Python Collections – Practice Set

This set is based on the topics we've covered so far:
- **Introduction to Lists**
- **List Methods**
- **Tuples and Operations on Tuples**
- **Sets and Set Methods**
- **Dictionaries and Dictionary Methods**

These exercises will give you hands-on practice with Python's most important data structures.

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1. Introduction to Lists

1. Create a list `fruits = ["apple", "banana", "cherry"]`.
    1. Print the first fruit.
    2. Replace `"banana"` with `"orange"`.
    3. Print the length of the list.
2. Create a list of numbers from `1` to `10`.
    1. Print the first three numbers using slicing.
    2. Print the last three numbers using slicing.

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2. List Methods

1. Start with `numbers = [5, 2, 9, 1, 7]` and do the following:
    1. Sort the list in ascending order.
    2. Append the number `10` to the list.

    3. Remove the number `2` from the list.

2. Create a list `names = ["Alice", "Bob", "Charlie"]` and use the `insert()` method to add `"David"` at index `1`.

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3. Tuples and Operations on Tuples

1. Create a tuple `coordinates = (10, 20)` and print both elements.
2. Try to modify the tuple by setting `coordinates[0] = 50` — note what happens.
3. Convert the tuple to a list, change its first element to `50`, and convert it back to a tuple.

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4. Sets and Set Methods

1. Create a set `my_set = {1, 2, 3, 3, 4}` and print it. (What happens to duplicate `3`?)
2. Add `5` to the set, remove `2`, and check if `4` is in the set.
3. Create two sets:
    1. `a = {1, 2, 3}`
    2. `b = {3, 4, 5}`
       Find their:
    3. Union
    4. Intersection
    5. Difference (`a - b`)

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5. Dictionaries and Dictionary Methods

1. Create a dictionary `student = {"name": "John", "age": 20, "grade": "A"}` and:
    1. Print the value of `"name"`.
    2. Change `"grade"` to `"A+"`.
    3. Add a new key `"city"` with value `"Delhi"`.
2. Create a dictionary of three friends and their phone numbers. Use:
    1. `keys()` to get all names
    2. `values()` to get all numbers
    3. `items()` to loop over key-value pairs and print them

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6. Bonus Challenges

1. Write a program that takes a list of numbers and removes all duplicates using a set.
2. Given a dictionary of products and their prices, find the product with the highest price.
3. Write a program that merges two dictionaries into one.