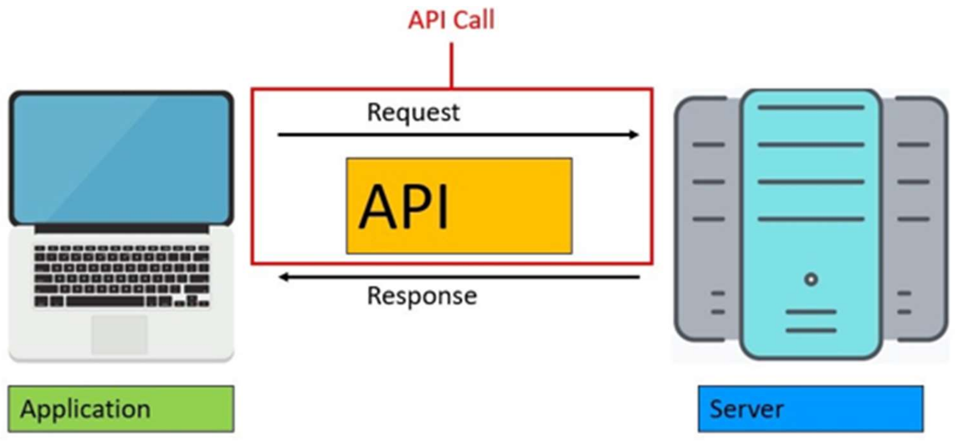
**LEC # 04**

## POETRY

Poetry is a tool for dependency management and packaging in Python. It allows you to declare the libraries your project depends on and it will manage (install/update) them for you. Poetry offers a lockfile to ensure repeatable installs, and can build your project for distribution.

## API Calls

Application programming interfaces (APIs) are a way for one program to interact with another. API calls are the medium by which they interact. An API call, or API request, is a message sent to a server asking an API to provide a service or information.



## Package Index

The package index contains all outline drawings and Material declarations for those packages.

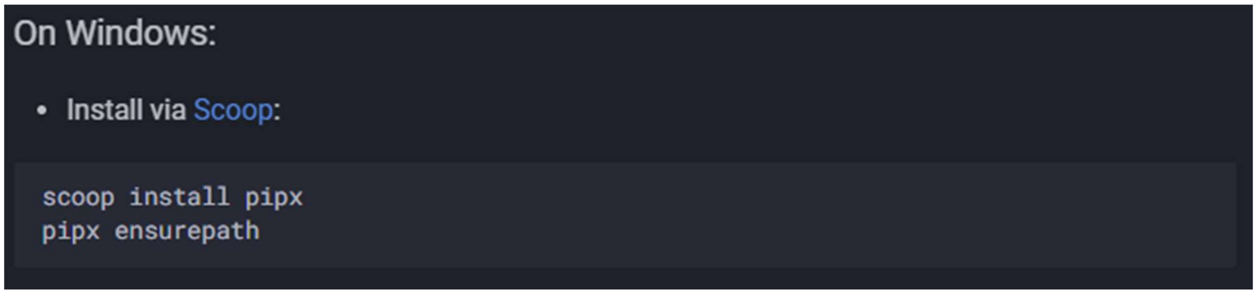
## PyPI

The Python Package Index (PyPI) is a repository of software for the Python programming language.

In any folder _init_.py use to create package.

**Installation of Poetry Package**

- First install scoop package: https://scoop.sh/
- Then install poetry package: https://pipx.pypa.io/stable/installation/

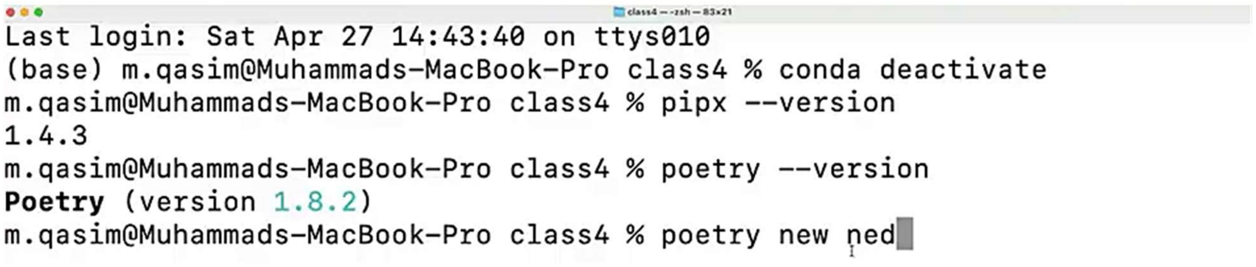


On Windows:

- Install via Scoop:

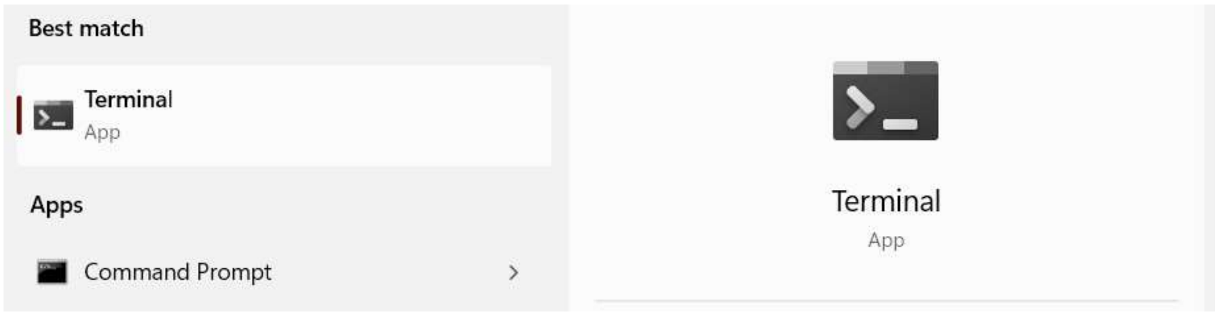
```
scoop install pipx
pipx ensurepath
```

**Working**

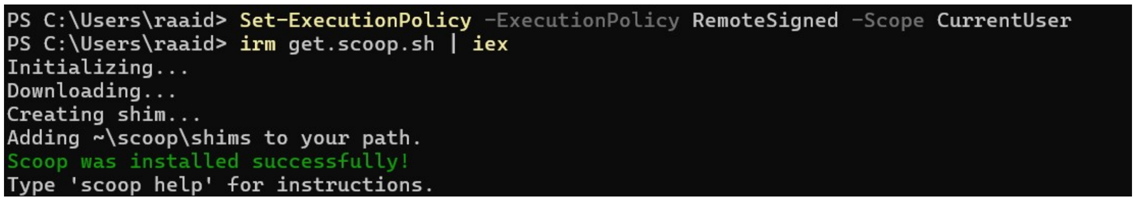


```
Last login: Sat Apr 27 14:43:40 on ttys010
(base) m.qasim@Muhammads-MacBook-Pro class4 % conda deactivate
m.qasim@Muhammads-MacBook-Pro class4 % pipx --version
1.4.3
m.qasim@Muhammads-MacBook-Pro class4 % poetry --version
Poetry (version 1.8.2)
m.qasim@Muhammads-MacBook-Pro class4 % poetry new ned
```

- Open Terminal in Windows



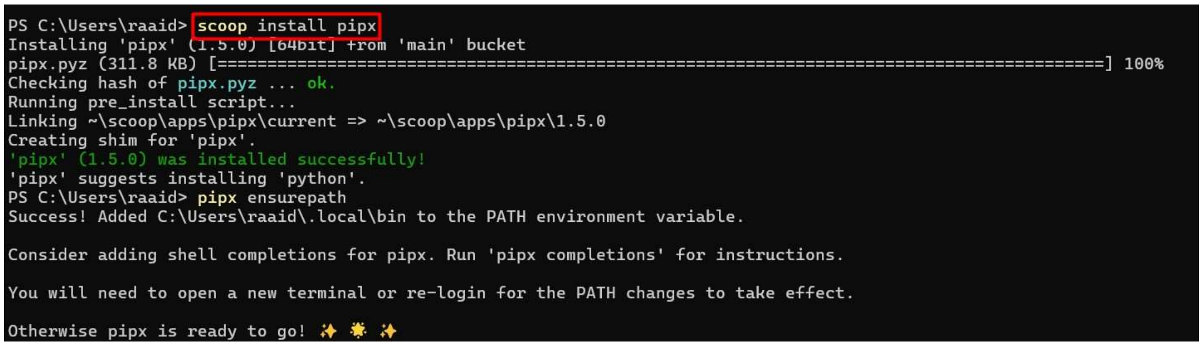
- Run Following Commands in Sequence
  - `Set-ExecutionPolicy -ExecutionPolicy RemoteSigned -Scope CurrentUser`
  - `irm get.scoop.sh | iex`



```
PS C:\Users\raaid> Set-ExecutionPolicy -ExecutionPolicy RemoteSigned -Scope CurrentUser
PS C:\Users\raaid> irm get.scoop.sh | iex
Initializing...
Downloading...
Creating shim...
Adding ~\scoop\shims to your path.
Scoop was installed successfully!
Type 'scoop help' for instructions.
```

## Installing Pipx

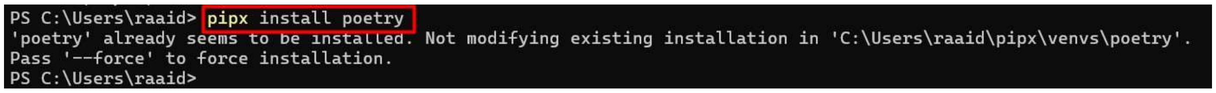
- Run following highlighted command in Terminal



```
PS C:\Users\raaid> scoop install pipx
Installing 'pipx' (1.5.0) [64bit] from 'main' bucket
pipx.pyz (311.8 KB) [=========================================================================================] 100%
Checking hash of pipx.pyz ... ok.
Running pre_install script...
Linking ~\scoop\apps\pipx\current => ~\scoop\apps\pipx\1.5.0
Creating shim for 'pipx'.
'pipx' (1.5.0) was installed successfully!
'pipx' suggests installing 'python'.
PS C:\Users\raaid> pipx ensurepath
Success! Added C:\Users\raaid\.local\bin to the PATH environment variable.

Consider adding shell completions for pipx. Run 'pipx completions' for instructions.

You will need to open a new terminal or re-login for the PATH changes to take effect.

Otherwise pipx is ready to go! ✨ 🌟 ✨
```

## Installing Poetry

- Run following highlighted command in Terminal

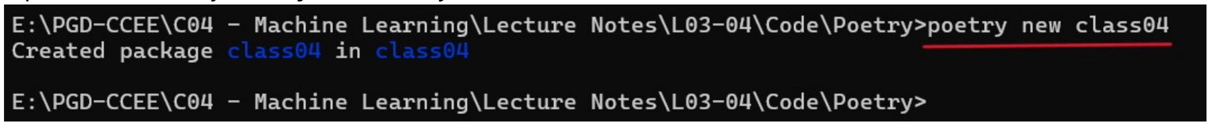


```
PS C:\Users\raaid> pipx install poetry
'poetry' already seems to be installed. Not modifying existing installation in 'C:\Users\raaid\pipx\venvs\poetry'.
Pass '--force' to force installation.
PS C:\Users\raaid>
```

# Using Poetry

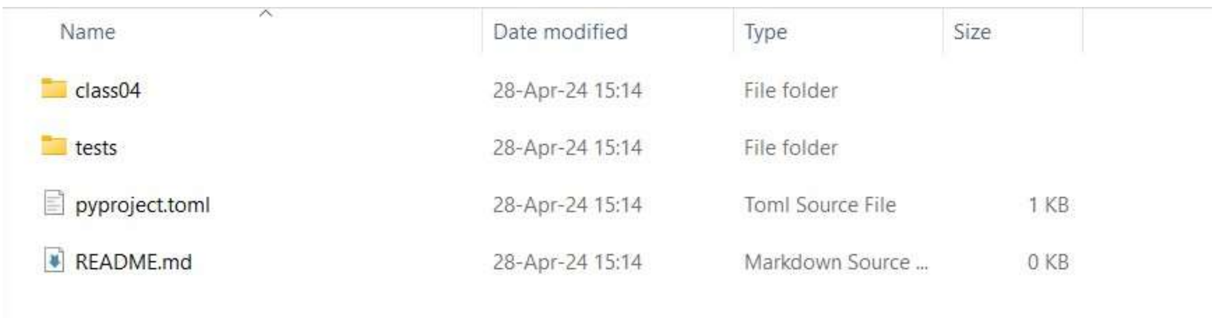
## Creating Package

- Open Terminal in you Project directory and run below command



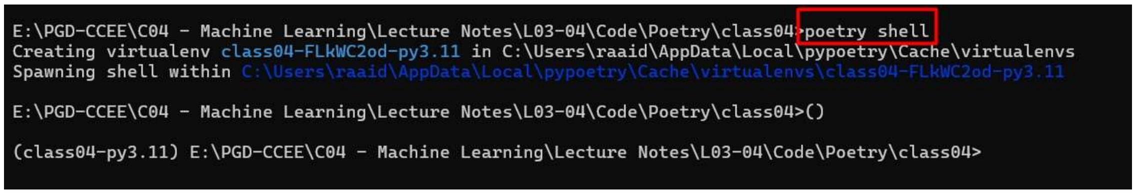
```
E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry>poetry new class04
Created package class04 in class04

E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry>
```

- After successful command, below directories will be created.



| Name | Date modified | Type | Size |
|---|---|---|---|
| class04 | 28-Apr-24 15:14 | File folder | |
| tests | 28-Apr-24 15:14 | File folder | |
| pyproject.toml | 28-Apr-24 15:14 | Toml Source File | 1 KB |
| README.md | 28-Apr-24 15:14 | Markdown Source ... | 0 KB |

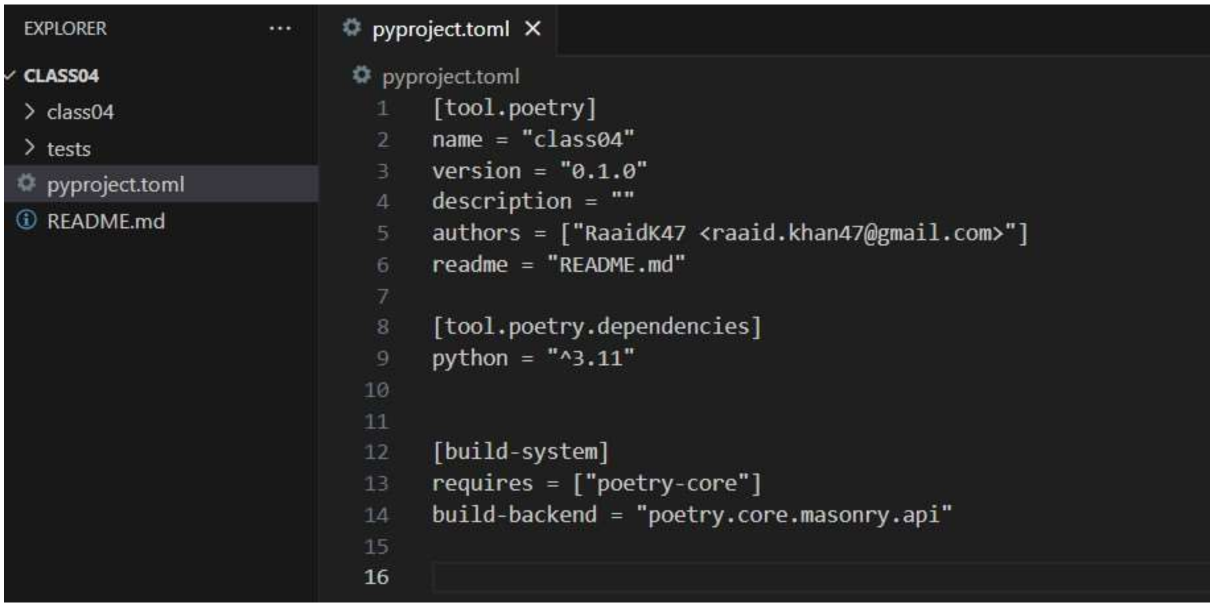
- Change Directory to Project Folder which Contains TOML (Tom's Obvious, Minimal Language) File.
  - If conda is installed, deactivate it using `conda deactivate`.
  - Run Poetry Shell in this folder using command `poetry shell`



```
E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>poetry shell
Creating virtualenv class04-FLkWC2od-py3.11 in C:\Users\raaid\AppData\Local\pypoetry\Cache\virtualenvs
Spawning shell within C:\Users\raaid\AppData\Local\pypoetry\Cache\virtualenvs\class04-FLkWC2od-py3.11

E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>()

(class04-py3.11) E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>
```

## TOML File

- Open Project in VS Code
- Open `pyproject.toml` file



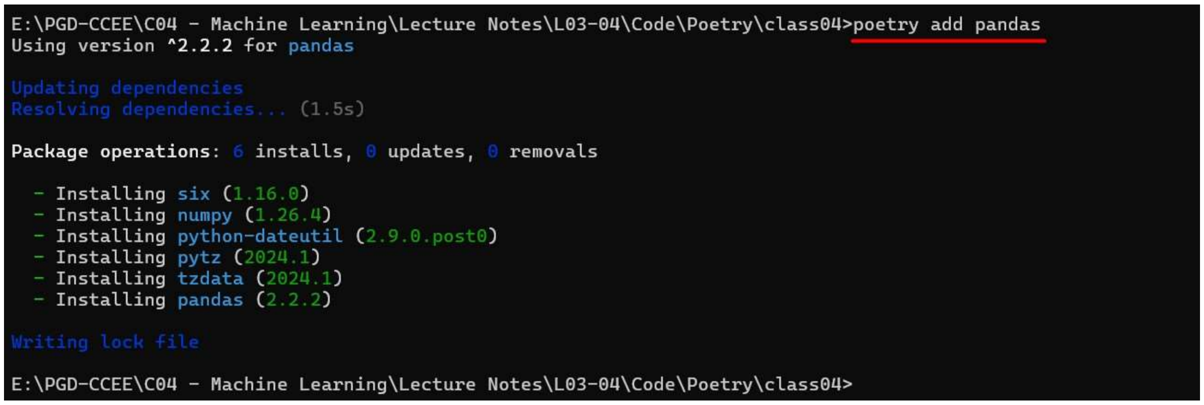
```toml
[tool.poetry]
name = "class04"
version = "0.1.0"
description = ""
authors = ["RaaidK47 <raaid.khan47@gmail.com>"]
readme = "README.md"

[tool.poetry.dependencies]
python = "^3.11"


[build-system]
requires = ["poetry-core"]
build-backend = "poetry.core.masonry.api"

```

- `.toml` contains MetaData (Data about Data) of our Project.
  - Author Details
  - Project Dependencies
  - Python `^3.11` (Version 3 is fixed (^), .11 can be changed)

## Installing Dependencies in Project

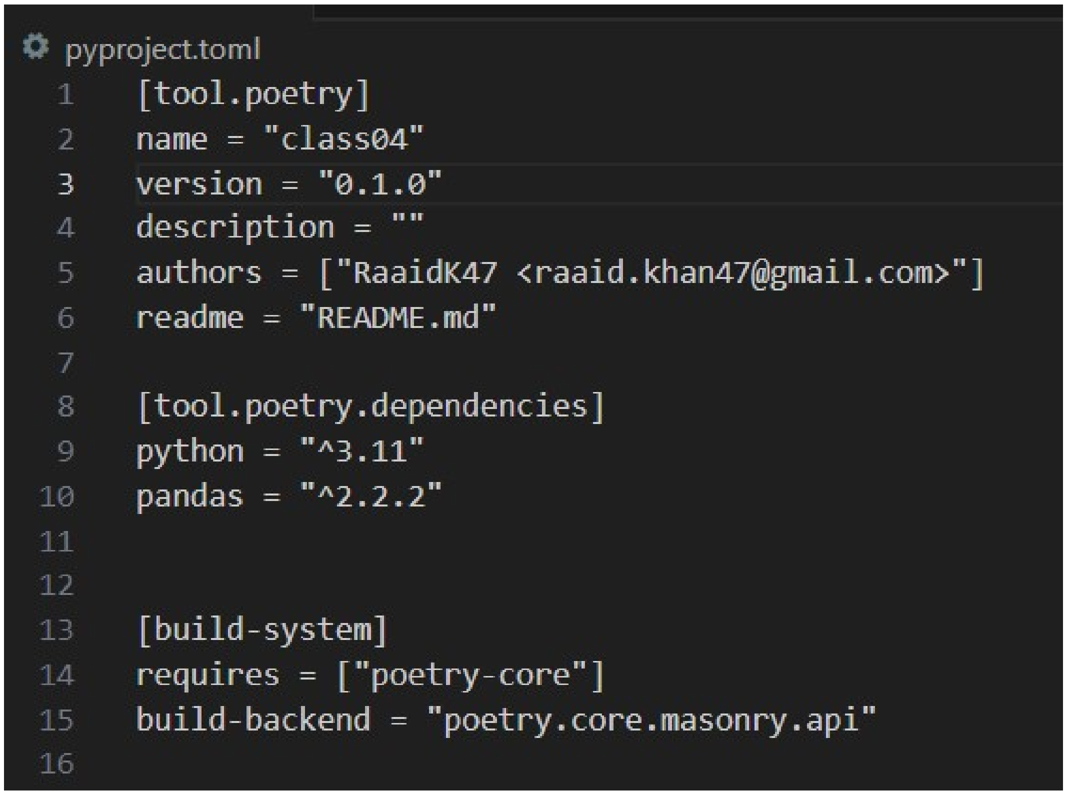
- Open any terminal in Project Folder containing `.toml` file.

- Install dependencies with command `poetry add pandas`



```
E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>poetry add pandas
Using version ^2.2.2 for pandas

Updating dependencies
Resolving dependencies... (1.5s)

Package operations: 6 installs, 0 updates, 0 removals

  - Installing six (1.16.0)
  - Installing numpy (1.26.4)
  - Installing python-dateutil (2.9.0.post0)
  - Installing pytz (2024.1)
  - Installing tzdata (2024.1)
  - Installing pandas (2.2.2)

Writing lock file

E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>
```

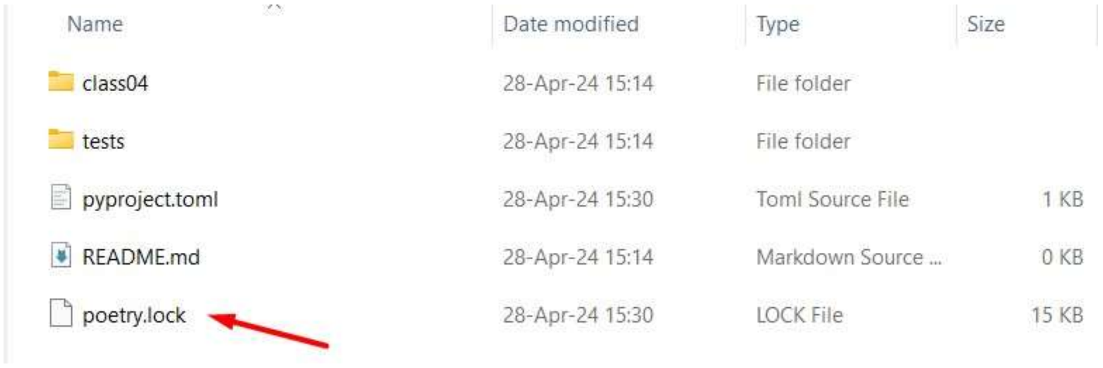
- After Installation, `.toml` file will be change



pyproject.toml

```
[tool.poetry]
name = "class04"
version = "0.1.0"
description = ""
authors = ["RaaidK47 <raaid.khan47@gmail.com>"]
readme = "README.md"

[tool.poetry.dependencies]
python = "^3.11"
pandas = "^2.2.2"


[build-system]
requires = ["poetry-core"]
build-backend = "poetry.core.masonry.api"
```

- A `poetry.lock` file will also be created.

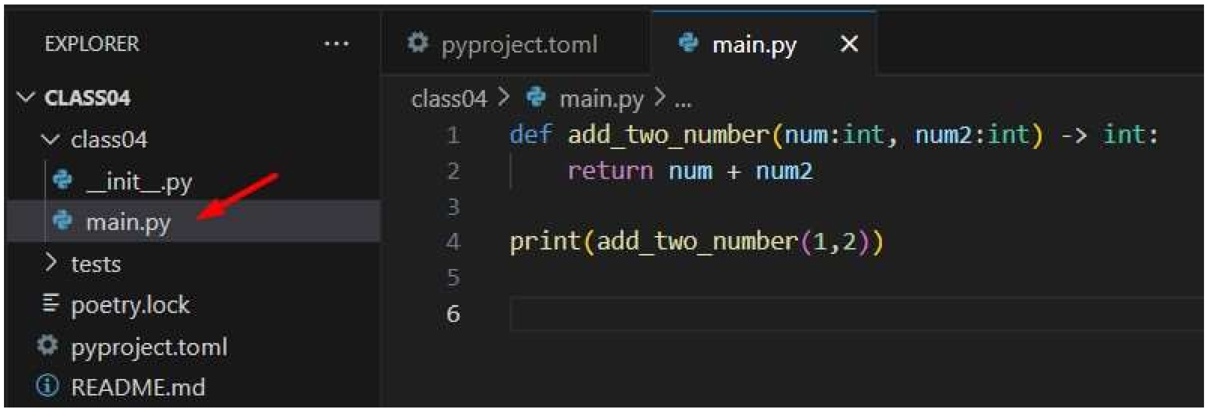


| Name | Date modified | Type | Size |
|---|---|---|---|
| class04 | 28-Apr-24 15:14 | File folder | |
| tests | 28-Apr-24 15:14 | File folder | |
| pyproject.toml | 28-Apr-24 15:30 | Toml Source File | 1 KB |
| README.md | 28-Apr-24 15:14 | Markdown Source ... | 0 KB |
| poetry.lock | 28-Apr-24 15:30 | LOCK File | 15 KB |

## Creating the Project

- Go to project folder i.e. `class04`

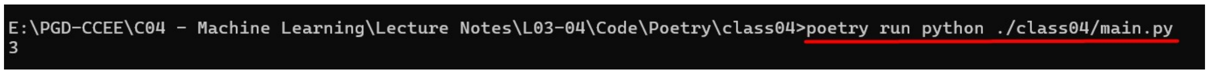
- Create `main.py` file.



```python
def add_two_number(num:int, num2:int) -> int:
    return num + num2

print(add_two_number(1,2))

```

## Running Project

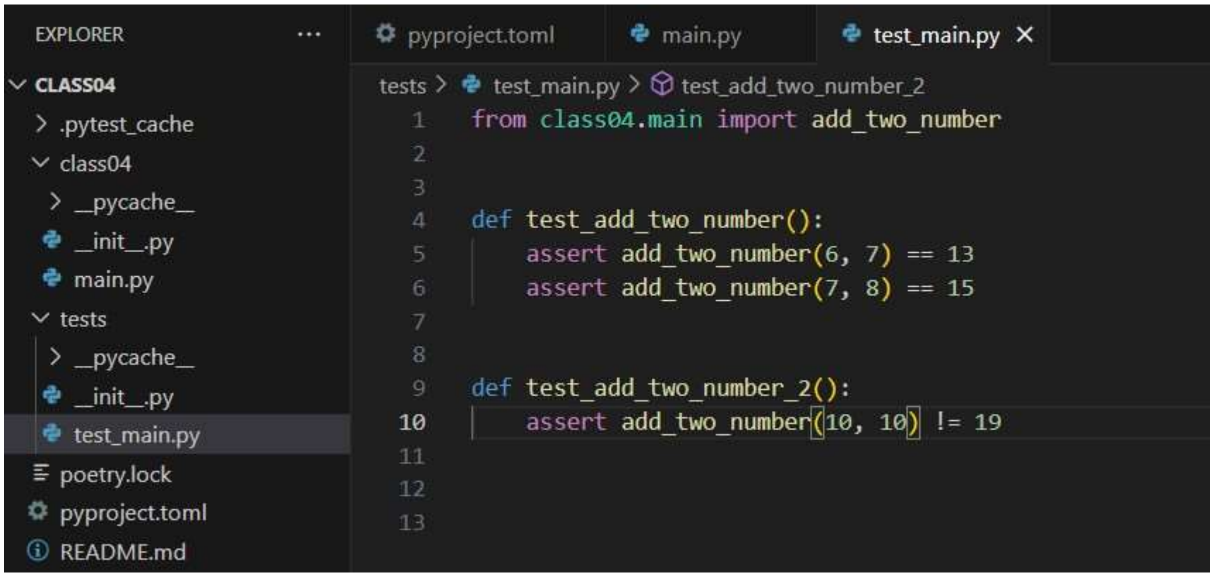
- Open Terminal in Main Folder
- Run Following command



```
E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>poetry run python ./class04/main.py
3
```

## Writing Tests

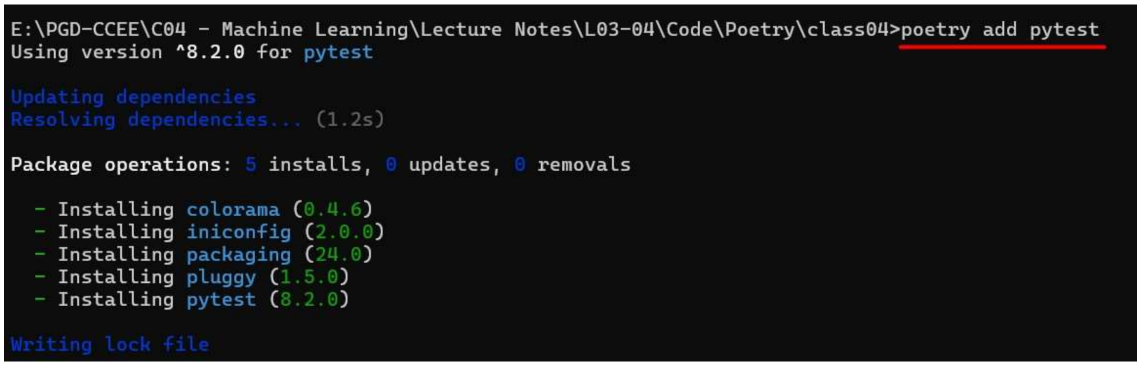
- Create a Test in `tests` folder.



```python
from class04.main import add_two_number


def test_add_two_number():
    assert add_two_number(6, 7) == 13
    assert add_two_number(7, 8) == 15


def test_add_two_number_2():
    assert add_two_number(10, 10) != 19



```

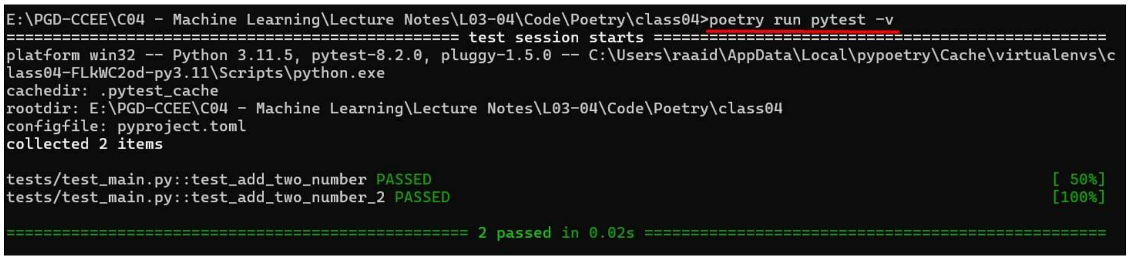
- Test Application using `Poetry`

- First install pytest in Poetry



```
E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>poetry add pytest
Using version ^8.2.0 for pytest

Updating dependencies
Resolving dependencies... (1.2s)

Package operations: 5 installs, 0 updates, 0 removals

  - Installing colorama (0.4.6)
  - Installing iniconfig (2.0.0)
  - Installing packaging (24.0)
  - Installing pluggy (1.5.0)
  - Installing pytest (8.2.0)

Writing lock file
```

- Run tests using following command



```
E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04>poetry run pytest -v
================================================= test session starts =================================================
platform win32 -- Python 3.11.5, pytest-8.2.0, pluggy-1.5.0 -- C:\Users\raaid\AppData\Local\pypoetry\Cache\virtualenvs\c
lass04-FLkWC2od-py3.11\Scripts\python.exe
cachedir: .pytest_cache
rootdir: E:\PGD-CCEE\C04 - Machine Learning\Lecture Notes\L03-04\Code\Poetry\class04
configfile: pyproject.toml
collected 2 items

tests/test_main.py::test_add_two_number PASSED                                                                   [ 50%]
tests/test_main.py::test_add_two_number_2 PASSED                                                                 [100%]

================================================== 2 passed in 0.02s ==================================================
```