

Python Data Structures

Part A: List and Tuple Operations

A.1. Create a list of 10 random integers between 1 and 100.

A.2. Write code to:

- Sort the list in ascending and descending order.
- Remove duplicate values (if any).
- Find and print the maximum and minimum values.
- Calculate and print the average.

Part B: Set Operations

B.1. Create two sets:

- Set A containing integers from 1 to 10.
- Set B containing even integers from 5 to 15.

B.2. Perform and print the result of:

- Union
- Intersection
- Difference (A - B and B - A)
- Symmetric difference

Part C: Dictionary Manipulation

C.1. Create a dictionary representing three students and their scores:

```
students = {  
    "Alice": 85,  
    "Bob": 92,  
    "Charlie": 78  
}
```

C.2. Write code to:

- Add a new student "David" with score 88.
- Update "Alice"'s score to 90.
- Remove "Charlie" from the dictionary.
- Print the average score of the remaining students.
- Print the names of all students who scored above 85.

Part D: Applied Task

Scenario: You are designing a simple inventory management system.

D.1. Define a dictionary named `inventory`, where:

- Keys are product names (strings).
- Values are tuples of the form `(quantity, price)`.

Example:

```
inventory = {  
    "apple": (50, 0.5),  
    "banana": (100, 0.3),  
    "orange": (75, 0.7)  
}
```

D.2. Write functions to:

- Add a new product or update an existing product's quantity and price.
- Remove a product by name.
- Calculate and print the total inventory value (sum of quantity \times price for all products).
- List all products whose quantity is below a threshold (e.g., less than 50).