Python Engineer Roadmap

Python can be used in a lot of computer science fields. In this repository, we have collected resources for each field of computer science that are related to Python.
Not sure which source to choose? You can follow the resources marked with a ✓ symbol, they are highly recommended by the community.

Contribution

Before you head over, read the Contribution Guide first. You are new to contribution process? For more information about the steps and guides, check out the First Contribution Guide.

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Prerequisites

- ### Algorithms and Data Structures

    - **Book**

        - ✅ Grokking Algorithms by Aditya Bhargava
        - ✅ Cracking the Coding Interview by Gayle Laakmann McDowell
        - Data Structure and Algorithmic Thinking with Python: Data Structure and Algorithmic Puzzles by Narasimha Karumanchi
        - Introduction to Algorithms (CLRS)

    - **Video**

        - Data Structures And Algorithms Course by Mosh Hamedani

- **Platform**
  - ✅ LeetCode
  - HackerRank
  - CodeWars
  - TheAlgorithms
  - Codeforces
- **Repo**
  - ✅ Coding University
- **Cheat Sheet**
  - Data Structures Cheat Sheet

System Design

- **Book**
  - ✅ System Design Interview by Alex Xu
  - System Design Interview: Volume 2 by Alex Xu & Sahn Lam
- **Course**
  - Educative - Grokking the System Design Interview

Git

- **Documentation**
  - Git Documentation
- **Video**
  - ✅ Git Course by Mosh Hamedani
  - Git and GitHub tutorial for beginners by Amigoscode
  - Git and GitHub crash course by freeCodeCamp
  - Git For Professionals course by Trevor Miller
- **Book**
  - Pro Git
  - Git Notes for Professionals
- **Website**
  - Git For Beginners by tutorialspoint
  - Git For Intermediates and Professionals by W3schools
  - Advanced Git Tips by atlassian

        - Learn Git Branching
    - **Cheat Sheet**
        - Git cheat sheet

- ## Operating System
    - **Book**
        - ✅ LPIC-1: Linux Professional Institute Certification Study Guide: Exams 101 and 102 by Roderick W. Smith
    - **Video**
        - Lpic-1 Course by Jadi
    - **Platform**
        - Linux Journey
    - **Community**
        - Discord Linux group
        - Linux For Everyone Community
    - **Cheat Sheet**
        - Linux commands cheat sheet

- ## Virtual Environment
    - **VENV**
        - **Documentation**
            - VENV Documentation
    - **VirtualEnvWrapper**
        - **Documentation**
            - VirtualEnvWrapper Documentation
    - **PipEnv**
        - **Documentation**
            - PipEnv Documentation
    - **Conda**
        - **Documentation**
            - Conda Documentation
    - **Python-Poetry**

        - **Documentation**
            - Python-Poetry Documentation

- # Python
    - **Documentation**
        - Python Documentation
    - **Beginner**
        - **Book**
            - ✅ Python Crash Course by Eric Matthes
            - Head First Python by Paul Barry
            - Learn Python the Hard Way by Zed Shaw
            - Essential Python Tools
        - **Video**
            - Python Beginner Tutorial by NeuralNine
            - Python Programming Tutorials by Tech with Tim
        - **Platform**
            - W3schools
            - Codecademy Python 2
            - Codecademy Python 3
            - Sololearn Python
    - **Intermediate**
        - **Book**
            - ✅ Python Cookbook by David Beazley & Brian Jones
            - Beyond the Basic Stuff with Python Best Practices for Writing Clean Code by Sweigart, Al
            - Fluent Python by Luciano Ramalho 2nd Edition
            - Effective Python by Brett Slatkin
            - Python Concurrency with asyncio
        - **Video**
            - Python Intermediate Tutorial by NeuralNine
            - Intermediate Python Tutorials by Tech with Tim
        - **Platform**
            - GeeksForGeeks
            - Programiz

- **Advanced**
  - **Book**
    - ✅ Architecture Patterns with Python by Harry Percival & Bob Gregory
    - ✅ Practices of the Python Pro by Dane Hillard
    - ✅ Python Tricks by Dan Bader
    - Python Testing with pytest by Brian Okken
    - Python Concurrency with asyncio by Matthew Fowler
    - Python for Programmers by Deitel Developer Series
    - Serious Python by Julien Danjou
    - Python Notes for Professionals
  - **Video**
    - Python3: Deep Dive (4 Parts)
  - **Platform**
    - ✅ RealPython
    - Python-Course
- **Community**
  - Python Discord group
  - Python Telegram group
- **Cheat Sheet**
  - Beginners Python cheat sheet
  - Python cheat sheet

Career Path

- **Backend**
  - **Django**
    - **Documentation**
      - Django Documentation
    - **Book**
      - Django for Beginners by William S. Vincent
      - Django for APIs by William S. Vincent
      - Django for Professionals by William S. Vincent
      - Two Scoops of Django 3.x by Daniel Roy Greenfeld, Audrey Roy Greenfeld

        - Test-Driven Development with Python: Obey the Testing Goat: Using Django, Selenium, and JavaScript by Harry Percival
        - Test-Driven Development with Django by Kevin Harvey
        - Django3 by example by antonio mele
    - **Video**
        - Django Web Framework - Full Course for Beginners by Justin Mitchel
        - Build REST APIs with Django REST Framework and Python By Shubham Sarda
        - Django For Everybody - Full Course by Dr. Charles Severance
        - Django ORM Mastery - Very Academy
        - Learn Django Class Base View - Very Academy
        - Django Course by Mosh Hamedani
        - Try Django 3.2 - Python Web Development Tutorial Series by Justin Mitchel
    - **Awesome Django**
        - Awesome Django
    - **Community**
        - Django Discord group
        - Django Telegram group
    - **Cheat Sheet**
        - Django Cheat Sheet
        - Django Models Cheat Sheet
        - Django Class Based Views Cheat Sheet
- **FastAPI**
    - **Video**
        - Python API Development - Comprehensive Course for Beginners by Sanjeev Thiyagarajan
        - FastAPI course by testdriven.io & talkpython.fm
    - **Documentation**
        - FastAPI documentation
        - FastAPI Utilities documentation
    - **Awesome FastAPI**
        - Awesome FastAPI
    - **Community**
        - FastApi Discord group

- **Flask**
  - **Book**
    - Flask Web Development: Developing Web Applications with Python
    - Flask Framework Cookbook
  - **Video**
    - Flask Tutorial by Tech With Tim
    - REST APIs with Flask and Python by Jose Salvatierra
  - **Documentation**
    - Flask Document
  - **Cheat Sheet**
    - Flask Cheat Sheet and Quick Reference
- **Tornado**
  - **Book**
    - Introduction to Tornado by Michael Dory
  - **Video**
    - Tornado, Coroutines and Concurrency by Bek Brace
    - Tornado in Depth by Oscar Vilaplana
    - More than just a pretty web framework, the Tornado IOLoop by Gavin M.Roy
  - **Documentation**
    - Tornado Document
- **Web2Py**
  - **Documentation**
    - Web2Py Document
  - **Book**
    - Complete Reference Manual by Massimo Di Pierro
    - Killer Web Development by Marco Laspe
- **Sanic**
  - **Documentation**
    - Sanic Document
    - Sanic Guide

        - **Article**
            - Getting Started with Sanic for Python by Mukul Khanna
        - **Video**
            - Async Web Apps with Sanic by Dougal Matthews
    - **AIOHTTP**
        - **Documentation**
            - AIOHTTP Document
    - **Bottle**
        - **Documentation**
            - Bottle Document
    - **Dash**
        - **Documentation**
            - Dash-Python Document
        - **Awesome Dash**
            - Awesome Dash
        - **Template**
            - Dash Clean Architecture Template
    - List Of All Python Backend Web Frameworks
- ## Data Science
    - **Data Analysis**
        - **Numpy**
            - **Documentation**
                - Numpy Document
        - **Scipy**
            - **Documentation**
                - Scipy Document
        - **Pandas**
            - **Documentation**
                - Pandas Document

- **Data Visualization**
  - **Matplotlib**
    - **Documentation**
      - Matplotlib Document
  - **Plotly**
    - **Documentation**
      - Plotly Document

- ## Machine Learning
  - **Video**
    - Machine Learning Course by Andrew Ng

- ## Deep Learning
  - **Video**
    - Deep Learning Specialization
    - AladdinPersson

- ## Neural Networks
  - **Video**
    - Neural Networks and Calculus

- ## Image Processing

- ## DevOps
  - **Community**
    - DevOps, SRE, & Infrastructure

- ## Hacking
  - **Book**
    - Black Hat Python, 2nd Edition: Python Programming for Hackers and Pentesters

- ## Algorithmic Trading

- ## Bot
  - **Telegram**
    - **Telethon**
      - Source

        - Documentation
    - **Pyrogram**
        - Source
        - Documentation
    - **Python Telegram Bot**
        - Source
        - Documentation
    - **AIOGram**
        - Source
        - Documentation
    - **PyTelegramBotApi**
        - Source
        - Documentation
    - **TeleBot**
        - Source
- **Discord**

Advanced Topics

⚠ The following topics don't have any order or priority of learning.
 Choose topics that you are **interested in** or **suit your needs**.

- ### Databases
    - **General**
        - **Book**
            - ✅ Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems
            - Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement
    - **SQLite**
        - **Documentation**
            - SQLite Documentation

        - **Tutorials**
            - SQLite Tutorial
    - **PostgreSQL**
        - **Documentation**
            - PostgreSQL Documentation
        - **Community**
            - PostgreSQL Telegram group
        - **Cheat Sheet**
            - PostgreSQL Cheat Sheet By GoalKicker
            - PostgreSQL CHEAT SHEET
            - POSTGRESQL 8.3 PSQL CHEAT SHEET
    - **MySQL**
        - **Documentation**
            - MySQL Documentation
        - **Tutorials**
            - MySQL Tutorial
        - **Cheat Sheet**
            - MySQL Cheat Sheet by GoalKicker
    - **Oracle**
        - **Documentation**
            - Oracle Documentation
        - **Tutorials**
            - Oracle Tutorial
        - **Cheat Sheet**
            - Oracle Cheat Sheet by GoalKicker
    - **MongoDB**
        - **Documentation**
            - MongoDB Documentation

        - **Tutorial**
            - Python MongoDB
        - **Cheat Sheet**
            - MongoDB Cheat Sheet by GoalKicker
    - **Redis**
        - **Documentation**
            - Redis Documentation
        - **Article**
            - How to use redis with python by Brad Solomon
        - **Cheat Sheet**
            - Redis Cheat Sheet 1
            - Redis Cheat Sheet 2
    - **MemCached**
        - **Documentation**
            - MemCached Wiki
    - **Apache Cassandra**
        - **Documentation**
            - Apache Cassandra Documentation

- ## Clean Code
    - **Book**
        - ✓ Clean Code in Python by Mariano Anaya
        - Code Complete: A Practical Handbook of Software Construction, Second Edition by Steve Mcconnell

- ## Clean Architecture

  (In Progress)

- ## Caching
    - **Article**
        - Caching in django with redis by Real Python
    - **Video**

        - Redis Course - In-Memory Database Tutorial

- ## Testing

    - **Python `unittest` package**

        - **Documentation**
            - Testing in Python
            - Getting Started With Testing in Python

    - **`PyTest` Testing Package**

        - **Documentation**
            - Official PyTest Documentation

    - **DRF Test Framework**

        - **Documentation**

            - Testing - Django REST framework

        - **Video**

            - Pytest Django and Django Rest Framework

- ## Container Platforms

    - **Docker**

        - **Documentation**

            - Docker Documentation

        - **Book**

            - Docker in Action, Second Edition
            - Docker Deep Dive: Zero to Docker in a single book

        - **Video**

            - Docker Mastery With Django - very academy
            - Docker Course by Mosh Hamedani
            - Docker Swarm Step by Step

        - **Cheat Sheet**

            - Docker Cheat Sheet

    - **Kubernetes**

        - **Documentation**

        - Kubernetes Documentation
    - **Video**
        - "Just me and Opensource" YouTube channel
    - **Book**
        - Kubernetes: Up and Running, 2nd Edition
        - Kubernetes in Action, Second Edition
    - **Community**
        - Kubernetes Discord group

- ## Programming Paradigms
    - **Object-Oriented Programming**
        - **Tutorial**
            - Python Classes and Objects by W3Schools (Beginners)
            - Python Object Oriented Programming by programiz.com (Beginners)
        - **Article**
            - Python OOPs Concepts 3 by GeeksForGeeks (Beginners)
            - Object-Oriented Programming (OOP) in Python 3 by David Amos (Intermediate)
        - **Book**
            - Python Object-Oriented Programming
    - **Functional Programming**
        - **Article**
            - Functional Programming in Python

- ## Architectural Patterns
    - **Microservice**
        - **Book**
            - Microservice Architecture
            - Building Microservices, 2nd Edition
    - **Enterprise Applications**
        - **Book**
            - Patterns of Enterprise Application Architecture
            - Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions

- ## Design Principles
  - **SOLID**
    - **Article**
      - SOLID Principles In Python by Philip Norton
      - Uncle Bob's SOLID principles made easy - in Python!
  - **KISS**
  - **DRY**
- ## Design Patterns
  - **Book**
    - Head First Design Patterns: Building Extensible and Maintainable Object-Oriented Software
    - Django Design Patterns and Best Practices (by Arun Ravindran)
    - Dive Into Design Patterns by Alexander Shvets
  - **Video**
    - Design Patterns Course by Mosh Hamedani
- ## Message Brokers
  - **RabbitMQ**
    - **Article**
      - RabbitMQ Hello World
      - RabbitMQ Work Queues
      - RabbitMQ Publish/Subscribe
      - RabbitMQ Routing
      - RabbitMQ Topics
      - RabbitMQ Remote procedure call (RPC)
- ## WSGI Servers
  - **Gunicorn**
    - **Documentation**
      - Gunicorn Documentation
  - **uWSGI**
    - **Documentation**
      - uWSGI Documentation

- ## ASGI Servers
  - **Uvicorn**
    - **Documentation**
      - Uvicorn Documentation
  - **Starlette**
    - **Documentation**
      - Starlette Documentation
- ## Web Servers
  - **Nginx**
    - **Documentation**
      - NGINX Documentation
    - **Book**
      - NGINX Cookbook
    - **Cheat Sheet**
      - NGINX CHEAT SHEET
  - **Apache**
    - **Documentation**
      - Apache Documentation
    - **Book**
      - Apache Cookbook: Solutions and Examples for Apache Administrators
    - **Cheat Sheet**
      - Apache Cheat Sheet
- ## Availability and Reliability

  (In Progress)
- ## Distributed Systems

  (In Progress)
- ## Reactive Systems

(In Progress)

- ## Refactoring
  - **Video**
    - Dive Into REFACTORING
- ## Security
  - **Book**
    - The Web Application Hacker's Handbook
    - Application_Security_Program_Handbook - a guide for software engineers
    - Designing secure software - a guide for devlopers
    - Hacking APIs Breaking Web Application Programming Interfaces
    - Web Application Security Exploitation and Countermeasures for Modern Web Applications
    - Web Security for Developers: Real Threats, Practical Defense
    - Mastering Modern Web Penetration Testing
  - **WebSite**
    - OWASP Top 10
    - OWASP Top 10 for Web with live training
    - SANS SWAT Checklist
- ## Monitoring

  (In Progress)
- ## Soft Skill

  (In Progress)
- ## Public Cloud

  (In Progress)

Where to Go Next?

(In Progress)