MODULE 1: Python Basics (5 Exercises)

1. Write a program that reads a string and prints the number of vowels, consonants, and digits.
2. Create a function that takes a sentence and returns a dictionary of word frequencies.
3. Implement a mini calculator with add, subtract, multiply, and divide using functions.
4. Write a program that reads N numbers and returns the second highest value without sorting.
5. Read 10 values and store them into a list without using loops (use list comprehension).

MODULE 2: Data Structures (Lists, Tuples, Sets, Dicts) (10 Exercises)

6. Given a list of product prices, remove duplicates while maintaining order.
7. Merge two lists into a dictionary of {key: value} where list1 is keys and list2 is values.
8. Given a dictionary of student marks, return the top 3 students.
9. Flatten a nested list like [[1,2],[3,4],[5,6]] into a single list.
10. Find common elements between three sets.
11. Convert a list of tuples to a dictionary only if keys are unique.
12. Given a tuple of names, return one tuple with unique names.
13. Build a program to reverse every alternate element in a list.
14. From a dictionary of employees, filter only employees with salary above 60000.
15. Given two dictionaries, combine them but sum values for matching keys.

MODULE 3: Classes, OOP, Inheritance, Overriding (8 Exercises)

16. Build a Student class storing id, name, and marks. Add methods to calculate grade.
17. Implement a Product → ElectronicProduct (inheritance) where Electronics adds warranty years.
18. Create a Payment class with credit-card and UPI subclasses overriding process_payment().
19. Create a Vehicle class and Car, Bike subclasses. Override max_speed().
20. Implement Operator Overloading: add two objects of BankAccount to return total balance.
21. Build a ShoppingCart class implementing add, remove, total, apply_discount.

22. Create a Library class to store books and a method to search by title or author.
23. Create a User class and an Admin subclass that can delete a user (override methods).

MODULE 4: File Handling (Text, CSV, JSON) (6 Exercises)

24. Read a text file and count: characters, words, lines.
25. Create a CSV file storing 20 employees and read it back into a dictionary list.
26. Write a program that appends log entries to a logfile with timestamps.
27. Build a program that loads a JSON file of products, adds a discount, and writes back.
28. Split a text file into two files: first half and second half.
29. Convert a CSV file to JSON using Python.

MODULE 5: Pandas (CSV, JSON, Missing Data, Grouping, Merging) (10 Exercises)

30. Load a 100-row retail dataset and find: total orders, total revenue, and top 5 products.
31. Identify missing values and fill numeric columns with median, categorical with mode.
32. Group by product category and calculate: total sales, count of orders, average price.
33. Create a new column "DiscountedPrice" = price minus 10 percent.
34. Merge a customers.csv and orders.csv on customer_id and generate a combined report.
35. Load a JSON file containing customers and normalize nested fields.
36. Filter transactions for customers who spent more than 5000 total.
37. Generate pivot table: category vs month showing total sales.
38. Remove outliers using IQR and list the cleaned dataset.
39. Combine multiple CSVs into one final DataFrame and remove duplicates.
