Course:

IT314: Software Engineering

Instructor:

Prof. Manish Khare & Prof. Saurabh Tiwari

Lab 8: Report

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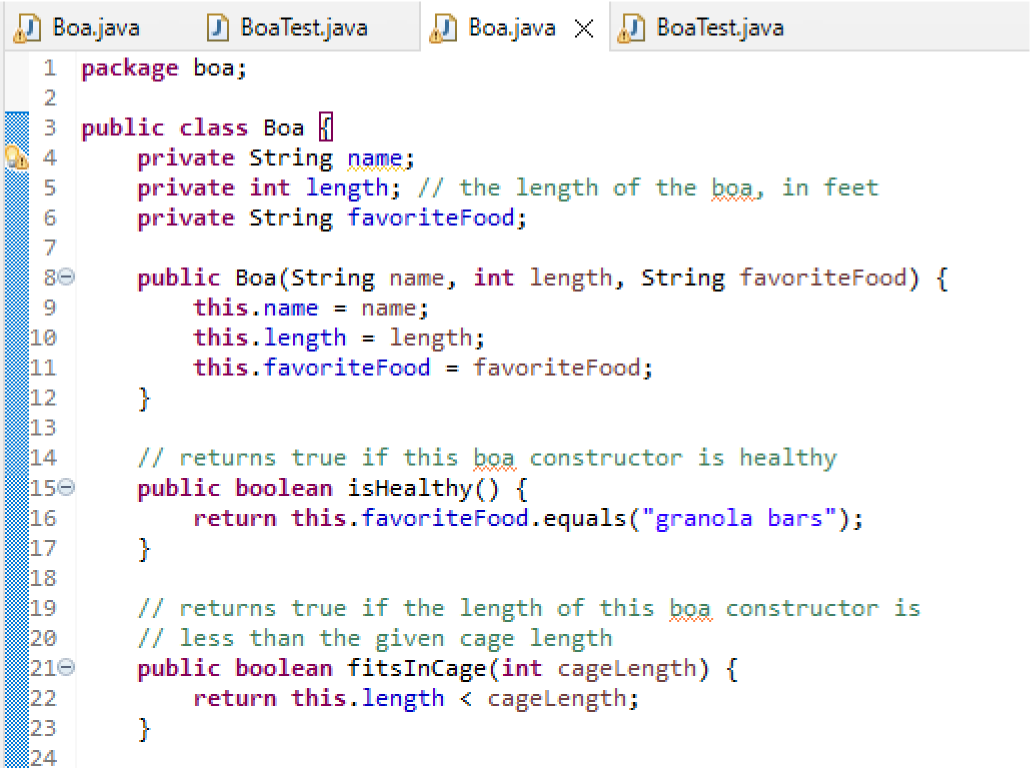
Date: 21-04-2023

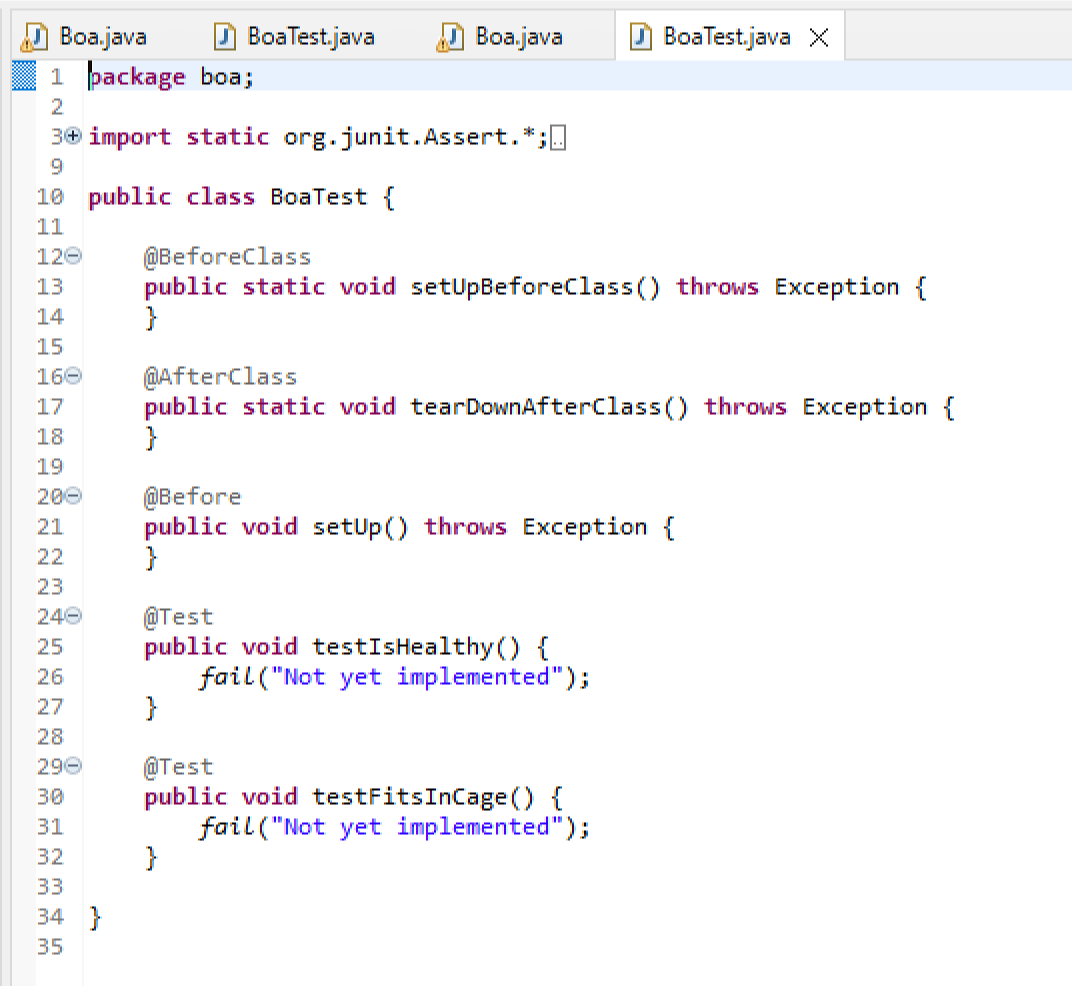
Lab Exercise:

- Firstly, I created a new project in eclipse and created a package.
- Then, we created a class for a Boa. Here is the code:



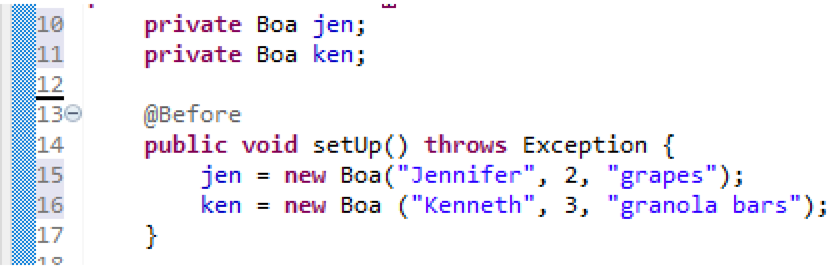
```java
package boa;

public class Boa {
    private String name;
    private int length; // the length of the boa, in feet
    private String favoriteFood;

    public Boa(String name, int length, String favoriteFood) {
        this.name = name;
        this.length = length;
        this.favoriteFood = favoriteFood;
    }

    // returns true if this boa constructor is healthy
    public boolean isHealthy() {
        return this.favoriteFood.equals("granola bars");
    }

    // returns true if the length of this boa constructor is
    // less than the given cage length
    public boolean fitsInCage(int cageLength) {
        return this.length < cageLength;
    }

```

- We created a test case for the class Boa selecting test method stubs isHealthy() and fitsInCage(int).



```java
package boa;

import static org.junit.Assert.*;

public class BoaTest {

    @BeforeClass
    public static void setUpBeforeClass() throws Exception {
    }

    @AfterClass
    public static void tearDownAfterClass() throws Exception {
    }

    @Before
    public void setUp() throws Exception {
    }

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

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

}
```

- Now, we created some Boa objects for the test case. The first object has name= “Jennifer”, length=2, favoriteFood= “grapes” and the second object has name= “Kenneth”, length=3, favoriteFood= “granola bars”.

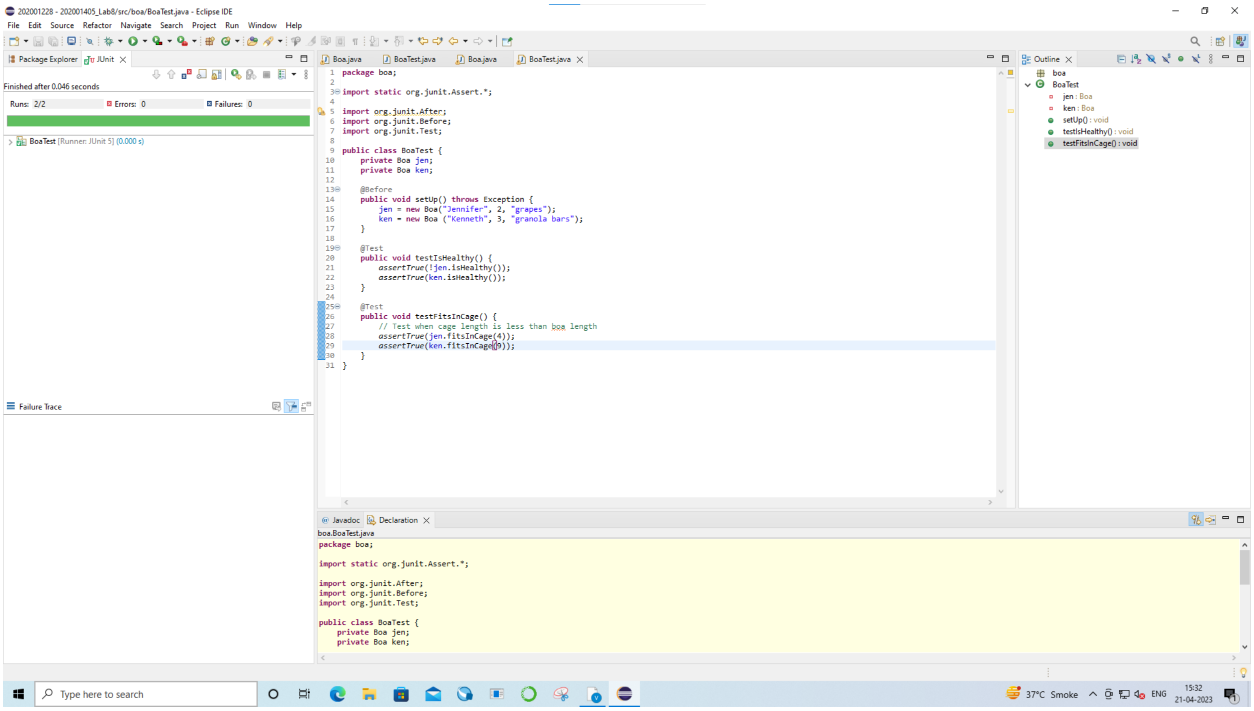


```java
    private Boa jen;
    private Boa ken;

    @Before
    public void setUp() throws Exception {
        jen = new Boa("Jennifer", 2, "grapes");
        ken = new Boa ("Kenneth", 3, "granola bars");
    }
```

- Now, it’s time to create tests. JUnit provided stubs for two test methods, each annotated with @Test. The purpose of the isHealthy() method is to check that the isHealthy() method in the Boa class behaves the way it’s supposed to. So, I modified the testIsHealthy() first to test the method.

Then, I also robustly tested the method testFitsInCage() using three different set of values:

1. When both the lengths are less than cage lengths:

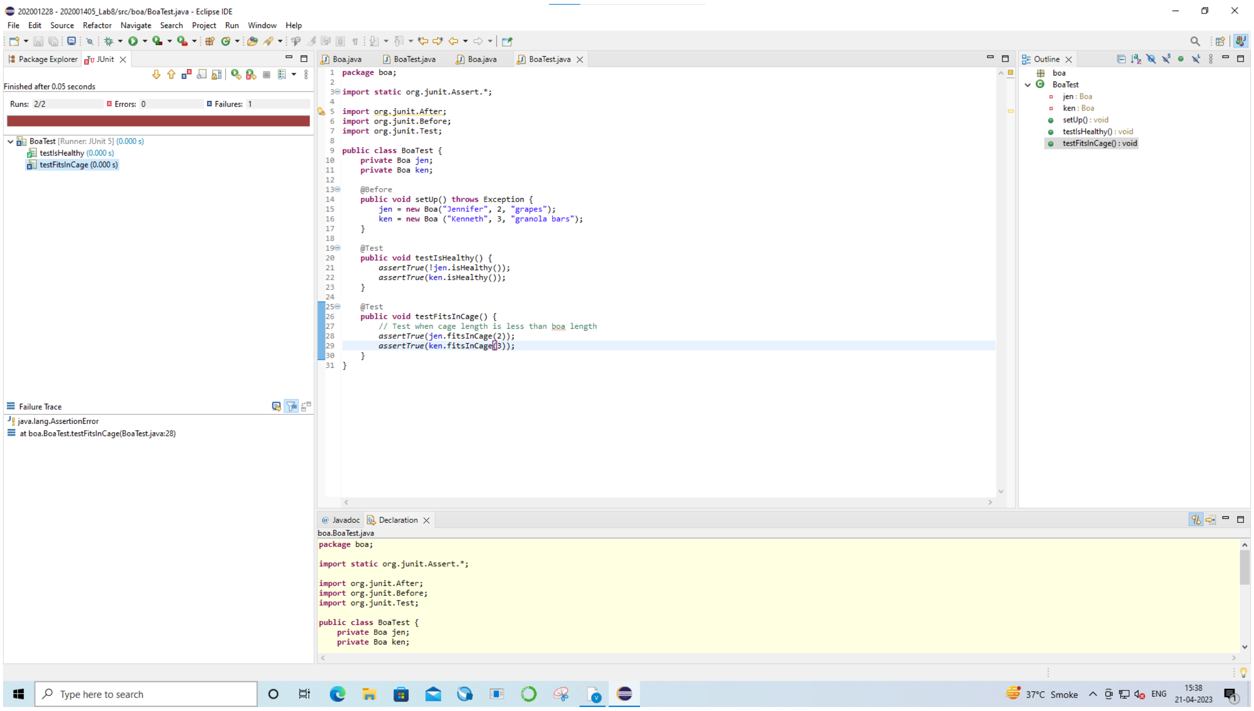


202001228 - 202001405_Lab8/src/boa/BoaTest.java - Eclipse IDE

```
Finished after 0.046 seconds
Runs: 2/2     Errors: 0     Failures: 0
BoaTest [Runner: JUnit 5] (0.000 s)
```

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;

    @Before
    public void setUp() throws Exception {
        jen = new Boa("Jennifer", 2, "grapes");
        ken = new Boa ("Kenneth", 3, "granola bars");
    }

    @Test
    public void testIsHealthy() {
        assertTrue(!jen.isHealthy());
        assertTrue(ken.isHealthy());
    }

    @Test
    public void testFitsInCage() {
        // Test when cage length is less than boa length
        assertTrue(jen.fitsInCage(4));
        assertTrue(ken.fitsInCage(9));
    }
}
```

2. When both the lengths are equal to cage lengths:

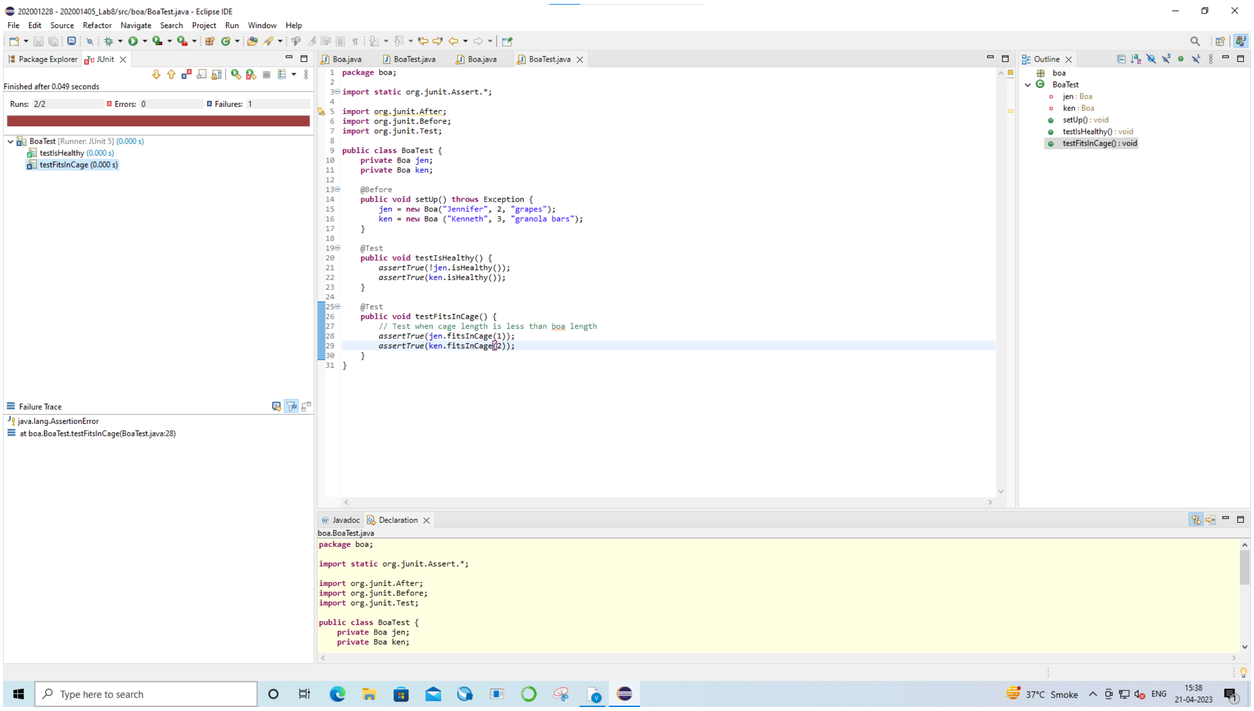


202001228 - 202001405_Lab8/src/boa/BoaTest.java - Eclipse IDE

```
Finished after 0.05 seconds
Runs: 2/2     Errors: 0     Failures: 1
BoaTest [Runner: JUnit 5] (0.000 s)
    testIsHealthy (0.000 s)
    testFitsInCage (0.000 s)

Failure Trace
java.lang.AssertionError
at boa.BoaTest.testFitsInCage(BoaTest.java:28)
```

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;

    @Before
    public void setUp() throws Exception {
        jen = new Boa("Jennifer", 2, "grapes");
        ken = new Boa ("Kenneth", 3, "granola bars");
    }

    @Test
    public void testIsHealthy() {
        assertTrue(!jen.isHealthy());
        assertTrue(ken.isHealthy());
    }

    @Test
    public void testFitsInCage() {
        // Test when cage length is less than boa length
        assertTrue(jen.fitsInCage(2));
        assertTrue(ken.fitsInCage(3));
    }
}
```

3. When both the lengths are greater than cage lengths:



Finished after 0.049 seconds

Runs: 2/2 Errors: 0 Failures: 1

```
BoaTest [Runner: JUnit 5] (0.000 s)
    testIsHealthy (0.000 s)
    testFitsInCage (0.000 s)
```

Failure Trace

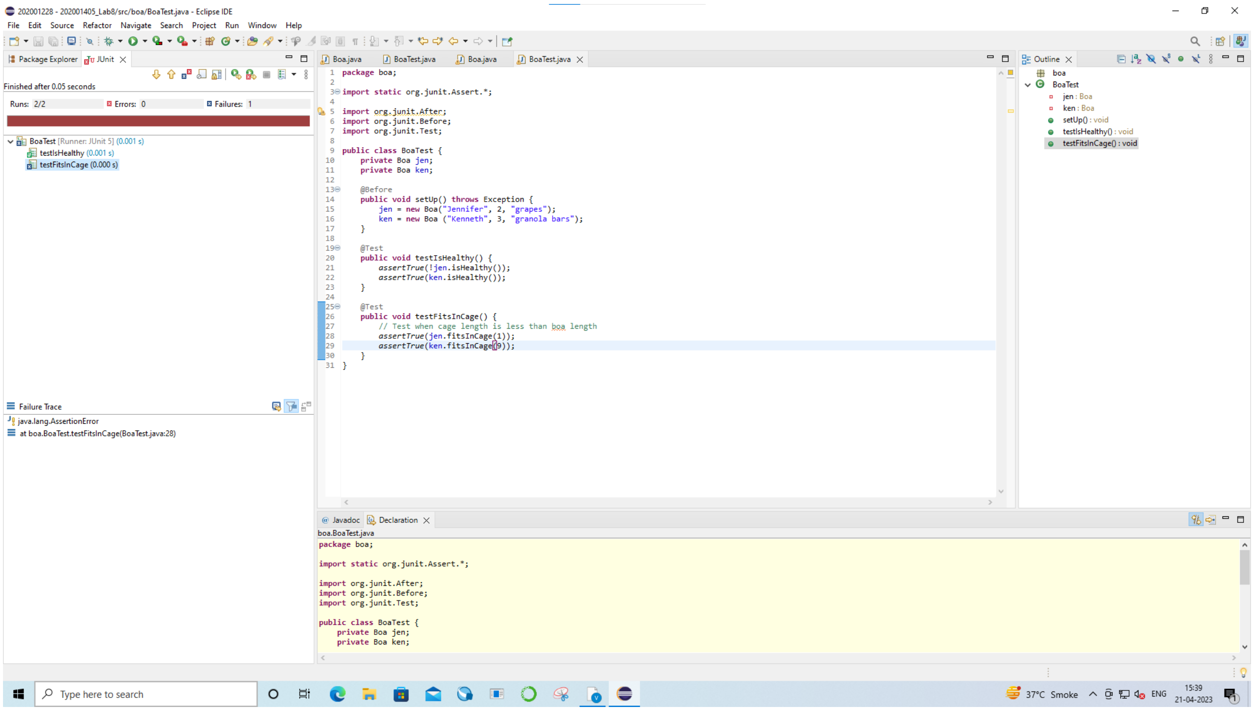
```
java.lang.AssertionError
at boa.BoaTest.testFitsInCage(BoaTest.java:28)
```

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;

    @Before
    public void setUp() throws Exception {
        jen = new Boa("Jennifer", 2, "grapes");
        ken = new Boa ("Kenneth", 3, "granola bars");
    }

    @Test
    public void testIsHealthy() {
        assertTrue(!jen.isHealthy());
        assertTrue(ken.isHealthy());
    }

    @Test
    public void testFitsInCage() {
        // Test when cage length is less than boa length
        assertTrue(jen.fitsInCage(1));
        assertTrue(ken.fitsInCage(2));
    }
}
```

boa.BoaTest.java

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;
```

4. When either one of the lengths doesn’t satisfy the test:



Finished after 0.05 seconds

Runs: 2/2 Errors: 0 Failures: 1

```
BoaTest [Runner: JUnit 5] (0.001 s)
    testIsHealthy (0.001 s)
    testFitsInCage (0.000 s)
```

Failure Trace

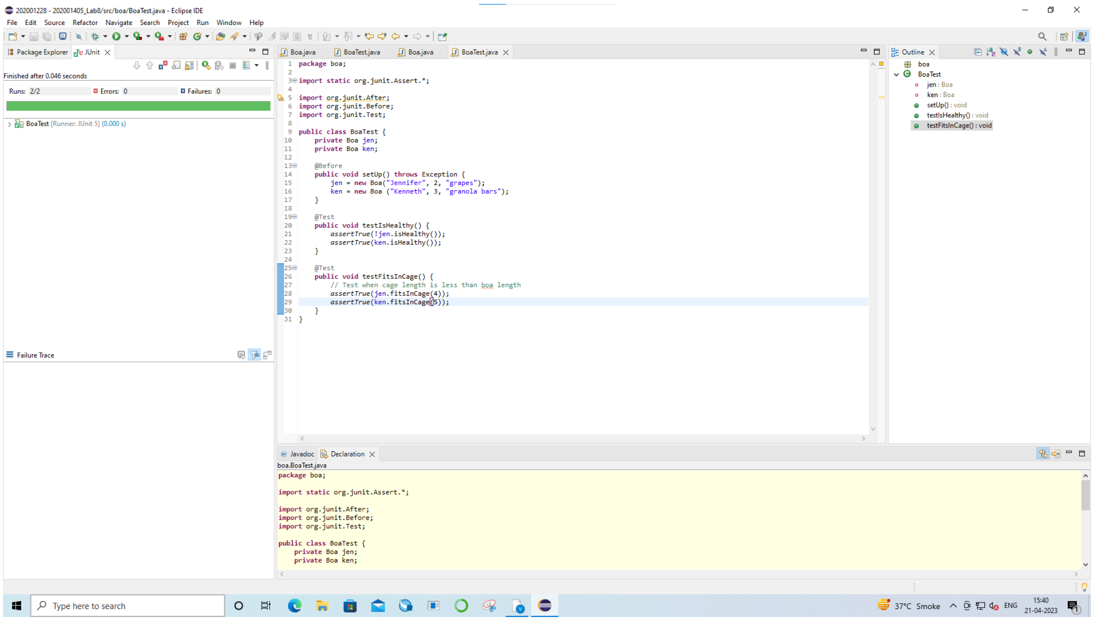
```
java.lang.AssertionError
at boa.BoaTest.testFitsInCage(BoaTest.java:28)
```

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;

    @Before
    public void setUp() throws Exception {
        jen = new Boa("Jennifer", 2, "grapes");
        ken = new Boa ("Kenneth", 3, "granola bars");
    }

    @Test
    public void testIsHealthy() {
        assertTrue(!jen.isHealthy());
        assertTrue(ken.isHealthy());
    }

    @Test
    public void testFitsInCage() {
        // Test when cage length is less than boa length
        assertTrue(jen.fitsInCage(1));
        assertTrue(ken.fitsInCage(9));
    }
}
```

boa.BoaTest.java

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;
```

- Here is the final fixed test case:



202001228 - 202001405_Lab8/src/boa/BoaTest.java - Eclipse IDE

Finished after 0.046 seconds

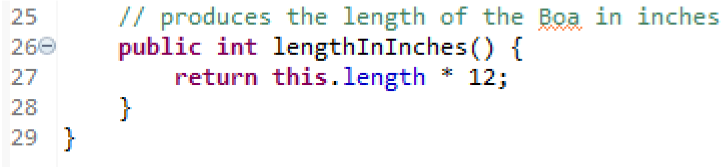
Runs: 2/2 Errors: 0 Failures: 0

BoaTest [Runner: JUnit 5] (0.000 s)

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;

    @Before
    public void setUp() throws Exception {
        jen = new Boa("Jennifer", 2, "grapes");
        ken = new Boa ("Kenneth", 3, "granola bars");
    }

    @Test
    public void testIsHealthy() {
        assertTrue(!jen.isHealthy());
        assertTrue(ken.isHealthy());
    }

    @Test
    public void testFitsInCage() {
        // Test when cage length is less than boa length
        assertTrue(jen.fitsInCage(4));
        assertTrue(ken.fitsInCage(5));
    }
}
```

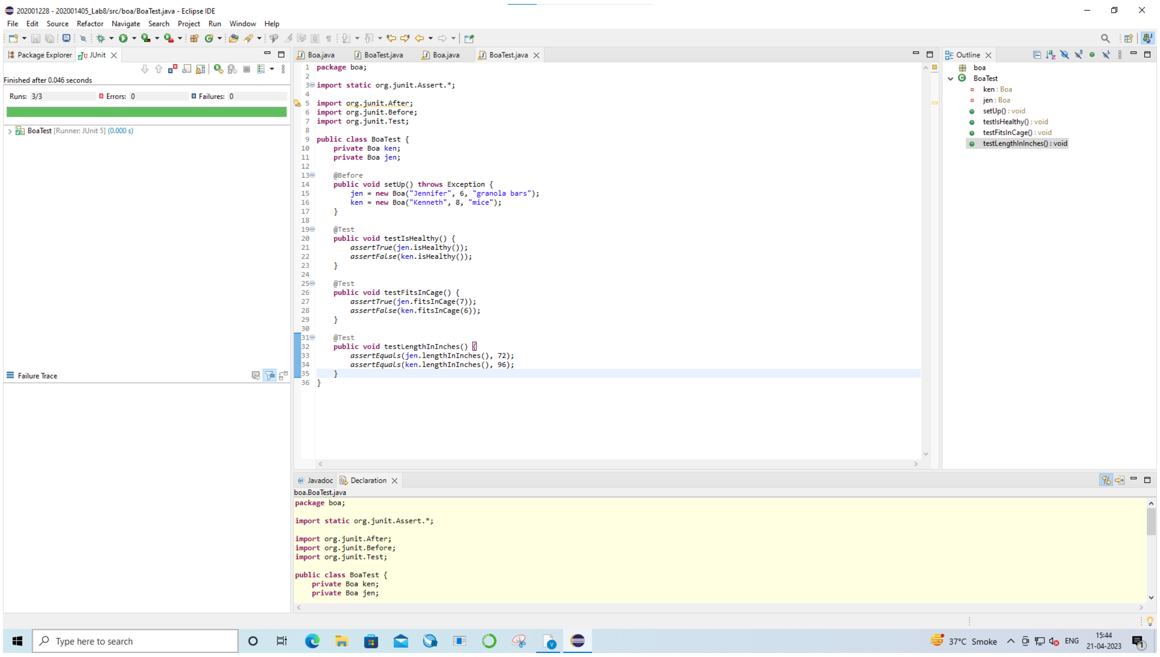
```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa jen;
    private Boa ken;
```

- Added a new method to the Boa class, lengthInInches():



```java
    // produces the length of the Boa in inches
    public int lengthInInches() {
        return this.length * 12;
    }
}
```

Created Tests:



202001228 - 202001405_Lab8/src/boa/BoaTest.java - Eclipse IDE

Finished after 0.046 seconds

Runs: 3/3 Errors: 0 Failures: 0

BoaTest [Runner: JUnit 5] (0.000 s)

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa ken;
    private Boa jen;

    @Before
    public void setUp() throws Exception {
        jen = new Boa("Jennifer", 6, "granola bars");
        ken = new Boa("Kenneth", 8, "mice");
    }

    @Test
    public void testIsHealthy() {
        assertTrue(jen.isHealthy());
        assertFalse(ken.isHealthy());
    }

    @Test
    public void testFitsInCage() {
        assertTrue(jen.fitsInCage(7));
        assertFalse(ken.fitsInCage(6));
    }

    @Test
    public void testLengthInInches() {
        assertEquals(jen.lengthInInches(), 72);
        assertEquals(ken.lengthInInches(), 96);
    }
}
```

```java
package boa;

import static org.junit.Assert.*;

import org.junit.After;
import org.junit.Before;
import org.junit.Test;

public class BoaTest {
    private Boa ken;
    private Boa jen;
```