Junit Basic Testing Exercises

Exercise 1:SETTING UP JUNIT:

Scenario:

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

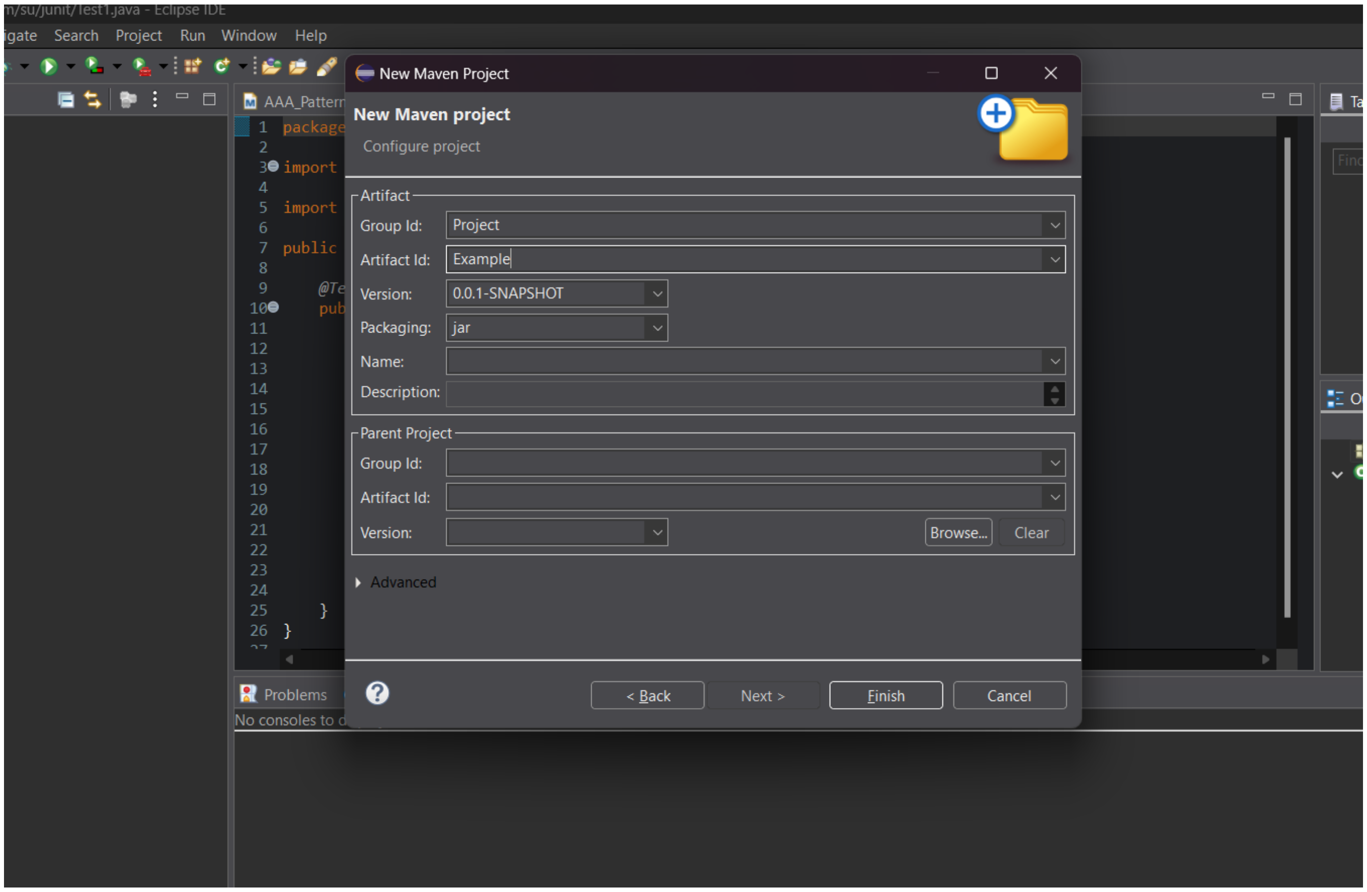
SOLUTION:

Step 1. Create or Open a **Maven Project** :

You can use an IDE like **IntelliJ IDEA**, **Eclipse**, or set it up manually.

Step 2. Click File-> New-> Maven Project(Click on create a simple project)

Then write the name of group id and artifact id and then click on finish button.



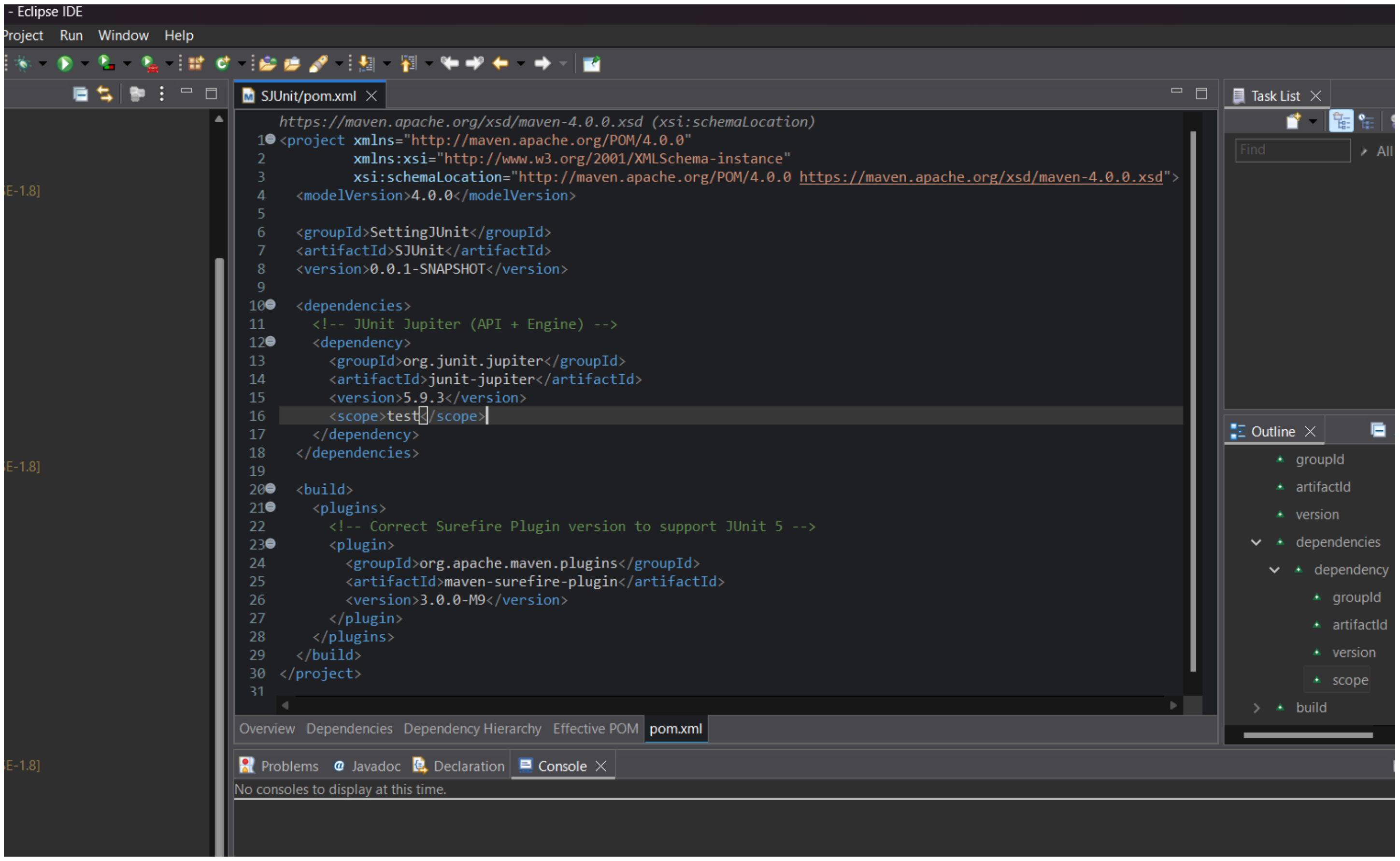
Artifact
Group Id: Project
Artifact Id: Example
Version: 0.0.1-SNAPSHOT
Packaging: jar
Name:
Description:

Parent Project
Group Id:
Artifact Id:
Version:

Step 3. Add **Junit Dependency** to your project . Add following to your **pom.xml** file:

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>Project</groupId>
  <artifactId>Example</artifactId>
  <version>0.0.1-SNAPSHOT</version>

  <dependencies>
    <!-- JUnit Jupiter (API + Engine) -->
    <dependency>
      <groupId>org.junit.jupiter</groupId>
      <artifactId>junit-jupiter</artifactId>
      <version>5.9.3</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
  <build>
    <plugins>
      <!-- Correct Surefire Plugin version to support JUnit 5 -->
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-surefire-plugin</artifactId>
        <version>3.0.0-M9</version>
      </plugin>
    </plugins>
  </build>
</project>
```

Then run this by maven test.

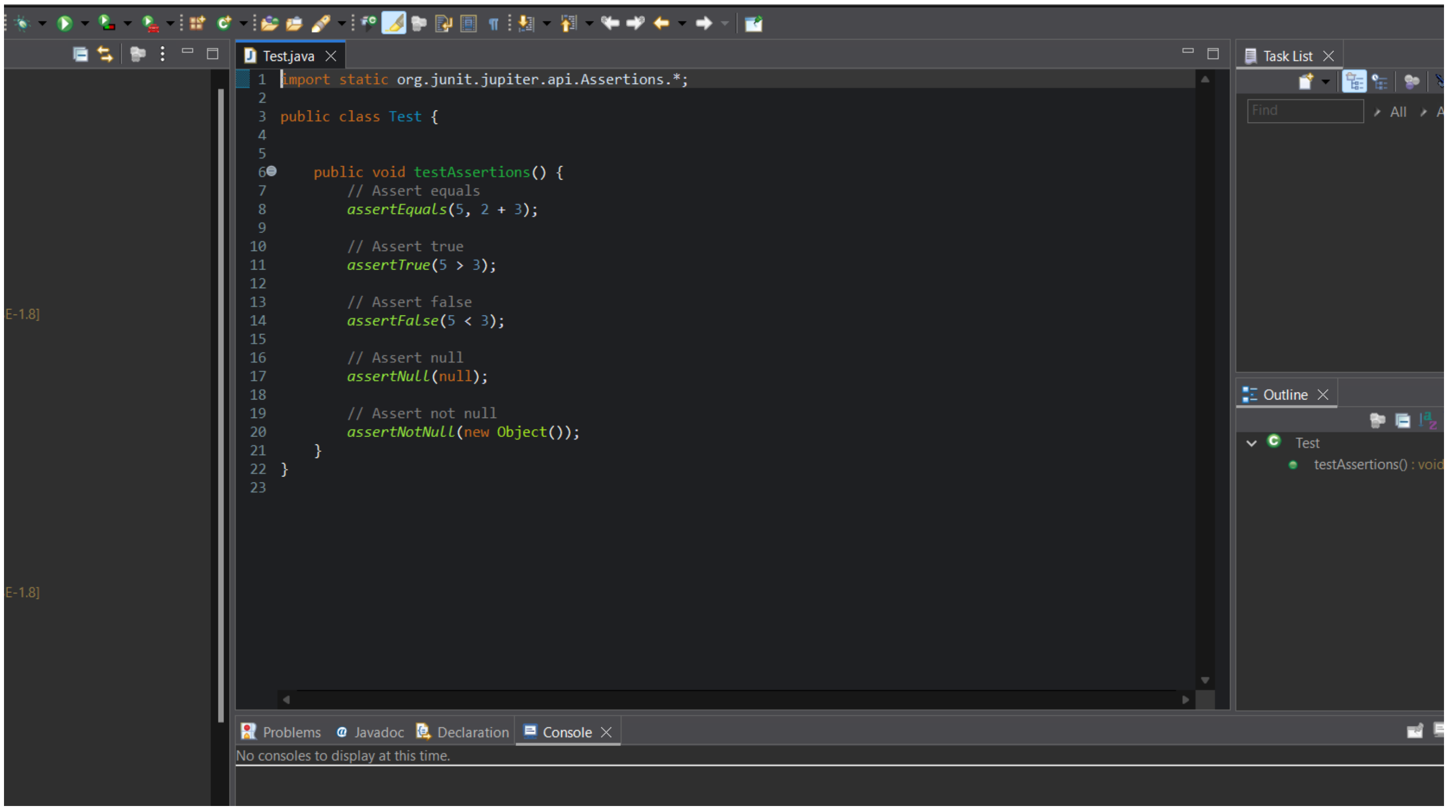


```
https://maven.apache.org/xsd/maven-4.0.0.xsd (xsi:schemaLocation)
<project xmlns="http://maven.apache.org/POM/4.0.0"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 https://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>SettingJUnit</groupId>
  <artifactId>SJUnit</artifactId>
  <version>0.0.1-SNAPSHOT</version>

  <dependencies>
    <!-- JUnit Jupiter (API + Engine) -->
    <dependency>
      <groupId>org.junit.jupiter</groupId>
      <artifactId>junit-jupiter</artifactId>
      <version>5.9.3</version>
      <scope>test</scope>
    </dependency>
  </dependencies>

  <build>
    <plugins>
      <!-- Correct Surefire Plugin version to support JUnit 5 -->
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-surefire-plugin</artifactId>
        <version>3.0.0-M9</version>
      </plugin>
    </plugins>
  </build>
</project>
```

No consoles to display at this time.

Step 4. Create your test classes in **src/test/java**.

Write a sample test case:



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

public class 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());
    }
}
```

No consoles to display at this time.

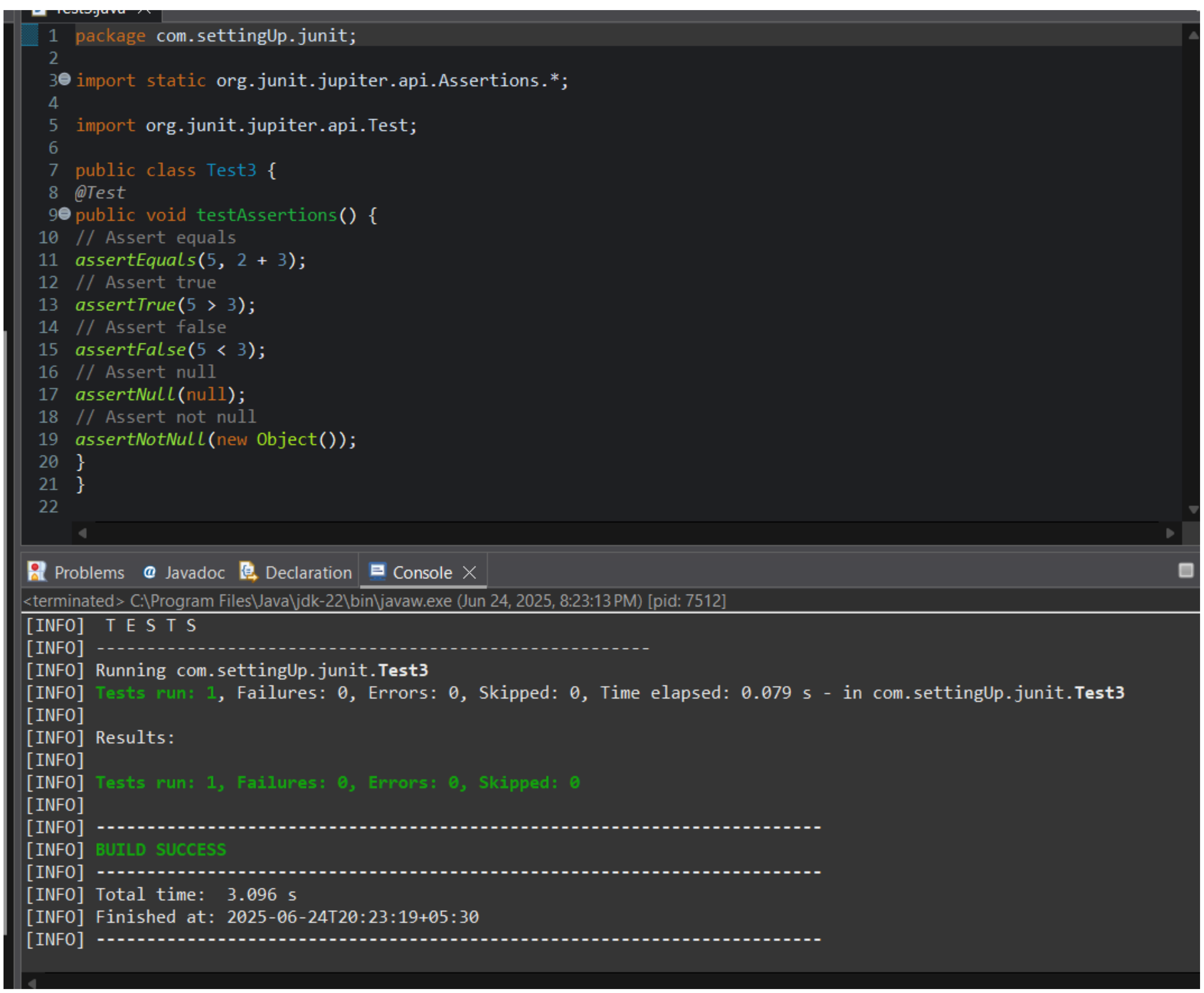
CODE:

```
import static org.junit.jupiter.api.Assertions.*;
public class Test {
   public void testAssertions() {
      assertEquals(5, 2 + 3);
      assertTrue(5 > 3);
      assertFalse(5 < 3);
      assertNull(null);
      assertNotNull(new Object());
   }
}
```

Step 5. Then run the test class in **maven test** and then **Junit test** .

OUTPUT:

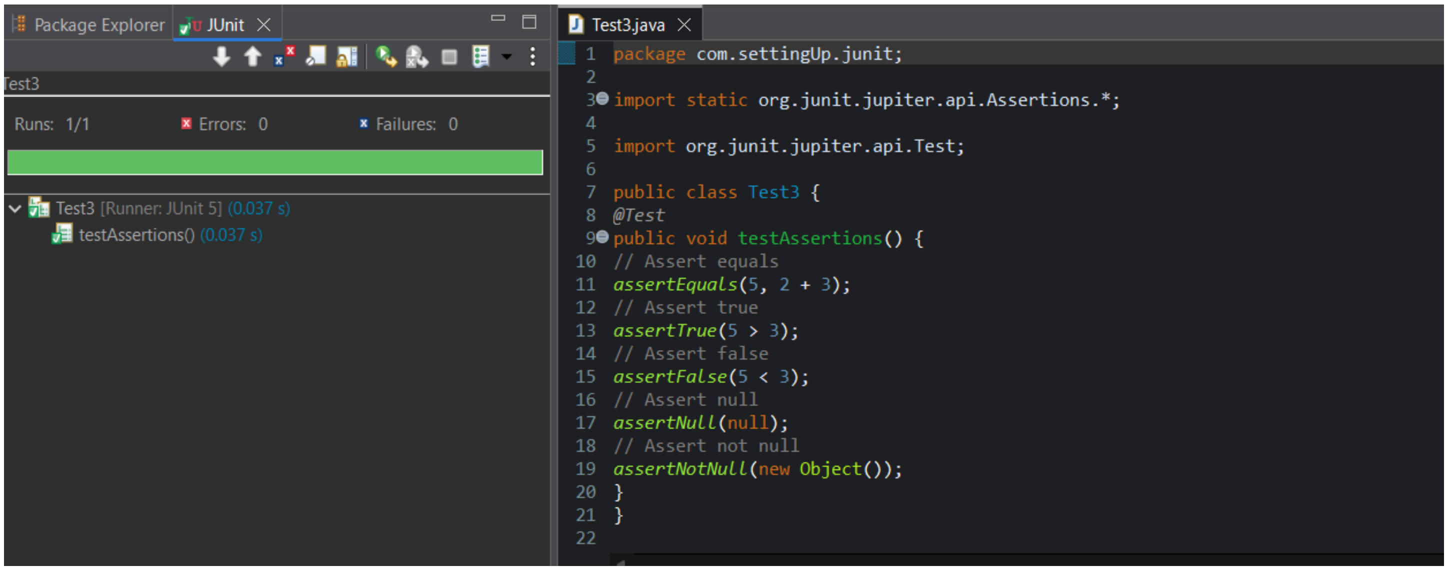
Maven Test:



```
package com.settingUp.junit;

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

import org.junit.jupiter.api.Test;

public class Test3 {
@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());
}
}

```

```
<terminated> C:\Program Files\Java\jdk-22\bin\javaw.exe (Jun 24, 2025, 8:23:13 PM) [pid: 7512]
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running com.settingUp.junit.Test3
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.079 s - in com.settingUp.junit.Test3
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  3.096 s
[INFO] Finished at: 2025-06-24T20:23:19+05:30
[INFO] ------------------------------------------------------------------------
```

Junit Test:



```java
package com.settingUp.junit;

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

import org.junit.jupiter.api.Test;

public class Test3 {
@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());
}
}
```

<u>Exercise 3: Assertions in Junit</u>

Scenario:

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

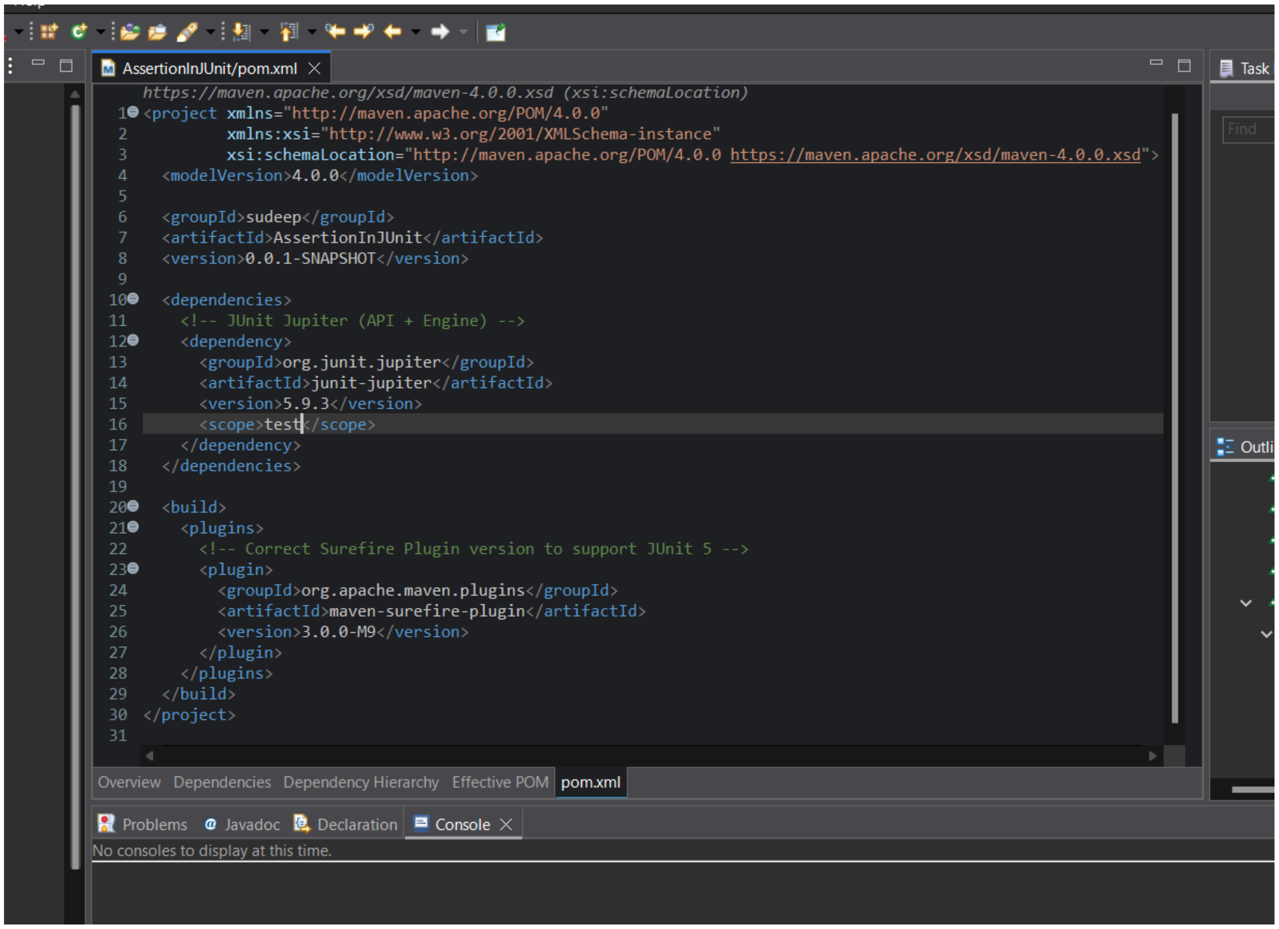
<u>SOLUTION:</u>

Step 1:Add the Junit Dependency in pom.xml

pom.xml :

```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>sudeep</groupId>
  <artifactId>AssertionInJUnit</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <dependencies>
    <!-- JUnit Jupiter (API + Engine) -->
    <dependency>
      <groupId>org.junit.jupiter</groupId>
      <artifactId>junit-jupiter</artifactId>
      <version>5.9.3</version>
      <scope>test</scope>
    </dependency>
  </dependencies>
  <build>
    <plugins>
```

```
      <!-- Correct Surefire Plugin version to support JUnit 5 -->
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-surefire-plugin</artifactId>
        <version>3.0.0-M9</version>
      </plugin>
    </plugins>
  </build>
</project>
```



```
https://maven.apache.org/xsd/maven-4.0.0.xsd (xsi:schemaLocation)
<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>sudeep</groupId>
  <artifactId>AssertionInJUnit</artifactId>
  <version>0.0.1-SNAPSHOT</version>

  <dependencies>
    <!-- JUnit Jupiter (API + Engine) -->
    <dependency>
      <groupId>org.junit.jupiter</groupId>
      <artifactId>junit-jupiter</artifactId>
      <version>5.9.3</version>
      <scope>test</scope>
    </dependency>
  </dependencies>

  <build>
    <plugins>
      <!-- Correct Surefire Plugin version to support JUnit 5 -->
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-surefire-plugin</artifactId>
        <version>3.0.0-M9</version>
      </plugin>
    </plugins>
  </build>
</project>
```

No consoles to display at this time.

Step 2: Create your test classes in **src/test/java**.

Write the required test case and run as maven test and Junit test:

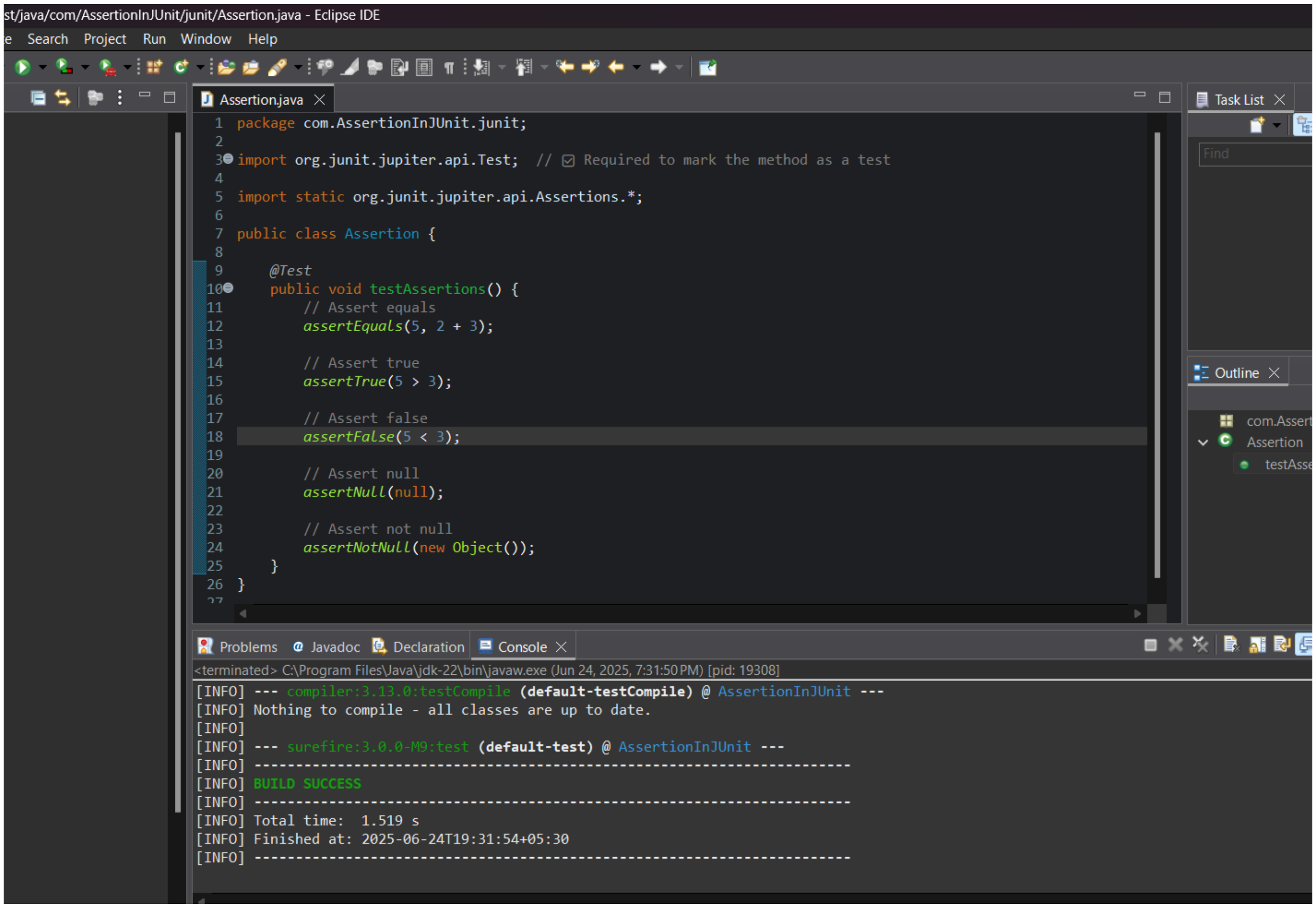
Code of Assertion.java:

```
package com.AssertionInJUnit.junit;
import org.junit.jupiter.api.Test;
import static org.junit.jupiter.api.Assertions.*;
public class Assertion {
  @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());
    }
}
```

OUTPUT:

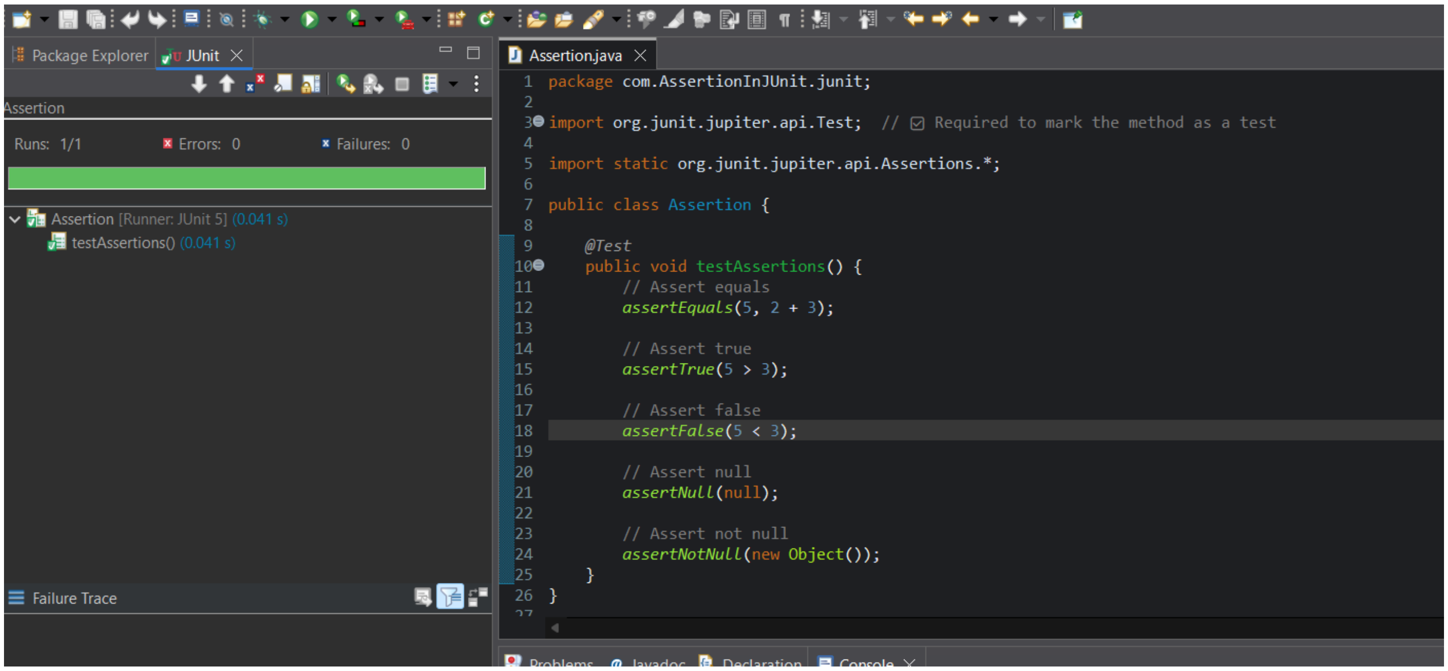
Maven test:


st/java/com/AssertionInJUnit/junit/Assertion.java - Eclipse IDE
e Search Project Run Window Help
Assertion.java
Task List
Find
Outline
com.Assert
Assertion
testAsse
Problems Javadoc Declaration Console

```
package com.AssertionInJUnit.junit;

import org.junit.jupiter.api.Test;  // ☑ Required to mark the method as a test

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

public class Assertion {

    @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());
    }
}
```

```
<terminated> C:\Program Files\Java\jdk-22\bin\javaw.exe (Jun 24, 2025, 7:31:50 PM) [pid: 19308]
[INFO] --- compiler:3.13.0:testCompile (default-testCompile) @ AssertionInJUnit ---
[INFO] Nothing to compile - all classes are up to date.
[INFO]
[INFO] --- surefire:3.0.0-M9:test (default-test) @ AssertionInJUnit ---
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  1.519 s
[INFO] Finished at: 2025-06-24T19:31:54+05:30
[INFO] ------------------------------------------------------------------------
```

Junit test:



```java
package com.AssertionInJUnit.junit;

import org.junit.jupiter.api.Test;  // ☑ Required to mark the method as a test

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

public class Assertion {

    @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());
    }
}
```

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

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

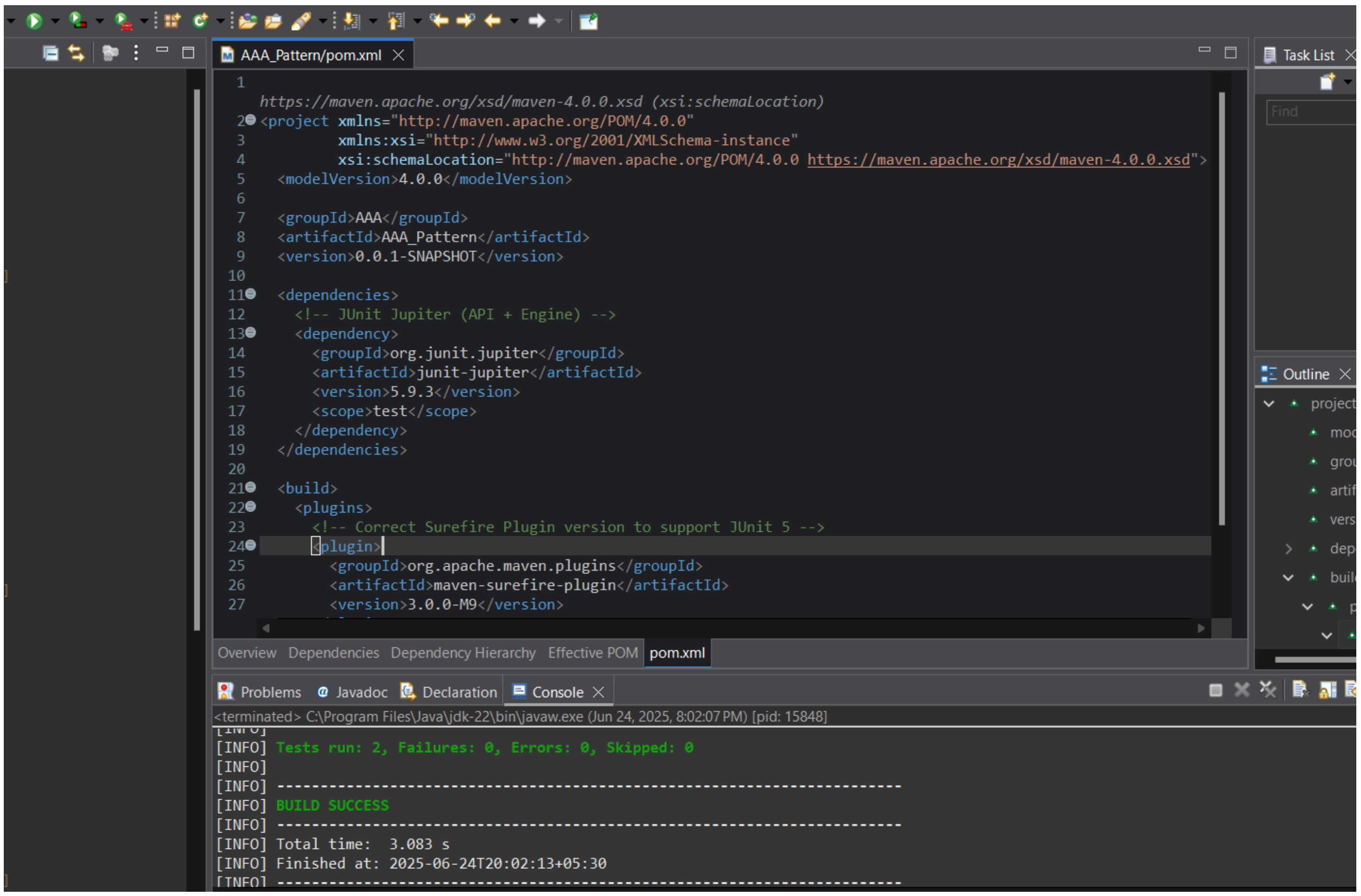
<u>SOLUTION:</u>

Step 1:Add the Junit Dependency in pom.xml

pom.xml :

```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>AAA</groupId>
  <artifactId>AAA_Pattern</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <dependencies>
    <!-- JUnit Jupiter (API + Engine) -->
    <dependency>
      <groupId>org.junit.jupiter</groupId>
      <artifactId>junit-jupiter</artifactId>
      <version>5.9.3</version>
      <scope>test</scope>
    </dependency>
  </dependencies>

  <build>
    <plugins>
      <!-- Correct Surefire Plugin version to support JUnit 5 -->
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-surefire-plugin</artifactId>
        <version>3.0.0-M9</version>
      </plugin>
    </plugins>
  </build>
</project>
```

OUTPUT:



```
https://maven.apache.org/xsd/maven-4.0.0.xsd (xsi:schemaLocation)
<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>AAA</groupId>
  <artifactId>AAA_Pattern</artifactId>
  <version>0.0.1-SNAPSHOT</version>

  <dependencies>
    <!-- JUnit Jupiter (API + Engine) -->
    <dependency>
      <groupId>org.junit.jupiter</groupId>
      <artifactId>junit-jupiter</artifactId>
      <version>5.9.3</version>
      <scope>test</scope>
    </dependency>
  </dependencies>

  <build>
    <plugins>
      <!-- Correct Surefire Plugin version to support JUnit 5 -->
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-surefire-plugin</artifactId>
        <version>3.0.0-M9</version>
```

```
<terminated> C:\Program Files\Java\jdk-22\bin\javaw.exe (Jun 24, 2025, 8:02:07 PM) [pid: 15848]
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  3.083 s
[INFO] Finished at: 2025-06-24T20:02:13+05:30
[INFO] ------------------------------------------------------------------------
```

Step 2: Create your test classes in **src/test/java**.

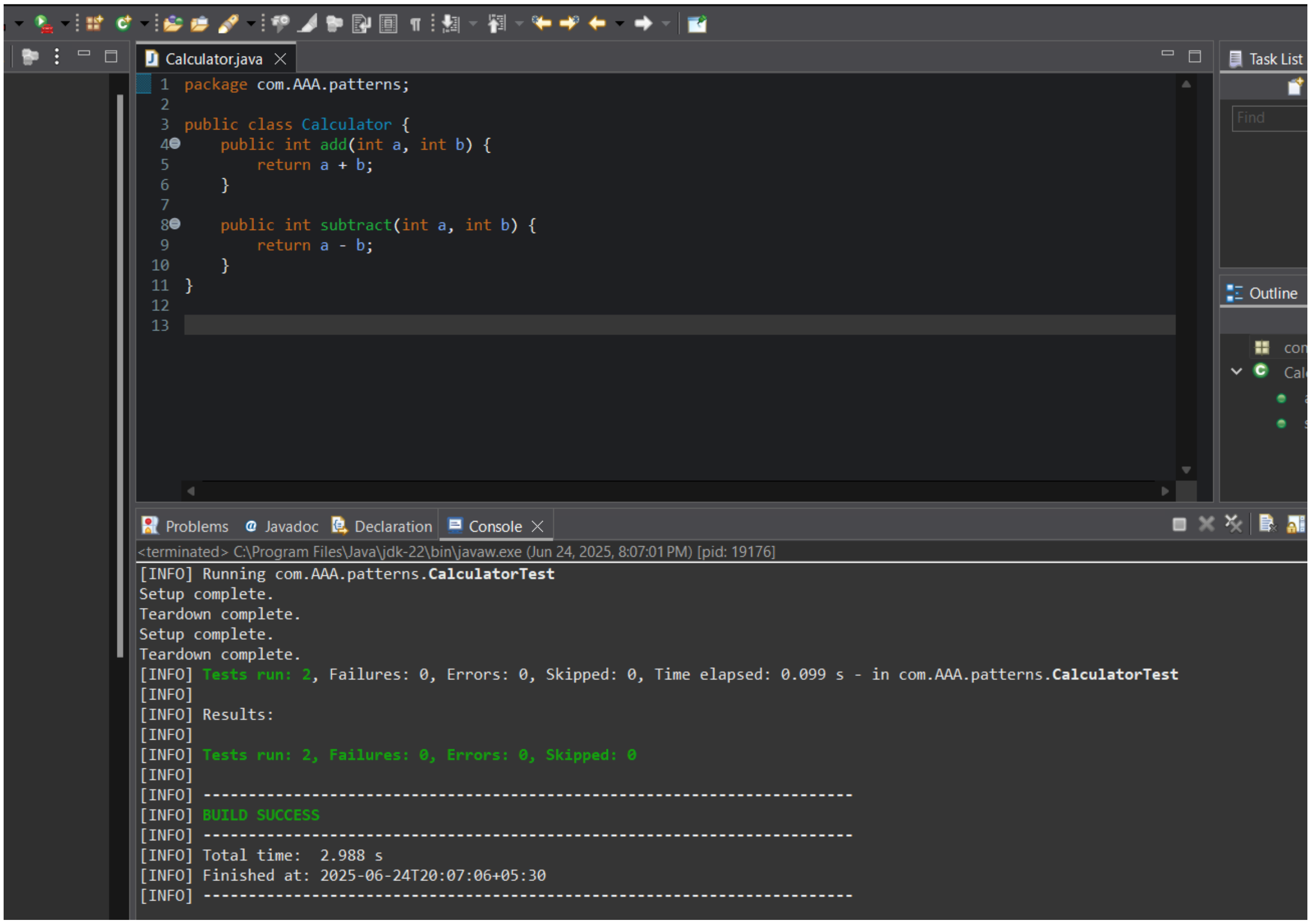
Write the required test case and run as maven test and Junit test:

CODE for Calculator.java:

```
package com.AAA.patterns;
public class Calculator {
   public int add(int a, int b) {
      return a + b;
   }
   public int subtract(int a, int b) {
      return a - b;
   }
}
```

OUTPUT:

Maven Test for Calculator.java:



```
package com.AAA.patterns;

public class Calculator {
    public int add(int a, int b) {
        return a + b;
    }

    public int subtract(int a, int b) {
        return a - b;
    }
}

```

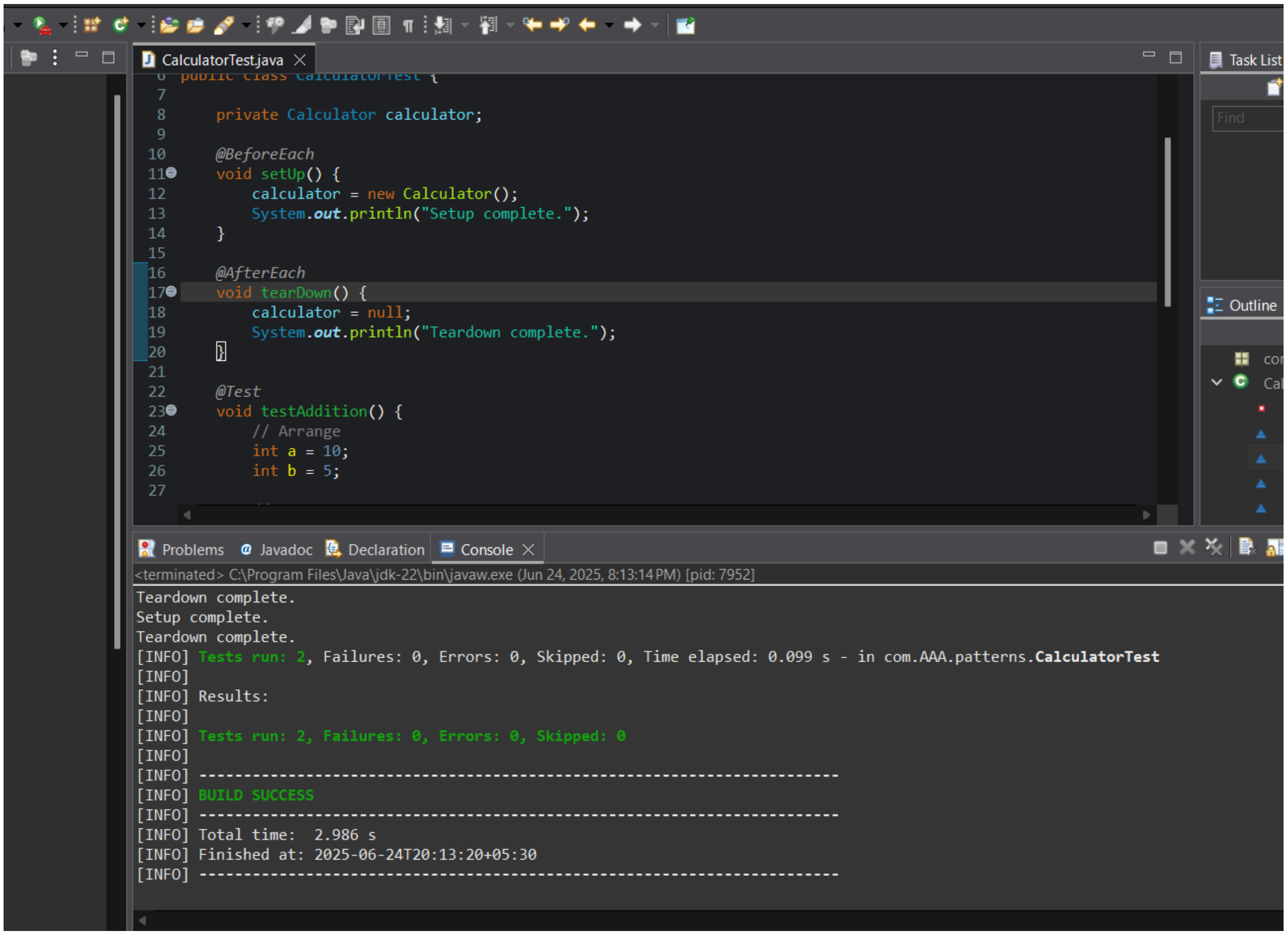
```
<terminated> C:\Program Files\Java\jdk-22\bin\javaw.exe (Jun 24, 2025, 8:07:01 PM) [pid: 19176]
[INFO] Running com.AAA.patterns.CalculatorTest
Setup complete.
Teardown complete.
Setup complete.
Teardown complete.
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.099 s - in com.AAA.patterns.CalculatorTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  2.988 s
[INFO] Finished at: 2025-06-24T20:07:06+05:30
[INFO] ------------------------------------------------------------------------
```

CODE for CalculatorTest.java:

```
package com.AAA.patterns;
import org.junit.jupiter.api.*;
import static org.junit.jupiter.api.Assertions.*;
public class CalculatorTest {
    private Calculator calculator;
    @BeforeEach
    void setUp() {
        calculator = new Calculator();
        System.out.println("Setup complete.");
    }
    @AfterEach
    void tearDown() {
        calculator = null;
        System.out.println("Teardown complete.");
    }
    @Test
    void testAddition() {
        // Arrange
        int a = 10;
        int b = 5;
        // Act
        int result = calculator.add(a, b);
        // Assert
        assertEquals(15, result);
    }
    @Test
    void testSubtraction() {
        // Arrange
        int a = 10;
        int b = 3;
        // Act
        int result = calculator.subtract(a, b);
        // Assert
        assertEquals(7, result);
    }
}
```

OUTPUT:

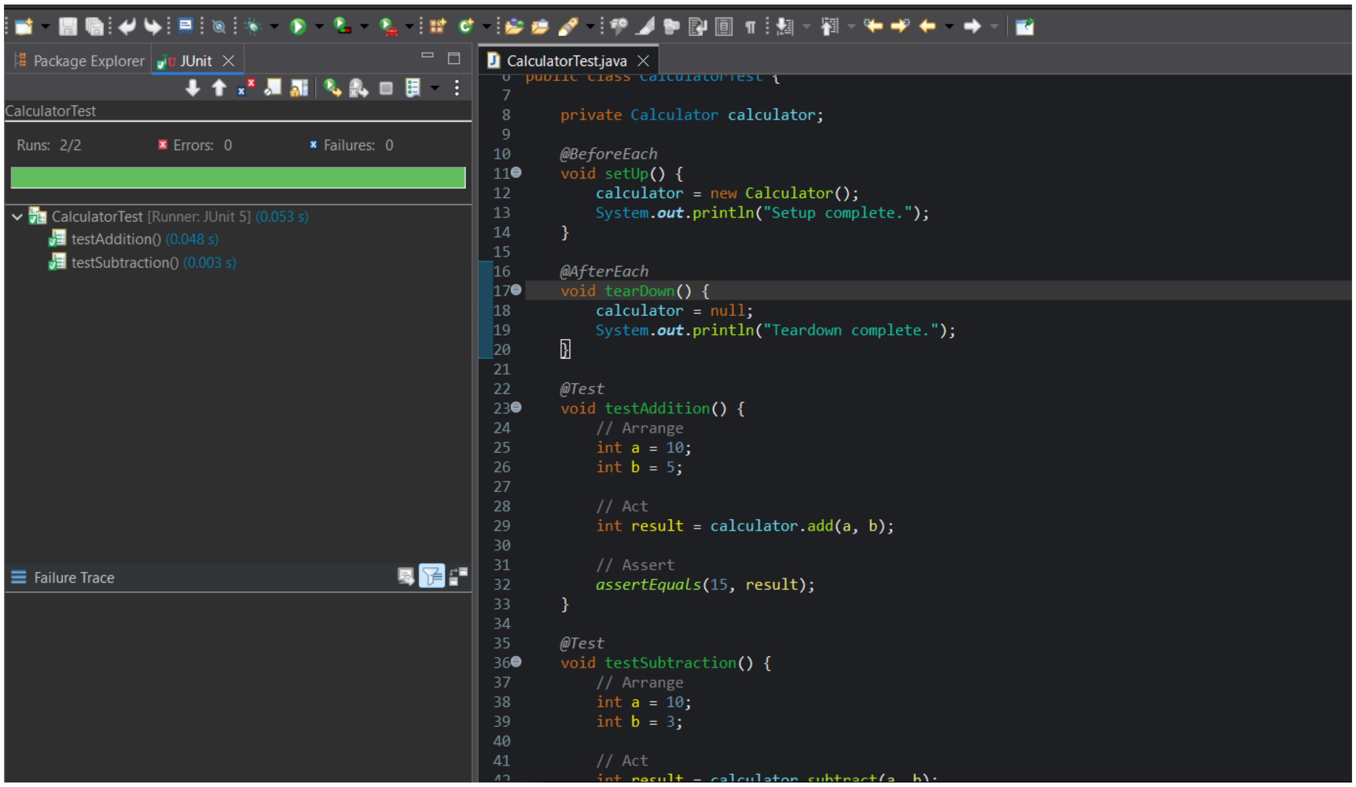
Maven Test for CalculatorTest.java:



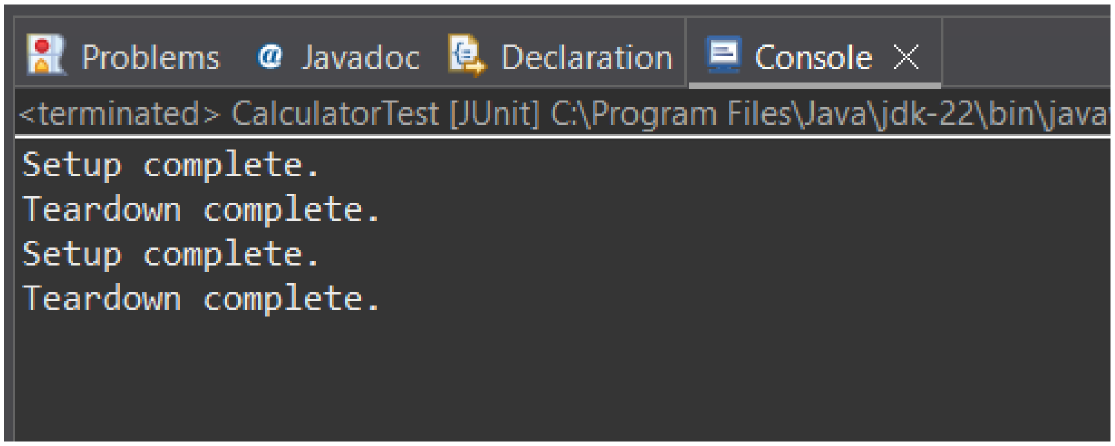
```java
public class CalculatorTest {

    private Calculator calculator;

    @BeforeEach
    void setUp() {
        calculator = new Calculator();
        System.out.println("Setup complete.");
    }

    @AfterEach
    void tearDown() {
        calculator = null;
        System.out.println("Teardown complete.");
    }

    @Test
    void testAddition() {
        // Arrange
        int a = 10;
        int b = 5;

```

```
<terminated> C:\Program Files\Java\jdk-22\bin\javaw.exe (Jun 24, 2025, 8:13:14 PM) [pid: 7952]
Teardown complete.
Setup complete.
Teardown complete.
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.099 s - in com.AAA.patterns.CalculatorTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  2.986 s
[INFO] Finished at: 2025-06-24T20:13:20+05:30
[INFO] ------------------------------------------------------------------------
```

Junit Test for CalculatorTest.java:



```java
public class CalculatorTest {

    private Calculator calculator;

    @BeforeEach
    void setUp() {
        calculator = new Calculator();
        System.out.println("Setup complete.");
    }

    @AfterEach
    void tearDown() {
        calculator = null;
        System.out.println("Teardown complete.");
    }

    @Test
    void testAddition() {
        // Arrange
        int a = 10;
        int b = 5;

        // Act
        int result = calculator.add(a, b);

        // Assert
        assertEquals(15, result);
    }

    @Test
    void testSubtraction() {
        // Arrange
        int a = 10;
        int b = 3;

        // Act
        int result = calculator.subtract(a, b);
```



```
<terminated> CalculatorTest [JUnit] C:\Program Files\Java\jdk-22\bin\java
Setup complete.
Teardown complete.
Setup complete.
Teardown complete.
```

NAME- G Kullayi Reddy

SUPERSET ID-6371952