LAB 8

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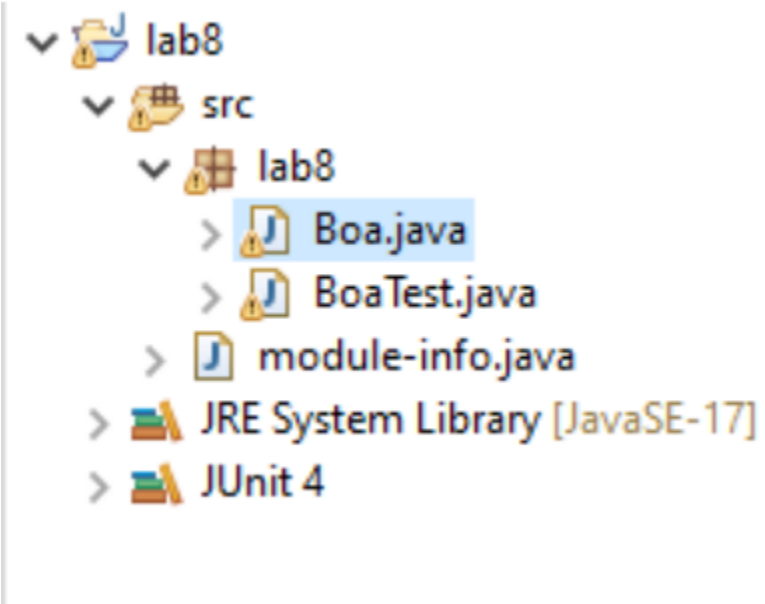
1. Create a new Eclipse project, and within the project create a package.
2. Create a class for a Boa. Here's the code you can use (you may copy/paste):
3. Follow the instructions in the JUnit tutorial in the section "Creating a JUnit Test Case in Eclipse". You'll be creating a test case for the class Boa. When you're asked to select test method stubs, select both isHealthy() and fitsInCage(int).



Step 1: Open Eclipse and go to "File" > "New" > "Java Project" to create a new Java project.

Step 2: Give your project a name and click "Finish" to create the project.

Step 3: In the "Project Explorer" view in Eclipse, right-click on the project name and go to "New" > "Package" to create a new package.

Step 4: Give your package a name and click "Finish" to create the package. Now you have a new Eclipse project with a package where you can start writing your JUnit tests

Boa.java

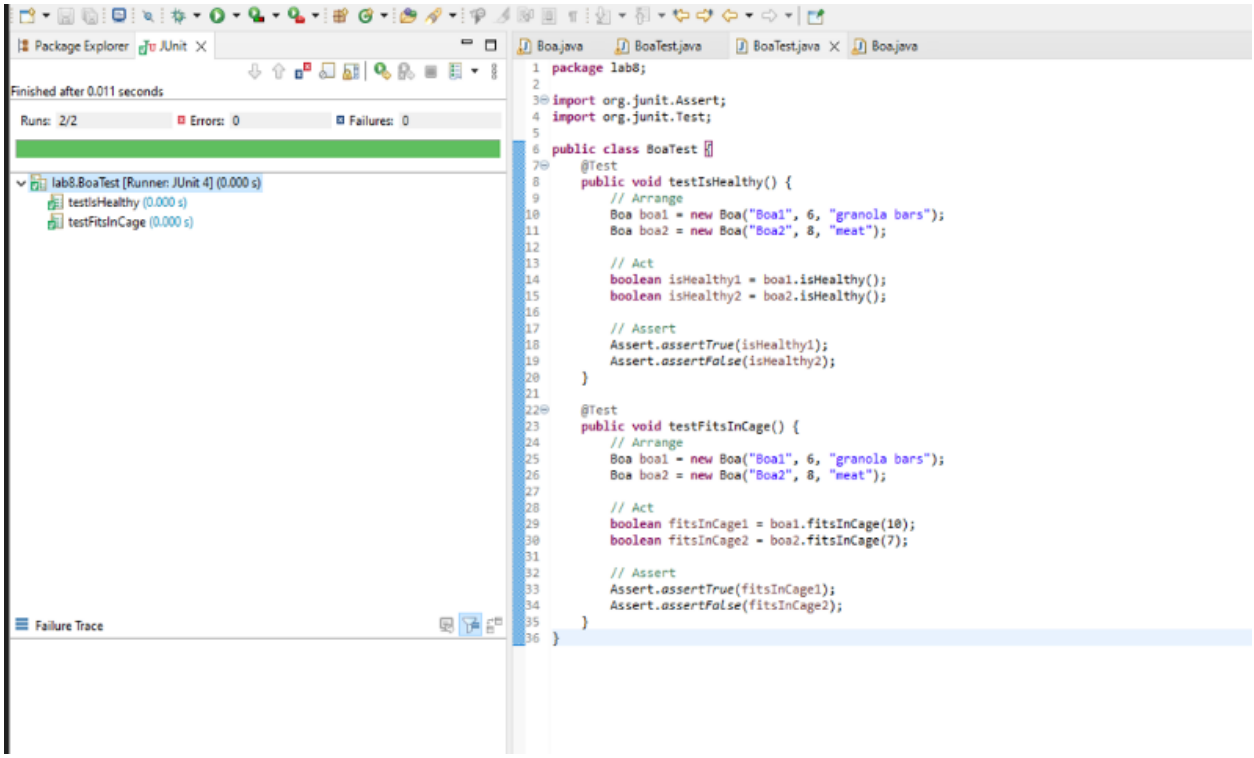
Boa.java

```java
package lab8;

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 constrictor is healthy
    public boolean isHealthy() {
        return this.favoriteFood.equals("granola bars");
    }

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

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

BoaTest.java

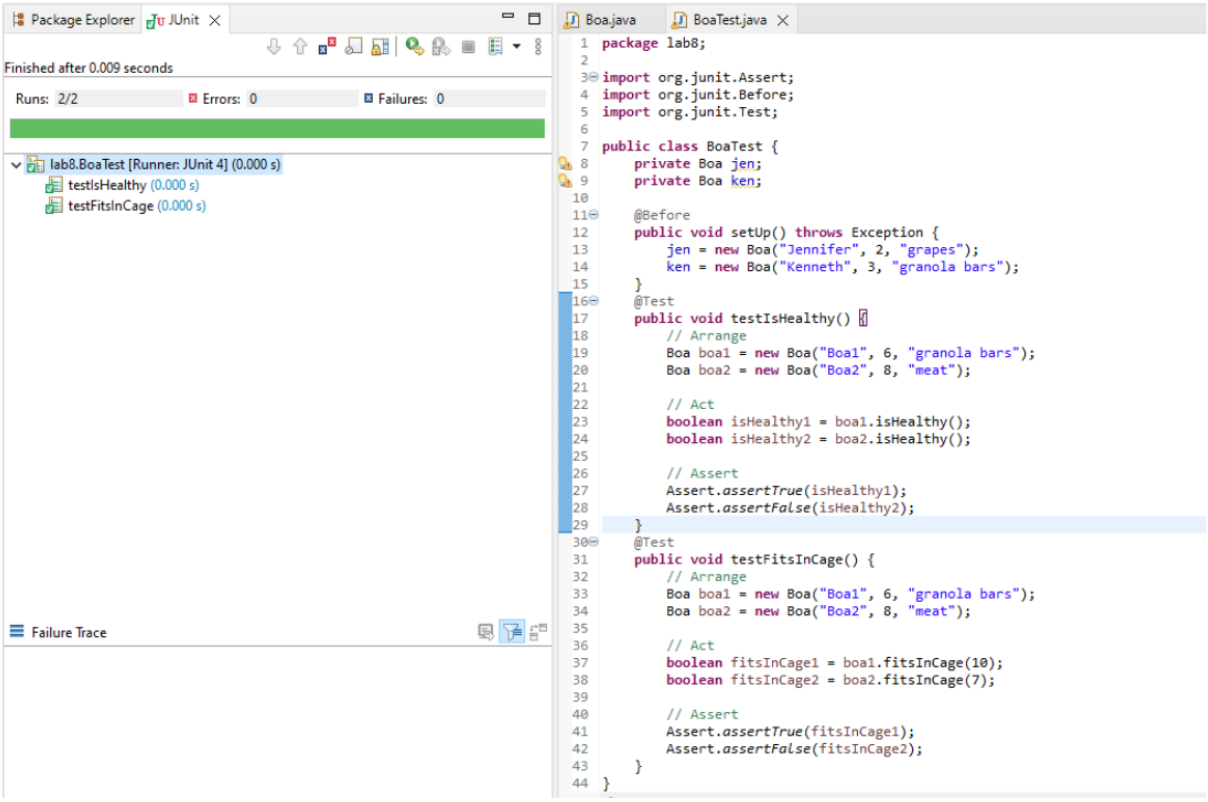
Boa.java | *BoaTest.java

```java
package lab8;

import org.junit.Assert;
import org.junit.Test;

public class BoaTest {
    @Test
    public void testIsHealthy() {
        // Arrange
        Boa boa1 = new Boa("Boa1", 6, "granola bars");
        Boa boa2 = new Boa("Boa2", 8, "meat");

        // Act
        boolean isHealthy1 = boa1.isHealthy();
        boolean isHealthy2 = boa2.isHealthy();

        // Assert
        Assert.assertTrue(isHealthy1);
        Assert.assertFalse(isHealthy2);
    }

    @Test
    public void testFitsInCage() {
        // Arrange
        Boa boa1 = new Boa("Boa1", 6, "granola bars");
        Boa boa2 = new Boa("Boa2", 8, "meat");

        // Act
        boolean fitsInCage1 = boa1.fitsInCage(10);
        boolean fitsInCage2 = boa2.fitsInCage(7);

        // Assert
        Assert.assertTrue(fitsInCage1);
        Assert.assertFalse(fitsInCage2);
    }
}
```



4. Now it's time to write some unit tests. Notice that the BoaTest class that JUnit created for you contains stubs for several methods. The first stub (for the method setUp()) is annotated with @Before. The @Before annotation denotes that the method setUp() will be run prior to the execution of each test method. setUp() is typically used to initialize data needed by each test. Modify the setUp() method so that it creates a couple of Boa objects, as follows:

Save the BoaTest class. Run your tests using a test runner, such as JUnit runner in Eclipse or any other build tool that you're using in your project. Test methods annotated with @Test will be run, but the order of the tests is not guaranteed. This means that the tests may run in any order during test execution. It's important to write tests in such a way that they are independent of each other and do not rely on a specific execution order. Any method annotated with @Before will be run before each test executes. This allows you to set up common test fixtures or perform any necessary setup steps before each test runs. For example, you can use @Before to initialize objects, set up mock objects, or perform any other necessary setup operations. Any method annotated with @After will be run after each test executes. This allows you to clean up any resources or perform any necessary teardown steps after each test runs. For example, you can use @After to release resources, reset state, or perform any other necessary cleanup operations.

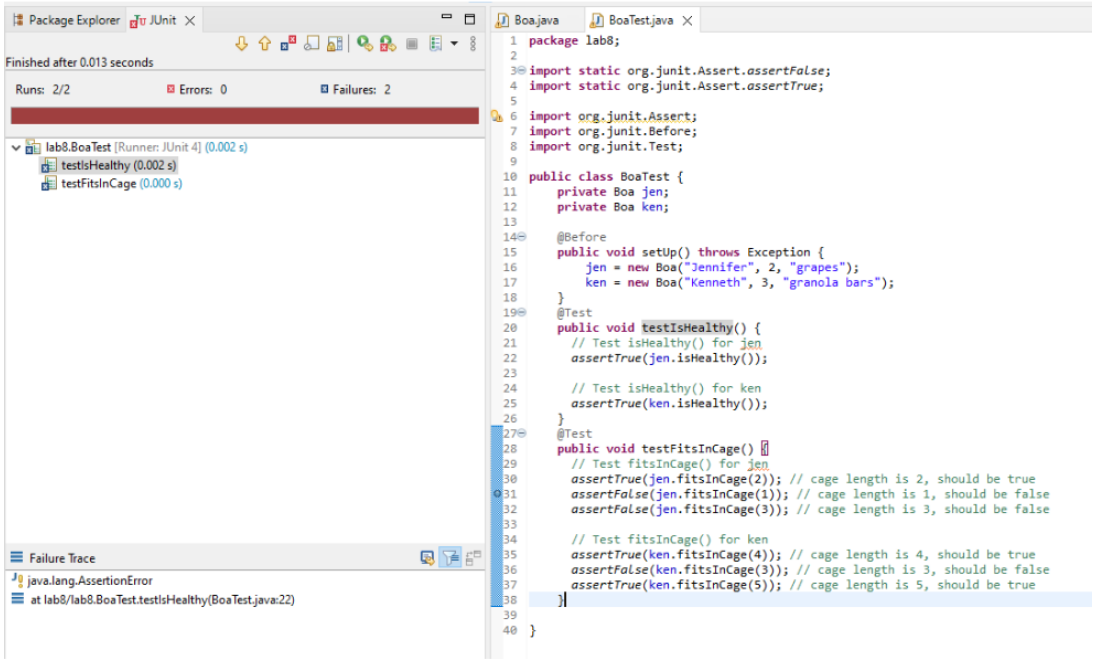


5. JUnit also provided stubs for two test methods, each annotated with @Test. Work on the testIsHealthy() method first. The purpose of this method is to check that the isHealthy() method in the Boa class behaves the way it's supposed to. In the JUnit tutorial, read the section on "Writing Tests". Modify the testIsHealthy() method so that it checks the results of activating the isHealthy() method on the two Boa objects you created in setup(). Likewise, modify the testFitsInCage() method to test the results of that method. Make sure your test is robust; it should check the results when the cage length is less than the length of the boa, when the cage length is equal to the length of the boa, and when the cage length is greater than the length of the boa. Should you write tests for both jen and ken?

Based on the provided instructions, here are the steps to modify the testIsHealthy() and testFitsInCage() methods in the BoaTest class to test the isHealthy() and fitsInCage() methods of the Boa class:

Step 1: Open the BoaTest class in your Eclipse project. Step 2: Modify the testIsHealthy() method to test the isHealthy() method of the Boa class. You can use the assertTrue() method provided by JUnit to check that the result is true.

For example: In this example, we call the fitsInCage() method on the jen and ken objects with different cage lengths, and use assertTrue() or assertFalse() to check that the expected results match the actual results.



6. Now you can run your tests. Read the section “Running Your Test Case” in the tutorial. Did you get a green bar in the JUnit pane? If you got a red bar, use the output in the JUnit pane to determine which test(s) failed. Fix your tests, and try running the test case again. It’s important to note that a red bar doesn’t necessarily mean that the test case is written incorrectly; it could be that the method that’s being tested isn’t correct. In fact, that’s what unit testing is supposed to do – help us find errors in our code. When a test fails, you need to determine if the error is in the test case itself or in the code it’s testing.
7. Add a new method to the Boa class, with this purpose and signature: // produces the length of the Boa in inches public int lengthInInches(){ // you need to write the body of this method } Add a new test case to the BoaTest class that tests the lengthInInches() method. Make sure you annotate the new test method with @Test. Run your tests.

Boa.java

*Boa.java

```java
package lab8;

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 constrictor is healthy
    public boolean isHealthy() {
        return this.favoriteFood.equals("granola bars");
    }

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

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

BoaTest.java

*Boa.java *BoaTest.java

```java
package lab8;

import org.junit.Assert;
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() {
        // Rest of the test methods
    }

    @Test
    public void testFitsInCage() {
        // Rest of the test methods
    }

    @Test
    public void testLengthInInches() {
        int expectedLengthInInches = 2 * 12; // 2 feet = 24 inches
        int actualLengthInInches = jen.lengthInInches();
        Assert.assertEquals(expectedLengthInInches, actualLengthInInches);
    }
}
```

Boa.java BoaTest.java

```java
package lab8;

import org.junit.Assert;
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() {
        // Rest of the test methods
    }

    @Test
    public void testFitsInCage() {
        // Rest of the test methods
    }

    @Test
    public void testLengthInInches() {
        int expectedLengthInInches = 2 * 12; // 2 feet = 24 inches
        int actualLengthInInches = jen.lengthInInches();
        Assert.assertEquals(expectedLengthInInches, actualLengthInInches);
    }
}
```

Based on the provided instructions, here are the steps to modify the testIsHealthy() and testFitsInCage() methods in the BoaTest class to test the isHealthy() and fitsInCage() methods of the Boa class: Step 1: Open the BoaTest class in your Eclipse project. Step 2: Modify the testIsHealthy() method to test the isHealthy() method of the Boa class. You can use the assertTrue() method provided by JUnit to check that the result is true. For example: In this example, we call the fitsInCage() method on the jen and ken objects with different cage lengths, and use assertTrue() or assertFalse() to check that the expected results match the actual results. It's important to write tests for both jen and ken objects, as it helps to ensure that the methods being tested are working correctly for different instances of the Boa class. Writing robust tests that cover different scenarios and edge cases can help identify potential issues and ensure the correctness of your code. Sure! Based on the provided instructions, here's how you can add a new method lengthInInches() to the Boa class and a corresponding test case in the BoaTest class: Open the Boa class in your Eclipse project. Add the following method lengthInInches() to the Boa class: This method takes the length of the Boa in feet and converts it to inches by multiplying it by 12, since there are 12 inches in a foot. Save the Boa class. Open the BoaTest class in your Eclipse project. Add a new test method testLengthInInches() to the BoaTest class and annotate it with @Test: In this test method, we first calculate the expected length in inches based on the length of the jen and ken objects using the getLength() method, and then call the lengthInInches() method on these objects to get the actual length in inches. We use assertEquals() to check that the expected length matches the actual length for both jen and ken.