

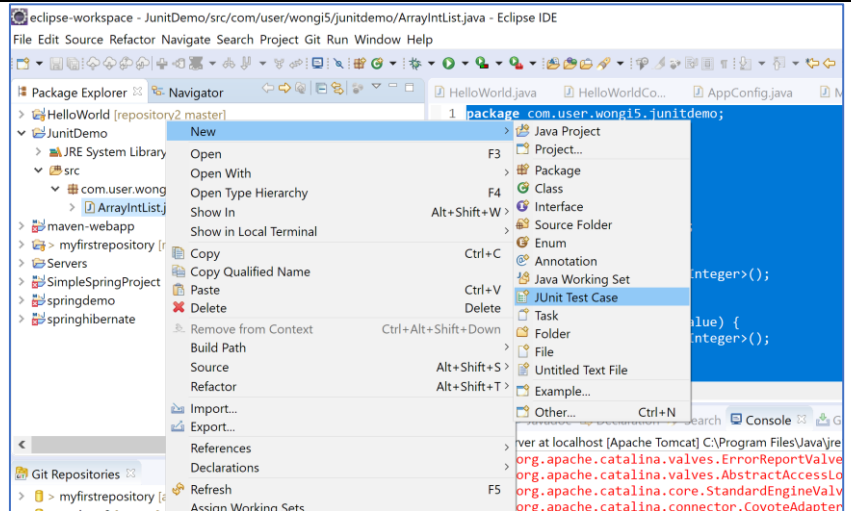
Lab 03: Using JUnit for Unit Testing

(Ref: <https://courses.cs.washington.edu/courses/cse143/11wi/eclipse-tutorial/junit.shtml>)

<p>Step 1: Creating a Java class for testing</p> <p>Create a Java Project and add a class called ArrayIntList.java as shown</p>	<pre>package com.user.wongi5.junitdemo; import java.util.ArrayList; import java.util.List; public class ArrayIntList { List<Integer> list = null; public ArrayIntList() { list = new ArrayList<Integer>(); } public ArrayIntList(int value) { list = new ArrayList<Integer>(); list.add(value); } public void add(int value) { list.add(value); } public void add(int pos, int value) { list.add(pos, value); } public void remove(int pos) { list.remove(pos); } public int indexOf(int value) { return list.indexOf(value); } public boolean isEmpty() { return list.isEmpty(); } public boolean contains(int value) { return list.contains(value); } public int get(int pos) { return list.get(pos); } public int size() { return list.size(); } public String toString() { return list.toString(); } }</pre>
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Step 2: Creating JUnit test cases

Right-click `ArrayIntList.java` and choose **New** → **JUnit Test Case** → **Next**



New JUnit Test Case

Select the name of the new JUnit test case. You have the options to specify the class under test and on the next page, to select methods to be tested.

☐ New JUnit 3 test ☐ New JUnit 4 test ☒ New JUnit Jupiter test

Source folder:

Package:

Name:

Superclass:

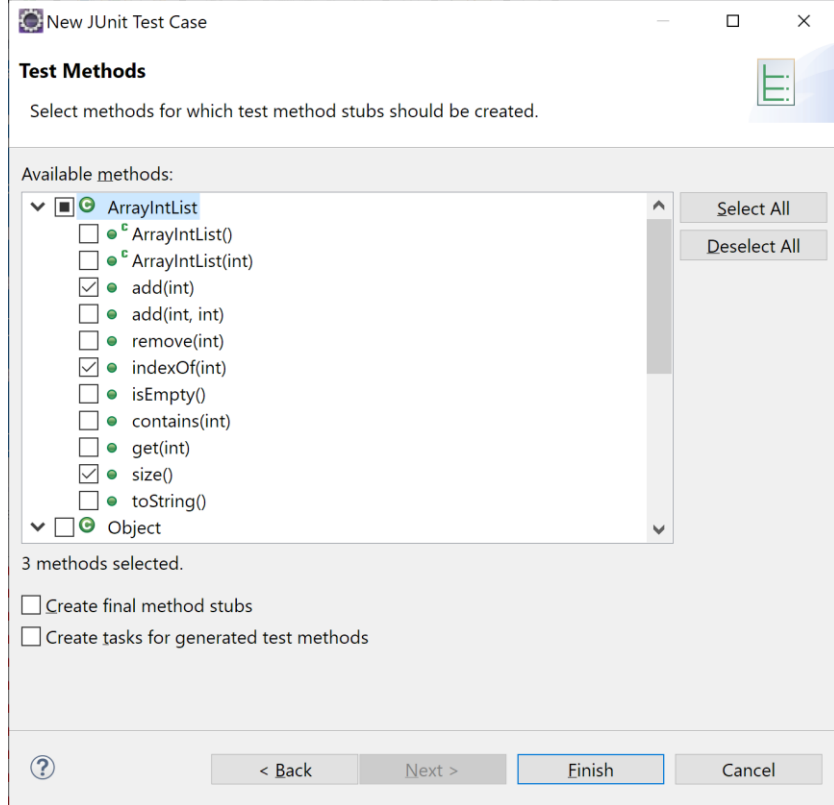
Which method stubs would you like to create?

☐ setUpBeforeClass() ☐ tearDownAfterClass()
☐ setUp() ☐ tearDown()
☐ constructor

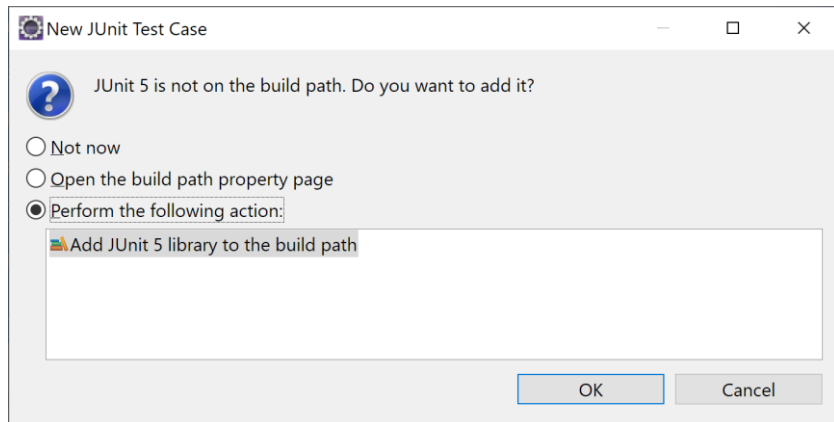
Do you want to add comments? (Configure templates and default value [here](#))
☐ Generate comments

Class under test:

Choose the methods to be tested: add(int), indexOf(int), size(), then click Finish



Click OK in the following dialog



Delete the generated test methods and change the codes as shown

The screenshot shows the Eclipse IDE with the following components:

- Package Explorer:** Displays the project structure. The file `ArrayListTest.java` is selected under `com.user.wong15.junitdemo`.
- Editor:** Shows the code for `ArrayListTest.java`. The code is as follows:

```
1 package com.user.wong15.junitdemo;
2
3 import static org.junit.jupiter.api.Assertions.*;
4
5 class ArrayListTest {
6
7     @Test
8     void testAddInt() {
9         fail("Not yet implemented");
10    }
11
12    @Test
13    void testIndexOf() {
14        fail("Not yet implemented");
15    }
16
17    @Test
18    void testSize() {
19        fail("Not yet implemented");
20    }
21
22 }
23
24
25
```
- Outline:** Shows the class `ArrayListTest` with methods `testAddInt()`, `testIndexOf()`, and `testSize()`.
- Problems:** Shows a message: `<terminated> Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jre1.8.0_221\bin\javaw.exe (Au...` with a red error icon.

```

package com.user.wongi5.junitdemo;

import static org.junit.Assert.assertEquals;
import static org.junit.Assert.assertFalse;
import static org.junit.Assert.assertTrue;
import static org.junit.jupiter.api.Assertions.*;

import org.junit.jupiter.api.Test;

class ArrayIntListTest {

    @Test
    public void testAddAndGet() {
        ArrayIntList list = new ArrayIntList();
        list.add(42);
        list.add(-3);
        list.add(17);
        list.add(99);
        assertEquals(42, list.get(0));
        assertEquals(-3, list.get(1));
        assertEquals(17, list.get(2));
        assertEquals(99, list.get(3));

        assertEquals("second attempt", 42,
list.get(0)); // make sure I can get them a second
time
        assertEquals("second attempt", 99,
list.get(3));
    }

    @Test
    public void testSize() {
        ArrayIntList list = new ArrayIntList();
        assertEquals(0, list.size());
        list.add(42);
        assertEquals(1, list.size());
        list.add(-3);
        assertEquals(2, list.size());
        list.add(17);
        assertEquals(3, list.size());
        list.add(99);
        assertEquals(4, list.size());
        assertEquals("second attempt", 4,
list.size()); // make sure I can get it a second time
    }

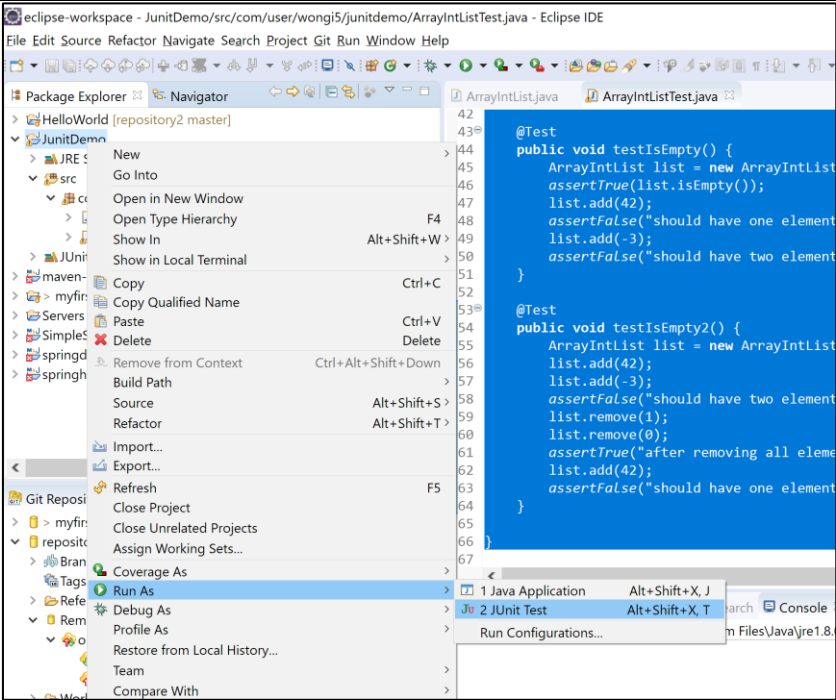
    @Test
    public void testIsEmpty() {
        ArrayIntList list = new ArrayIntList();
        assertTrue(list.isEmpty());
        list.add(42);
        assertFalse("should have one element",
list.isEmpty());
        list.add(-3);
        assertFalse("should have two elements",
list.isEmpty());
    }
}

```

	<pre>@Test public void testIsEmpty2() { ArrayList list = new ArrayList(); list.add(42); list.add(-3); assertFalse("should have two elements", list.isEmpty()); list.remove(1); list.remove(0); assertTrue("after removing all elements", list.isEmpty()); list.add(42); assertFalse("should have one element", list.isEmpty()); }</pre>
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Step 3: Run the test

Right-click the project,
choose Run As → JUnit Test



It shows that all test cases pass

Try to introduce one or two errors in ArrayListTest and test again

