Lab 14. Unit Testing with JUnit 5

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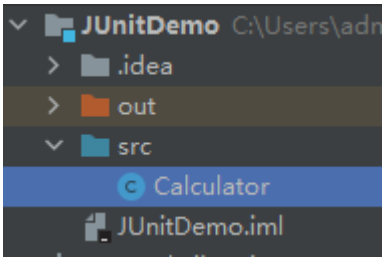
Setup JUnit as a Maven Project

JUnit is essentially a dependency to your project, which could be downloaded and managed using Maven. Please follow this official guide of IntelliJ IDEA to create a Maven project, add a `Calculator.java`, create test cases and execute them.

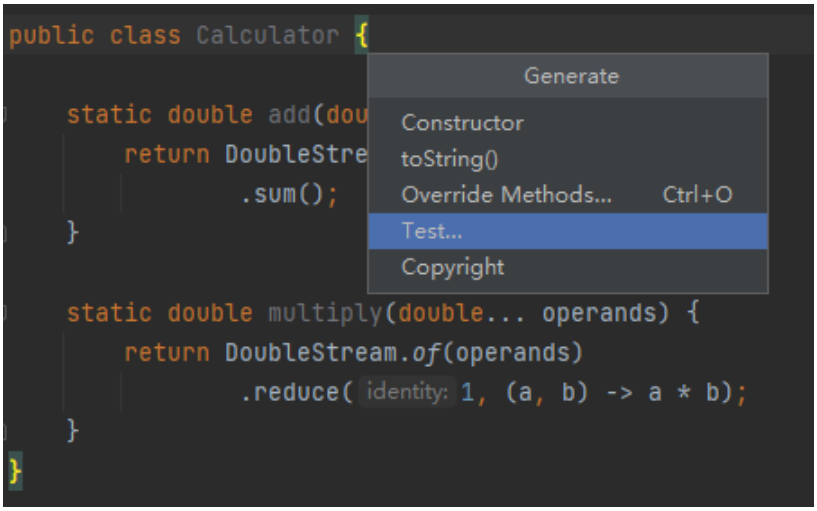
Setup JUnit for an Existing Java Project

If you already created a Java project, not Maven project, and wanted to use JUnit on this project, you could always download necessary `.jar` files of JUnit and add them to the classpath, as shown below.

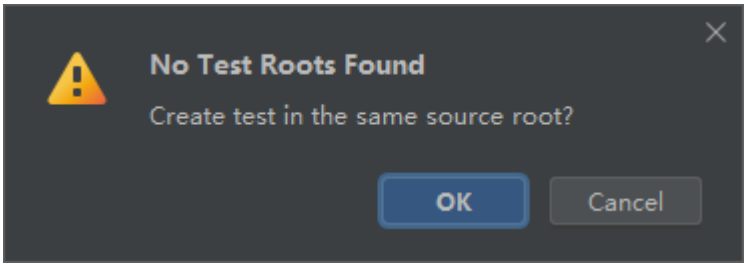
Suppose we have a Java project:



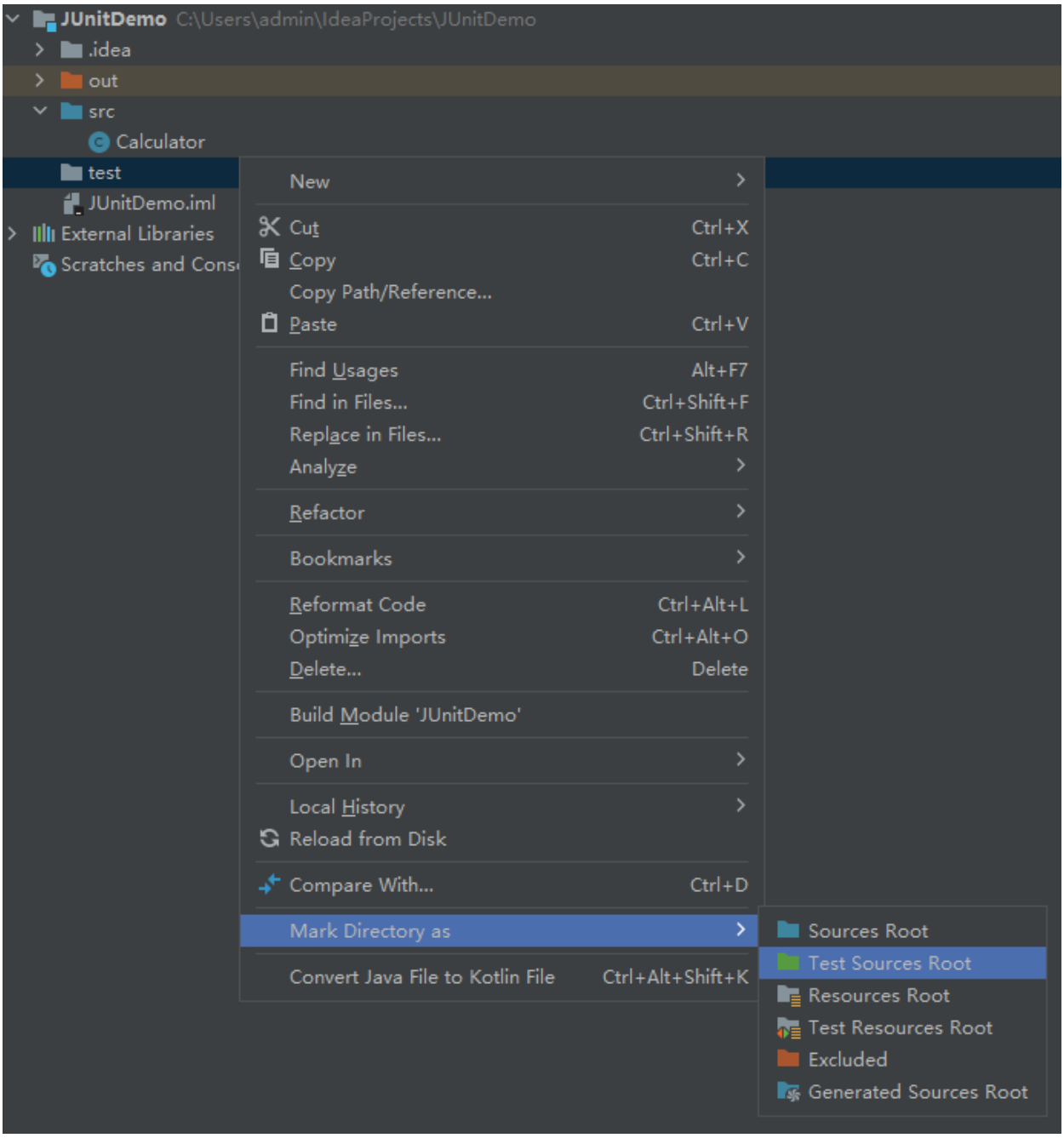
Inside `Calculator.java`, right click -> Generate -> Tests:

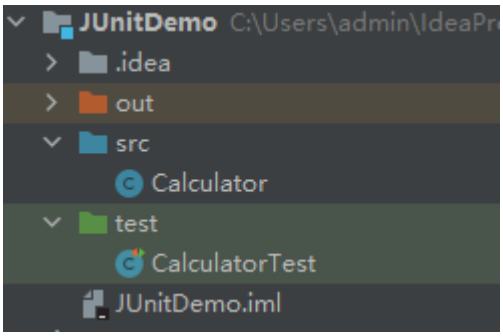


You'll probably see a popup like this. If you choose OK, the test will be put under the same directory as `Calculator.java`.

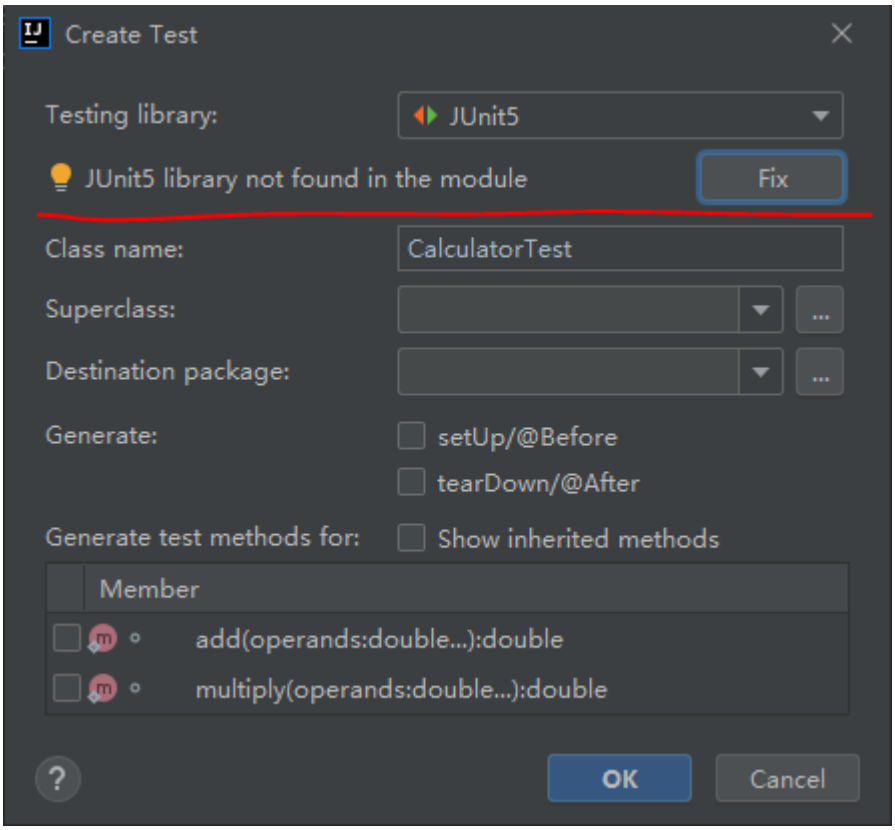


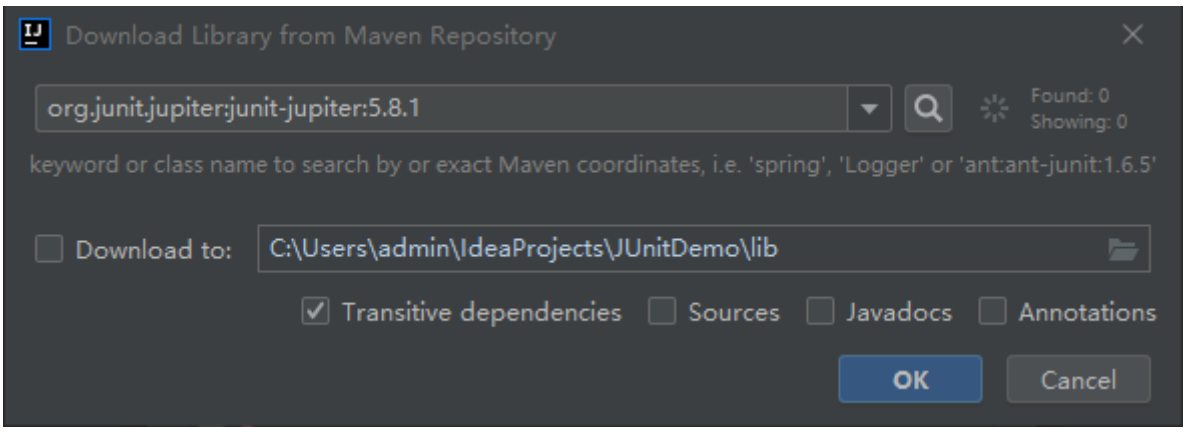
This is fine for a toy project. However, as a convention, `test` directory is typically separated from the `src` directory. We could create a `test` directory and mark it as the "test root". This way, generated tests will be put into this test root automatically, with the same package structure as those in `src`.





When you generate tests, if you haven't configured JUnit, click "Fix" and "OK" to download JUnit.





After downloading JUnit and adding it to classpath, you should be good to go.

Sample JUnit Tests

Download `Calculator.java` and `Person.java` from our course website, which are the source code to be tested. Then, download `AssertionDemo.java` from our course website, which showcases different types of JUnit tests that assert program logic, exceptions, and execution time. You should be able to understand the test code.

Test Lifecycle

Download `StandardTests.java` from our course website. This test showcases JUnit test lifecycle methods annotated with `@BeforeAll`, `@BeforeEach`,`@AfterAll` and `@AfterEach`. Run this test with and without the class annotation `@TestInstance(TestInstance.Lifecycle.PER_CLASS)` and understand the results.