**1. Lists and List Comprehension:** a. Create a list called **numbers** with integers from 1 to 10. b. Use list comprehension to create a new list called **squared\_numbers** that contains the squares of each number in the **numbers** list. c. Create a list called **even\_numbers** that contains only the even numbers from the **numbers** list using list comprehension. d. Create a list called **words** with five different words. e. Use list comprehension to create a new list called **word\_lengths** that contains the lengths of each word in the **words** list.

**2. List Manipulation:** a. Given the list **fruits = ["apple", "banana", "cherry", "date", "kiwi"]**, remove "date" from the list. b. Add "grape" to the end of the **fruits** list. c. Sort the **fruits** list in alphabetical order. d. Reverse the order of the **fruits** list.

**3. Dictionaries:** a. Create a dictionary called **student** with the following key-value pairs: - 'name' -> 'Alice' - 'age' -> 20 - 'major' -> 'Computer Science' b. Add a new key-value pair 'university' -> 'XYZ University' to the **student** dictionary. c. Check if 'grade' exists in the **student** dictionary, and if it does not, add 'grade' -> 'A'. d. Print all the keys and values in the **student** dictionary using a for loop.

**4. String Manipulation:** a. Create a string called **sentence** with the following text: "Python programming is fun." b. Use string slicing to extract and print only the word "programming" from the sentence. c. Replace "Python" with "Java" in the **sentence** and print the updated sentence. d. Check if the sentence starts with "Python." e. Check if the sentence ends with "fun."

**5. Conditional Statements:** a. Write a Python function **is\_even(n)** that takes an integer **n** as input and returns True if it's even and False otherwise. b. Write a Python function **is\_vowel(letter)** that takes a single character **letter** as input and returns True if it's a vowel (a, e, i, o, u - both lowercase and uppercase), and False otherwise. c. Write a Python function **grade\_exam(score)** that takes a numeric score as input and returns the corresponding grade as follows: - 90-100: 'A' - 80-89: 'B' - 70-79: 'C' - 60-69: 'D' - Below 60: 'F'

**6. Loops:** a. Write a Python program that prints all the prime numbers between 1 and 50. b. Write a Python program that calculates the factorial of a number entered by the user using a while loop. c. Write a Python program that prints the Fibonacci sequence up to the nth term, where n is entered by the user.

**7. Functions:** a. Write a Python function **calculate\_area(radius)** that calculates and returns the area of a circle given its radius. b. Write a Python function **count\_vowels(word)** that takes a word as input and returns the count of vowels in the word. c. Write a Python function **reverse\_list(lst)** that takes a list as input and returns a new list with the elements reversed (e.g., [1, 2, 3] should become [3, 2, 1]).

These problems cover a variety of Python programming concepts and should provide your students with a diverse set of practice exercises.