

Understanding Python Environments Part 2

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Recap from Part 1

- What is a Python environment
- Tools: `venv`, `conda`
- How Python finds and loads packages

Quick quiz from Part 1:

- Command to check active interpreter?

Hands-on: Creating Envs and Moving Through Them

Goal: Learn to create, activate, deactivate, and switch between environments efficiently.

With **venv**

```
python -m venv myenv
source myenv/bin/activate    # macOS/Linux
myenv\Scripts\activate      # Windows
deactivate
```

With **conda**

```
conda create --name data-env python=3.10
conda activate data-env
conda deactivate
```

Switching Between Multiple Environments

- **List available environments**
 - `conda env list`
 - Manually track `venv` folders
- **Quick switching tips**
 - Use aliases/functions in shell
 - Keep environments in a dedicated `~/envs` folder

Best Practices

- Always use a virtual environment for projects
- Keep dependencies minimal
- Use `requirements.txt` or `pyproject.toml`
- Pin exact versions for reproducibility

```
pip freeze > requirements.txt
```

- Automate environment setup in README

Containerizing Python Environments

Why use containers?

- Same env in dev, test, prod
- No “works on my machine” problem

Minimal Dockerfile

```
FROM python:3.11-slim
WORKDIR /app
COPY requirements.txt .
RUN pip install --no-cache-dir -r requirements.txt
COPY . .
CMD ["python", "app.py"]
```

When to Choose Containers vs. Virtual Envs

- **Virtual Envs**
 - Fast local development
 - Lightweight
 - No extra dependencies
- **Containers**
 - Cross-platform consistency
 - Deployment-ready
 - Isolation from host OS

Final Takeaways

- Understand your environment **before** coding
- Use tools wisely (`venv` , `conda` , containers)
- Reproducibility saves time and headaches
- Keep environments clean and project-specific
- Document setup instructions for your team

Q&A ?

Time to ask about:

- Edge cases you've faced
- Integration with existing workflows
- Recommendations for your specific stack