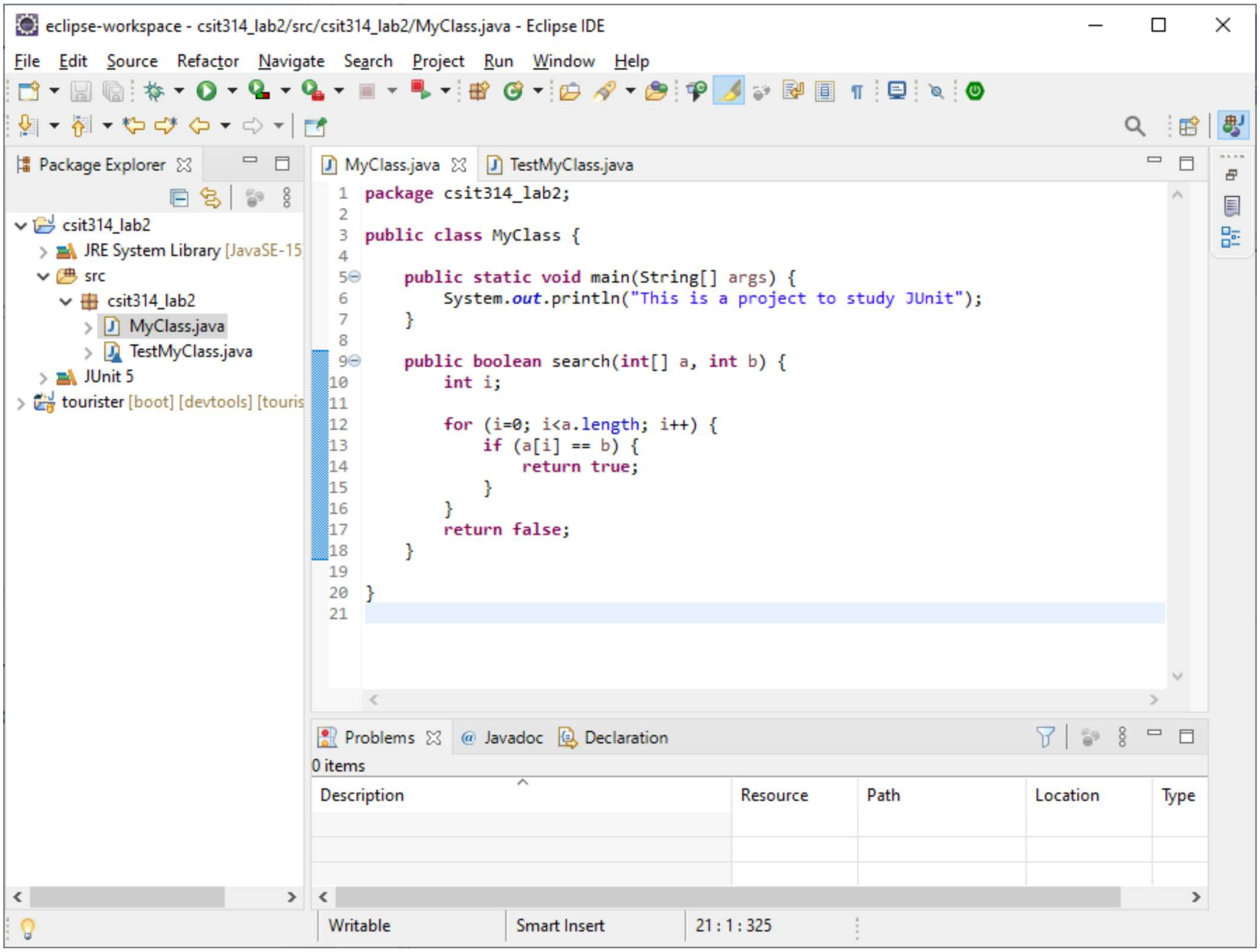
Lab 5: Test-Driven Development

CSIT314 Software Development Methodologies

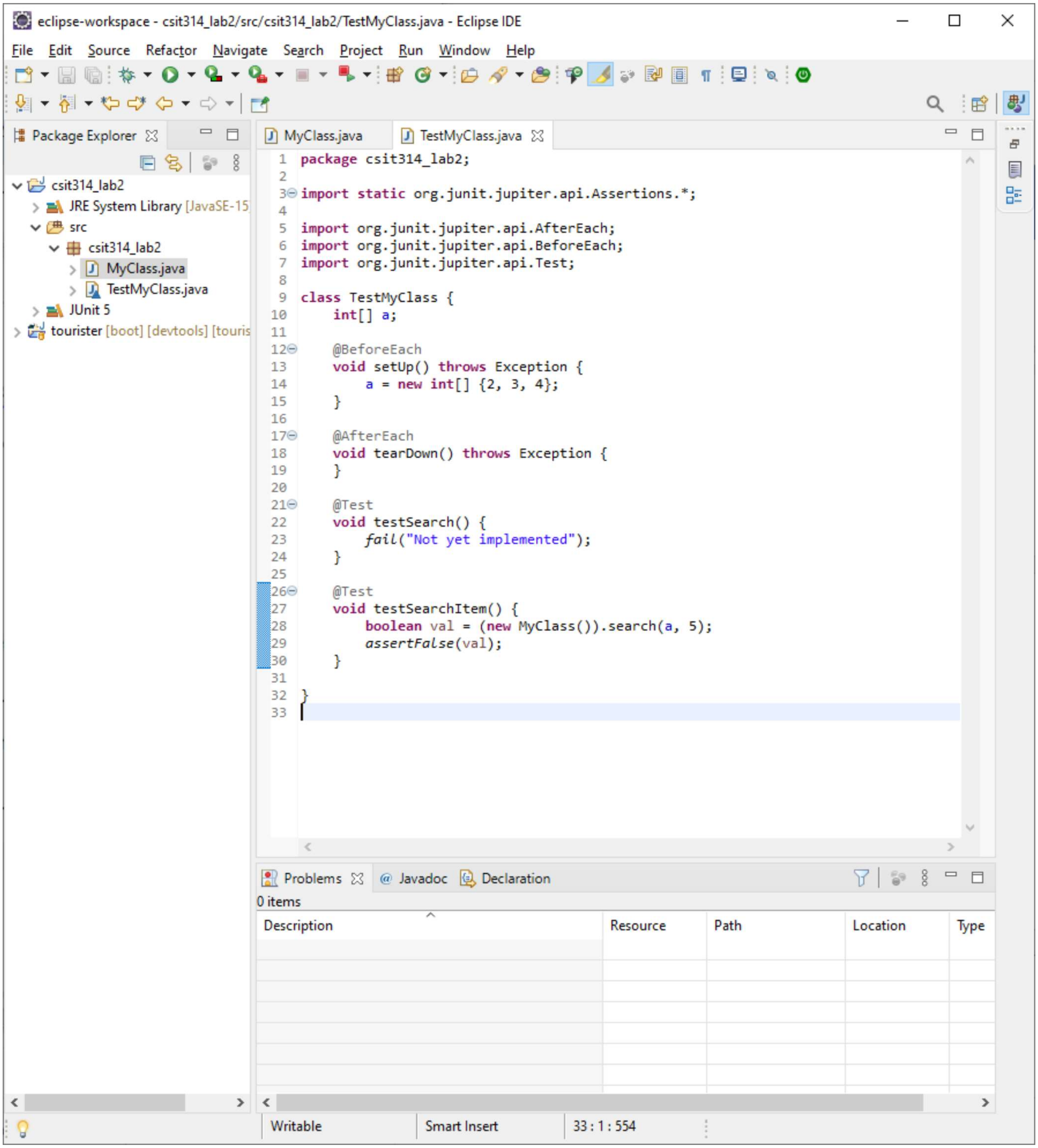
Task 1: Array search

1.1 Writing the class



```java
package csit314_lab2;

public class MyClass {

    public static void main(String[] args) {
        System.out.println("This is a project to study JUnit");
    }

    public boolean search(int[] a, int b) {
        int i;

        for (i=0; i<a.length; i++) {
            if (a[i] == b) {
                return true;
            }
        }
        return false;
    }

}
```

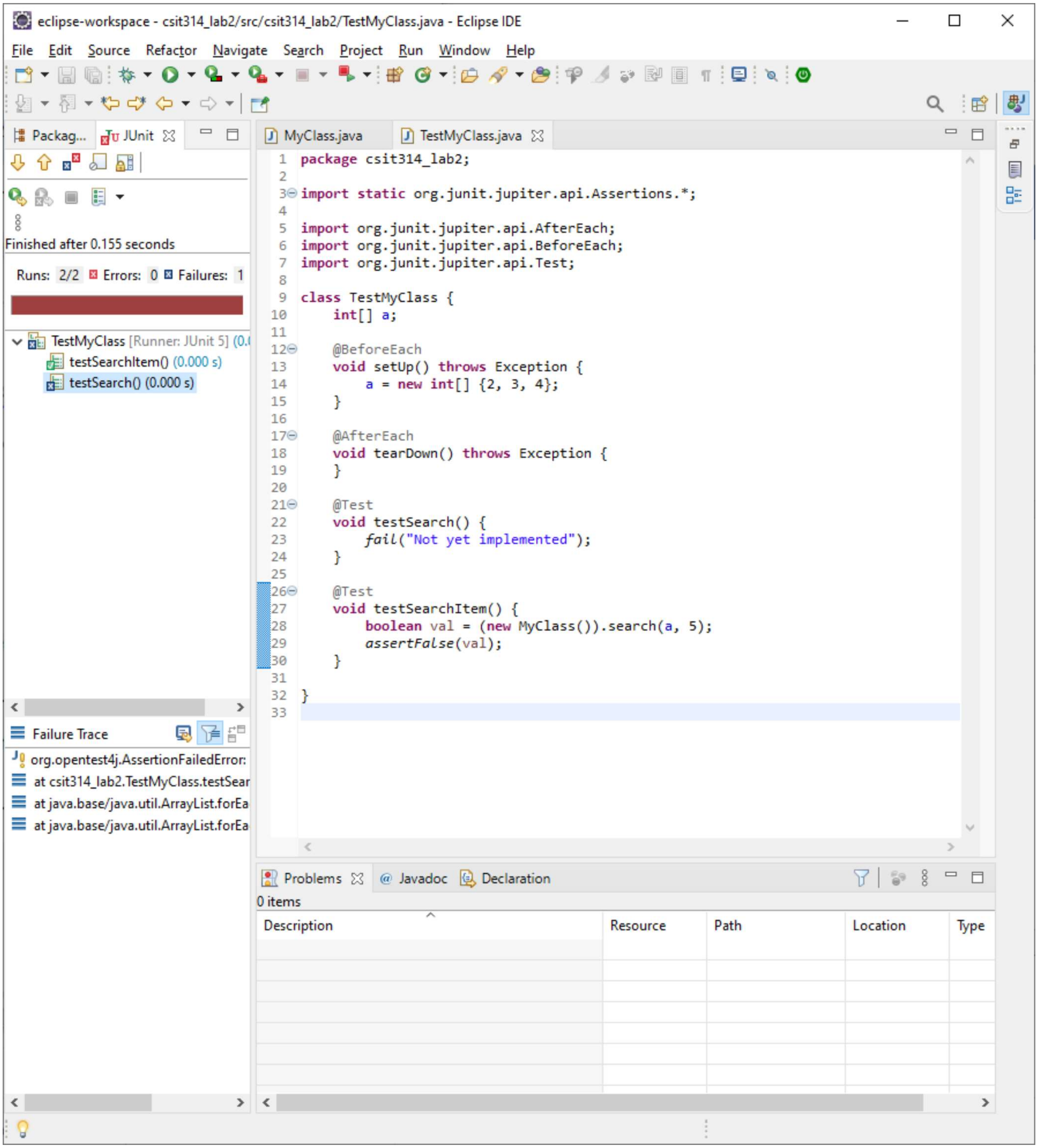
1.2 Writing the test class



eclipse-workspace - csit314_lab2/src/csit314_lab2/TestMyClass.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
csit314_lab2
JRE System Library [JavaSE-15
src
csit314_lab2
MyClass.java
TestMyClass.java
JUnit 5
tourister [boot] [devtools] [touris
MyClass.java
TestMyClass.java
Problems
Javadoc
Declaration
0 items
Description
Resource
Path
Location
Type
Writable
Smart Insert
33 : 1 : 554

```java
package csit314_lab2;

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

import org.junit.jupiter.api.AfterEach;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;

class TestMyClass {
    int[] a;

    @BeforeEach
    void setUp() throws Exception {
        a = new int[] {2, 3, 4};
    }

    @AfterEach
    void tearDown() throws Exception {
    }

    @Test
    void testSearch() {
        fail("Not yet implemented");
    }

    @Test
    void testSearchItem() {
        boolean val = (new MyClass()).search(a, 5);
        assertFalse(val);
    }

}
```

1.3 Running the test



eclipse-workspace - csit314_lab2/src/csit314_lab2/TestMyClass.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Packag... JUnit
MyClass.java
TestMyClass.java
Failure Trace
Problems
Javadoc
Declaration

```
Finished after 0.155 seconds

Runs: 2/2   Errors: 0   Failures: 1

TestMyClass [Runner: JUnit 5] (0.(
    testSearchItem() (0.000 s)
    testSearch() (0.000 s)
```

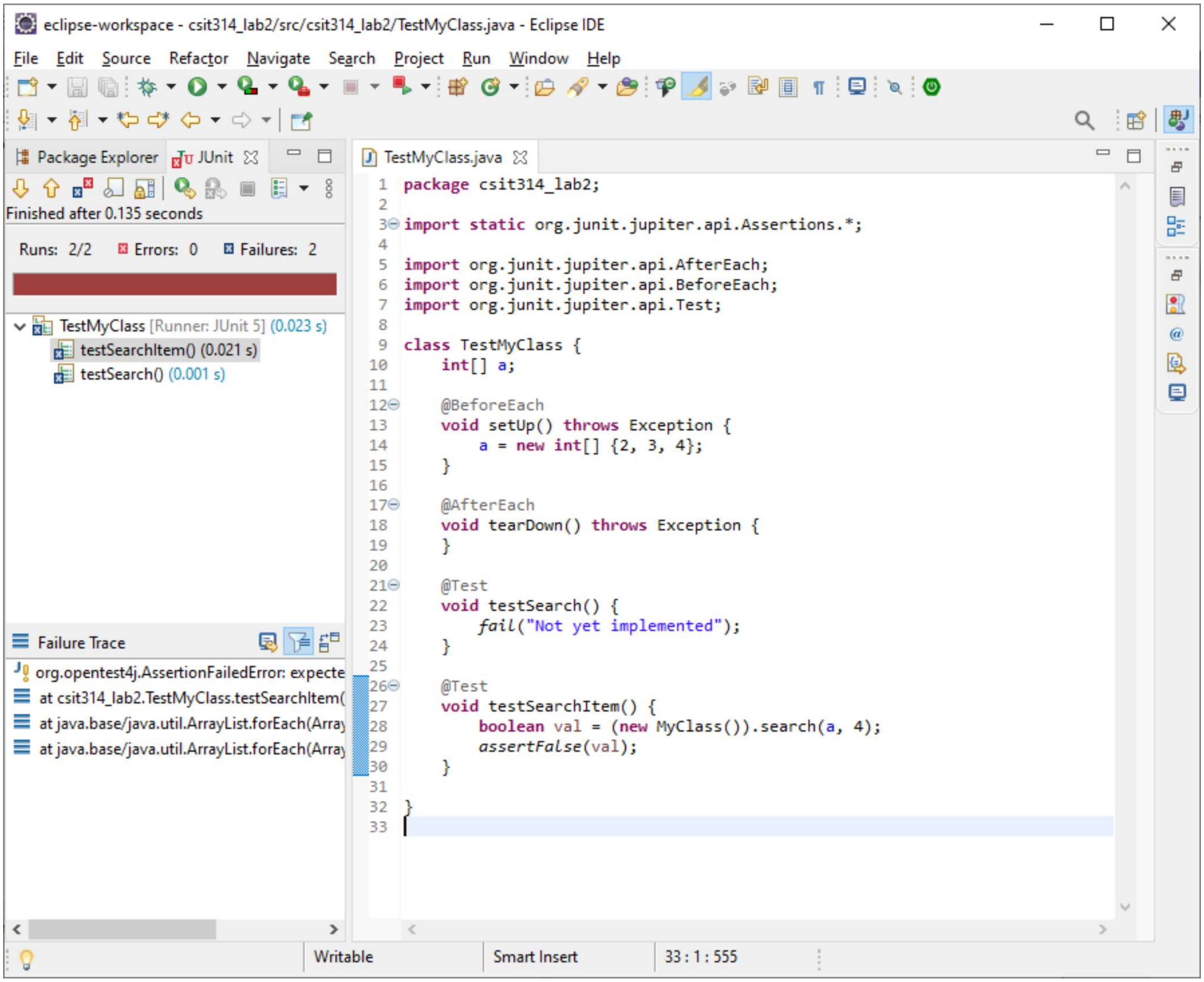
```
org.opentest4j.AssertionFailedError:
at csit314_lab2.TestMyClass.testSear
at java.base/java.util.ArrayList.forEa
at java.base/java.util.ArrayList.forEa
```

```java
package csit314_lab2;

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

import org.junit.jupiter.api.AfterEach;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;

class TestMyClass {
    int[] a;

    @BeforeEach
    void setUp() throws Exception {
        a = new int[] {2, 3, 4};
    }

    @AfterEach
    void tearDown() throws Exception {
    }

    @Test
    void testSearch() {
        fail("Not yet implemented");
    }

    @Test
    void testSearchItem() {
        boolean val = (new MyClass()).search(a, 5);
        assertFalse(val);
    }

}
```

0 items

Description	Resource	Path	Location	Type

1.4 Trying a different value (test fail)


eclipse-workspace - csit314_lab2/src/csit314_lab2/TestMyClass.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
JUnit
TestMyClass.java
Failure Trace
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Smart Insert
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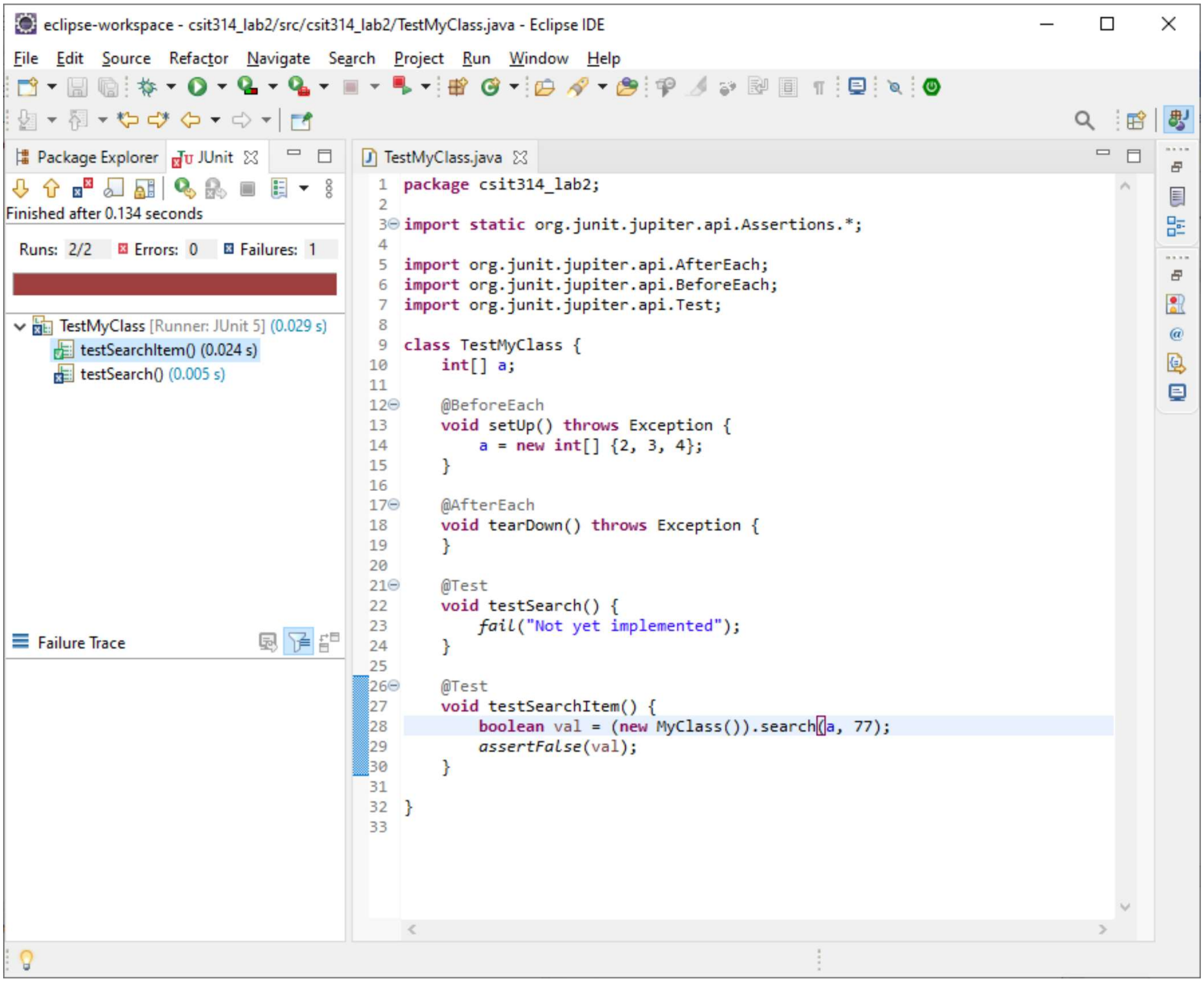
```
Finished after 0.135 seconds

Runs: 2/2    Errors: 0    Failures: 2

TestMyClass [Runner: JUnit 5] (0.023 s)
    testSearchItem() (0.021 s)
    testSearch() (0.001 s)
```

```
org.opentest4j.AssertionFailedError: expecte
at csit314_lab2.TestMyClass.testSearchItem(
at java.base/java.util.ArrayList.forEach(Array
at java.base/java.util.ArrayList.forEach(Array
```

```java
package csit314_lab2;

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

import org.junit.jupiter.api.AfterEach;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;

class TestMyClass {
    int[] a;

    @BeforeEach
    void setUp() throws Exception {
        a = new int[] {2, 3, 4};
    }

    @AfterEach
    void tearDown() throws Exception {
    }

    @Test
    void testSearch() {
        fail("Not yet implemented");
    }

    @Test
    void testSearchItem() {
        boolean val = (new MyClass()).search(a, 4);
        assertFalse(val);
    }

}
```

1.5 Trying a different value (test sucess)



eclipse-workspace - csit314_lab2/src/csit314_lab2/TestMyClass.java - Eclipse IDE

Finished after 0.134 seconds

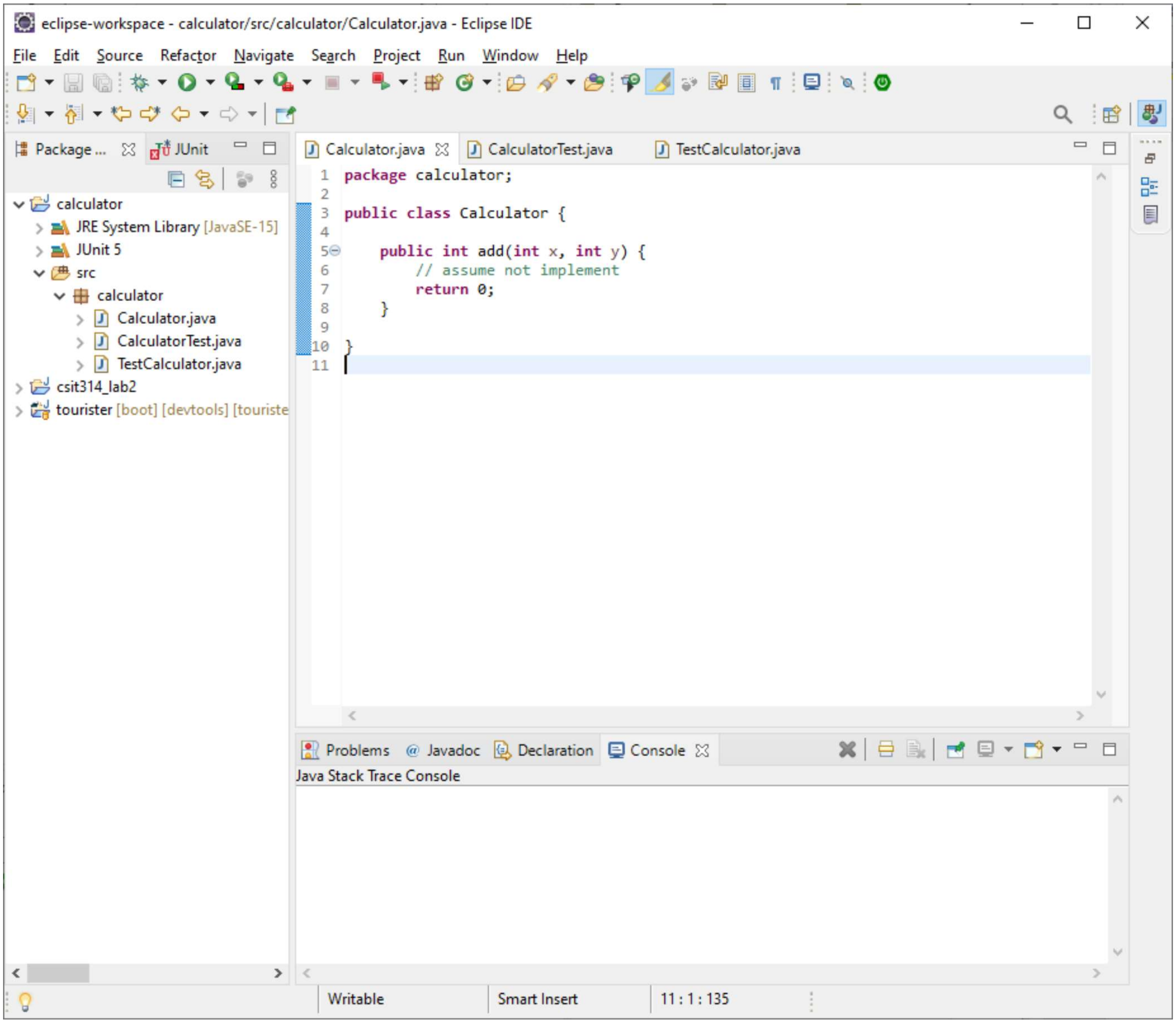
Runs: 2/2 Errors: 0 Failures: 1

```
TestMyClass [Runner: JUnit 5] (0.029 s)
    testSearchItem() (0.024 s)
    testSearch() (0.005 s)
```

```java
package csit314_lab2;

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

import org.junit.jupiter.api.AfterEach;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;

class TestMyClass {
    int[] a;

    @BeforeEach
    void setUp() throws Exception {
        a = new int[] {2, 3, 4};
    }

    @AfterEach
    void tearDown() throws Exception {
    }

    @Test
    void testSearch() {
        fail("Not yet implemented");
    }

    @Test
    void testSearchItem() {
        boolean val = (new MyClass()).search(a, 77);
        assertFalse(val);
    }

}
```

Task 2: Calculator

2.1 Writing the Calculator class



eclipse-workspace - calculator/src/calculator/Calculator.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package ... JUnit
calculator
JRE System Library [JavaSE-15]
JUnit 5
src
calculator
Calculator.java
CalculatorTest.java
TestCalculator.java
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Calculator.java CalculatorTest.java TestCalculator.java
Problems @ Javadoc Declaration Console
Java Stack Trace Console
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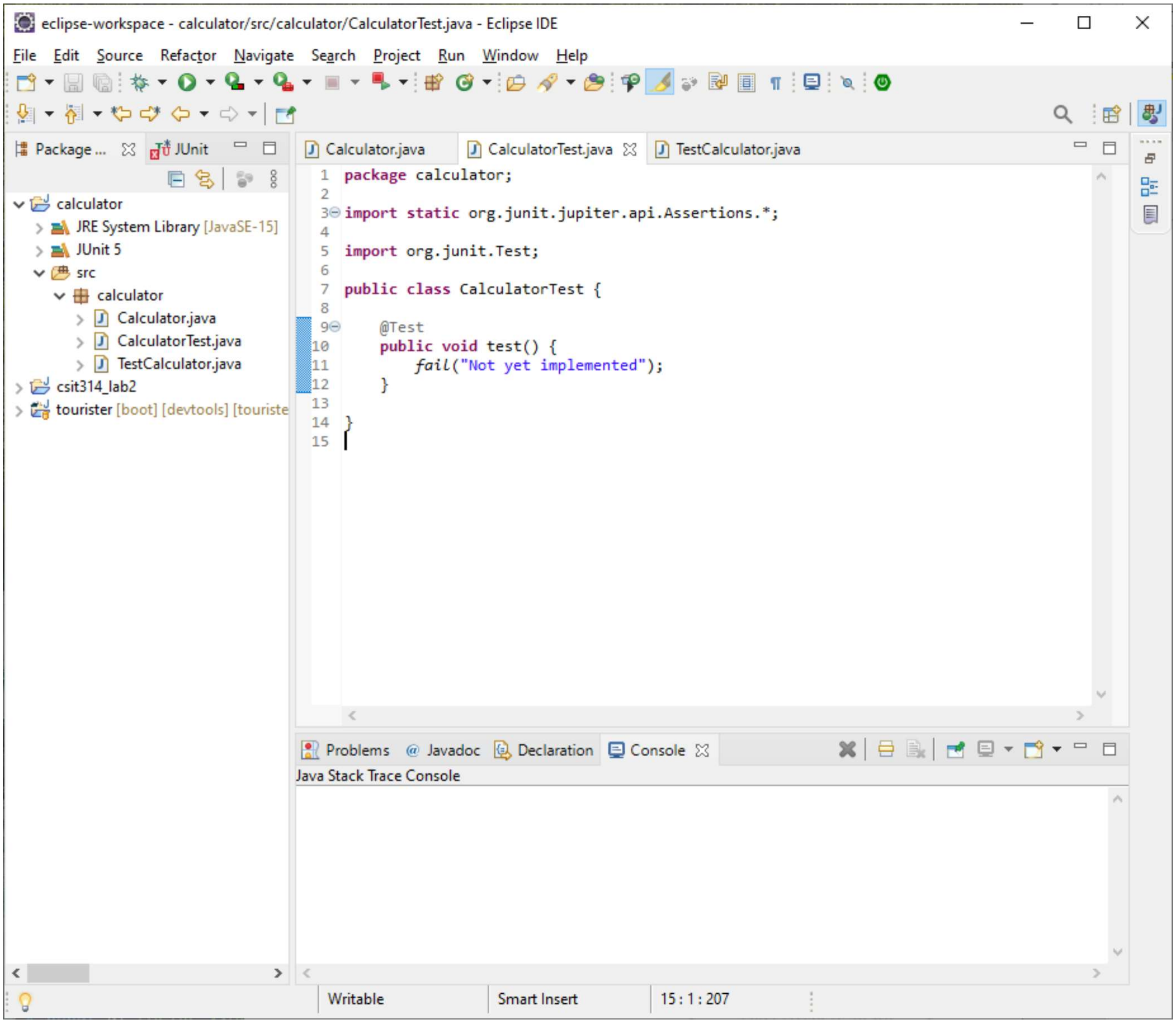
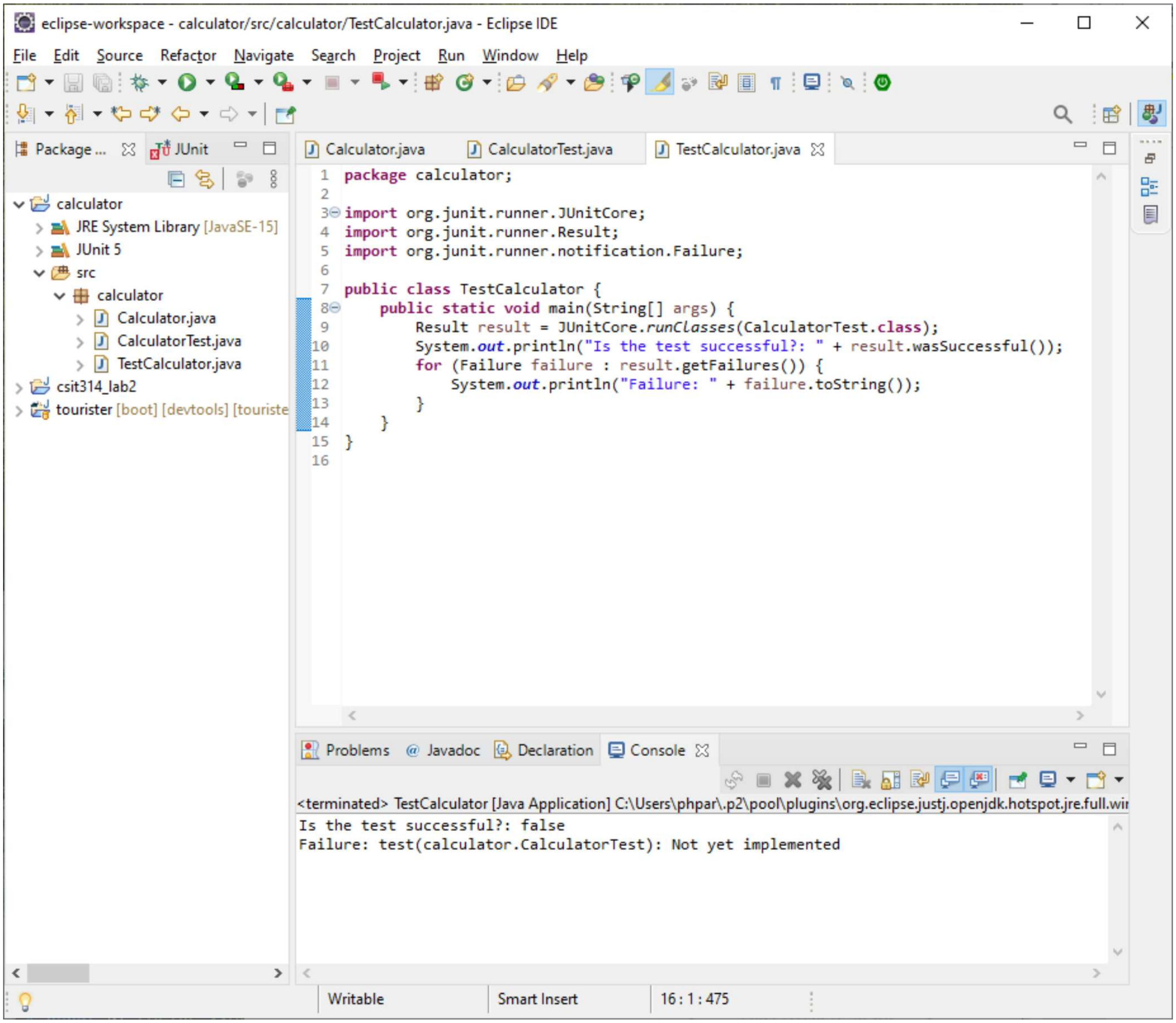
```java
package calculator;

public class Calculator {

    public int add(int x, int y) {
        // assume not implement
        return 0;
    }

}

```

2.2 Writing the CalculatorTest class



```java
package calculator;

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

import org.junit.Test;

public class CalculatorTest {

    @Test
    public void test() {
        fail("Not yet implemented");
    }

}
```

2.3 Writing and running the TestCalculator class


eclipse-workspace - calculator/src/calculator/TestCalculator.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package ... JUnit
calculator
JRE System Library [JavaSE-15]
JUnit 5
src
calculator
Calculator.java
CalculatorTest.java
TestCalculator.java
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Calculator.java CalculatorTest.java TestCalculator.java
Problems Javadoc Declaration Console
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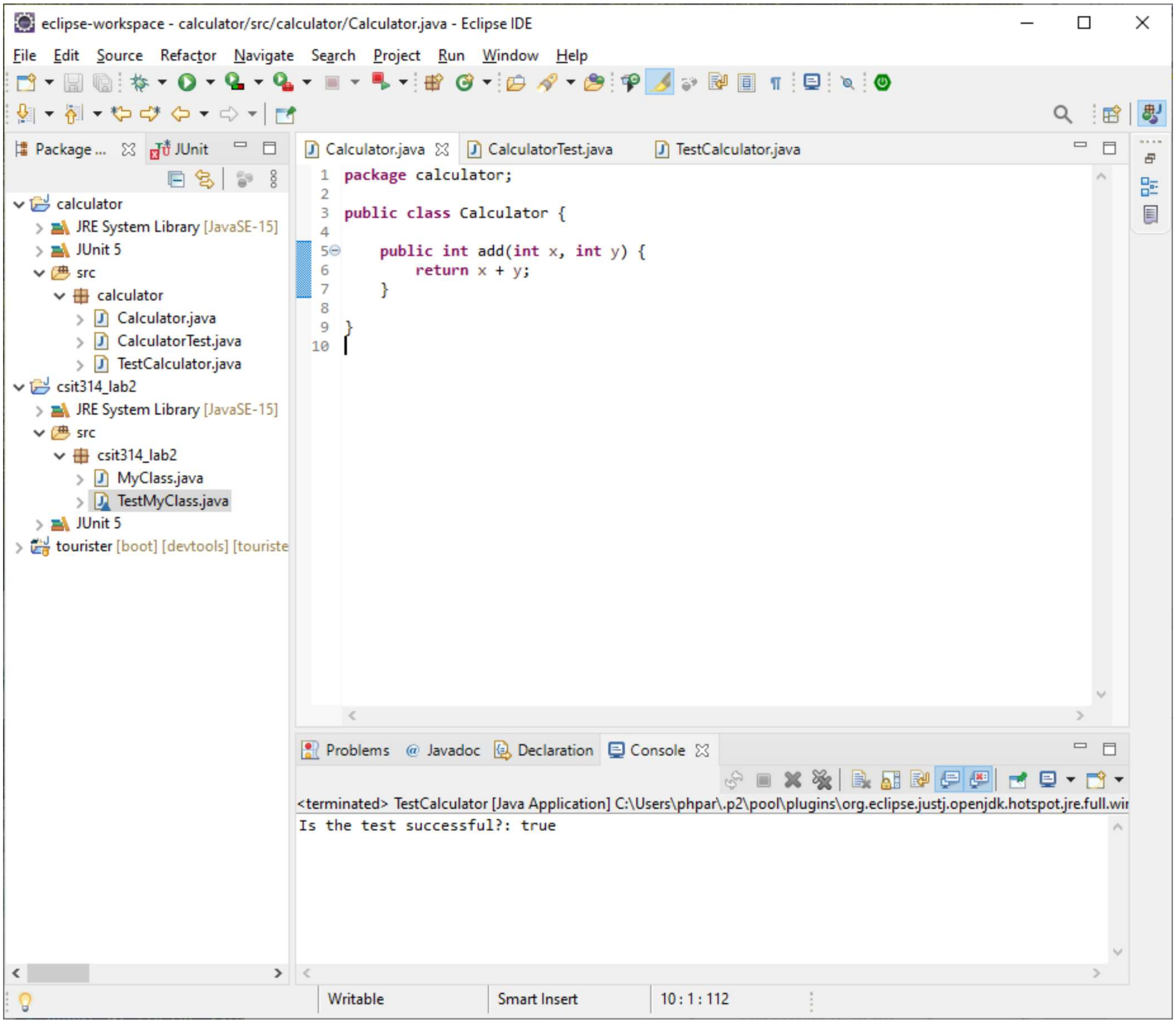
```java
package calculator;

import org.junit.runner.JUnitCore;
import org.junit.runner.Result;
import org.junit.runner.notification.Failure;

public class TestCalculator {
    public static void main(String[] args) {
        Result result = JUnitCore.runClasses(CalculatorTest.class);
        System.out.println("Is the test successful?: " + result.wasSuccessful());
        for (Failure failure : result.getFailures()) {
            System.out.println("Failure: " + failure.toString());
        }
    }
}
```

```
<terminated> TestCalculator [Java Application] C:\Users\phpar\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.wi
Is the test successful?: false
Failure: test(calculator.CalculatorTest): Not yet implemented
```

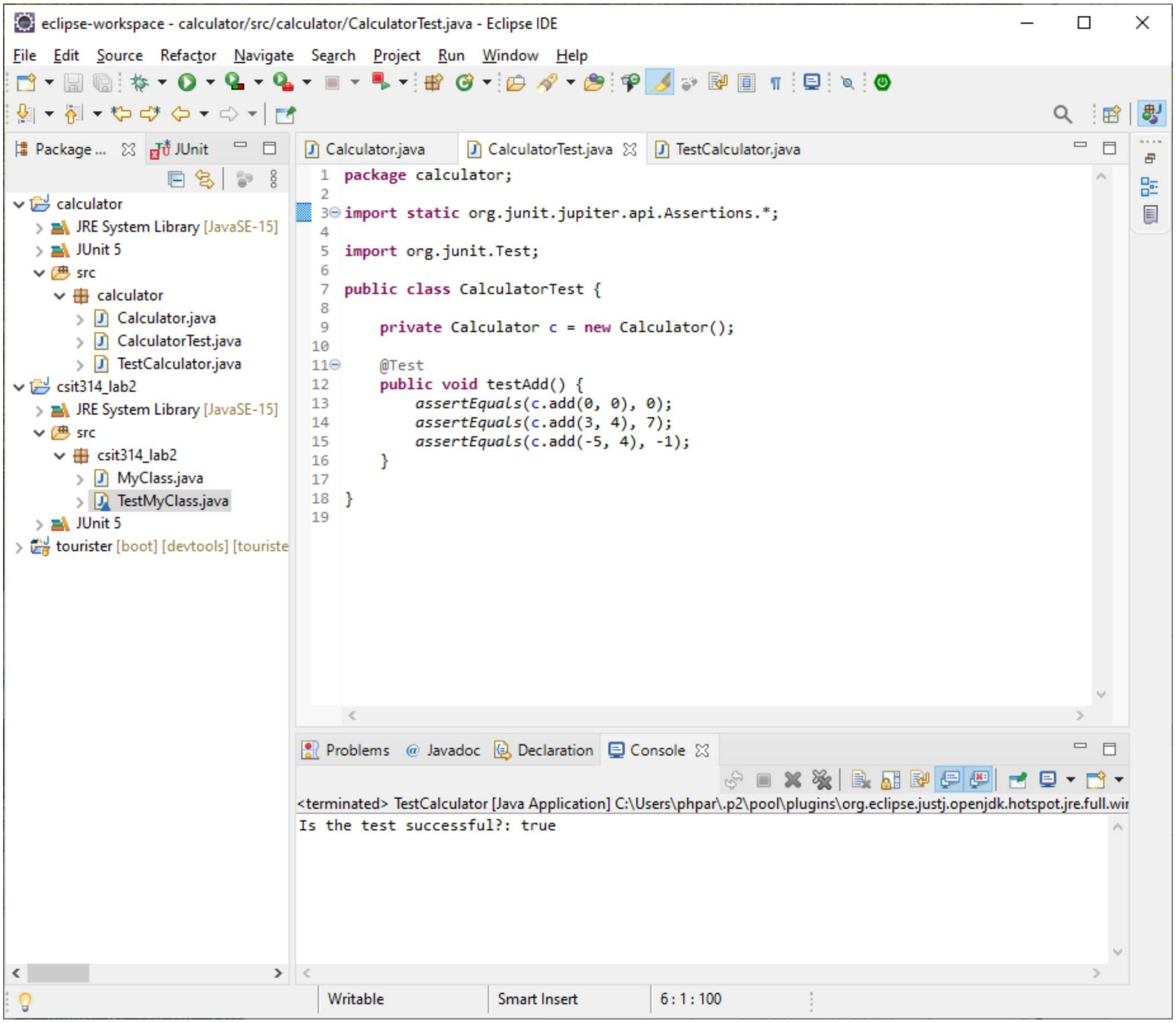
2.4 Completing the Calculator class



```
package calculator;

public class Calculator {

    public int add(int x, int y) {
        return x + y;
    }

}
```

```
<terminated> TestCalculator [Java Application] C:\Users\phpar\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.wi
Is the test successful?: true
```

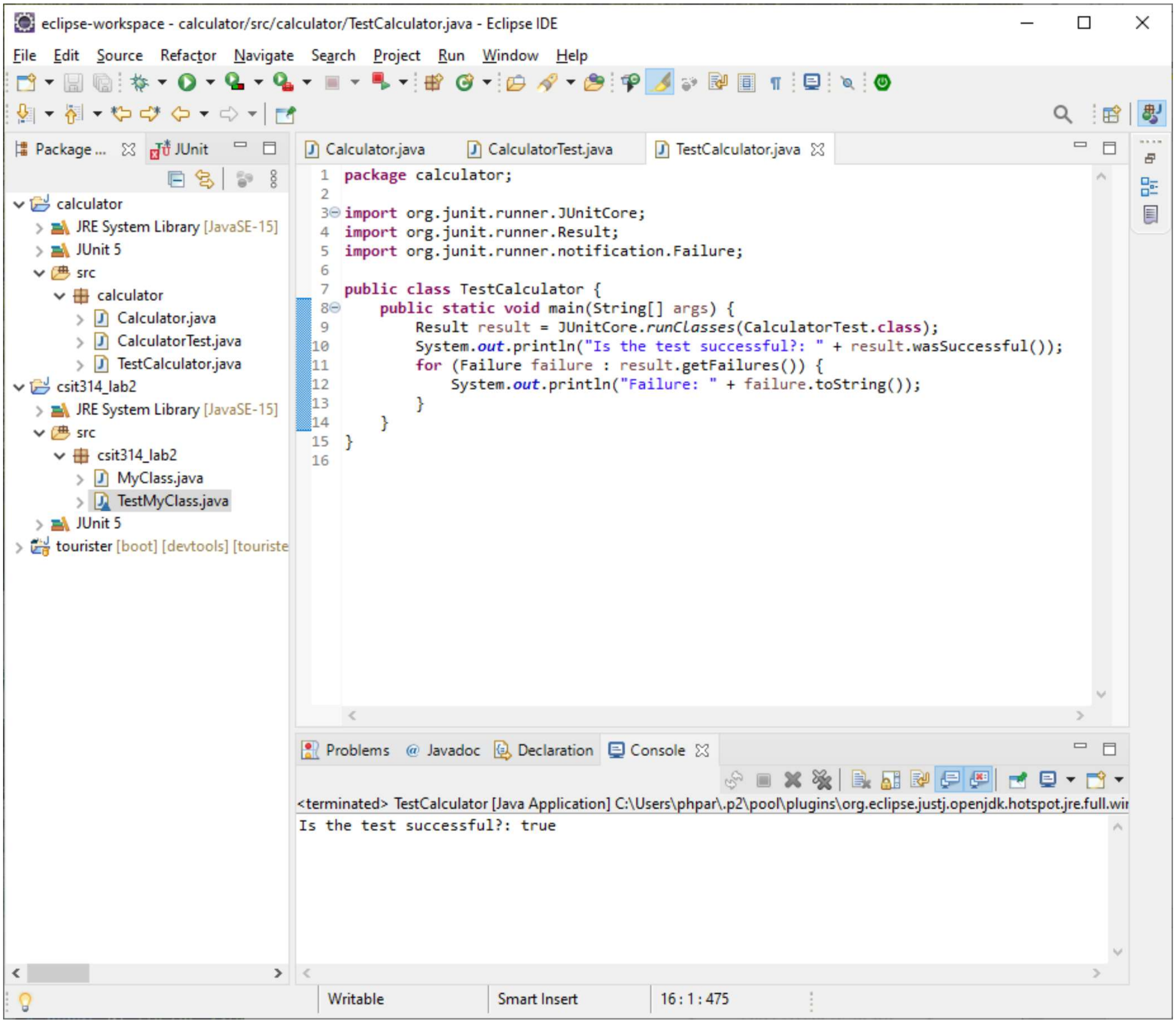
2.5 Completing the CalculatorTest class



```java
package calculator;

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

import org.junit.Test;

public class CalculatorTest {

    private Calculator c = new Calculator();

    @Test
    public void testAdd() {
        assertEquals(c.add(0, 0), 0);
        assertEquals(c.add(3, 4), 7);
        assertEquals(c.add(-5, 4), -1);
    }

}
```

```
<terminated> TestCalculator [Java Application] C:\Users\phpar\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.wi
Is the test successful?: true
```

2.6 Running TestCalculator again



```java
package calculator;

import org.junit.runner.JUnitCore;
import org.junit.runner.Result;
import org.junit.runner.notification.Failure;

public class TestCalculator {
    public static void main(String[] args) {
        Result result = JUnitCore.runClasses(CalculatorTest.class);
        System.out.println("Is the test successful?: " + result.wasSuccessful());
        for (Failure failure : result.getFailures()) {
            System.out.println("Failure: " + failure.toString());
        }
    }
}
```

```
<terminated> TestCalculator [Java Application] C:\Users\phpar\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.wi
Is the test successful?: true
```