BOSSCODER ACADEMY

MASTER PYTHON

in 10 Days

BASIC → INTERMEDIATE

Your Ultimate Guide to Data Science & ML

DAY 01

INTRODUCTION AND SETUP

🎯 Aim

Get acquainted with Python and set up the development environment.

📂 Resources

- Python Official Documentation: https://www.python.org/doc/
- Codecademy Python Course: https://www.codecademy.com/learn/learn-python-3

❓ Example Questions

Q 1: Write a Python program to print "Hello, World!"

Q 2: Calculate the sum of two numbers entered by the user.

Q 3: Convert temperature from Celsius to Fahrenheit.

Practice Questions

1. Write a Python program to calculate the area of a rectangle given its length and width.
2. Create a program that takes a user's name and age as input and prints a greeting message.
3. Write a program to check if a number is even or odd.
4. Given a list of numbers, find the maximum and minimum values.
5. Create a Python function to check if a given string is a palindrome.
6. Calculate the compound interest for a given principal amount, interest rate, and time period.
7. Write a program that converts a given number of days into years, weeks, and days.
8. Given a list of integers, find the sum of all positive numbers.
9. Create a program that takes a sentence as input and counts the number of words in it.
10. Implement a program that swaps the values of two variables.

DAY 02

VARIABLES AND DATA TYPES

🎯 Aim

Understand variables and different data types in Python.

📂 Resources

- W3Schools Python Variables: https://www.w3schools.com/python/python_variables.asp
- Real Python Data Types: https://realpython.com/python-data-types/

❓ Example Questions

Q 1: Create variables for storing a person's name, age, and average test score.

Q 2: Concatenate two strings and print the result.

Q 3: Create a list of fruits and access elements using indexing.

Practice Questions

1. Given a list of numbers, find the sum and average.
2. Create a program that takes a temperature in Celsius and converts it to Kelvin.
3. Implement a program that checks if a given string is a palindrome.
4. Create a function to reverse a given string.
5. Given a list of names, concatenate them into a single string separated by spaces.
6. Write a Python program to check if a given string is a pangram (contains all letters of the alphabet).
7. Calculate the area and circumference of a circle given its radius.
8. Implement a program that converts a given number of minutes into hours and minutes.
9. Create a function to count the number of vowels in a given string.
10. Write a program to check if a number is prime.

DAY 03

CONTROL FLOW AND LOOPS

🎯 Aim

Learn about conditional statements and loops in Python.

📂 Resources

- W3Schools Python Conditions: https://www.w3schools.com/python/python_conditions.asp
- Real Python Python Loops: https://realpython.com/python-for-loop/

❓ Example Questions

Q 1: Write a program that checks if a given number is positive, negative, or zero.

Q 2: Create a loop that prints the first 10 even numbers.

Q 3: Implement a program that finds the largest number in a list.

Practice Questions

1. Create a program that takes a year as input and checks if it is a leap year or not.
2. Given a list of integers, find all the even numbers and store them in a new list.
3. Write a Python program to check if a given number is a prime number.
4. Create a program that generates the Fibonacci sequence up to a given number of terms.
5. Given a list of names, print all names starting with the letter 'A'.
6. Implement a program that prints the multiplication table of a given number.
7. Write a program that calculates the factorial of a given number.
8. Create a loop that prints all prime numbers between 1 and 50.
9. Given a list of words, count the number of words with more than five characters.
10. Calculate the sum of digits of a given number.

DAY 04

FUNCTIONS

🎯 Aim

Understand functions and how to define and call them.

📂 Resources

- W3Schools Python Functions: https://www.w3schools.com/python/python_functions.asp
- Real Python Defining Functions: https://realpython.com/defining-your-own-python-function/

❓ Example Questions

Q 1: Write a function to calculate the area of a circle given its radius.

Q 2: Create a function to check if a number is prime.

Q 3: Implement a function that reverses a given string.

Practice Questions

1. Given a list of numbers, create a function to find the sum of all positive numbers.
2. Write a Python function to check if a given string is a palindrome.
3. Implement a function that returns the factorial of a given number using recursion.
4. Create a function to find the square of each element in a given list.
5. Write a function to check if a number is even or odd and return "Even" or "Odd" accordingly.
6. Calculate the area of a triangle given its base and height using a function.
7. Create a function that takes a list of strings and returns the list sorted alphabetically.
8. Write a function that takes two lists and returns their intersection (common elements).
9. Implement a function to check if a given year is a leap year or not.
10. Create a function that takes a number as input and prints its multiplication table.

DAY 05

STRING MANIPULATION

🎯 Aim

Learn about common string operations and formatting.

📂 Resources

- W3Schools Python Strings: https://www.w3schools.com/python/python_strings.asp
- Real Python Python String Formatting: https://realpython.com/python-string-formatting/

❓ Example Questions

Q 1: Create a program that checks if a given string is a palindrome.

Q 2: Write a function to count the number of vowels in a given string.

Q 3: Write a function to count the number of vowels in a given string.

Practice Questions

1. Given a list of words, concatenate them into a single string separated by spaces.
2. Create a function to reverse a given string.
3. Write a program that takes a sentence as input and counts the number of words in it.
4. Implement a function that checks if a given string is a pangram (contains all letters of the alphabet).
5. Given a string, write a function to remove all vowels from it and return the modified string.
6. Write a Python program to find the length of the longest word in a sentence.
7. Create a function that takes a sentence as input and returns the sentence in reverse order.
8. Given a list of names, count the number of names that start with a vowel.
9. Write a function to remove all duplicate characters from a given string.
10. Implement a program that takes a sentence and a word as input and checks if the word is present in the sentence.

DAY 06

LISTS AND TUPLES

🎯 Aim

Understand lists and tuples in Python and their operations.

📂 Resources

- W3Schools Python Lists: https://www.w3schools.com/python/python_lists.asp
- Real Python Lists and Tuples: https://realpython.com/python-lists-tuples/

❓ Example Questions

Q 1: Given a list of numbers, find the sum and average using built-in functions.

Q 2: Create a list of fruits and add a new fruit to the list.

Q 3: Access elements in a tuple using indexing.

Practice Questions

1. Given two lists of numbers, concatenate them into a single list.
2. Write a program that finds the largest and smallest elements in a list.
3. Implement a function that takes a list of numbers and returns a new list with the squared values.
4. Create a program that finds the common elements between two lists and stores them in a new list.
5. Given a list of words, find the word with the maximum length and its length.
6. Write a Python program to count the occurrences of each element in a given list.
7. Given a list of names, remove all duplicate names and print the unique names.
8. Create a function that takes a list of strings and returns the list sorted by the length of the strings.
9. Write a program that checks if a given list is sorted in ascending order.
10. Implement a function that takes two lists and returns their union (all unique elements from both lists).

DAY 07

DICTIONARIES AND SETS

🎯 Aim

Understand dictionaries and sets in Python and their operations.

📂 Resources

- W3Schools Python Dictionaries: https://www.w3schools.com/python/python_dictionaries.asp
- Real Python Dictionaries and Sets: https://realpython.com/python-dicts/

❓ Example Questions

Q 1: Create a dictionary to store information about a person (name, age, address).

Q 2: Add a new key-value pair to an existing dictionary.

Q 3: Create a set of unique numbers from a list of numbers.

Practice Questions

1. Given two dictionaries, merge them into a single dictionary.
2. Write a program that finds the most frequent element in a list.
3. Implement a function that removes a key-value pair from a dictionary.
4. Create a program that checks if two sets have any elements in common.
5. Given a list of dictionaries, find the dictionary with the highest value for a specific key.
6. Write a Python program that counts the number of occurrences of each character in a given string using a dictionary.
7. Given two sets, find the union, intersection, and difference between them.
8. Create a function that takes a list of dictionaries and sorts them based on a specified key.
9. Write a program that finds the average value of all the elements in a list of dictionaries.
10. Implement a function that takes a list of strings and returns a set of unique characters present in all strings.

DAY 08

FILE HANDLING

🎯 Aim

Learn about reading and writing files in Python.

📂 Resources

- W3Schools Python File Handling: https://www.w3schools.com/python/python_file_handling.asp
- Real Python Read and Write Files: https://realpython.com/read-write-files-python/

❓ Example Questions

Q 1: Write a program that reads a text file and prints its contents.

Q 2: Create a new text file and write some content into it.

Q 3: Read a CSV file and process its data.

Practice Questions

1. Write a Python program to copy the contents of one text file into another.
2. Given a CSV file with student names and scores, find the student with the highest score.
3. Implement a program that reads a text file and counts the number of words and lines in it.
4. Create a function that takes a list of sentences and writes them to a new text file, each on a new line.
5. Given a CSV file with employee details (name, age, salary), calculate the average salary of all employees.
6. Write a program that reads a CSV file and finds the total sales revenue for a specific product.
7. Given a text file with a list of numbers, write a function that finds the sum of all numbers in the file.
8. Implement a program that reads a CSV file and generates a bar chart to represent the data using Matplotlib.
9. Write a function that reads a JSON file and extracts specific information from it.
10. Given a CSV file with temperature data for each day of the week, find the average temperature for each day.

DAY 09

OBJECT-ORIENTED PROGRAMMING (OOP)

🎯 Aim

Introduce Object-Oriented Programming (OOP) concepts in Python.

📂 Resources

- W3Schools Python Classes: https://www.w3schools.com/python/python_classes.asp
- Real Python Python OOP: https://realpython.com/python3-object-oriented-programming/

❓ Example Questions

Q 1: Create a class to represent a basic calculator with add, subtract, multiply, and divide methods.

Q 2: Create a class to represent a book with attributes like title, author, and publication year.

Q 3: Define a class for a Circle with methods to calculate its area and circumference.

Practice Questions

1. Create a class to represent a Student with attributes like name, age, and grades.
2. Given a CSV file with employee details (name, position, salary), create a class to represent an Employee.
3. Implement a program that simulates a basic bank account using a BankAccount class.
4. Write a Python program that uses a Rectangle class to calculate the area and perimeter of a rectangle.
5. Create a class to represent a Car with attributes like make, model, and year.
6. Given a JSON file with customer data, create a Customer class to store and manipulate the data.
7. Write a program that uses a Person class to keep track of a person's name, age, and address.
8. Implement a program that uses a Circle class to calculate the area and circumference of multiple circles.
9. Given a CSV file with product details (name, price, quantity), create a Product class to manage the data.
10. Create a class to represent a Movie with attributes like title, director, and rating.

DAY 10

INHERITANCE AND ENCAPSULATION

🎯 Aim

Understand inheritance and encapsulation in Object-Oriented Programming.

📂 Resources

- W3Schools Python Inheritance: https://www.w3schools.com/python/python_inheritance.asp
- Real Python Inheritance and Composition: https://realpython.com/inheritance-composition-python/

❓ Example Questions

Q 1: Create a base class Animal with a method sound() and create derived classes Dog and Cat with their own sound().

Q 2: Implement a class hierarchy to represent different types of vehicles (Car, Bike) with their own attributes and methods.

Q 3: Create a class Person with private attributes and define methods to get and set the values of those attributes.

Practice Questions

1. Create a base class Shape with methods to calculate area and perimeter, and derive classes Circle and Square.
2. Implement a class hierarchy to represent different types of employees (Manager, Engineer) with their attributes.
3. Write a Python program that uses inheritance to represent a hierarchy of shapes (Triangle, Rectangle, etc.).
4. Create a class hierarchy to represent different types of animals (Bird, Fish) with their own attributes and methods.
5. Given a JSON file with product details (name, price, quantity), create a Product class with encapsulated attributes.
6. Implement a program that uses inheritance to represent a hierarchy of vehicles (Car, Bike, Truck, etc.).
7. Write a Python program that uses encapsulation to protect sensitive information in a User class.

Practice Questions

8. Create a class hierarchy to represent different types of electronics (Phone, Laptop) with their attributes.

9. Given a CSV file with employee details (name, position, salary), create an Employee class with private attributes.

10. Implement a program that uses inheritance to represent a hierarchy of shapes (Circle, Triangle, Rectangle, etc.).