Python Hands-On Exercises – My Code Synopsis

Exercise 1 – Prime Number Check

In this exercise, I wrote a function that checks whether a given number is prime. I handled edge cases like numbers less than or equal to 1, and then used a loop to check divisibility up to the square root of the number. If any number divides the input evenly, I return False; otherwise, I return True.

Exercise 2 – List Manipulation

Here, I created a program that takes a list of integers, filters out only the even numbers, and then returns them in descending order. I used a list comprehension for filtering and the sorted() function with reverse ordering.

Exercise 3 – Tuple and Set Operations

In this task, I first converted a list into a tuple. Then I converted that tuple into a set to remove duplicate values. Finally, I returned a sorted list of the unique elements.

Exercise 4 – Dictionary Comprehension

For this exercise, I wrote code that takes a list of words and counts how many vowels each word contains. I used a dictionary comprehension to map each word to its vowel count by checking each character in the word.

Exercise 5 – NumPy Matrix and Diagonal Sum

I created a 5×5 NumPy matrix with values from 1 to 25. Then I extracted its diagonal elements using NumPy's built-in functions and calculated their total sum. This helped me practice NumPy array operations.

Exercise 6 – Pandas Series Creation and Indexing

In this task, I created a Pandas Series containing Celsius temperatures. Then I converted those values into Fahrenheit using vectorised operations and created another Series with the same index.

Exercise 7 – DataFrame Filtering

I created a DataFrame with employee salary data and calculated the 75th percentile using the quantile() method. After that, I filtered and displayed only the employees whose salary was above that percentile.

Exercise 8 – Data Visualization (Bar Chart)

Here, I worked with a sales DataFrame. I grouped the data by product category, calculated total sales for each category, and then plotted a bar chart using Matplotlib to visualise the results.

Exercise 9 – Vehicle and Car Classes

In this exercise, I created a base class called Vehicle with attributes like make and model. Then I created a subclass Car that inherited from Vehicle and added an extra attribute for the number of doors. I also wrote a method inside Car to display all the attributes.

Exercise 10 – BankAccount Class

Here, I implemented a BankAccount class with a private balance attribute. I added methods to deposit money, withdraw money safely without allowing the balance to go negative, and check the current balance.