5-Day Workshop Plan

Python Programming

Day 1: Introduction to Python

Session Overview: Day 1 will introduce Python programming, covering basic syntax, variables, data types, and simple operations.

Schedule:

- 10:00 AM - 10:15 AM: Welcome & Introduction
- Overview of the workshop and introduction to Python's capabilities.
- 10:15 AM - 11:15 AM: Python Basics
- Understanding Python syntax, variables, data types (integers, strings, lists, etc.), and basic operators.
- 11:15 AM - 11:30 AM: Break
- 11:30 AM - 1:00 PM: Control Structures
- Introduction to conditional statements (if, else, elif) and loops (for, while).
- 2:00 PM - 2:15 PM: Recap and Q&A
- Review the concepts of variables, data types, and control structures.
- 2:15 PM - 3:15 PM: Functions
- Learn how to define and use functions in Python, passing arguments, and returning values.
- 3:15 PM - 3:30 PM: Break
- 3:30 PM - 5:00 PM: Hands-on: Python Basics Practice
- Practice coding using variables, loops, conditionals, and functions.

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Day 2: Data Structures and Algorithms

Session Overview: Day 2 will focus on Python data structures (lists, tuples, dictionaries, sets) and basic algorithms (sorting, searching).

Schedule:

- 10:00 AM - 10:15 AM: Recap of Day 1
- Quick review of Python basics and functions.
- 10:15 AM - 11:15 AM: Lists and Tuples
- Understanding lists, tuples, and operations like indexing, slicing, appending, and sorting.
- 11:15 AM - 11:30 AM: Break
- 11:30 AM - 1:00 PM: Dictionaries and Sets
- Learn how to use dictionaries and sets for storing data and performing operations like key-value pairs, searching, and set operations.
- 2:00 PM - 2:15 PM: Recap and Q&A
- Review data structures covered and address any questions.
- 2:15 PM - 3:15 PM: Basic Algorithms (Sorting, Searching)
- Introduction to sorting algorithms (Bubble, Selection) and searching algorithms (Linear, Binary).
- 3:15 PM - 3:30 PM: Break
- 3:30 PM - 5:00 PM: Hands-on: Data Structures and Algorithms Practice
- Coding exercises on implementing data structures and algorithms.

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Day 3: Object-Oriented Programming (OOP)

Session Overview: Day 3 will cover object-oriented programming (OOP) concepts in Python, such as classes, objects, inheritance, and polymorphism.

Schedule:

- 10:00 AM - 10:15 AM: Recap of Day 2
- Review of data structures and algorithms.
- 10:15 AM - 11:15 AM: Introduction to OOP
- Learn the principles of OOP: classes, objects, attributes, methods, and the concept of self.
- 11:15 AM - 11:30 AM: Break
- 11:30 AM - 1:00 PM: Inheritance and Polymorphism
- Explore inheritance, method overriding, and polymorphism in Python.
- 2:00 PM - 2:15 PM: Recap and Q&A
- Clarification of OOP concepts and principles.
- 2:15 PM - 3:15 PM: Encapsulation and Abstraction
- Learn how to implement encapsulation and abstraction in Python using private/public attributes and abstract classes.
- 3:15 PM - 3:30 PM: Break
- 3:30 PM - 5:00 PM: Hands-on: OOP Practice
- Create classes, use inheritance, and implement encapsulation and abstraction in Python.

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Day 4: Working with Files, Exceptions, and Libraries

Session Overview: Day 4 will teach how to handle files, work with exceptions, and introduce useful Python libraries for real-world applications.

Schedule:

- 10:00 AM - 10:15 AM: Recap of Day 3
- Quick review of OOP concepts.
- 10:15 AM - 11:15 AM: File Handling
- Learn how to read, write, and manipulate files (txt, CSV, JSON) in Python.
- 11:15 AM - 11:30 AM: Break
- 11:30 AM - 1:00 PM: Exception Handling
- Introduction to handling errors and exceptions using try, except, else, and finally blocks.
- 2:00 PM - 2:15 PM: Recap and Q&A
- Address any doubts about file handling and exception handling.
- 2:15 PM - 3:15 PM: Introduction to Python Libraries
- Overview of libraries like NumPy, pandas, and Matplotlib for data analysis and visualization.
- 3:15 PM - 3:30 PM: Break
- 3:30 PM - 5:00 PM: Hands-on: File Handling and Libraries Practice
- Practical session on reading/writing files and using libraries like pandas and Matplotlib.

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Day 5: Advanced Python Topics and Project

Session Overview: Day 5 will cover advanced Python concepts, including regular expressions and web scraping, followed by a final project for hands-on experience.

Schedule:

- 10:00 AM - 10:15 AM: Recap of Day 4
- Review of file handling, exceptions, and libraries.
- 10:15 AM - 11:15 AM: Regular Expressions
- Introduction to regular expressions (regex) and their applications in pattern matching and text processing.
- 11:15 AM - 11:30 AM: Break
- 11:30 AM - 1:00 PM: Web Scraping
- Learn how to scrape web data using Python libraries like BeautifulSoup and requests.
- 2:00 PM - 2:15 PM: Recap and Q&A
- Review of advanced topics and their applications.
- 2:15 PM - 3:15 PM: Final Project Introduction
- Introduction to the final project and guidelines.
- 3:15 PM - 3:30 PM: Break
- 3:30 PM - 5:00 PM: Hands-on: Final Project
- Participants work on a small Python project combining concepts learned during the workshop (file handling, data analysis, OOP, etc.).