IT314- Software Engineering

Lab-8

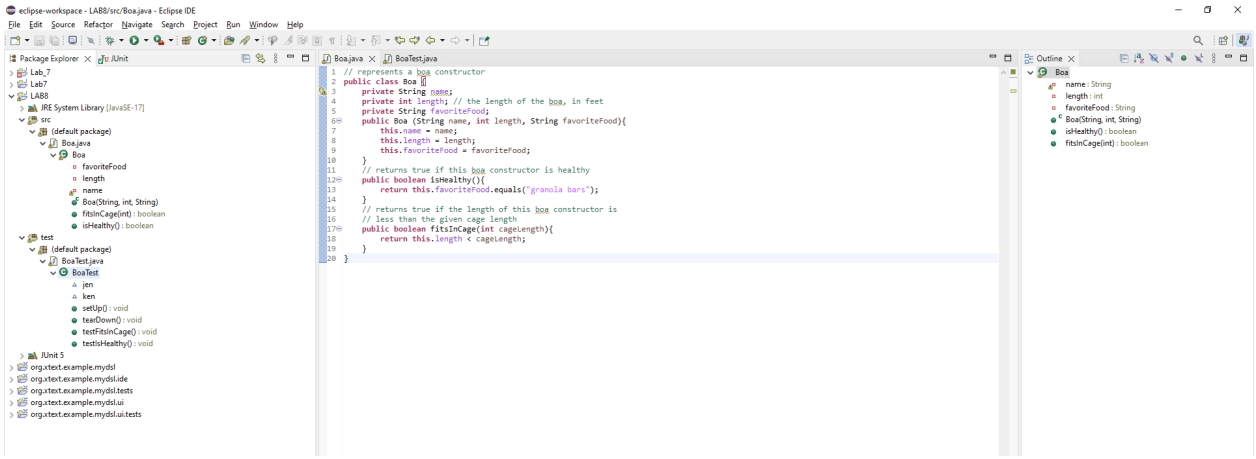
Kunal Hotwani

(202001468)

21st April, 2023

1. **Create a new Eclipse project, and within the project create a package.**

Ans: A ‘new’ project is created along with a new package:



2. **Create a class for a Boa. Here's the code you can use (you may copy/paste):**

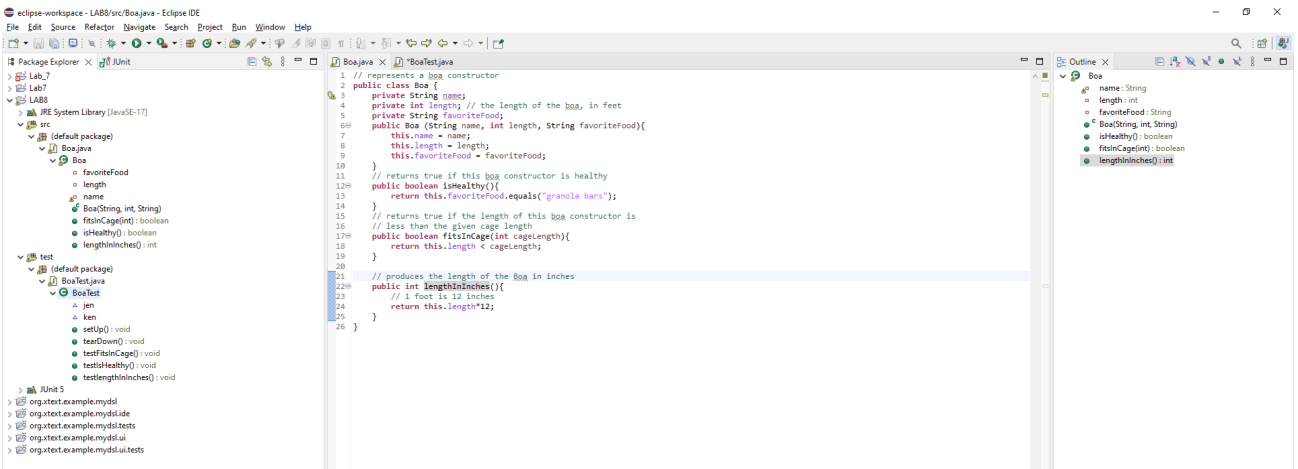
Ans: The code mentioned is pasted in the file:

```
// represents a boa constrictor
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;
}
}
```

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).**

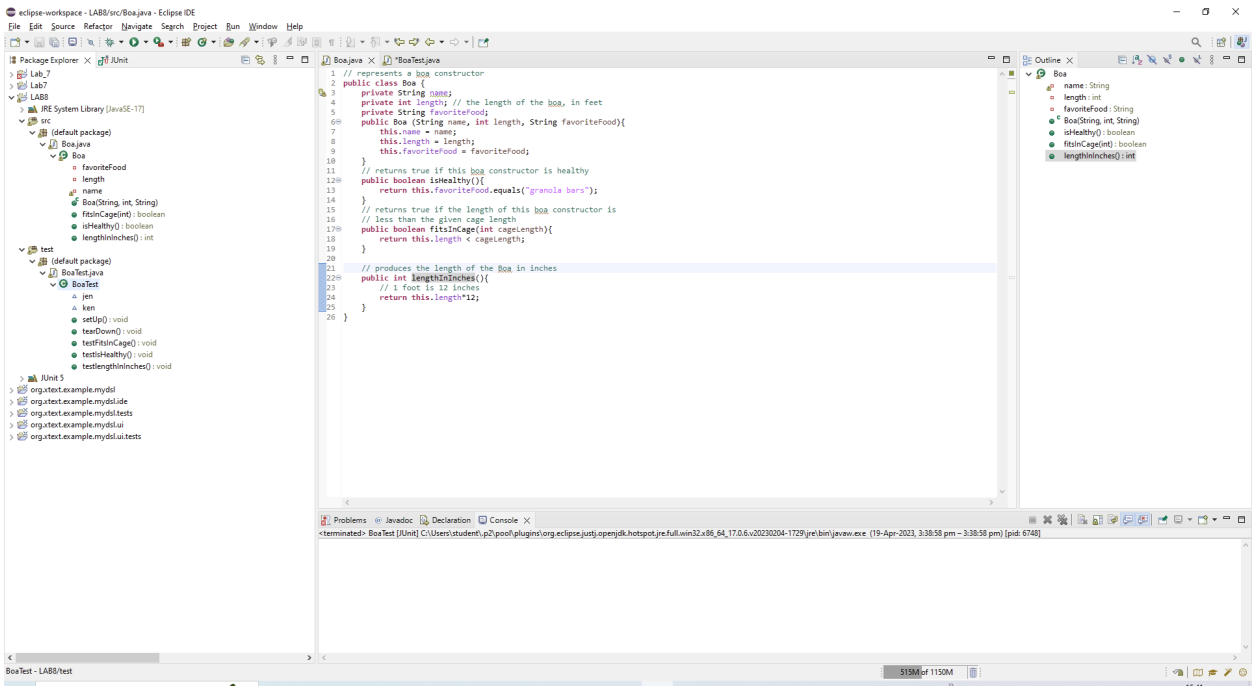
Ans: The test case for 'Boa' is created as follows, it contains the set-up method

```
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");
    }

    // write test methods here
}
```



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:**

Ans: Test methods such as 'testFitsInCage()' and 'testIsHealthy()' are as below:



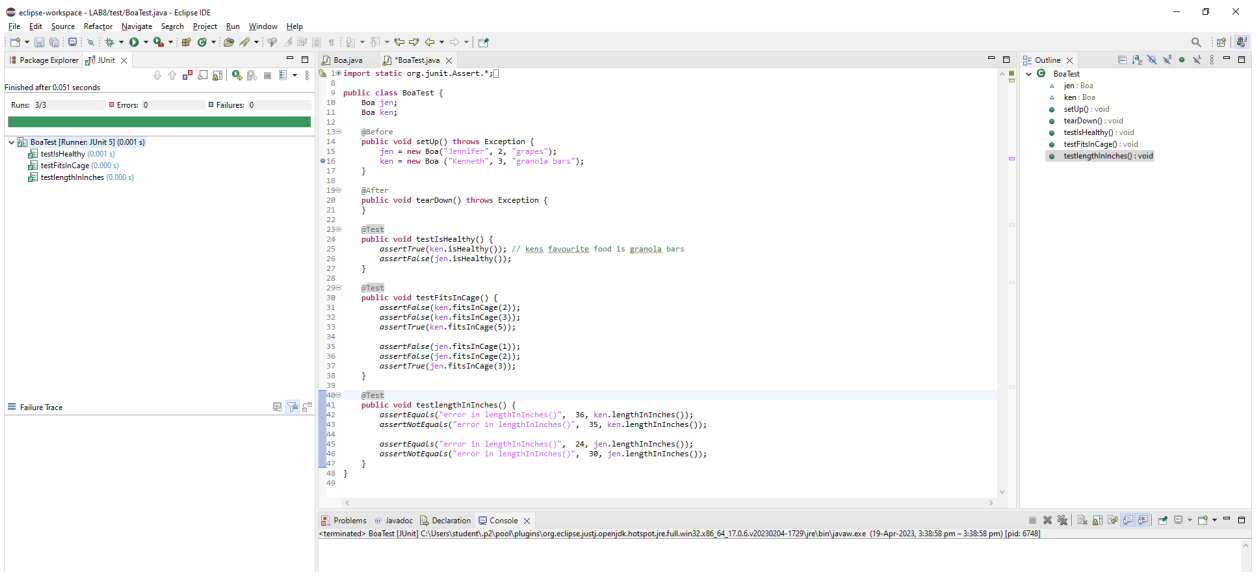
5. **JUnit also provided stubs for two test methods, each annotated with @Test. Work on the testIsHealthy() method first. The purpose of this method is to check that the isHealthy() method in the Boa class behaves the way it's supposed to. In the JUnit tutorial, read the section on "Writing Tests". Modify 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?**

Ans: The modified methods as below:

```
@Test
public void testIsHealthy() {
    // check that jen is not healthy
    assertFalse(jen.isHealthy());
    // check that ken is healthy
    assertTrue(ken.isHealthy());
}

@Test
public void testFitsInCage() {
    // Test for jen
    assertFalse(jen.fitsInCage(1)); // cage length is less than length of boa
    assertTrue(jen.fitsInCage(2)); // cage length is equal to length of boa
    assertTrue(jen.fitsInCage(3)); // cage length is greater than length of boa
   // Test for ken
    assertFalse(ken.fitsInCage(2)); // cage length is less than length of boa
    assertTrue(ken.fitsInCage(3)); // cage length is equal to length of boa
    assertTrue(ken.fitsInCage(4)); // cage length is greater than length of boa
}
```

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.**

Ans: The tests are run as follows:



As it turns out, all the three tests run successfully without any failures

7. **Add a new method to the Boa class, with this purpose and signature:**
   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.

Ans: The lengthInInches() method:

```
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;
    }
}
```

Modified ‘Boa’ class with new lengthInInches() method:

```
import static org.junit.Assert.assertEquals;
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 testLengthInInches() {
        assertEquals(24, jen.lengthInInches());
        assertEquals(36, ken.lengthInInches());
    }
}
```