**Chapter\_3\_Exercises\_and\_Project\_Notes**

**Steve’s Working Draft Workflow:**

* Document the Problem
* Develop or Understand a Logic Narrative
* Develop Psudo Code
* Code
* Test and Debug

**Exercise 1: List Manipulation**

**Description:**

This exercise will help you practice basic list operations such as adding, removing, and modifying elements. You will create a list of your favorite movies, add new movies, remove one, and print the updated list.

**Task:**

Create a list of your favorite movies. Add two more movies, remove one, and print the updated list.

**Exercise 2: 2D Array Access**

**Description:**

Learn to work with multi-dimensional arrays (lists of lists) by creating a 3x3 matrix and accessing its elements using nested loops. This exercise will enhance your understanding of how to iterate over complex data structures.

**Task:**

Create a 3x3 matrix and print each element using nested loops.

**Exercise 3: Dictionary Operations**

**Description:**

This exercise focuses on dictionary operations such as adding, updating, and accessing values. You will create a dictionary to store information about a book, update its values, and print all keys and values.

**Task:**

Create a dictionary with information about a book (title, author, year). Add a key for genre, update the year, and print all the keys and values.

**Exercise 4: Set Operations**

**Description:**

Practice working with sets by creating a set of unique words from a given sentence. This exercise will help you understand how sets handle uniqueness and membership operations.

**Task:**

Create a set of unique words from a given sentence.

**Exercise 5: For Loop Practice**

**Description:**

Gain experience with for loops by writing a loop that generates the first 10 numbers in the Fibonacci sequence. This exercise will enhance your understanding of iterative processes and sequence generation.

**Task:**

Write a for loop to print the first 10 numbers in the Fibonacci sequence.

**Exercise 6: While Loop Practice**

**Description:**

This exercise will help you practice while loops by writing a loop to reverse a string. You will gain a better understanding of condition-based iteration and string manipulation.

**Task:**

Write a while loop to reverse a string.

**Exercise 7: Combined Data Types**

**Description:**

Learn to work with combined data types by creating a list of dictionaries. Each dictionary will represent a student with keys for name and grade. You will print each student's name and grade using a loop.

**Task:**

Create a list of dictionaries, where each dictionary represents a student with keys for name and grade. Print each student's name and grade using a loop.

**3.15 Project: Build a Python Quiz Game**

This next project is a Quiz Game, further solidifying your understanding of collections and loops by applying these concepts in a fun, interactive way. This project tests your knowledge and encourages creative problem-solving and coding practice.

**Objective:**

Create an interactive quiz game that tests the player's knowledge across various topics. The game should present a series of questions, each with multiple-choice answers, and track the player's score throughout the session.”

**Setup Instructions Define Questions and Answers:**

Create a list of dictionaries, where each dictionary represents a quiz question, its multiple-choice options, and the correct answer.

Since the focus of the project isn’t to test your creativity, I will provide you with some questions below. Use them, or don’t use them. Either works.

**Gameplay Flow:**

Display a welcome message to the user. Loop through the questions.

**Optionally:**

You could randomly shuffle the questions to ensure a unique gameplay experience each time. To do so, you would need to import Python’s random package and then shuffle the questions. We haven’t talked about importing Python packages, so here is the code to do it:

# Shuffle the questions

import random

random.shuffle(questions)

Iterate through the questions, presenting each one to the user along with the answer choices.

Prompt the user for their answer to each question.

**Scoring:**

Keep track of the user's score by incrementing it for each correct answer. Provide immediate feedback to the user after each question, indicating whether their answer was correct or incorrect. If incorrect, display the correct answer.

**Ending the Game:**

* Allow the user to exit the game early by typing a specific command (e.g., 'exit').
* Once all questions have been answered, or the user decides to exit, display the user's final score.

**Success Criteria:**

* The game must successfully run without errors.
* The user should be able to select their answer to each question and receive immediate feedback.
* The game should accurately track and display the user's score.
* The game should offer an option for the user to exit at any point.

**Setting Up for Success Review Collections:**

* Understand how lists and dictionaries can store quiz questions and options.
* Practice Loops: Familiarize yourself with for and while loops for iterating through the questions and validating user inputs.
* Input and Output: Get comfortable with using input() to capture user responses and print() to display messages and questions.

**Sample Quiz Questions**

Question 1: Who was buried in Andrew Jackson's grave?

Options: Donald Trump Andrew Jackson John Tyler Joe Biden

Correct Answer: Andrew Jackson

Question 2: What color was George Washington’s great white horse?

Options: Black Brown White Green Correct Answer: White

Question 3: What data type is used to store items as a sequence that can maintain order?

Options: List Tuple Set Dictionary

Correct Answer: List

Question 4: To loop over each character in a word, which Python structure should you use?

Options: For loop While loop If statement Print Statement

Correct Answer: For loop

Question 5: Which Python collection allows us to store unique items identified by a key?

Options: List Tuple Set Dictionary

Correct Answer: Dictionary

Question 6: Which Python collection type prevents duplicates?

Options: List Tuple Set Dictionary

Correct Answer: Set

This project is designed to reinforce your understanding of Python's fundamental concepts while also providing a fun and interactive way to engage with the material. Remember, the key to success is not just completing the project but learning and experimenting with Python along the way.

Example of Possible Output Welcome to the Basic Quiz Game!

1/6: What data type is used to store items as a sequence that can maintain order? 1. List 2. Tuple 3. Set 4. Dictionary Your answer (1-4): 1 Correct! You earned a point.

2/6: What color was George Washington’s great white horse? 1. Black 2. Brown 3. White 4. Green Your answer (1-4): 3 Correct! You earned a point.

3/6: Who was buried in Andrew Jackson grave? 1. Donald Trump 2. Andrew Jackson 3. John Tyler 4. Joe Biden Your answer (1-4): 2 Correct! You earned a point.

4/6: Which Python collection type prevents duplicates? 1. List 2. Tuple 3. Set 4. Dictionary Your answer (1-4): 3 Correct! You earned a point.

5/6: To loop over each character in a word, which Python structure should you use? 1. For loop 2. While loop 3. If statement 4. Print Statement Your answer (1-4): 1 Correct! You earned a point.

6/6: Which Python collection allows us to store unique items identified by a key? 1. List 2. Tuple 3. Set 4. Dictionary Your answer (1-4): 1