

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

Code:

Calculator.java:

```
package com.example;

public class Calculator {

    public int add(int a, int b) {

        return a + b;

    }

    public int multiply(int a, int b) {

        return a * b;

    }

}
```

CalculatorTest.java:

```
package com.example;

import org.junit.Before;
import org.junit.After;
import org.junit.Test;
import static org.junit.Assert.*;

public class CalculatorTest {

    private Calculator calculator;

    @Before

    public void setUp() {

        calculator = new Calculator();

        System.out.println("Setup: Calculator instance created");

    }

    @After

    public void tearDown() {

        calculator = null;

        System.out.println("Teardown: Calculator instance cleared");

    }

}
```

@Test

```
public void testAdd() {  
    int result = calculator.add(2, 3);  
    assertEquals(5, result);  
}
```

@Test

```
public void testMultiply() {  
    int result = calculator.multiply(4, 5);  
    assertEquals(20, result);  
}  
}
```

Output:

The screenshot displays an IDE interface with the following components:

- Package Explorer:** Shows the project structure with a folder 'com.example' containing 'CalculatorTest'.
- JUnit Runner:** Indicates 'Finished after 0.032 seconds' and 'Runs: 2/2', 'Errors: 0', 'Failures: 0'.
- Source Code Editor:** Displays the 'CalculatorTest.java' file with the following code:

```
1 package com.example;  
2  
3 import org.junit.Before;  
4 import org.junit.After;  
5 import org.junit.Test;  
6  
7 import static org.junit.Assert.*;  
8  
9 public class CalculatorTest {  
10  
11     private Calculator calculator;  
12  
13     @Before  
14     public void setUp() {  
15         calculator = new Calculator();  
16         System.out.println("Setup: Calculator instance created");  
17     }  
18  
19     @After  
20     public void tearDown() {  
21         calculator = null;  
22         System.out.println("Teardown: Calculator instance cleared");  
23     }  
24  
25     @Test  
26     public void testAdd() {  
27         int result = calculator.add(2, 3);  
28         assertEquals(5, result);  
29     }  
30 }
```
- Console:** Shows the output of the test run:

```
<terminated> CalculatorTest [JUnit] C:\Program Files\Java\jdk-21\bin\javaw.exe (01-Jul-2025, 10:46:41 pm - 10:46:41 pm) [pid: 37332]  
Setup: Calculator instance created  
Teardown: Calculator instance cleared  
Setup: Calculator instance created  
Teardown: Calculator instance cleared
```