.txt

This will install all the dependencies listed in that file.

**🔼 4. Upgrade pip (recommended)**

python -m pip install --upgrade pip

**🚫 5. Deactivate the Virtual Environment**

When you're done working:

deactivate

This will return your terminal to the system Python.

**📄 6. Create requirements.txt (Optional)**

To save all installed packages into a requirements.txt:

pip freeze > requirements.txt

Later, use this file to install the same packages on another machine:

pip install -r requirements.txt

**🔥 Quick Summary of Commands**

| **Action** | **Windows (PowerShell)** | **Windows (CMD)** | **Mac/Linux** |
| --- | --- | --- | --- |
| Create virtual environment | python -m venv venv | python -m venv venv | python3 -m venv venv |
| Activate venv | .\venv\Scripts\Activate.ps1 | venv\Scripts\activate | source venv/bin/activate |
| Deactivate venv | deactivate | deactivate | deactivate |
| Install single package | pip install package\_name | Same | Same |
| Install from requirements.txt | pip install -r requirements.txt | Same | Same |
| Upgrade pip | python -m pip install --upgrade pip | Same | Same |