

## **Python Homework Assignment: Data Structures and Operators**

### Assignment 1: List Operations

1. Create a list named `numbers` containing integers from 1 to 10.
2. Append the number 11 to the list.
3. Remove the number 5 from the list.
4. Insert the number 100 at index 2.
5. Print the length of the list.

### Assignment 2: Tuple Operations

1. Create a tuple named `fruits` containing "apple", "banana", "cherry", and "date".
2. Access and print the third element of the tuple.
3. Attempt to change the second element of the tuple to "grape". Explain why this operation fails.
4. Print the length of the tuple.

### Assignment 3: Dictionary Operations

1. Create a dictionary named `student` with keys "name", "age", and "grade", and appropriate values.
2. Add a new key-value pair to the dictionary: "city" with the value "New York".
3. Remove the "grade" key-value pair from the dictionary.
4. Print all keys in the dictionary.
5. Check if the key "age" exists in the dictionary.

### Assignment 4: Arithmetic Operations

1. Create variables `a` and `b` with values 10 and 5, respectively.
2. Calculate and print the result of addition, subtraction, multiplication, division, and modulus of `a` and `b`.

### Assignment 5: Comparison and Logical Operators

1. Compare `a` and `b` using the equality operator and print the result.
2. Compare `a` and `b` using the greater than operator and print the result.
3. Check if both `a` is greater than 5 and `b` is less than or equal to 10, print the result.

### Coding Problems:

#### Problem 1: Sum of Squares

1. Define a function named `sum\_of\_squares` that takes a list of numbers as input.

2. Initialize a variable ``total`` to 0.
3. Iterate through the numbers in the list.
4. For each number, square it and add it to ``total``.
5. Return the value of ``total``.

#### Problem 2: Common Elements

1. Define a function named ``common_elements`` that takes two lists as input.
2. Initialize an empty list ``common``.
3. Iterate through the elements of the first list.
4. For each element, check if it exists in the second list.
5. If it does, append it to the ``common`` list.
6. Return the ``common`` list.

#### Problem 3: Dictionary Merge

1. Define a function named ``merge_dicts`` that takes two dictionaries as input.
2. Initialize an empty dictionary ``result``.
3. Iterate through the keys of the first dictionary.
4. For each key, add its value to the corresponding key in ``result``.
5. Iterate through the keys of the second dictionary.
6. For each key, add its value to the corresponding key in ``result``.
7. Return the ``result`` dictionary.

#### Submission Instructions:

- Write Python code for each assignment and coding problem following the provided steps.
- Include comments to explain your code.
- Save your Python script as "homework.py".
- Submit your script by [submission date].

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These step-by-step instructions provide clear guidance on how to approach and solve each problem in the assignment, ensuring that students can understand and implement the solutions effectively.