Multi-Functional Calculator - Code and Documentation

Overview

This PDF contains a multi-step programming task that involves building a multi-functional calculator in three languages: Python, JavaScript, and C++.

Each implementation must include:

- A clear docstring or comment block explaining the purpose of the program.
- Four functions: add, subtract, multiply, divide.
- Two test cases for each language.
- Output printed for verification.
- Documentation explaining the purpose, parameters, and return values.

Python Implementation

Functions:

- add(a, b): Returns the sum of a and b.
- subtract(a, b): Returns the difference of a and b.
- multiply(a, b): Returns the product of a and b.
- divide(a, b): Returns the quotient or an error if b is zero.

Test Cases:

- add(10, 5) => 15
- divide(8, 0) => "Error: Division by zero"

Code:

"""

Multi-functional Calculator

This script defines a simple calculator that supports four operations: addition, subtraction, multiplication, and division. Each operation is implemented as a function.

"""

def add(a, b):

```
    return a + b

def subtract(a, b):
    return a - b

def multiply(a, b):
    return a * b

def divide(a, b):
    if b == 0:
        return "Error: Division by zero"
    return a / b

print("10 + 5 =", add(10, 5))
print("8 / 0 =", divide(8, 0))
```

JavaScript Implementation

Functions:

- add(a, b): Returns a + b.
- subtract(a, b): Returns a - b.
- multiply(a, b): Returns a * b.
- divide(a, b): Returns a / b or error message.

Test Cases:

- multiply(6, 7) => 42
- divide(20, 4) => 5

Code:

```
/**
 * Multi-functional Calculator
```

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```
 * Supports basic operations: add, subtract, multiply, divide.
 * Handles division by zero.
 */

function add(a, b) {
    return a + b;
}

function subtract(a, b) {
    return a - b;
}

function multiply(a, b) {
    return a * b;
}

function divide(a, b) {
    if (b === 0) {
        return "Error: Division by zero";
    }
    return a / b;
}

console.log("6 * 7 =", multiply(6, 7));
console.log("20 / 4 =", divide(20, 4));
```

C++ Implementation

Functions:

- add(double a, double b): Returns a + b.
- subtract(double a, double b): Returns a - b.

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- multiply(double a, double b): Returns a * b.

- divide(double a, double b): Returns result or error message.

Test Cases:

- subtract(15, 3) => 12

- divide(9, 0) => "Error: Division by zero"

Code:

```
#include <iostream>
using namespace std;

/*
 * Multi-functional Calculator
 * Implements add, subtract, multiply, and divide.
 * Handles division by zero.
 */

double add(double a, double b) {
    return a + b;
}

double subtract(double a, double b) {
    return a - b;
}

double multiply(double a, double b) {
    return a * b;
}

string divide(double a, double b) {
    if (b == 0) return "Error: Division by zero";
    return to_string(a / b);
```

```
}

int main() {
    cout << "15 - 3 = " << subtract(15, 3) << endl;
    cout << "9 / 0 = " << divide(9, 0) << endl;
    return 0;
}
```