

Python Pro Study Plan

Level 1: Revise Core Python

Focus: Refresher for your basics

- Data Types, Variables
- Conditionals & Loops
- Functions (with *args, **kwargs)
- Lists, Tuples, Sets, Dicts
- String operations

Resources:

- <https://www.w3schools.com/python/>
- <https://realpython.com/start-here/>

Level 2: Master Functions and OOP

Focus: Deep dive into functions and OOP

- Recursion
- Lambda, map, filter, reduce
- Classes and Objects
- `__init__`, `__str__`, `__repr__`
- Inheritance, Polymorphism

Resources:

- <https://www.programiz.com/python-programming/object-oriented-programming>
- <https://realpython.com/defining-your-own-python-function/>

Level 3: Learn Decorators & Closures

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Focus: What the interviewer asked you

- Closures (functions inside functions)
- Writing custom decorators
- Using @staticmethod, @classmethod, @property

Resources:

- <https://realpython.com/primer-on-python-decorators/>
- https://www.youtube.com/watch?v=FsAPt_9Bf3U

Level 4: Dive into Generators & Iterators

- yield, generator functions
- Generator expressions
- Custom iterators using __iter__, __next__

Resource:

- <https://realpython.com/introduction-to-python-generators/>

Level 5: Context Managers

- with statement
- Writing custom context managers (__enter__, __exit__)
- contextlib module

Resource:

- <https://realpython.com/python-with-statement/>

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Level 6: Functional Programming

- map, filter, reduce
- functools (lru_cache, partial)
- itertools

Resource:

- <https://realpython.com/python-functional-programming/>

Level 7: Asynchronous Python & Concurrency

- async, await
- Event loop basics (asyncio)
- threading vs multiprocessing

Resource:

- <https://realpython.com/async-io-python/>

Level 8: Testing & Debugging

- Unit tests with unittest, pytest
- assert statements
- Debugging with pdb

Resource:

- <https://realpython.com/python-testing/>

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Level 9: Type Hinting & Static Typing

- typing module
- Type hints in functions
- Using mypy

Resource:

- <https://docs.python.org/3/library/typing.html>

Level 10: Real-World Application Building

Build small apps:

- CLI tools (e.g., To-do list using argparse)
- Web app using Flask or FastAPI
- Script to parse Excel or PDF files
- REST APIs with DB using SQLAlchemy

Resources:

- <https://www.youtube.com/watch?v=0sOvCWFmrtA>
- <https://blog.miguelgrinberg.com/post/the-flask-mega-tutorial-part-i-hello-world>