

Python commands for DevOps

1. File Operations

- **Read a file:**

```
python
```

```
with open('file.txt', 'r') as file:  
    content = file.read()  
    print(content)
```

- **Write to a file:**

```
python
```

```
with open('output.txt', 'w') as file:  
    file.write('Hello, DevOps!')
```

2. Environment Variables

- **Get an environment variable:**

```
python
```

```
import os  
  
db_user = os.getenv('DB_USER')  
print(db_user)
```

- **Set an environment variable:**

```
python
```

```
import os  
  
os.environ['NEW_VAR'] = 'value'
```

3. Subprocess Management

- **Run shell commands:**

```
python
```

```
import subprocess
```

```
result = subprocess.run(['ls', '-l'], capture_output=True, text=True)  
print(result.stdout)
```

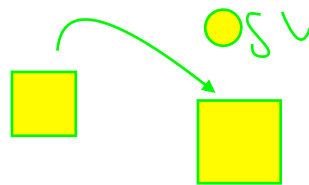
4. API Requests

- **Make a GET request:**

```
python
```

```
import requests
```

```
response = requests.get('https://api.example.com/data')  
print(response.json())
```



5. JSON Handling

- **Read JSON from a file:**

```
python
```

```
import json
```

```
with open('data.json', 'r') as file:  
    data = json.load(file)  
    print(data)
```

- **Write JSON to a file:**

```
python
```

```
import json
```

```
data = {'name': 'DevOps', 'type': 'Workflow'}  
with open('output.json', 'w') as file:  
    json.dump(data, file, indent=4)
```

6. Logging

- **Basic logging setup:**

```
python
```

```
import logging
```

```
logging.basicConfig(level=logging.INFO)  
logging.info("This is an informational message")
```

7. Working with Databases

- **Connect to a SQLite database:**

```
python
```

```
import sqlite3
```

```
conn = sqlite3.connect('example.db')  
cursor = conn.cursor()  
cursor.execute('CREATE TABLE IF NOT EXISTS users (id INTEGER  
PRIMARY KEY, name TEXT)')  
conn.commit()  
conn.close()
```

8. Automation with Libraries

- Using Paramiko for SSH connections:

```
python
```

```
import paramiko ✓
```

```
ssh = paramiko.SSHClient()  
ssh.set_missing_host_key_policy(paramiko.AutoAddPolicy())  
ssh.connect('hostname', username='user', password='password')
```

```
stdin, stdout, stderr = ssh.exec_command('ls')  
print(stdout.read().decode())  
ssh.close()
```

9. Error Handling

- **Try-except block:**

```
python

try:
    # code that may raise an exception
    risky_code()
except Exception as e:
    print(f'Error occurred: {e}')
```

10. Docker Integration

- **Using the docker package to interact with Docker:**

```
python

import docker

client = docker.from_env()
containers = client.containers.list()
for container in containers:
    print(container.name)
```

11. Working with YAML Files

- **Read a YAML file:**

```
python

import yaml

with open('config.yaml', 'r') as file:
    config = yaml.safe_load(file)
    print(config)
```

- **Write to a YAML file:**

```
python

import yaml

data = {'name': 'DevOps', 'version': '1.0'}
with open('output.yaml', 'w') as file:
    yaml.dump(data, file)
```

12. Parsing Command-Line Arguments

- **Using argparse:**

```
python

import argparse

parser = argparse.ArgumentParser(description='Process some integers.')
parser.add_argument('--num', type=int, help='an integer for the accumulator')

args = parser.parse_args()
print(args.num)
```

13. Monitoring System Resources

- **Using psutil to monitor system resources:**

```
python

import psutil

print(f"CPU Usage: {psutil.cpu_percent()}%")
print(f"Memory Usage: {psutil.virtual_memory().percent}%")
```

14. Handling HTTP Requests with Flask

- **Basic Flask API:**

```
python

from flask import Flask, jsonify


app = Flask(__name__)

@app.route('/health', methods=['GET'])
def health_check():
    return jsonify({'status': 'healthy'})

if __name__ == '__main__':
    app.run(host='0.0.0.0', port=5000)
```

15. Creating Docker Containers

- **Using the Docker SDK to create a container:**



```
python

import docker

client = docker.from_env()
container = client.containers.run('ubuntu', 'echo Hello World', detach=True)
print(container.logs())
```

16. Scheduling Tasks

- **Using schedule for task scheduling:**

```
python

import schedule
import time

def job():
    print("Running scheduled job...")

schedule.every(1).minutes.do(job)

while True:
    schedule.run_pending()
    time.sleep(1)
```

17. Version Control with Git

- **Using GitPython to interact with Git repositories:**

```
python

import git

repo = git.Repo('/path/to/repo')
repo.git.add('file.txt')
repo.index.commit('Added file.txt')
```

18. Email Notifications

- **Sending emails using smtplib:**

```
python

import smtplib
from email.mime.text import MIMEText

msg = MIMEText('This is the body of the email')
msg['Subject'] = 'Email Subject'
msg['From'] = 'you@example.com'
msg['To'] = 'recipient@example.com'

with smtplib.SMTP('smtp.example.com', 587) as server:
    server.starttls()
    server.login('your_username', 'your_password')
    server.send_message(msg)
```

19. Creating Virtual Environments

- **Creating and activating a virtual environment:**

```
python

import os
import subprocess

# Create virtual environment
subprocess.run(['python3', '-m', 'venv', 'myenv'])

# Activate virtual environment (Windows)
os.system('myenv\\Scripts\\activate')

# Activate virtual environment (Linux/Mac)
os.system('source myenv/bin/activate')
```

20. Integrating with CI/CD Tools

- **Using the requests library to trigger a Jenkins job:**

```
python
```

```
import requests


url = 'http://your-jenkins-url/job/your-job-name/build'
response = requests.post(url, auth=('user', 'token'))
print(response.status_code)
```

21. Database Migration

- **Using Alembic for database migrations:**

```
bash

alembic revision -m "initial migration"
alembic upgrade head
```



22. Testing Code

- **Using unittest for unit testing:**

```
python

import unittest

def add(a, b):
    return a + b

class TestMathFunctions(unittest.TestCase):
    def test_add(self):
        self.assertEqual(add(2, 3), 5)

if __name__ == '__main__':
    unittest.main()
```

23. Data Transformation with Pandas

- **Using pandas for data manipulation:**

```
python

import pandas as pd

df = pd.read_csv('data.csv')
```



```
df['new_column'] = df['existing_column'] * 2
df.to_csv('output.csv', index=False)
```

24. Using Python for Infrastructure as Code

- **Using boto3 for AWS operations:**

```
python

import boto3

ec2 = boto3.resource('ec2')
instances = ec2.instances.filter(Filters=[{'Name': 'instance-state-name',
'Values': ['running']}])
for instance in instances:
    print(instance.id, instance.state)
```

25. Web Scraping

- **Using BeautifulSoup to scrape web pages:**

```
python

import requests
from bs4 import BeautifulSoup

response = requests.get('http://example.com')
soup = BeautifulSoup(response.content, 'html.parser')
print(soup.title.string)
```

26. Using Fabric for Remote Execution

- **Running commands on a remote server:**

```
python

from fabric import Connection
```

```
conn = Connection(host='user@hostname', connect_kwargs={'password':  
'your_password'})  
conn.run('uname -s')
```

27. Automating AWS S3 Operations

- **Upload and download files using boto3:**

```
python  
  
import boto3  
  
s3 = boto3.client('s3')  
  
# Upload a file  
s3.upload_file('local_file.txt', 'bucket_name', 's3_file.txt')  
  
# Download a file  
s3.download_file('bucket_name', 's3_file.txt', 'local_file.txt')
```

28. Monitoring Application Logs

- **Tail logs using tail -f equivalent in Python:**

```
python  
  
import time  
  
def tail_f(file):  
    file.seek(0, 2) # Move to the end of the file  
    while True:  
        line = file.readline()  
        if not line:  
            time.sleep(0.1) # Sleep briefly  
            continue  
        print(line)  
  
with open('app.log', 'r') as log_file:  
    tail_f(log_file)
```

29. Container Health Checks

- **Check the health of a running Docker container:**

```
python

import docker

client = docker.from_env()
container = client.containers.get('container_id')
print(container.attrs['State']['Health']['Status'])
```

30. Using requests for Rate-Limited APIs

- **Handle rate limiting in API requests:**

```
python

import requests
import time

url = 'https://api.example.com/data'
while True:
    response = requests.get(url)
    if response.status_code == 200:
        print(response.json())
        break
    elif response.status_code == 429: # Too Many Requests
        time.sleep(60) # Wait a minute before retrying
    else:
        print('Error:', response.status_code)
        break
```

31. Docker Compose Integration

- Using docker-compose in Python:

```
python

import os
import subprocess

# Start services defined in docker-compose.yml
subprocess.run(['docker-compose', 'up', '-d'])

# Stop services
subprocess.run(['docker-compose', 'down'])
```

32. Terraform Execution

- Executing Terraform commands with subprocess:

```
python

import subprocess

# Initialize Terraform
subprocess.run(['terraform', 'init'])

# Apply configuration
subprocess.run(['terraform', 'apply', '-auto-approve'])
```

33. Working with Prometheus Metrics

- Scraping and parsing Prometheus metrics:

```
python

import requests

response = requests.get('http://localhost:9090/metrics')
metrics = response.text.splitlines()
```

```
for metric in metrics:  
    print(metric)
```

34. Using pytest for Testing

- **Simple test case with pytest:**

```
python  
  
def add(a, b):  
    return a + b  
  
def test_add():  
    assert add(2, 3) == 5
```

35. Creating Webhooks

- **Using Flask to create a simple webhook:**

```
python  
  
from flask import Flask, request  
  
app = Flask(__name__)  
  
@app.route('/webhook', methods=['POST'])  
def webhook():  
    data = request.json  
    print('Received data:', data)  
    return 'OK', 200  
  
if __name__ == '__main__':  
    app.run(port=5000)
```

36. Using Jinja2 for Configuration Templates

- **Render configuration files with Jinja2:**

```
python

from jinja2 import Template

template = Template('Hello, {{ name }}!')
rendered = template.render(name='DevOps')
print(rendered)
```

37. Encrypting and Decrypting Data

- **Using cryptography to encrypt and decrypt:**

```
python

from cryptography.fernet import Fernet

# Generate a key
key = Fernet.generate_key()
cipher_suite = Fernet(key)

# Encrypt
encrypted_text = cipher_suite.encrypt(b'Secret Data')

# Decrypt
decrypted_text = cipher_suite.decrypt(encrypted_text)
print(decrypted_text.decode())
```

38. Error Monitoring with Sentry

- **Sending error reports to Sentry:**

```
python

import sentry_sdk
```

```
sentry_sdk.init('your_sentry_dsn')

def divide(a, b):
    return a / b

try:
    divide(1, 0)
except ZeroDivisionError as e:
    sentry_sdk.capture_exception(e)
```

39. Setting Up Continuous Integration with GitHub Actions

- **Sample workflow file (.github/workflows/ci.yml):**

```
yaml

name: CI

on: [push]

jobs:
  build:
    runs-on: ubuntu-latest

    steps:
      - uses: actions/checkout@v2
      - name: Set up Python
        uses: actions/setup-python@v2
        with:
          python-version: '3.8'
      - name: Install dependencies
```

```
run: |  
    pip install -r requirements.txt  
- name: Run tests  
run: |  
    pytest
```

40. Creating a Simple API with FastAPI

- **Using FastAPI for high-performance APIs:**

```
python  
  
from fastapi import FastAPI  
  
app = FastAPI()  
  
@app.get('/items/{item_id}')  
async def read_item(item_id: int):  
    return {'item_id': item_id}  
  
if __name__ == '__main__':  
    import uvicorn  
    uvicorn.run(app, host='0.0.0.0', port=8000)
```

41. Log Aggregation with ELK Stack

- **Sending logs to Elasticsearch:**

```
python  
  
from elasticsearch import Elasticsearch  
  
es = Elasticsearch(['http://localhost:9200'])
```



```
log = {'level': 'info', 'message': 'This is a log message'}
es.index(index='logs', body=log)
```

42. Using pandas for ETL Processes

- **Performing ETL with pandas:**

```
python

import pandas as pd

# Extract
data = pd.read_csv('source.csv')

# Transform
data['new_column'] = data['existing_column'].apply(lambda x: x * 2)

# Load
data.to_csv('destination.csv', index=False)
```

43. Serverless Applications with AWS Lambda

- **Deploying a simple AWS Lambda function:**

```
python

import json

def lambda_handler(event, context):
    return {
        'statusCode': 200,
        'body': json.dumps('Hello from Lambda!')
    }
```

44. Working with Redis

- **Basic operations with Redis using redis-py:**

```
python

import redis

r = redis.StrictRedis(host='localhost', port=6379, db=0)

# Set a key
r.set('foo', 'bar')

# Get a key
print(r.get('foo'))
```

45. Using pyngrok for Tunneling

- **Create a tunnel to expose a local server:**

```
python

from pyngrok import ngrok

# Start the tunnel
public_url = ngrok.connect(5000)
print('Public URL:', public_url)

# Keep the tunnel open
input('Press Enter to exit...')
```

46. Creating a REST API with Flask-RESTful

- **Building REST APIs with Flask-RESTful:**

```
python

from flask import Flask
from flask_restful import Resource, Api

app = Flask(__name__)
api = Api(app)

class HelloWorld(Resource):
    def get(self):
        return {'hello': 'world'}

api.add_resource(HelloWorld, '/')

if __name__ == '__main__':
    app.run(debug=True)
```

47. Using asyncio for Asynchronous Tasks

- **Running asynchronous tasks in Python:**

```
python

import asyncio

async def main():
    print('Hello')
    await asyncio.sleep(1)
    print('World')
```

```
asyncio.run(main())
```

48. Network Monitoring with scapy

- **Packet sniffing using scapy:**

```
python


from scapy.all import sniff

def packet_callback(packet):
    print(packet.summary())

sniff(prn=packet_callback, count=10)
```

49. Handling Configuration Files with configparser

- **Reading and writing to INI configuration files:**



```
python

import configparser

config = configparser.ConfigParser()
config.read('config.ini')

print(config['DEFAULT']['SomeSetting'])

config['DEFAULT']['NewSetting'] = 'Value'
with open('config.ini', 'w') as configfile:
    config.write(configfile)
```

50. WebSocket Client Example

- **Creating a WebSocket client with websocket-client:**

```
python

import websocket

def on_message(ws, message):
    print("Received message:", message)

ws = websocket.WebSocketApp("ws://echo.websocket.org",
                            on_message=on_message)
ws.run_forever()
```

51. Creating a Docker Image with Python

- **Using docker library to build an image:**

```
python

import docker

client = docker.from_env()

# Dockerfile content
dockerfile_content = """
FROM python:3.9-slim
WORKDIR /app
COPY . /app
RUN pip install -r requirements.txt
CMD ["python", "app.py"]
```

```
"""

# Create a Docker image
image, build_logs = client.images.build(fileobj=dockerfile_content.encode('utf-8'), tag='my-python-app')

for line in build_logs:
    print(line)
```

52. Using psutil for System Monitoring

- Retrieve system metrics such as CPU and memory usage:

```
python

import psutil

print("CPU Usage:", psutil.cpu_percent(interval=1), "%")
print("Memory Usage:", psutil.virtual_memory().percent, "%")
```

53. Database Migration with Alembic

- Script to initialize Alembic migrations:

```
python

from alembic import command
from alembic import config

alembic_cfg = config.Config("alembic.ini")
command.upgrade(alembic_cfg, "head")
```

54. Using paramiko for SSH Connections

- Execute commands on a remote server via SSH:

```
python
```

```
import paramiko
```

```
client = paramiko.SSHClient()
```

```
client.set_missing_host_key_policy(paramiko.AutoAddPolicy())
```

```
client.connect('hostname', username='user', password='your_password')
```

```
stdin, stdout, stderr = client.exec_command('ls -la')
```

```
print(stdout.read().decode())
```

```
client.close()
```

55. CloudFormation Stack Creation with boto3

- **Creating an AWS CloudFormation stack:**

```
python
```

```
import boto3

cloudformation = boto3.client('cloudformation')

with open('template.yaml', 'r') as template_file:
    template_body = template_file.read()

response = cloudformation.create_stack(
    StackName='MyStack',
    TemplateBody=template_body,
    Parameters=[
        {
            'ParameterKey': 'InstanceType',
            'ParameterValue': 't2.micro'
        },
    ],
    TimeoutInMinutes=5,
    Capabilities=['CAPABILITY_NAMED_IAM'],
)
print(response)
```

56. Automating EC2 Instance Management

- **Starting and stopping EC2 instances:**

```
python

import boto3

ec2 = boto3.resource('ec2')

# Start an instance
instance = ec2.Instance('instance_id')
instance.start()

# Stop an instance
instance.stop()
```


57. Automated Backup with shutil

- **Backup files to a specific directory:**

```
python

import shutil
import os

source_dir = '/path/to/source'
backup_dir = '/path/to/backup'

shutil.copytree(source_dir, backup_dir)
```

58. Using watchdog for File System Monitoring

- **Monitor changes in a directory:**

```
python

from watchdog.observers import Observer
from watchdog.events import FileSystemEventHandler

class MyHandler(FileSystemEventHandler):
    def on_modified(self, event):
        print(f'File modified: {event.src_path}')

event_handler = MyHandler()
observer = Observer()
observer.schedule(event_handler, path='path/to/monitor', recursive=False)
observer.start()

try:
    while True:
        time.sleep(1)
except KeyboardInterrupt:
    observer.stop()
observer.join()
```

59. Load Testing with locust

- **Basic Locust load testing setup:**

```
python

from locust import HttpUser, task, between

class MyUser(HttpUser):
    wait_time = between(1, 3)

    @task
    def load_test(self):
        self.client.get('/')

# To run, save this as locustfile.py and run: locust
```

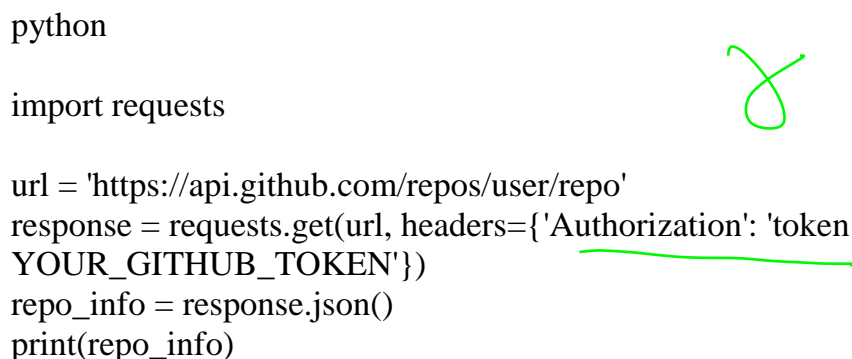
60. Integrating with GitHub API

- **Fetching repository details using GitHub API:**

```
python

import requests

url = 'https://api.github.com/repos/user/repo'
response = requests.get(url, headers={'Authorization': 'token YOUR_GITHUB_TOKEN'})
repo_info = response.json()
print(repo_info)
```



61. Managing Kubernetes Resources with kubectl

- **Using subprocess to interact with Kubernetes:**

```
python

import subprocess

# Get pods
```

```
subprocess.run(['kubectl', 'get', 'pods'])

# Apply a configuration
subprocess.run(['kubectl', 'apply', '-f', 'deployment.yaml'])
```

62. Using pytest for CI/CD Testing

- **Integrate tests in your CI/CD pipeline:**

```
python

# test_example.py
def test_addition():
    assert 1 + 1 == 2

# Run pytest in your CI/CD pipeline
subprocess.run(['pytest'])
```

63. Creating a Simple CLI Tool with argparse

- **Build a command-line interface:**

```
python

import argparse

parser = argparse.ArgumentParser(description='Process some integers.')
```

```
parser.add_argument('integers', metavar='N', type=int, nargs='+', help='an
integer to be processed')
parser.add_argument('--sum', dest='accumulate', action='store_const',
const=sum, default=max, help='sum the integers (default: find the max)')

args = parser.parse_args()
print(args.accumulate(args.integers))
```

64. Using dotenv for Environment Variables

- **Load environment variables from a .env file:**

```
python

from dotenv import load_dotenv
import os

load_dotenv()

database_url = os.getenv('DATABASE_URL')
print(database_url)
```

65. Implementing Web Scraping with BeautifulSoup

- **Scraping a web page for data:**

```
python

import requests
from bs4 import BeautifulSoup

response = requests.get('http://example.com')
soup = BeautifulSoup(response.text, 'html.parser')

for item in soup.find_all('h1'):
    print(item.text)
```

66. Using PyYAML for YAML Configuration Files

- **Load and dump YAML files:**

```
python

import yaml

# Load YAML file
with open('config.yaml', 'r') as file:
    config = yaml.safe_load(file)
    print(config)

# Dump to YAML file
with open('output.yaml', 'w') as file:
    yaml.dump(config, file)
```

67. Creating a Simple Message Queue with RabbitMQ

- **Send and receive messages using pika:**

```
python

import pika

# Sending messages
connection =
pika.BlockingConnection(pika.ConnectionParameters('localhost'))
channel = connection.channel()
channel.queue_declare(queue='hello')

channel.basic_publish(exchange='', routing_key='hello', body='Hello World!')
connection.close()

# Receiving messages
def callback(ch, method, properties, body):
    print("Received:", body)
```

```

connection =
pika.BlockingConnection(pika.ConnectionParameters('localhost'))
channel = connection.channel()
channel.queue_declare(queue='hello')

channel.basic_consume(queue='hello', on_message_callback=callback,
auto_ack=True)
channel.start_consuming()

```

68. Using sentry_sdk for Monitoring

- **Integrate Sentry for error tracking:**

```

python

import sentry_sdk

sentry_sdk.init("YOUR_SENTRY_DSN")

try:
    # Your code that may throw an exception
    1 / 0
except Exception as e:
    sentry_sdk.capture_exception(e)

```

69. Using openpyxl for Excel File Manipulation

- **Read and write Excel files:**

```

python

from openpyxl import Workbook, load_workbook

# Create a new workbook
wb = Workbook()
ws = wb.active
ws['A1'] = 'Hello'
wb.save('sample.xlsx')

```

```
# Load an existing workbook
wb = load_workbook('sample.xlsx')
ws = wb.active
print(ws['A1'].value)
```

70. Using sqlalchemy for Database Interaction

- **Define a model and perform CRUD operations:**

python

```
from sqlalchemy import create_engine, Column, Integer, String
from sqlalchemy.ext.declarative import declarative_base
from sqlalchemy.orm import sessionmaker
```

```
Base = declarative_base()
```

```
class User(Base):
    __tablename__ = 'users'
    id = Column(Integer, primary_key=True)
    name = Column(String)
```

```
engine = create_engine('sqlite:///example.db')
Base.metadata.create_all(engine)
```

```
Session = sessionmaker(bind=engine)
session = Session()
```

```
# Create
new_user = User(name='Alice')
session.add(new_user)
```

71. Monitoring Docker Containers with docker-py

- **Fetch and print the status of running containers:**

python

```
import docker

client = docker.from_env()
containers = client.containers.list()

for container in containers:
    print(f'Container Name: {container.name}, Status: {container.status}')
```

72. Using flask to Create a Simple API

- **Basic API setup with Flask:**

```
python

from flask import Flask, jsonify

app = Flask(__name__)

@app.route('/api/data', methods=['GET'])
def get_data():
    return jsonify({"message": "Hello, World!"})

if __name__ == '__main__':
    app.run(debug=True)
```

73. Automating Certificate Renewal with certbot

- **Script to renew Let's Encrypt certificates:**

```
python

import subprocess

# Renew certificates
subprocess.run(['certbot', 'renew'])
```


74. Using numpy for Data Analysis

- **Performing basic numerical operations:**

```
python

import numpy as np

data = np.array([1, 2, 3, 4, 5])
mean_value = np.mean(data)
print("Mean Value:", mean_value)
```

75. Creating and Sending Emails with **smtplib**

- **Send an email using Python:**

```
python

import smtplib
from email.mime.text import MIMEText

sender = 'you@example.com'
recipient = 'recipient@example.com'
msg = MIMEText('This is a test email.')
msg['Subject'] = 'Test Email'
msg['From'] = sender
msg['To'] = recipient

with smtplib.SMTP('smtp.example.com') as server:
    server.login('username', 'password')
    server.send_message(msg)
```

76. Using **schedule** for Task Scheduling

- **Schedule tasks at regular intervals:**

```
python
```

```
import schedule
import time

def job():
    print("Job is running...")

schedule.every(10).minutes.do(job)

while True:
    schedule.run_pending()
    time.sleep(1)
```

77. Using matplotlib for Data Visualization

- **Plotting a simple graph:**

```
python

import matplotlib.pyplot as plt

x = [1, 2, 3, 4, 5]
y = [2, 3, 5, 7, 11]

plt.plot(x, y)
plt.xlabel('X-axis')
plt.ylabel('Y-axis')
plt.title('Simple Plot')
plt.show()
```

78. Creating a Custom Python Package

- **Structure your project as a package:**

markdown

```
my_package/
├── __init__.py
├── module1.py
└── module2.py
```

- **setup.py for packaging:**

```
python  
  
from setuptools import setup, find_packages  
  
setup(  
    name='my_package',  
    version='0.1',  
    packages=find_packages(),  
    install_requires=[  
        'requests',  
        'flask'  
    ],  
)
```

79. Using pytest for Unit Testing

- **Writing a simple unit test:**

```
python  
  
# test_sample.py  
def add(a, b):  
    return a + b  
  
def test_add():  
    assert add(1, 2) == 3
```

80. Implementing OAuth with requests-oauthlib

- **Authenticate with an API using OAuth:**

```
python  
  
from requests_oauthlib import OAuth1Session  
  
oauth = OAuth1Session(client_key='YOUR_CLIENT_KEY',  
    client_secret='YOUR_CLIENT_SECRET')  
response = oauth.get('https://api.example.com/user')  
print(response.json())
```

81. Using pandas for Data Manipulation

- **Load and manipulate data in a CSV file:**

```
python

import pandas as pd

df = pd.read_csv('data.csv')
print(df.head())

# Filter data
filtered_df = df[df['column_name'] > 10]
print(filtered_df)
```

82. Using requests for HTTP Requests

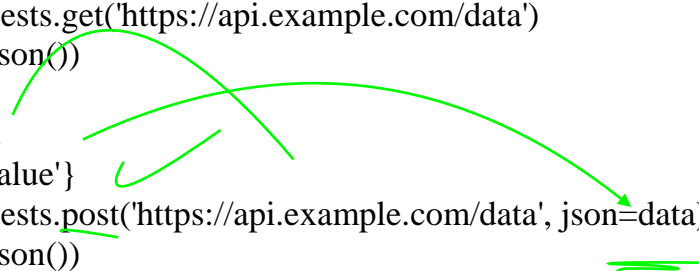
- **Making a GET and POST request:**

```
python

import requests

# GET request
response = requests.get('https://api.example.com/data')
print(response.json())


# POST request
data = {'key': 'value'}
response = requests.post('https://api.example.com/data', json=data)
print(response.json())
```



83. Creating a Basic Web Server with http.server

- **Simple HTTP server to serve files:**

```
python
```



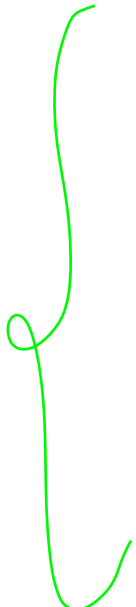
```
from http.server import SimpleHTTPRequestHandler, HTTPServer

PORT = 8000
handler = SimpleHTTPRequestHandler

with HTTPServer(("", PORT), handler) as httpd:
    print(f'Serving on port {PORT}')
    httpd.serve_forever()
```

84. Using Flask for Webhooks

- **Handling incoming webhook requests:**



```
python

from flask import Flask, request


app = Flask(__name__)

@app.route('/webhook', methods=['POST'])
def webhook():
    data = request.json
    print(data)
    return "", 200

if __name__ == '__main__':
    app.run(port=5000)
```

85. Creating a Bash Script with subprocess

- **Run shell commands from Python:**



```
python

import subprocess

subprocess.run(['echo', 'Hello, World!'])
```

86. Using docker-compose with Python

- Programmatically run Docker Compose commands:

```
python

import subprocess

subprocess.run(['docker-compose', 'up', '-d'])
```

87. Using moto for Mocking AWS Services in Tests

- Mocking AWS S3 for unit testing:

```
python

import boto3
from moto import mock_s3

@mock_s3
def test_s3_upload():
    s3 = boto3.client('s3', region_name='us-east-1')
    s3.create_bucket(Bucket='my-bucket')
    s3.upload_file('file.txt', 'my-bucket', 'file.txt')
    # Test logic here
```

88. Using asyncio for Asynchronous Tasks

- Run multiple tasks concurrently:

```
python

import asyncio

async def say_hello():
    print("Hello")
    await asyncio.sleep(1)
    print("World")
```

```
async def main():
    await asyncio.gather(say_hello(), say_hello())

asyncio.run(main())
```

89. Using flask-cors for Cross-Origin Resource Sharing

- Allow CORS in a Flask app:

```
python

from flask import Flask
from flask_cors import CORS

app = Flask(__name__)
CORS(app)

@app.route('/data', methods=['GET'])
def data():
    return {"message": "Hello from CORS!"}

if __name__ == '__main__':
    app.run()
```

90. Using pytest Fixtures for Setup and Teardown

- Create a fixture to manage resources:

```
python

import pytest

@pytest.fixture
def sample_data():
    data = {"key": "value"}
    yield data # This is the test data
    # Teardown code here (if necessary)
```

```
def test_sample_data(sample_data):  
    assert sample_data['key'] == 'value'
```

91. Using `http.client` for Low-Level HTTP Requests

- **Make a raw HTTP GET request:**

```
python  
  
import http.client  
  
conn = http.client.HTTPSConnection("www.example.com")  
conn.request("GET", "/")  
response = conn.getresponse()  
print(response.status, response.reason)  
data = response.read()  
conn.close()
```

92. Implementing Redis Caching with `redis-py`

- **Basic operations with Redis:**

```
python  
  
import redis  
  
r = redis.StrictRedis(host='localhost', port=6379, db=0)  
  
# Set and get value  
r.set('key', 'value')  
print(r.get('key').decode('utf-8'))
```

93. Using `json` for Data Serialization

- **Convert Python objects to JSON:**


```
python

import json

data = {"key": "value"}
json_data = json.dumps(data)
print(json_data)
```

94. Using `xml.etree.ElementTree` for XML Processing

- **Parse an XML file:**

```
python

import xml.etree.ElementTree as ET

tree = ET.parse('data.xml')
root = tree.getroot()

for child in root:
    print(child.tag, child.attrib)
```

95. Creating a Virtual Environment with `venv`

- **Programmatically create a virtual environment:**

```
python

import venv

venv.create('myenv', with_pip=True)
```

96. Using `psutil` for System Monitoring

- **Get system memory usage:**


```
python
```

```
import psutil

memory = psutil.virtual_memory()
print(f'Total Memory: {memory.total}, Available Memory: {memory.available}')
```

97. Using sqlite3 for Lightweight Database Management

- **Basic SQLite operations:**



```
python

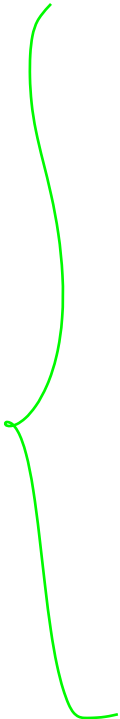
import sqlite3

conn = sqlite3.connect('example.db')
c = conn.cursor()

c.execute("""CREATE TABLE IF NOT EXISTS users (id INTEGER
PRIMARY KEY, name TEXT)""")
c.execute("INSERT INTO users (name) VALUES ('Alice')")
conn.commit()

for row in c.execute('SELECT * FROM users'):
    print(row)

conn.close()
```



98. Using pytest to Run Tests in Parallel

- **Run tests concurrently:**

```
bash

pytest -n 4 # Run tests in parallel with 4 workers
```

99. Using argparse for Command-Line Arguments

- **Parse command-line arguments:**

```
python
```

```
import argparse
```

```
parser = argparse.ArgumentParser(description='Process some integers.')
parser.add_argument('integers', metavar='N', type=int, nargs='+',
                    help='an integer for the accumulator')
parser.add_argument('--sum', dest='accumulate', action='store_const',
                    const=sum, default=max,
                    help='sum the integers (default: find the max)')
```

```
args = parser.parse_args()
print(args.accumulate(args.integers))
```

100. Using jsonschema for JSON Validation

- **Validate JSON against a schema:**

```
python
```

```
from jsonschema import validate
from jsonschema.exceptions import ValidationError
```

```
schema = {
    "type": "object",
    "properties": {
        "name": {"type": "string"},
        "age": {"type": "integer", "minimum": 0}
    },
    "required": ["name", "age"]
}
```

```
data = {"name": "John", "age": 30}
```

```
try:
    validate(instance=data, schema=schema)
    print("Data is valid")
except ValidationError as e:
    print(f"Data is invalid: {e.message}")
```