Python Intermediate

Piotr Kardaś, 2021

Piotr Kardaś

Software Engineer

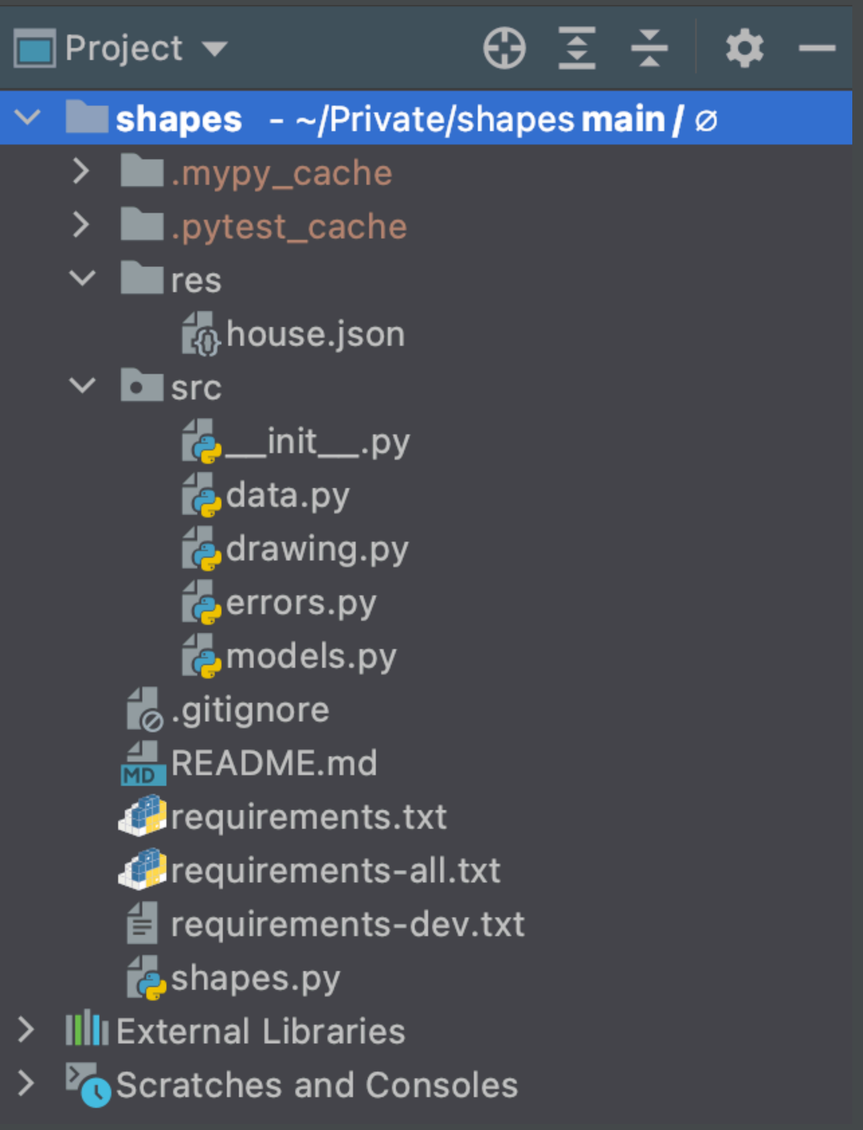
- 3 years of professional experience
- AirHelper since 2019
- Interests: Machine Learning, Programming books, Gym

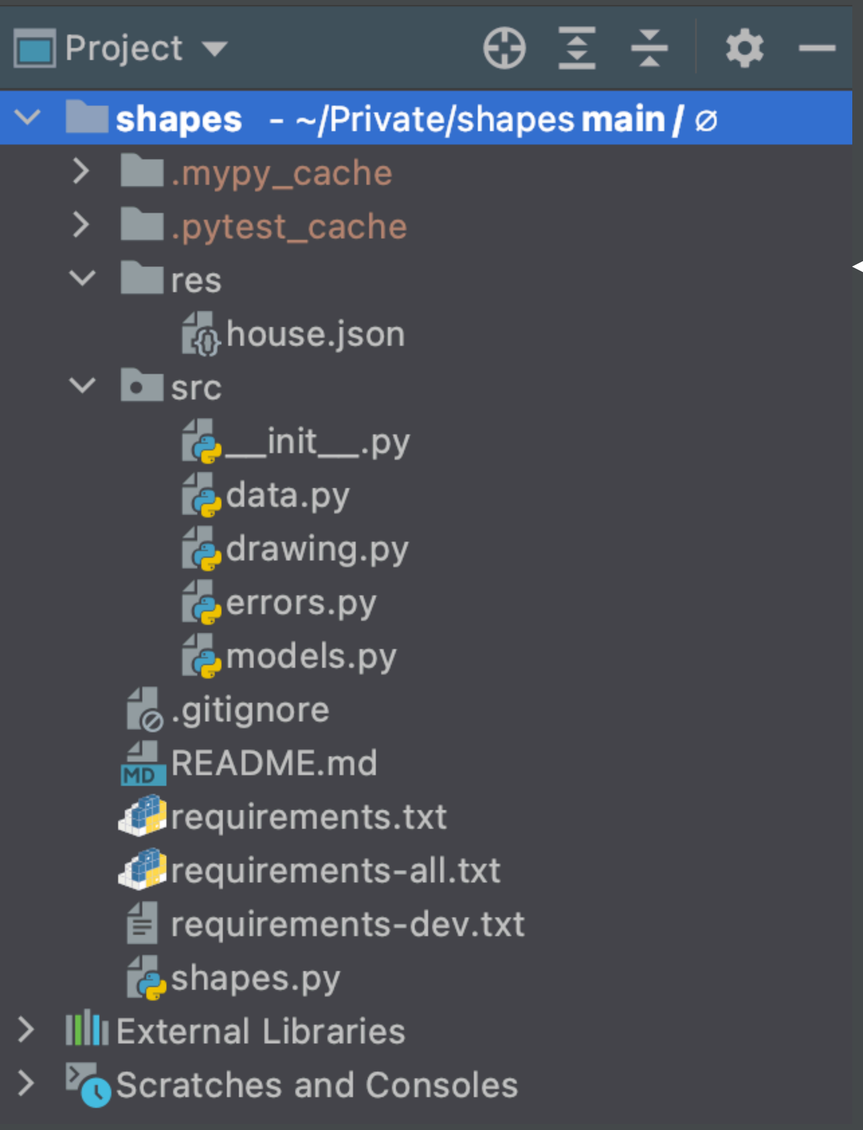
pkardas

Plan for today

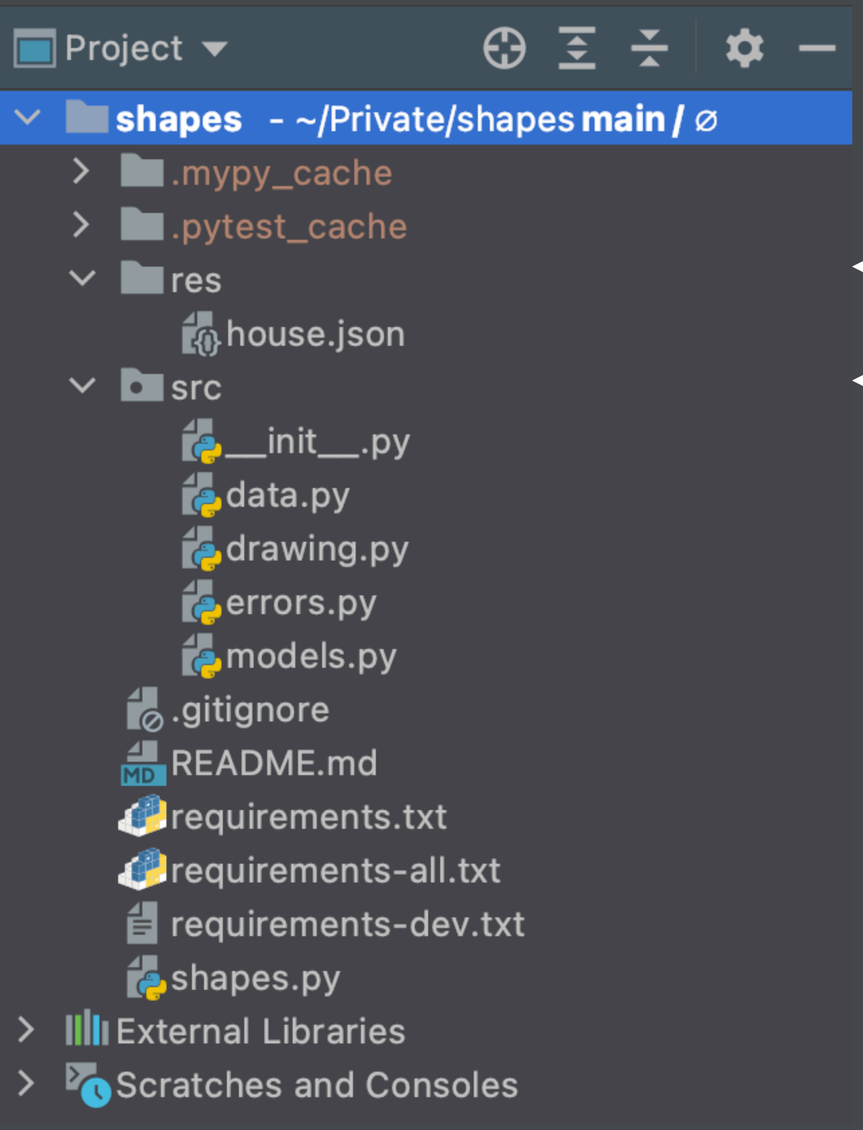
You have joined Awesome Drawings Inc. as a Software Engineer.

You will be responsible for extending company's core application - `shapes`.


Project
shapes - ~/Private/shapes main / ⌀
.mypy_cache
.pytest_cache
res
house.json
src
__init__.py
data.py
drawing.py
errors.py
models.py
.gitignore
README.md
requirements.txt
requirements-all.txt
requirements-dev.txt
shapes.py
External Libraries
Scratches and Consoles



folder with resources (JSON files), that can be used as input for the program



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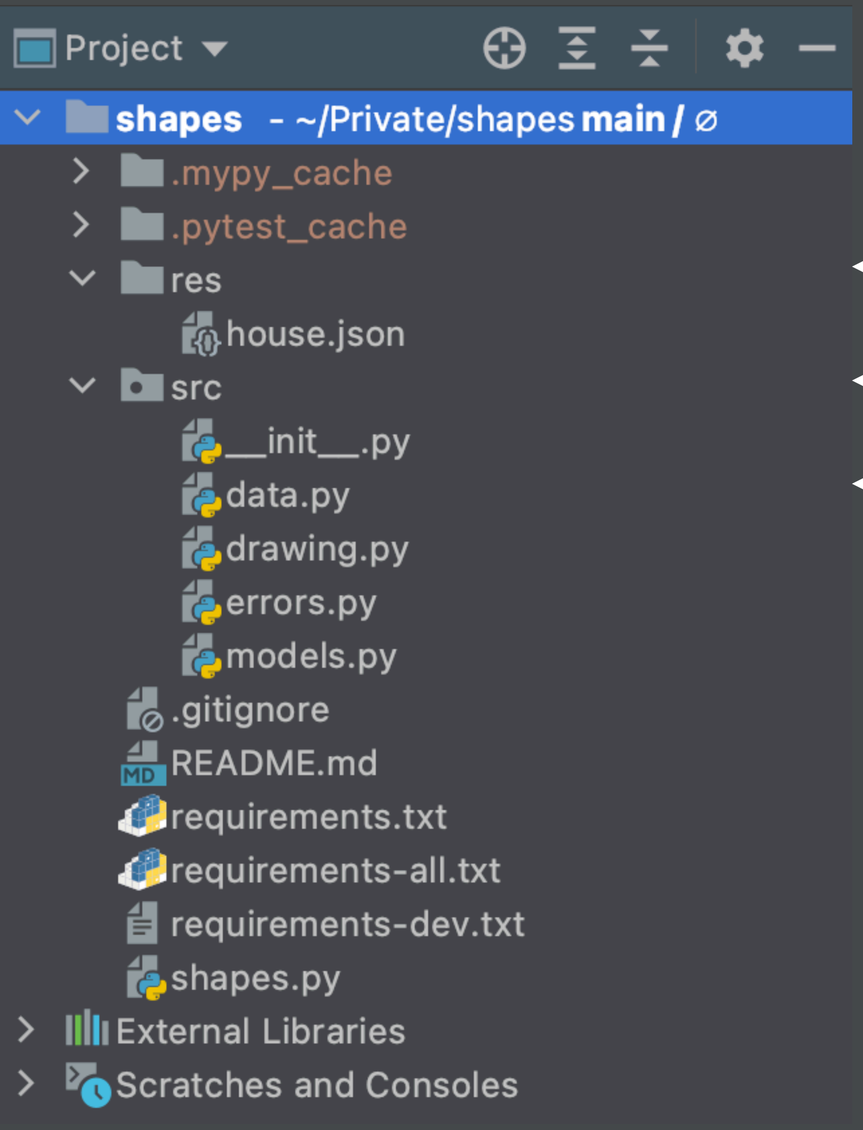

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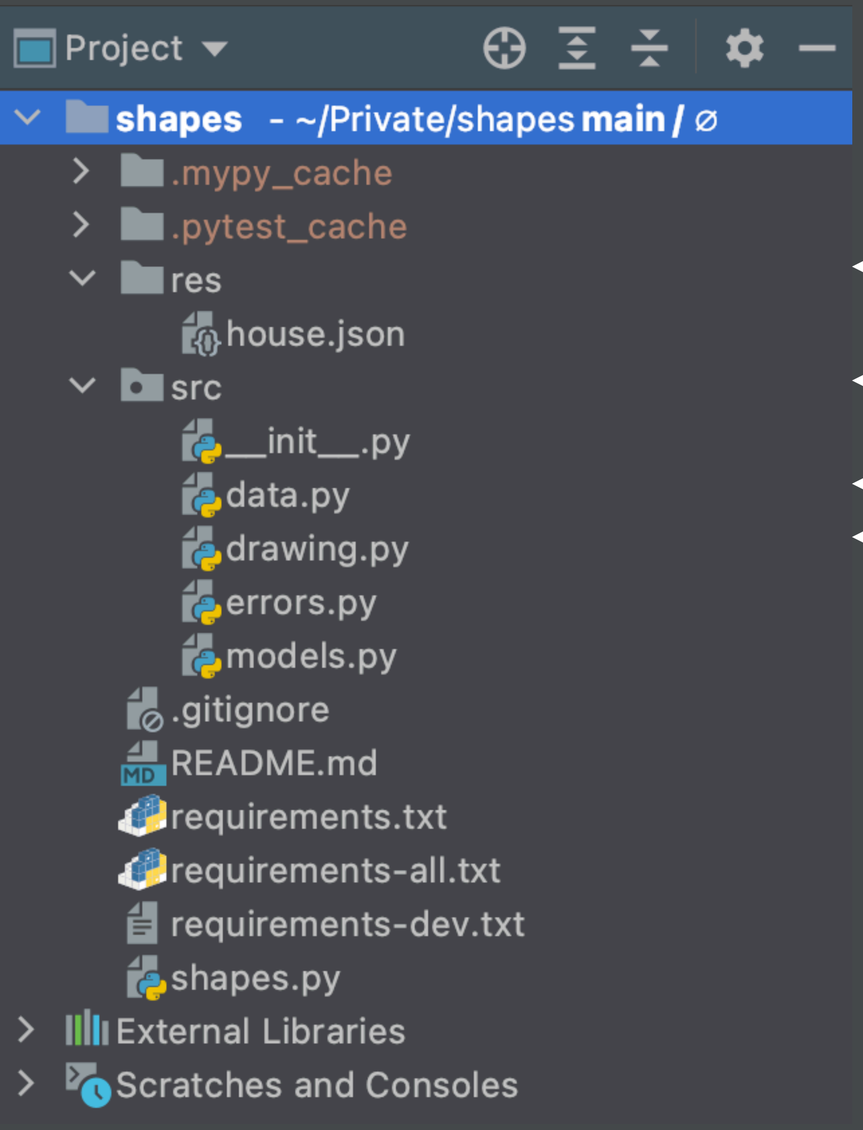

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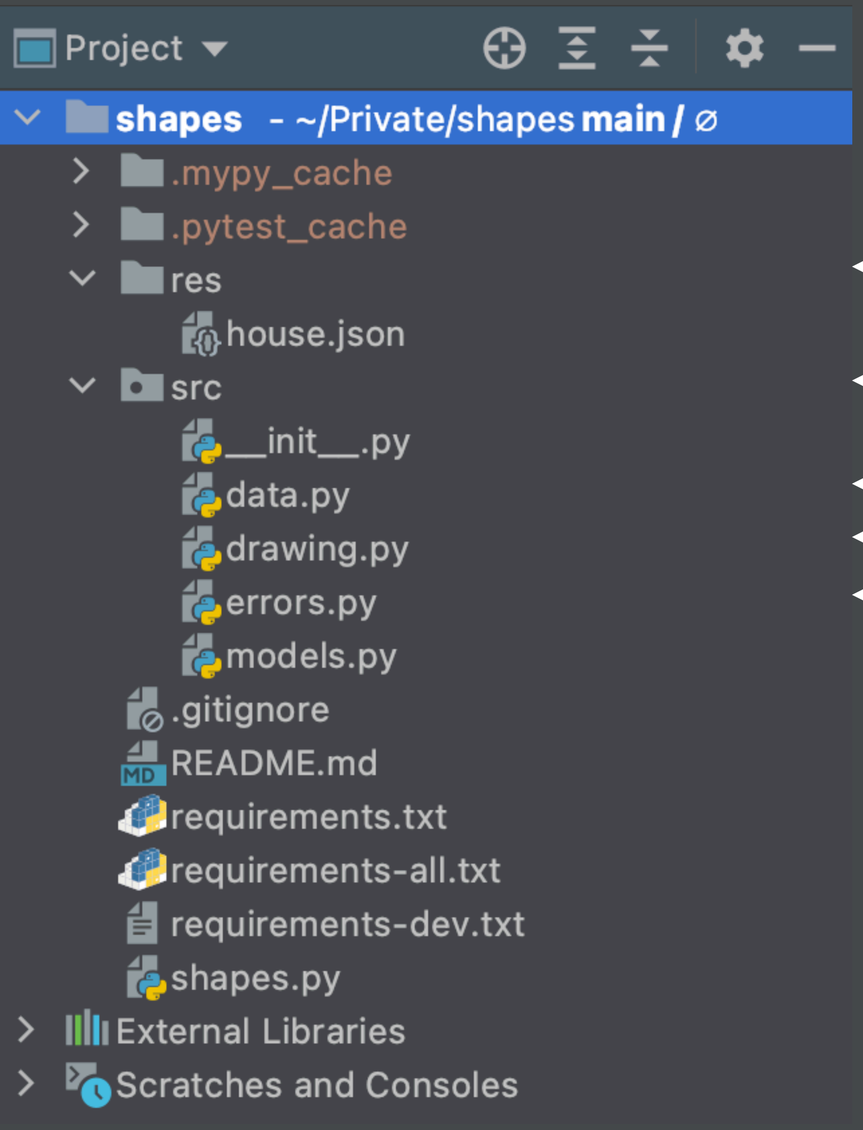

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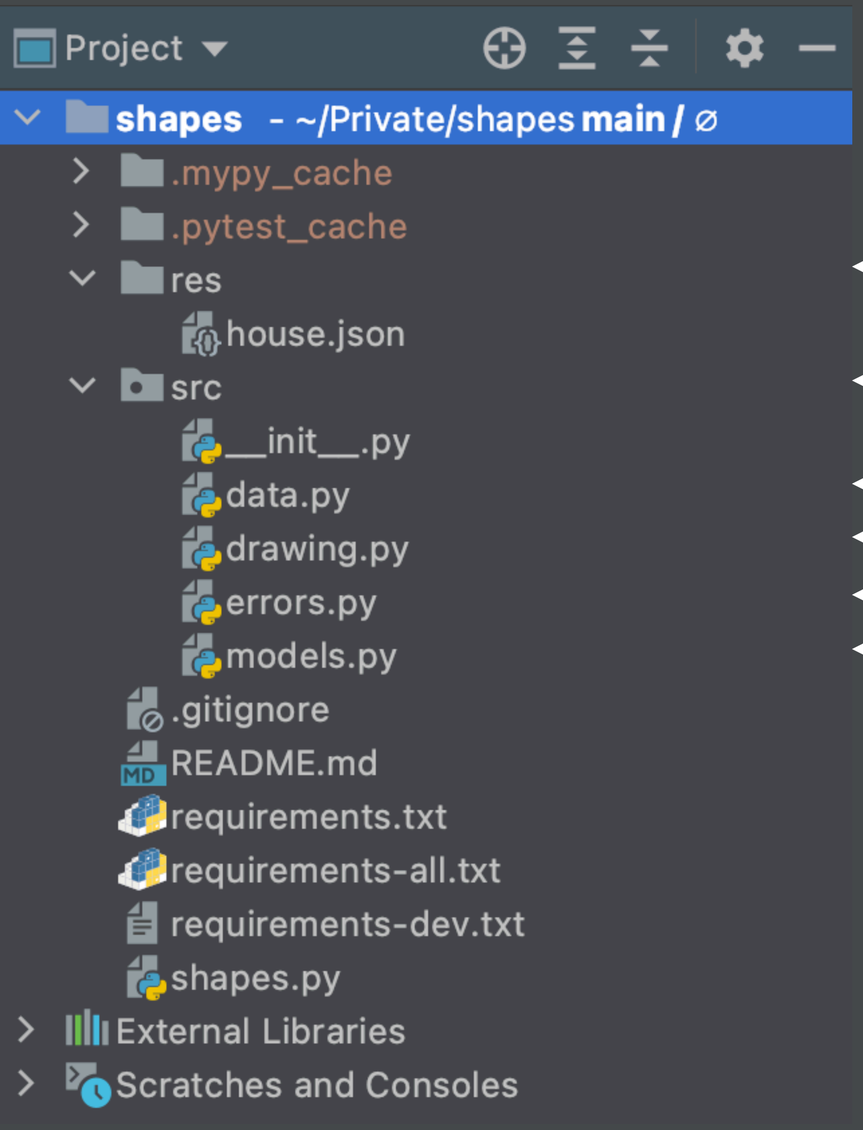
custom errors



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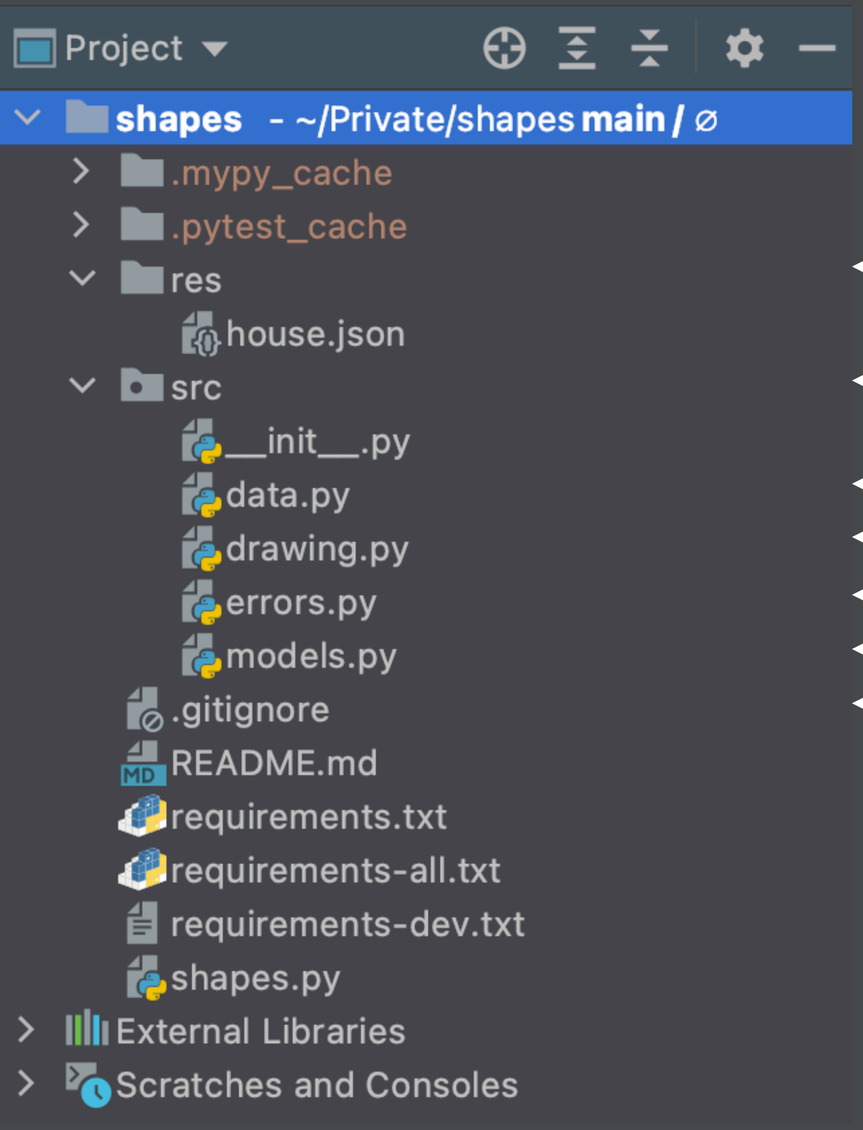
← shapes definition



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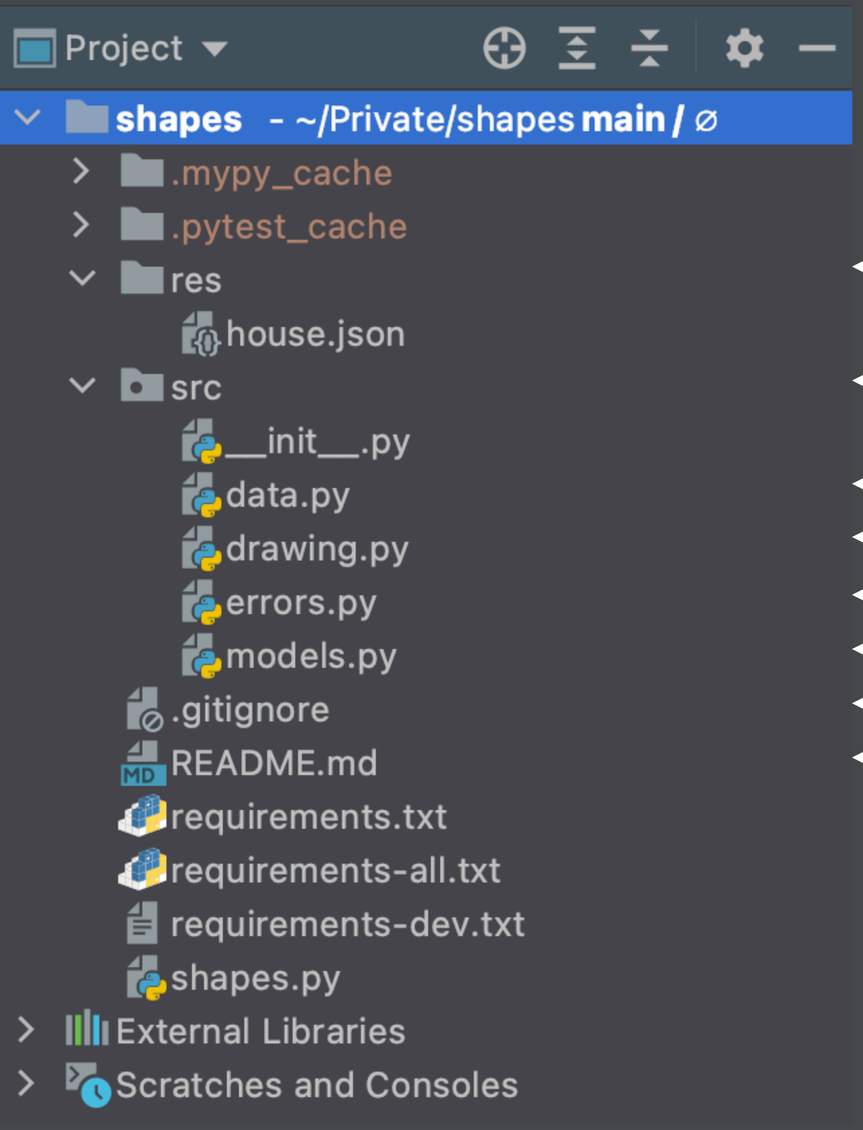
shapes definition

paths that are excluded from version control system



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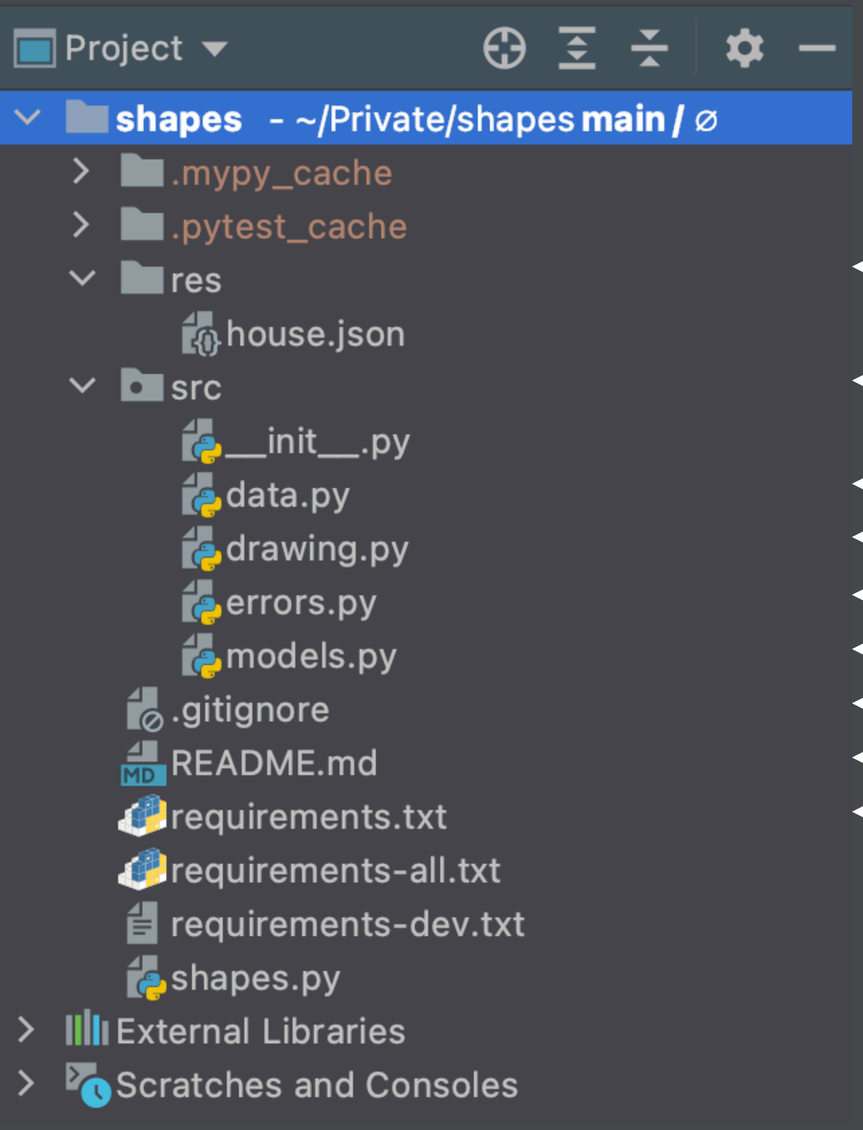
← paths that are excluded from version control system

← repository description and list of tasks



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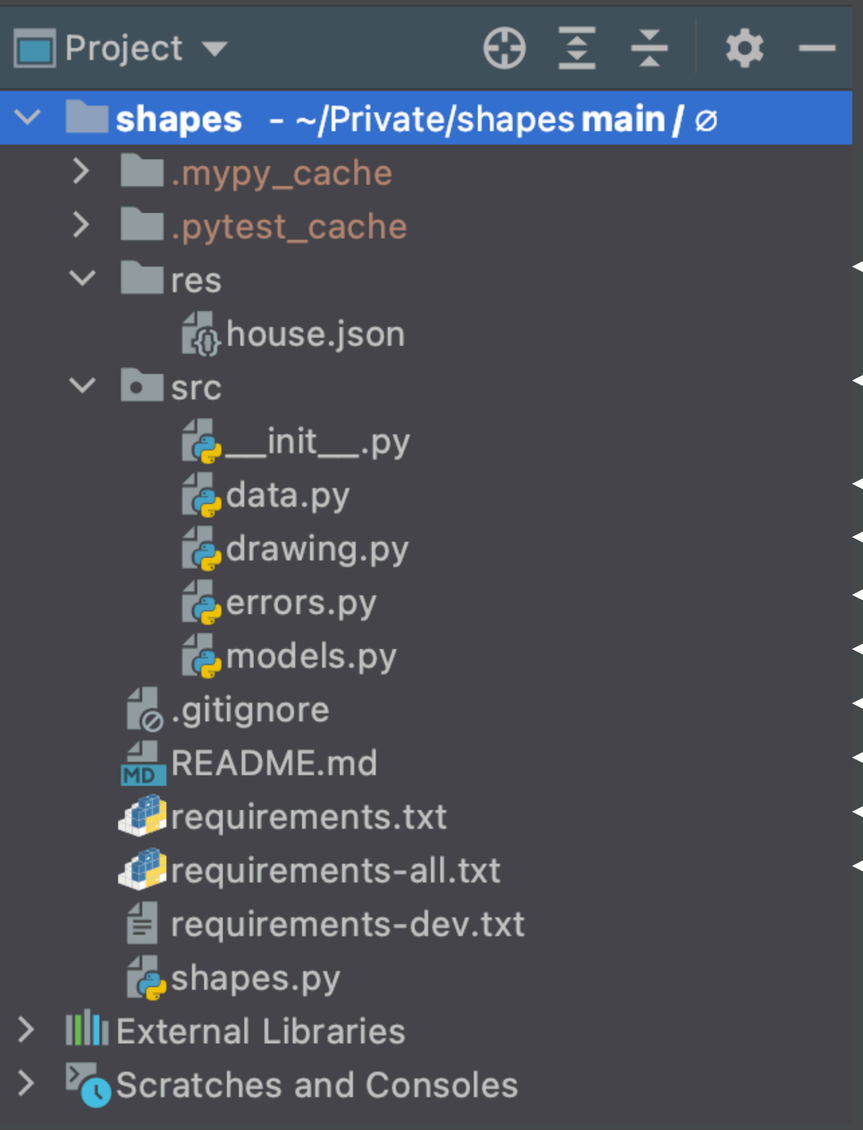

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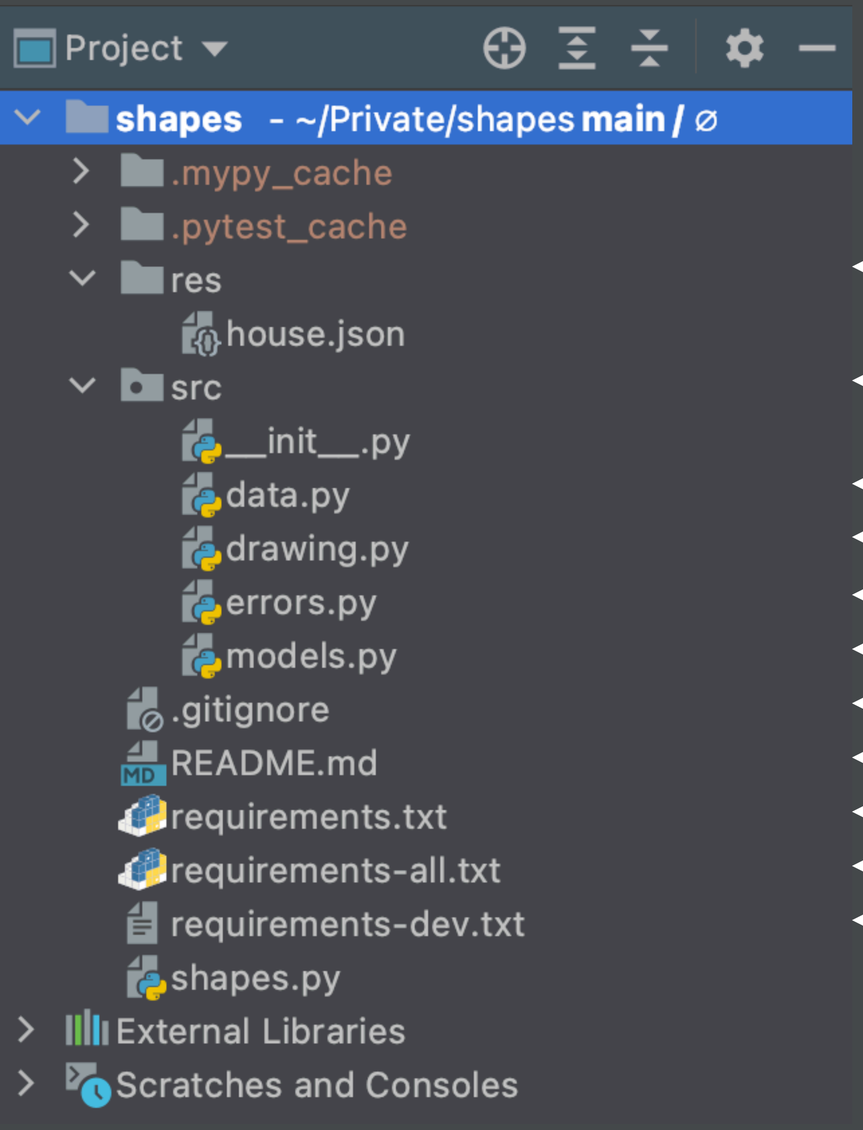

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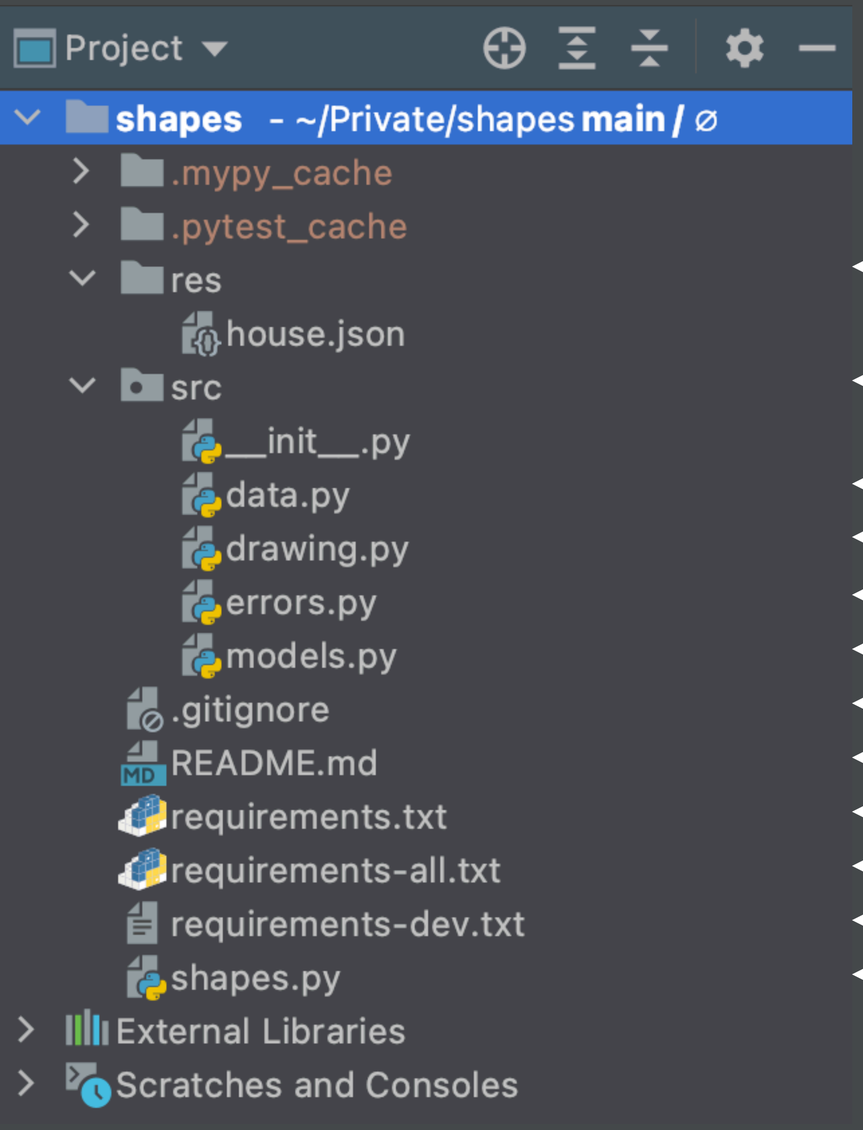

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← script that is starting the application

TASK 1

Theory

Type Hints

```
surname: str
age: int
```

python.org/dev/peps/pep-0484

Theory

Type Hints

```
surname: str
age: int


from typing import List

numbers: List[int]
```

python.org/dev/peps/pep-0484

Theory

Type Hints

```
surname: str
age: int


from typing import List

numbers: List[int]


def foo(numbers: List[int]) → int:
    pass
```

python.org/dev/peps/pep-0484

Theory

The standard way of creating classes

```
class Person:
    def __init__(self, name: str, age: int) → None:
        self.name = name
        self.age = age


person = Person("James", 49)
```

Theory

@dataclass

```
from dataclasses import dataclass


@dataclass
class Person:
    name: str
    age: int


person = Person("James", 49)
```

python.org/dev/peps/pep-0484

Theory

Pydantic - dataclass on steroids

```
from pydantic import BaseModel


class Person(BaseModel):
    name: str
    age: int


person = Person(name="James", age=49)
```

Theory

Pydantic - dataclass on steroids

but why?

TASK 2

🐍 TASK 3

Theory

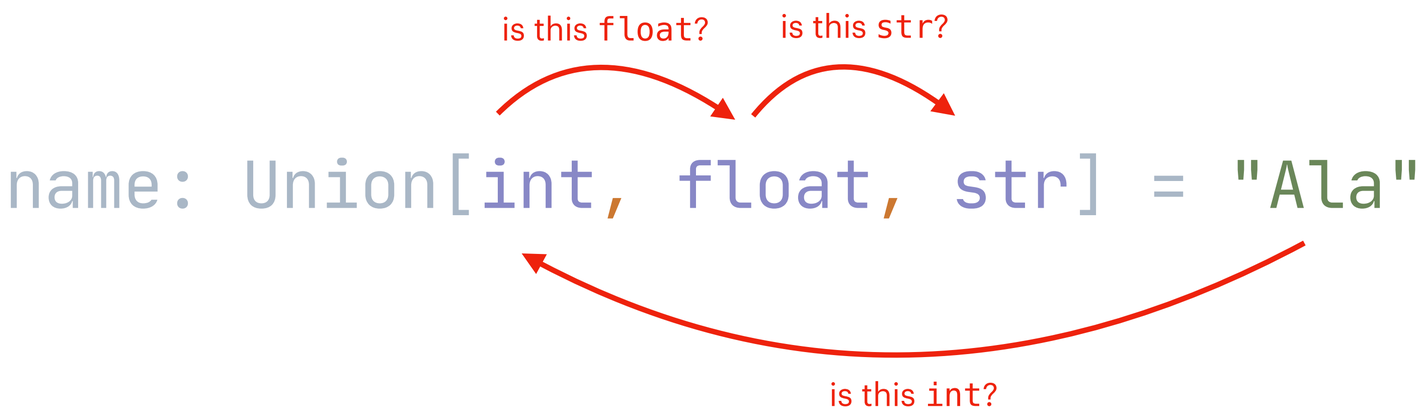
Union[...]

```
from typing import Union

name: Union[int, float, str] = "123"
name: Union[int, float, str] = 123
name: Union[int, float, str] = 123.00
```

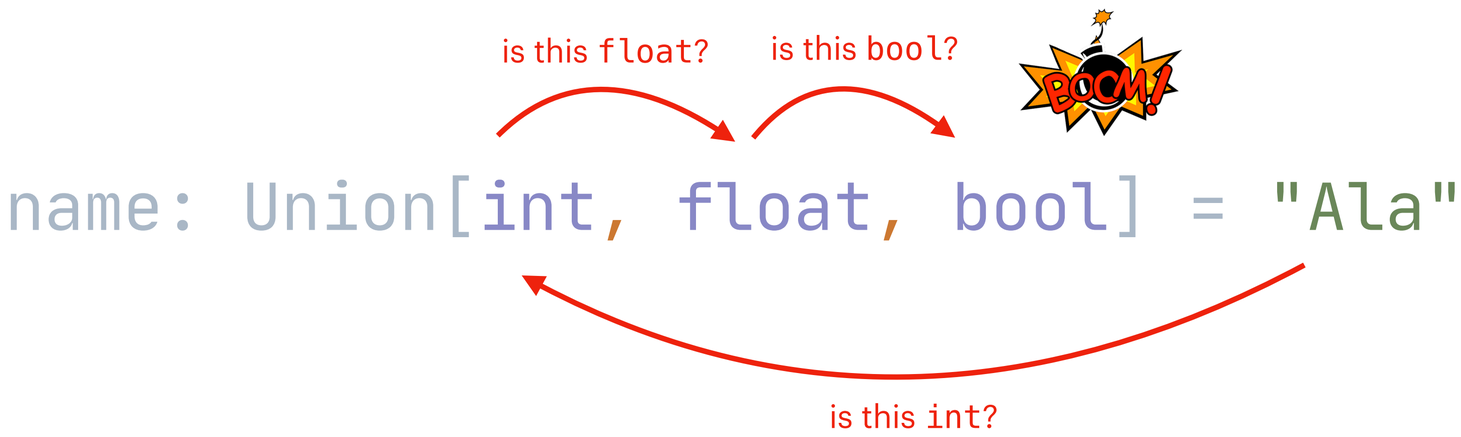
Theory

Union[...] and Pydantic



Theory

Union[...] and Pydantic



TASK 4

Theory

Optional[...]

```
from typing import Optional

name: Optional[int] = "James"
name: Optional[int] = None
```

Optional can be expressed as Union:

```
name: Union[int, None]
```

en.wikipedia.org/wiki/Option_type

TASK 5

Theory

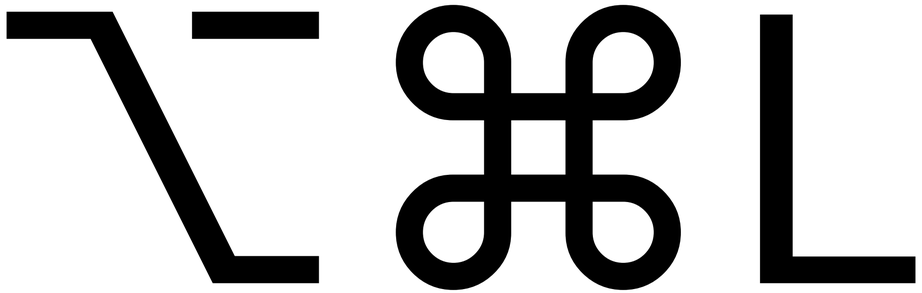
flake8

```
name: str =                    ":D"
```

E222 multiple spaces after operator

Theory

Reformat code



resources.jetbrains.com/storage/products/pycharm/docs/PyCharm_ReferenceCard_mac.pdf

Theory

flake8

```
name: str = ":D"
```

Theory

mypy

```
name: str = 123
```

error: Incompatible types in assignment (expression has type "int", variable has type "str")

Theory

mypy

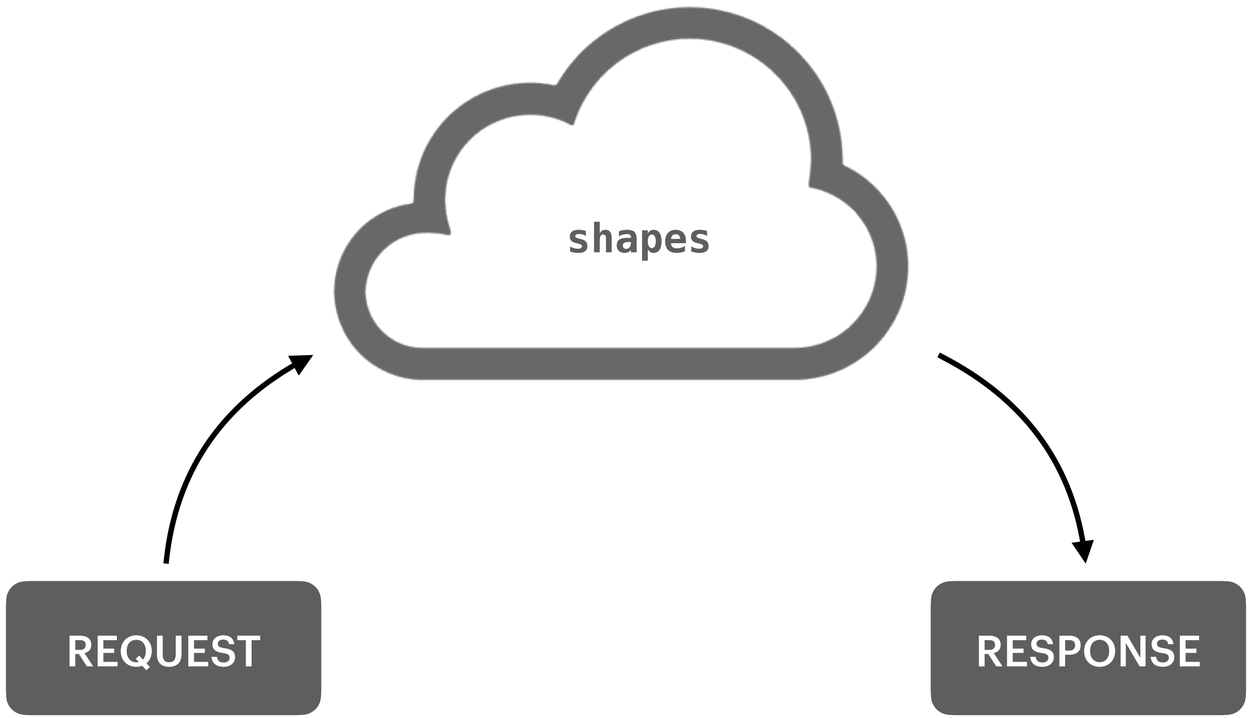
```
name: str = "Josh"
```

TASK 6

🐍 TASK 7*

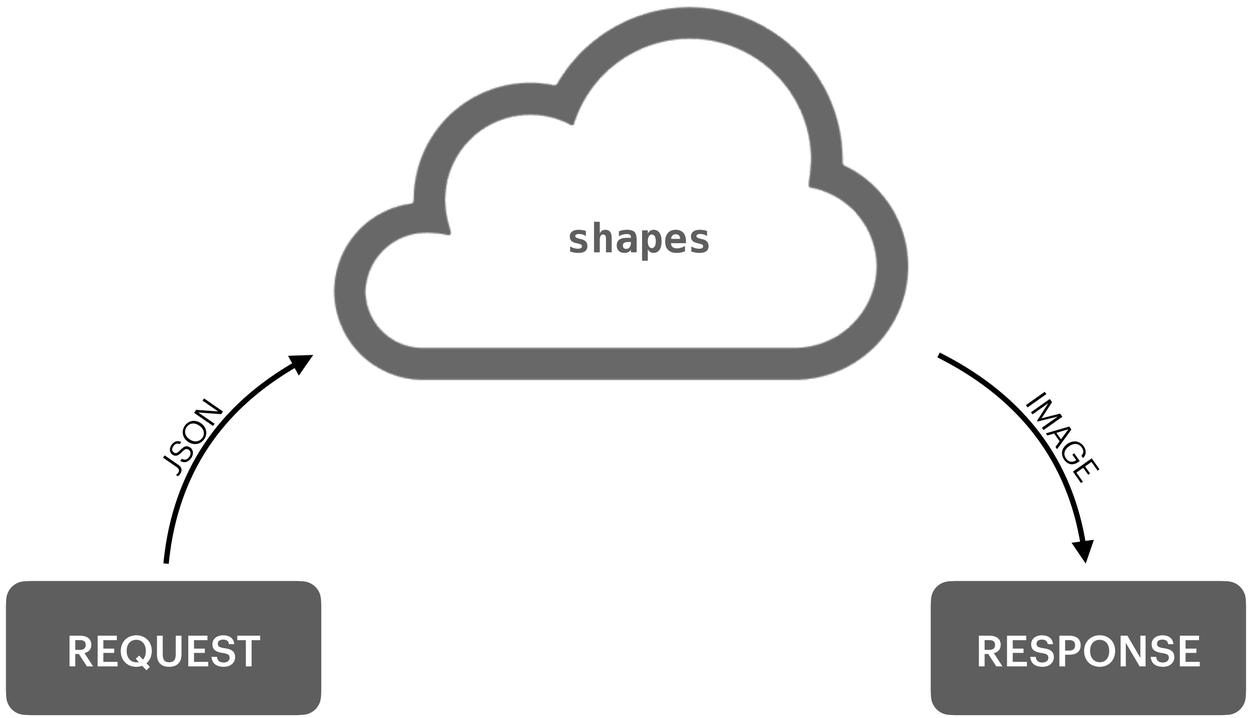
Theory

SaaS - Software as a Service



Theory

SaaS - Software as a Service



Theory

REST

Representational **S**tate **T**ransfer

REST is a design philosophy that builds upon the principles of HTTP.

Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems, Martin Kleppmann

Theory

HTTP methods

GET	Requests a representation of the specified resource. Requests using GET should only retrieve data.
HEAD	Asks for a response identical to that of a GET request, but without the response body.
POST	Used to submit an entity to the specified resource, often causing a change in state or side effects on the server.
PUT	Replaces all current representations of the target resource with the request payload.
DELETE	Deletes the specified resource.
CONNECT	Establishes a tunnel to the server identified by the target resource.
OPTIONS	Used to describe the communication options for the target resource.
TRACE	Performs a message loop-back test along the path to the target resource.
PATCH	Used to apply partial modifications to a resource.

developer.mozilla.org/en-US/docs/Web/HTTP/Methods

Theory

HTTP methods

GET	**Requests a representation of the specified resource. Requests using GET should only retrieve data.**
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Theory

FastAPI

```python
from typing import Optional

from fastapi import FastAPI

app = FastAPI()


@app.get("/")
def read_root():
    return {"Hello": "World"}


@app.get("/items/{item_id}")
def read_item(item_id: int, q: Optional[str] = None):
    return {"item_id": item_id, "q": q}
```

TASK 8

🐍 TASK 9*

Theory

pytest

```
def add(a: int, b: int) → int:
    return a + b
```

Theory

pytest

```python
def add(a: int, b: int) -> int:
    return a + b


def test_add():
    assert add(1, 1) == 2
```

Theory

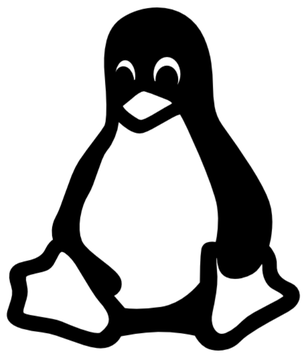
pytest

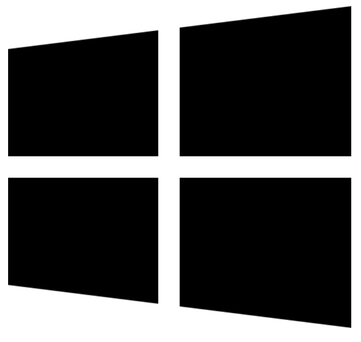
```
def add(a: int, b: int) → int:
    return a + b


def test_add():
    assert add(1, 1) == 2


import pytest


@pytest.mark.parametrize(
    "arg_0, arg_1, expected_result", [
        (0,   0,  0),
        (1,   1,  2),
        (1,  -1,  0),
        (-1, -1, -2),
    ]
)
def test_add(arg_0, arg_1, expected_result):
    assert add(arg_0, arg_1) == expected_result
```

TASK 10*

Theory

Docker

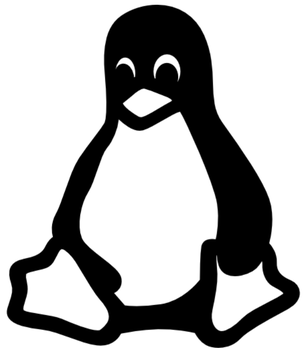


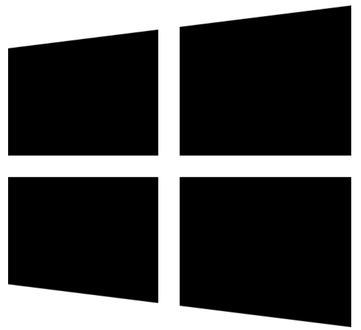


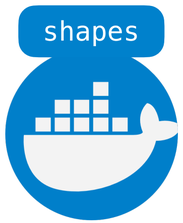
application installation might differ between operating systems

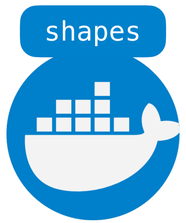
Theory

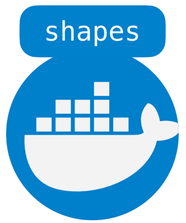
Docker











application installation looks exactly the same across different operating systems

Next steps 👟 🐍

Further application development.

Better error handling, database integration, AWS deployment.

Q&A