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

**Calculator.java**

**package** com.cts.JunitTestSetup;

**public** **class** Calculator

{

**public** **int** add(**int** a, **int** b) {

**return** a + b;

}

**public** **int** subtract(**int** a, **int** b) {

**return** a - b;

}

**public** **int** multiply(**int** a, **int** b) {

**return** a \* b;

}

**public** **int** divide(**int** a, **int** b) {

**if** (b == 0) {

**throw** **new** ArithmeticException("Cannot divide by zero.");

}

**return** a / b;

}

**public** **boolean** isEven(**int** number) {

**return** number % 2 == 0;

}

**public** **int** square(**int** number) {

**return** number \* number;

}

}

**CalculatorTest.java**

**package** com.cts.JunitTestSetup;

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

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

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

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

**public** **class** CalculatorTest {

**private** Calculator calculator;

@BeforeEach

**void** setUp() {

calculator = **new** Calculator();

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

}

@AfterEach

**void** tearDown() {

calculator = **null**;

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

}

@Test

**void** testAddition() {

**int** result = calculator.add(10, 5);

System.***out***.println("Addition Result: " + result);

*assertEquals*(15, result);

}

@Test

**void** testSubtraction() {

*assertEquals*(5, calculator.subtract(10, 5));

}

@Test

**void** testMultiplication() {

*assertEquals*(12, calculator.multiply(4, 3));

}

@Test

**void** testDivision() {

*assertEquals*(5, calculator.divide(20, 4));

}

@Test

**void** testDivisionByZero() {

*assertThrows*(ArithmeticException.**class**, () -> calculator.divide(10, 0));

}

@Test

**void** testIsEvenTrue() {

*assertTrue*(calculator.isEven(8));

}

@Test

**void** testIsEvenFalse() {

*assertFalse*(calculator.isEven(7));

}

@Test

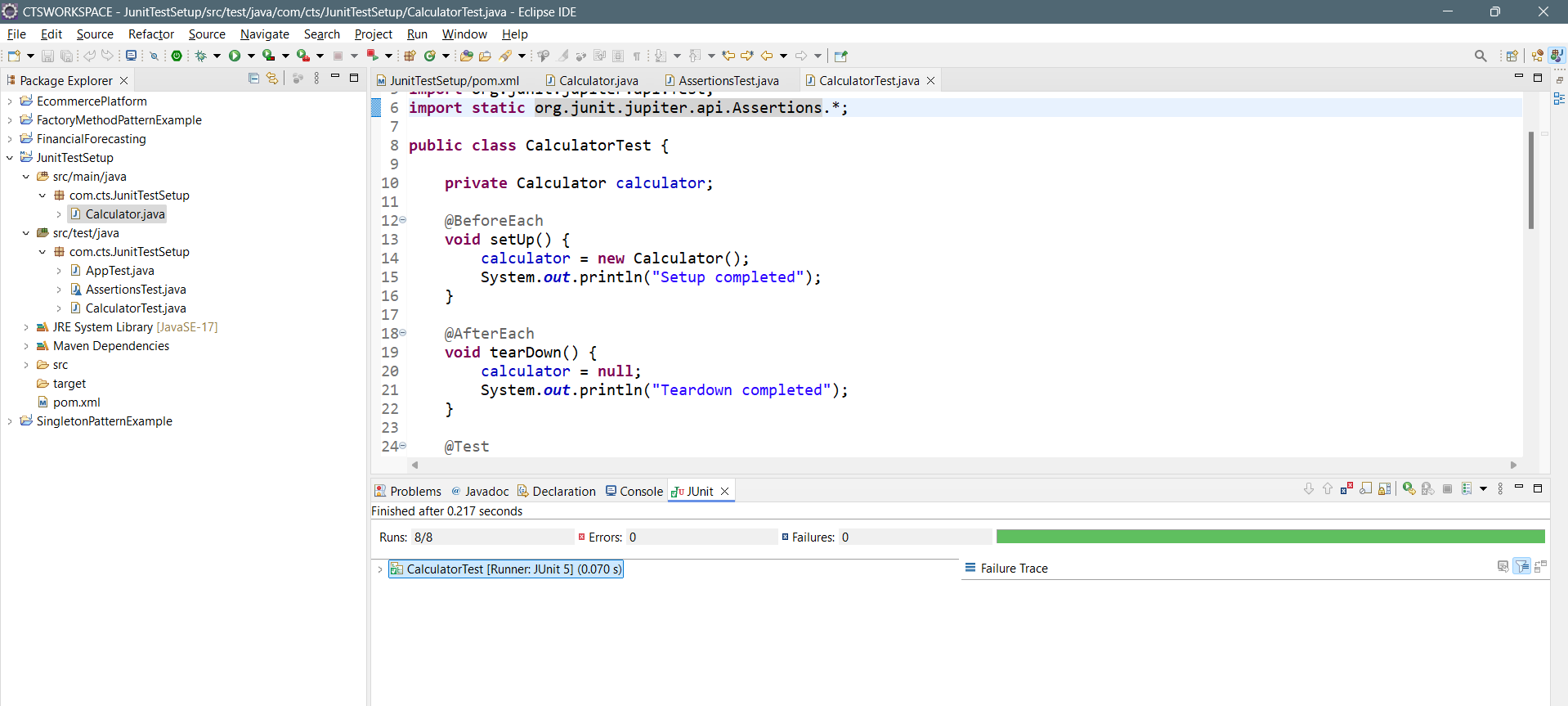
**void** testSquare() {

*assertEquals*(36, calculator.square(6));

}

}

Output:



A screenshot of a computer

Description automatically generated