Exercise 1: Setting Up JUnit

Scenario:

You need to set up JUnit in your Java project to start writing unit tests.

Steps:

1. Create a new Java project in your IDE (e.g., IntelliJ IDEA, Eclipse).

2. Add JUnit dependency to your project. If you are using Maven, add the following to your

pom.xml:

<dependency>

<groupId>junit</groupId>

<artifactId>junit</artifactId>

<version>4.13.2</version>

<scope>test</scope>

</dependency>

3. Create a new test class in your project.

**Code :**

package com.example;

import org.junit.Test;

import static org.junit.Assert.\*;

public class CalculatorTest {

@Test

public void testAdd() {

Calculator calc = new Calculator();

int result = calc.add(2, 3);

assertEquals(5, result);

}

}

Exercise 3: Assertions in JUnit

Scenario:

You need to use different assertions in JUnit to validate your test results.

Steps:

1. Write tests using various JUnit assertions.

Solution Code:

public class AssertionsTest {

@Test

public void testAssertions() {

// Assert equals

assertEquals(5, 2 + 3);

// Assert true

assertTrue(5 > 3);

// Assert false

assertFalse(5 < 3);

// Assert null

assertNull(null);

// Assert not null

assertNotNull(new Object());

}

}

**Code :**

import org.junit.Test;

import static org.junit.Assert.\*; // Import all static methods from Assert

public class AssertionsTest {

@Test

public void testAssertions() {

// Assert that 2 + 3 equals 5

assertEquals(5, 2 + 3);

// Assert that 5 is greater than 3

assertTrue(5 > 3);

// Assert that 5 is not less than 3

assertFalse(5 < 3);

// Assert that this is null

assertNull(null);

// Assert that this is not null

assertNotNull(new Object());

}

}

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 the AAA pattern.

2. Use @Before and @After annotations for setup and teardown methods.

**Code :**

import org.junit.Before;

import org.junit.After;

import org.junit.Test;

import static org.junit.Assert.\*;

// Class under test

class Calculator {

public int add(int a, int b) {

return a + b;

}

public int subtract(int a, int b) {

return a - b;

}

}

public class CalculatorTest {

private Calculator calc;

// Setup: Runs before each test

@Before

public void setUp() {

calc = new Calculator();

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

}

// Teardown: Runs after each test

@After

public void tearDown() {

calc = null;

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

}

@Test

public void testAddition() {

// Arrange

int a = 10;

int b = 5;

// Act

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

// Assert

assertEquals(15, result);

}

@Test

public void testSubtraction() {

// Arrange

int a = 10;

int b = 5;

// Act

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

// Assert

assertEquals(5, result);

}

}

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.

Steps:

1. Create a mock object for the external API.

2. Stub the methods to return predefined values.

3. Write a test case that uses the mock object.

Solution Code:

import static org.mockito.Mockito.\*;

import org.junit.jupiter.api.Test;

import org.mockito.Mockito;

public class MyServiceTest {

@Test

public void testExternalApi() {

ExternalApi mockApi = Mockito.mock(ExternalApi.class);

when(mockApi.getData()).thenReturn("Mock Data");

MyService service = new MyService(mockApi);

String result = service.fetchData();

assertEquals("Mock Data", result);

}

}

**Code :**

import org.junit.jupiter.api.Test;

import static org.junit.jupiter.api.Assertions.assertEquals;

import static org.mockito.Mockito.\*;

public class MyServiceTest {

@Test

public void testExternalApi() {

ExternalApi mockApi = mock(ExternalApi.class);

when(mockApi.getData()).thenReturn("Mock Data");

MyService service = new MyService(mockApi);

String result = service.fetchData();

assertEquals("Mock Data", result);

}

}

Exercise 2: Verifying Interactions

Scenario:

You need to ensure that a method is called with specific arguments.

Steps:

1. Create a mock object.

2. Call the method with specific arguments.

3. Verify the interaction.

Solution Code:

import static org.mockito.Mockito.\*;

import org.junit.jupiter.api.Test;

import org.mockito.Mockito;

public class MyServiceTest {

@Test

public void testVerifyInteraction() {

ExternalApi mockApi = Mockito.mock(ExternalApi.class);

MyService service = new MyService(mockApi);

service.fetchData();

verify(mockApi).getData();

}

}

**Code :**

import static org.mockito.Mockito.\*;

import org.junit.jupiter.api.Test;

public class MyServiceTest {

@Test

public void testVerifyInteraction() {

ExternalApi mockApi = mock(ExternalApi.class);

MyService service = new MyService(mockApi);

service.fetchData();

verify(mockApi).getData();

}

}