**Exercise 4: Arrange-Act-Assert (AAA) Pattern, Test Fixtures, Setup and** **Teardown Methods in Junit**

**Scenario:** You need to organize your tests using the Arrange-Act-Assert (AAA) pattern and use setup and teardown methods

**Steps:**

1. **Write tests using AAA pattern.**

*@Test*

public void testAdd() {

// Arrange

int a = 5;

int b = 3;

// Act

int result = calculator.add(a, b);

// Assert

*assertEquals*(8, result);

}

*@Test*

public void testSubtract() {

// Arrange

int a = 10;

int b = 4;

// Act

int result = calculator.subtract(a, b);

// Assert

*assertEquals*(6, result);

}

1. **Use @Before and @After annotations for setup and teardown methods**

*@Before*

public void setUp() {

calculator = new Calculator();

System.***out***.println("Setup complete");

}

// Teardown - runs after each test

*@After*

public void tearDown() {

calculator = null;

System.***out***.println("Teardown complete");

}

**Code:**

*Calculator.java –*

package com.example;

public class Calculator {

public int add(int a, int b) {

return a + b;

}

public int subtract(int a, int b) {

return a - b;

}

}

*CalculatorTest.java –*

package com.example;

import static org.junit.Assert.\*;

import org.junit.Before;

import org.junit.After;

import org.junit.Test;

public class CalculatorTest {

private Calculator calculator;

// Setup - runs before each test

*@Before*

public void setUp() {

calculator = new Calculator();

System.***out***.println("Setup complete");

}

// Teardown - runs after each test

*@After*

public void tearDown() {

calculator = null;

System.***out***.println("Teardown complete");

}

*@Test*

public void testAdd() {

// Arrange

int a = 5;

int b = 3;

// Act

int result = calculator.add(a, b);

// Assert

*assertEquals*(8, result);

}

*@Test*

public void testSubtract() {

// Arrange

int a = 10;

int b = 4;

// Act

int result = calculator.subtract(a, b);

// Assert

*assertEquals*(6, result);

}

}

*Pom.xml –*

<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 https://maven.apache.org/xsd/maven-4.0.0.xsd">

<modelVersion>4.0.0</modelVersion>

<groupId>com.example</groupId>

<artifactId>junitdemo-aaa</artifactId>

<version>0.0.1-SNAPSHOT</version>

<dependencies>

<!-- JUnit 4 Dependency -->

<dependency>

<groupId>junit</groupId>

<artifactId>junit</artifactId>

<version>4.13.2</version>

<scope>test</scope>

</dependency>

<!-- Hamcrest (used internally by JUnit) -->

<dependency>

<groupId>org.hamcrest</groupId>

<artifactId>hamcrest-core</artifactId>

<version>1.3</version>

<scope>test</scope>

</dependency>

</dependencies>

</project>

**Output: (Screenshots)**

