**Exercise 1: Setting Up Junit**

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

**CODE:**

**Calculator.java**

package org.example;  
  
public class Calculator {  
 public int add(int a, int b) {  
 return a + b;  
 }  
}

**Test.java**

package org.example;

import org.junit.Test;

import static org.junit.Assert.\*;

public class CalculatorTest {

@Test

public void testAdd() {

Calculator calc = new Calculator();

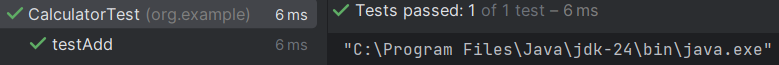
int result = calc.add(2, 3);

assertEquals(5, result);

}

}

**OUTPUT:**

****

**Exercise 3: Assertions in JUnit**

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

**CODE:**

**AssertionTest.java:**

package org.example;  
  
import org.junit.Test;  
import static org.junit.Assert.\*;  
  
public class AssertionTest {  
 @Test  
 public void testAssertions() {  
  
 *assertEquals*(5, 2 + 3);  
 *assertTrue*(5 > 3);  
 *assertFalse*(5 < 3);  
 *assertNull*(null);  
 *assertNotNull*(new Object());  
 }  
}

**OUTPUT:**

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

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

**CODE:**

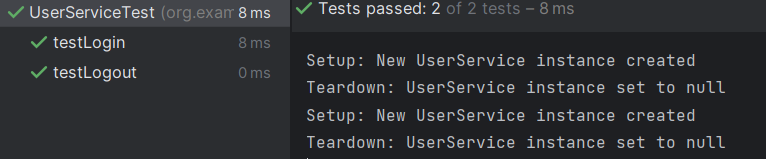
**UserService.java:**

package org.example;  
  
public class UserService {  
 private String currentUser;  
  
 public void login(String username) {  
 this.currentUser = username;  
 }  
  
 public void logout() {  
 this.currentUser = null;  
 }  
  
 public boolean isLoggedIn() {  
 return currentUser != null;  
 }  
  
 public String getCurrentUser() {  
 return currentUser;  
 }  
}

**UserServiceTest.java:**

package org.example;  
import org.junit.Before;  
import org.junit.After;  
import org.junit.Test;  
import static org.junit.Assert.\*;  
  
public class UserServiceTest {  
 private UserService userService;  
  
 @Before  
 public void setUp() {  
 userService = new UserService(); // Arrange  
 System.*out*.println("Setup: New UserService instance created");  
 }  
  
 @After  
 public void tearDown() {  
 userService = null;  
 System.*out*.println("Teardown: UserService instance set to null");  
 }  
  
 @Test  
 public void testLogin() {  
   
 userService.login("fazil");  
  
 *assertTrue*(userService.isLoggedIn());  
 *assertEquals*("fazil", userService.getCurrentUser());  
 }  
  
 @Test  
 public void testLogout() {  
   
 userService.login("fazil");  
  
 userService.logout();  
  
 *assertFalse*(userService.isLoggedIn());  
 *assertNull*(userService.getCurrentUser());  
 }  
}

**OUTPUT:**

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