**Exercise 1: Mocking and Stubbing**

**Scenario:**

You need to test a service that depends on an external API. Use Mockito to mock the external API and stub its methods

**Source Code:**

**CalculatorService.java**

**package** com.example;

**public** **interface** CalculatorService {

**int** add(**int** a, **int** b);

**int** subtract(**int** a, **int** b);

**int** multiply(**int** a, **int** b);

**int** divide(**int** a, **int** b);

}

**MyApplication.java**

**package** com.example;

**public** **class** MyApplication {

**private** **final** CalculatorService calc;

**public** MyApplication(CalculatorService calc) {

**this**.calc = calc;

}

**public** **int** computeSum(**int** x, **int** y) {

**return** calc.add(x, y);

}

**public** **int** computeDifference(**int** x, **int** y) {

**return** calc.subtract(x, y);

}

**public** **int** computeProduct(**int** x, **int** y) {

**return** calc.multiply(x, y);

}

**public** **int** computeQuotient(**int** x, **int** y) {

**return** calc.divide(x, y);

}

}

**MyApplicationTest.java**

**package** com.example;

**import** org.junit.jupiter.api.Test;

**import** **static** org.junit.jupiter.api.Assertions.\*;

**import** **static** org.mockito.Mockito.\*;

**class** MyApplicationTest {

@Test

**void** testAllOperationsAndPrint() {

CalculatorService mockCalc = *mock*(CalculatorService.**class**);

*when*(mockCalc.add(3, 7)).thenReturn(10);

*when*(mockCalc.subtract(9, 4)).thenReturn(5);

*when*(mockCalc.multiply(6, 5)).thenReturn(30);

*when*(mockCalc.divide(20, 4)).thenReturn(5);

MyApplication app = **new** MyApplication(mockCalc);

**int** sum = app.computeSum(3, 7);

**int** diff = app.computeDifference(9, 4);

**int** product = app.computeProduct(6, 5);

**int** quotient = app.computeQuotient(20, 4);

System.***out***.println("Mocked results:");

System.***out***.println("sum = " + sum);

System.***out***.println("diff = " + diff);

System.***out***.println("product = " + product);

System.***out***.println("div = " + quotient);

*assertEquals*(10, sum);

*assertEquals*(5, diff);

*assertEquals*(30, product);

*assertEquals*(5, quotient);

System.***out***.println("All mocked operations passed");

}

}

**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>calculator-app</artifactId>

<version>1.0-SNAPSHOT</version>

<properties>

<maven.compiler.release>21</maven.compiler.release>

</properties>

<dependencies>

<dependency>

<groupId>org.mockito</groupId>

<artifactId>mockito-core</artifactId>

<version>5.12.0</version>

<scope>test</scope>

</dependency>

<dependency>

<groupId>org.junit.jupiter</groupId>

<artifactId>junit-jupiter</artifactId>

<version>5.10.0</version>

<scope>test</scope>

</dependency>

</dependencies>

<build>

<plugins>

<plugin>

<groupId>org.apache.maven.plugins</groupId>

<artifactId>maven-surefire-plugin</artifactId>

<version>3.1.2</version>

<configuration>

<argLine>

--sun-misc-unsafe-memory-access=allow

-Dnet.bytebuddy.experimental=true

-XX:+EnableDynamicAgentLoading

</argLine>

</configuration>

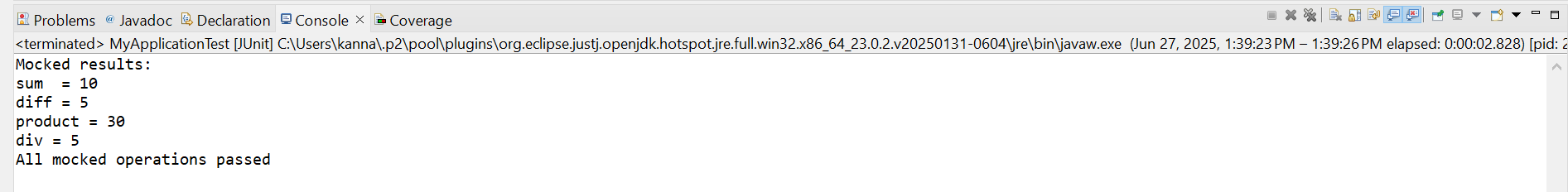
</plugin>

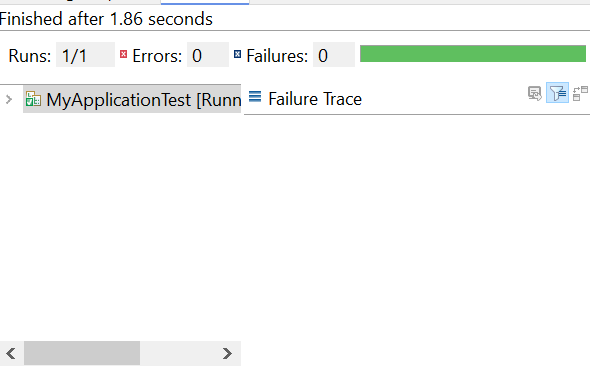
</plugins>

</build>

</project>

**Output:**

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