Assignment: Python Programming
Code Crafters

1. Functions

1.1. Task 1: Square Calculator

Write a function named `square(n)` that:

- Accepts an integer `n` as input.

- Returns the square of `n`.

Test the function with the value 7.

1.2. Task 2: Check Even or Odd

Write a function named `is_even(n)` that:

- Accepts an integer `n` as input.

- Returns `True` if `n` is even, otherwise returns `False`.

Test the function with the numbers 4 and 5.

1.3. Task 3: String Repeater

Write a function named `repeat_string(s, times)` that:

- Accepts a string `s` and an integer `times`.

- Returns the string `s` repeated `times` times.

Test the function with s="Hello" and times=3.

2. Indexing and String Manipulation

2.1. Task 4: Extract Year from Date

Given the string `date = "2024-12-08"`, write a program to:

- Extract and print the year, month, and day separately.

2.2. Task 5: String Replacement

Write a program that:

- Takes a sentence as input.

- Replaces all occurrences of the word "Python" with "JavaScript".

- Prints the modified sentence.

Example input: `"I love Python programming."`

3. Collections

3.1. Task 6: Calculate Average Marks

Write a program to:

- Create a list of integers representing marks scored in five subjects.

- Calculate and print the average marks.

3.2. Task 7: Manage To-Do List

Write a program to:

- Create an empty list named `to_do_list`.

- Allow the user to add tasks to the list by typing them (stop when they type "done").

- Print the list of tasks.

4. Dictionaries

4.1. Task 8: Phone Book

Write a program that:

- Creates a dictionary named `phone_book` where keys are names and values are phone numbers.

- Allows the user to input a name and print the corresponding phone number.

4.2. Task 9: Student Grades

Write a program to:

- Create a dictionary where the keys are student names and the values are their grades.

- Allow the user to input a student's name to get their grade.

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5.   2D Lists

5.1.   Task 10: Diagonal Sum

Given a matrix:

```
matrix = [
    [2, 4, 6],
    [1, 3, 5],
    [7, 9, 11]
]
```

Write a program to calculate and print the sum of the diagonal elements (top-left to bottom-right).

5.2.   Task 11: Transpose of a Matrix

Write a program to:

- Define a 2D list (matrix).

- Print the transpose of the matrix.

6.   Object-Oriented Programming

6.1.   Task 12: Define a Bank Account

Create a class named `BankAccount` that:

- Has attributes: `account_number`, `balance`.

- Contains methods:

    - `deposit(amount)`: Adds `amount` to `balance`.
    - `withdraw(amount)`: Subtracts `amount` from `balance`, if enough funds are available.
    - `display()`: Prints the account number and current balance.

Test the class by creating an instance and performing deposits and withdrawals.

6.2.   Task 13: Define a Library System

Create a class named `Library` that:

- Has an attribute: `books` (a list of available books).

- Contains methods:

    - `add_book(book)`: Adds a book to the library.
    - `borrow_book(book)`: Removes the book from the library if it is available.
    - `return_book(book)`: Adds a book back to the library.

Test the class by adding, borrowing, and returning books.

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7.   Submission

Submit your solutions in a Python file or Jupyter Notebook. Ensure that all code is commented for clarity.