

Python Foundations with Data and OCR Exercises

FA-0801 · 21 hours

Software Development · Data & Analytics

Introduction

Learn Python fundamentals through exercises, quizzes and code-alongs, then explore practical data acquisition, file processing, external libraries and OCR. Selected prepared examples introduce stock-data extraction and visualisation, web scraping and error handling.

The 21-hour programme gives beginners a foundation and guided exposure to application topics, not independent mastery of OCR, native-library integration or concurrent systems.

Learning outcomes

- Write simple scripts using variables, numbers, strings, conditions, lists, dictionaries and loops.
- Define functions and use scope, argument passing and basic recursion.
- Read and write structured files and use operating-system utilities.
- Use selected external packages to acquire and process example data and demonstrate OCR.
- Format text, handle common errors and compare pattern matching with if/elif control flow.
- Locate documentation and extend learning through small guided projects.

Prerequisites

Basic computer skills, familiarity with upload/download and local files, and comfort with English-language material. Use a computer with a selected supported Python 3 environment, reliable access to resources and any hosted account required for prepared exercises.

Training outline

1. Getting started

- Logic
- Algorithm
- Programming world
- Getting Started
- Installing Python
- IDEs
- IDLE
- Notebooks
- Google's Colab

2. Variables and scripts

- Variables and references to objects
- Review of variables and scripts
- What is a variable?
- Updating our Script
- Variables Quiz
- Exercise

3. Numbers and arithmetic

- The 123s - Numbers in Python
- Basic Arithmetic, Floats and Modulo
- Ordering Operations using (Brackets!)
- Hands on Project
- Fun with the Python math Module
- Python numbers quiz
- Exercise

4. Strings

- The ABCs - How to use Strings to handle text in Python
- Hello World!

- Coding Exercise: Hello World!
- Coding Exercise: Fixing Broken Strings
- Project
- Exercise
- Cool String Methods
- Quiz
- Coding Exercise

5. Conditions

- Logic and Conditional Flow
- Booleans & Comparison Operators
- Quiz: Comparison Operators Quiz
- if Statements
- Coding Exercise: If Statements Challenge
- Logical Operators
- Quiz

6. Data structures

- Python Data structures
- Lists
- Project
- More ways to add items to lists
- Dictionaries

7. Loops and functions

- Loops In Python
- While Loops
- For Loops
- List Comprehensions
- Project
- Functions in Python
- Coding Exercise
- Variable Scope
- Keyword arguments and default parameter values

- Function parameters
- Packing & Unpacking using *args and **kwargs

8. Practical data exercises

- Recursion
- Data stream conversion
- Data acquisition
- Using External Libraries
- Visualising a prepared historical stock dataset
- Extracting historical stock data through a selected available source

9. OCR, external dependencies and errors

- Optical Character Recognition
- Installing selected native dependencies or C-backed packages required by the prepared example
- Using f-string management to display textual data
- Introductory web scraping using permitted example pages or prepared data
- Error Handling
- Error Management

10. Operating-system and file utilities

- Using the OS utilities
- OS dependent I/O
- File Reading
- File Writing
- Structured File Reading
- Reading without "with"
- Reading with "with"

11. Language features and concurrent I/O introduction

- Formatted string literals (f-strings), introduced in Python 3.6
- String customizations
- Structural pattern matching with match/case, introduced in Python 3.10
- Pattern matching compared with if/elif; not a traditional switch statement

- Conditional
- Introduction to concurrent I/O and resource-management considerations

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