PYTHON

Assignment

1. **Create a program that defines a global variable and a local variable with the same name. Use a function to print both the global and local variables. Explain the output.**
2. **Write a function that modifies a global variable inside the function using the global keyword. Demonstrate the effect by printing the variable before and after the function call.**
3. **Create a nested function where the inner function attempts to modify a non-local variable. Use the nonlocal keyword to ensure the change reflects in the outer function. Verify the output by printing the variable before and after the inner function call.**
4. **Write a program that creates a counter using a global variable. The program should have two functions: one to increment the counter and one to decrement it. Verify that the global counter variable is updated correctly after multiple function calls.**
5. **Develop a program that defines a global list. Write two functions, one to add elements to the list and another to remove elements. Use the global keyword to modify the list within these functions.**
6. **Write a function that takes two numbers and returns their product. Create an alias for this function and use it to calculate the product of two other numbers. Compare the results of both function calls.**
7. **Define a function that returns the square of a number. Create an alias for the function and demonstrate how both the original function and its alias produce the same output for a given input.**

8. **Write a lambda function to calculate the cube of a given number. Test the lambda function with a list of numbers using the map function.**
9. **Create a lambda function that filters out even numbers from a list. Test it with a list of integers using the filter function.**
10. **Write a lambda function to calculate the sum of two numbers. Use it with the reduce function from the functools module to find the sum of all elements in a list.**
11. **Create a list of numbers and use the map function to produce a new list where each number is squared. Print both the original and the new list.**
12. **Write a program that uses the filter function to filter out all the negative numbers from a list. Test the program with a list that contains both positive and negative integers.**
13. **Write a function that calculates the factorial of a number using the reduce function. Test the function with a list of numbers.**
14. **Write a function that defines another function inside it. The inner function should take a number as an argument and return its square. The outer function should return the inner function and demonstrate its usage.**
15. **Create a nested function where the outer function calculates the sum of two numbers, and the inner function calculates the product of the same two numbers. Return both results as a tuple. Test the function with different pairs of numbers.**