

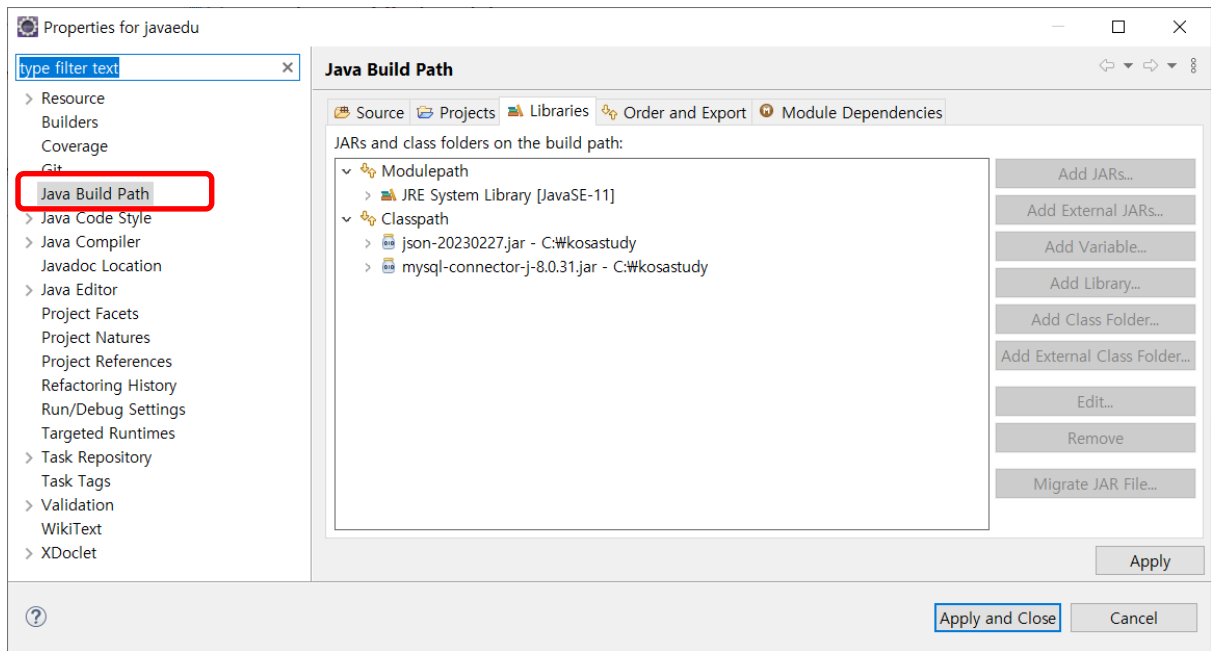
JUnit

Java 언어를 위한 테스트 프레임워크이다. JUnit 를 사용하면 클래스에 구현된 메서드가 주어진 기능을 제대로 수행하는지 단위테스트를 처리할 수 있다.

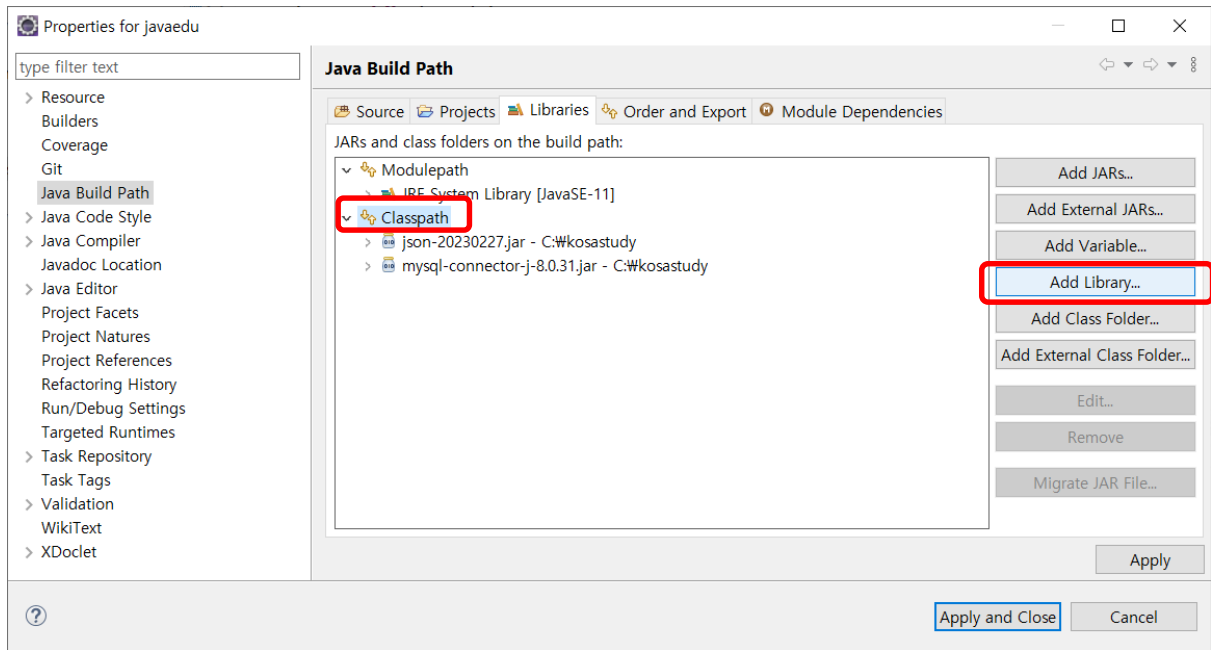
[이클립스에서의 Junit]

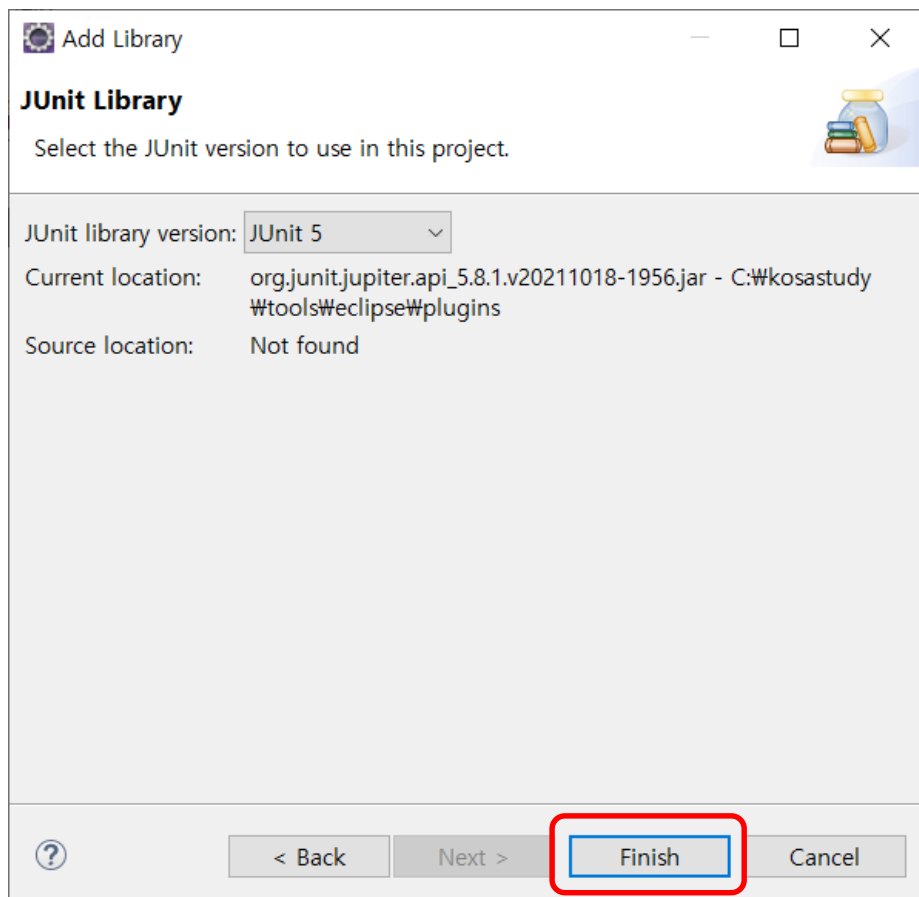
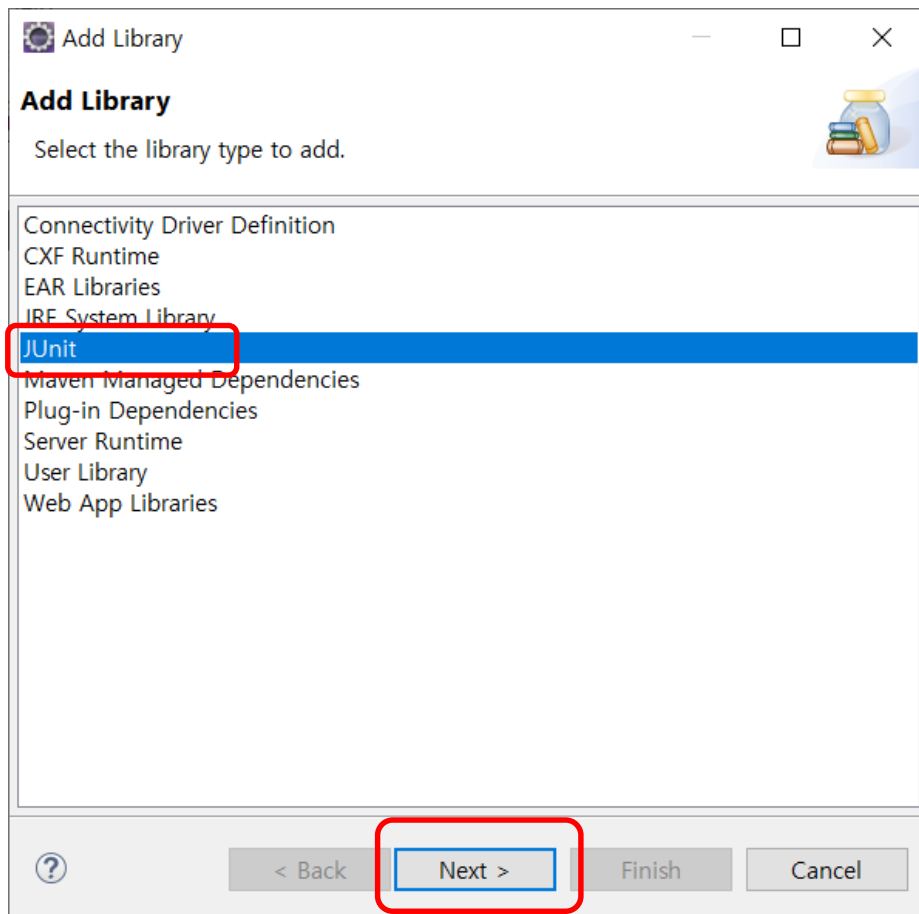
JUnit 라이브러리는 이클립스가 내장하고 있으므로 현재 사용중인 프로젝트에 라이브러리를 추가하여 간단하게 사용환경을 구축할 수 있다.

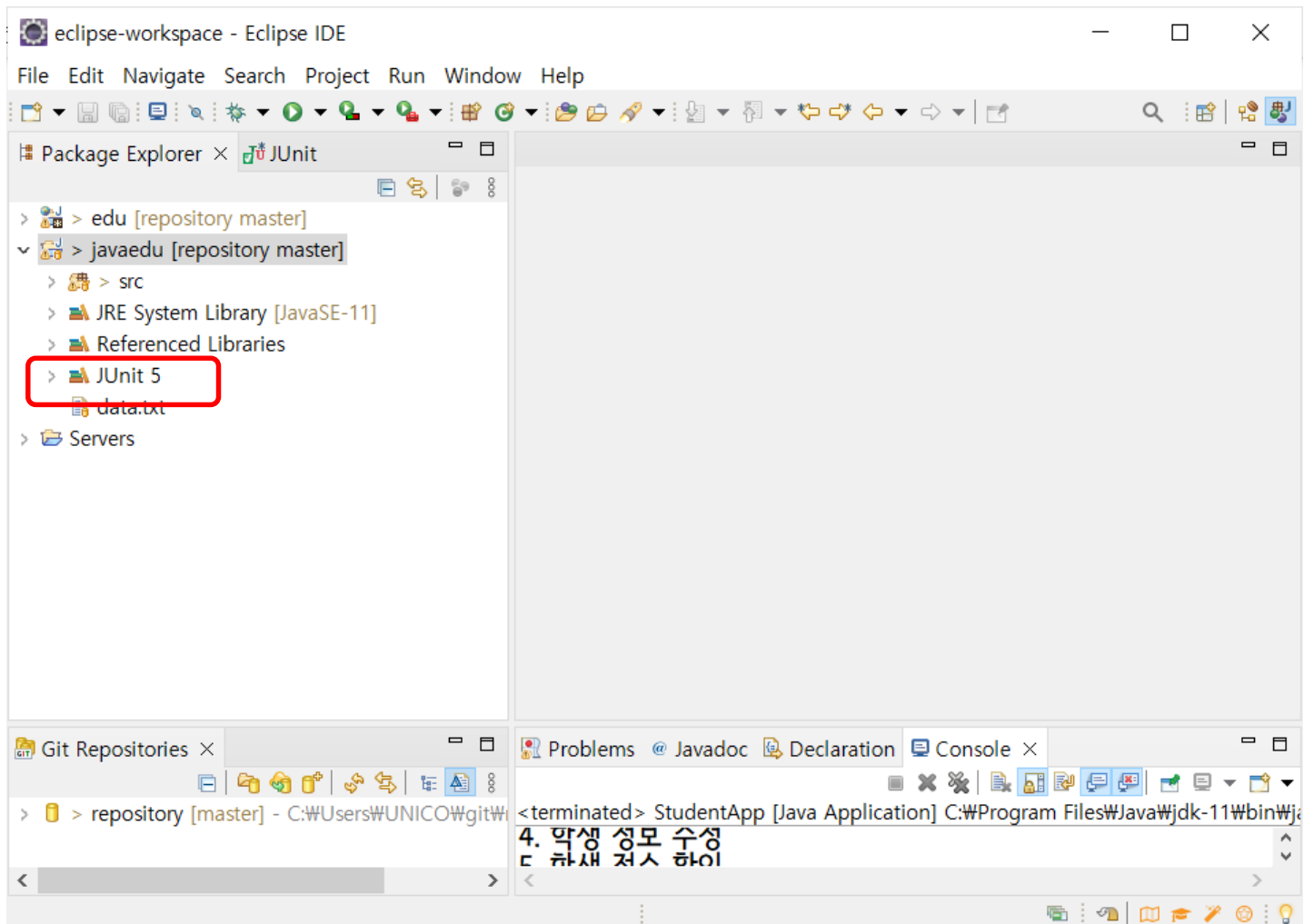
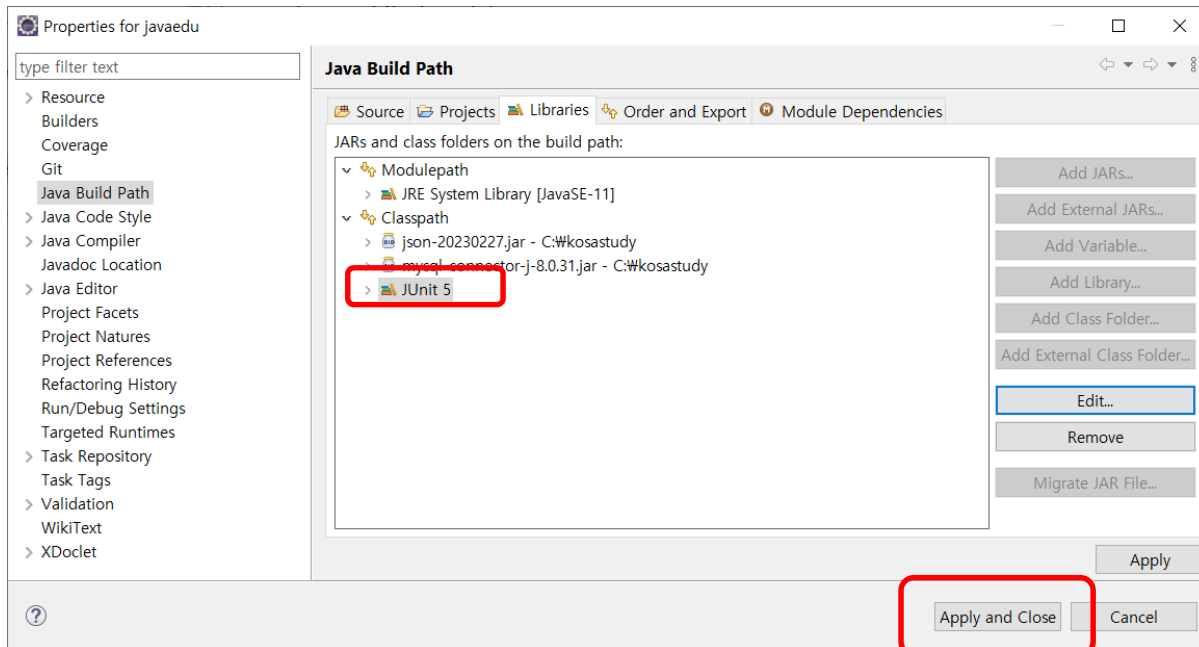
다음과 같이 프로젝트의 Build Path>Configure Build Path>Libraries 탭을 클릭한다.



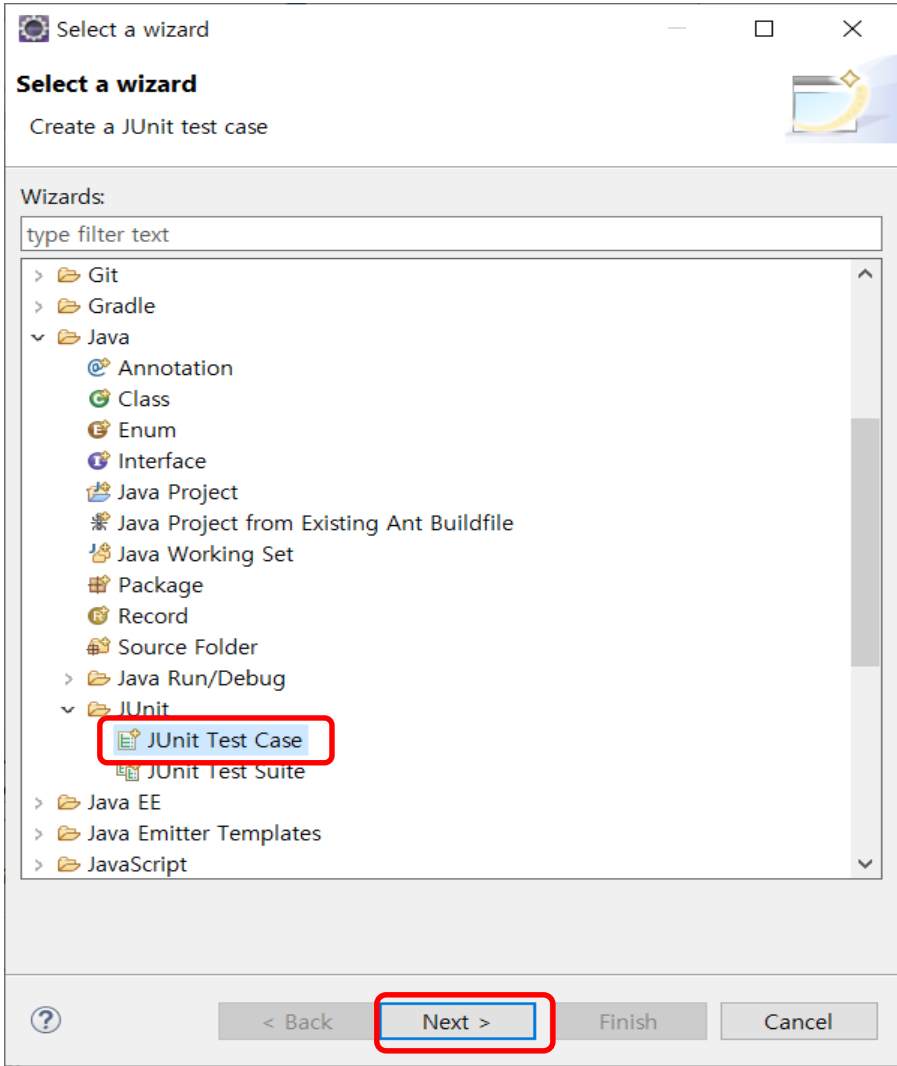
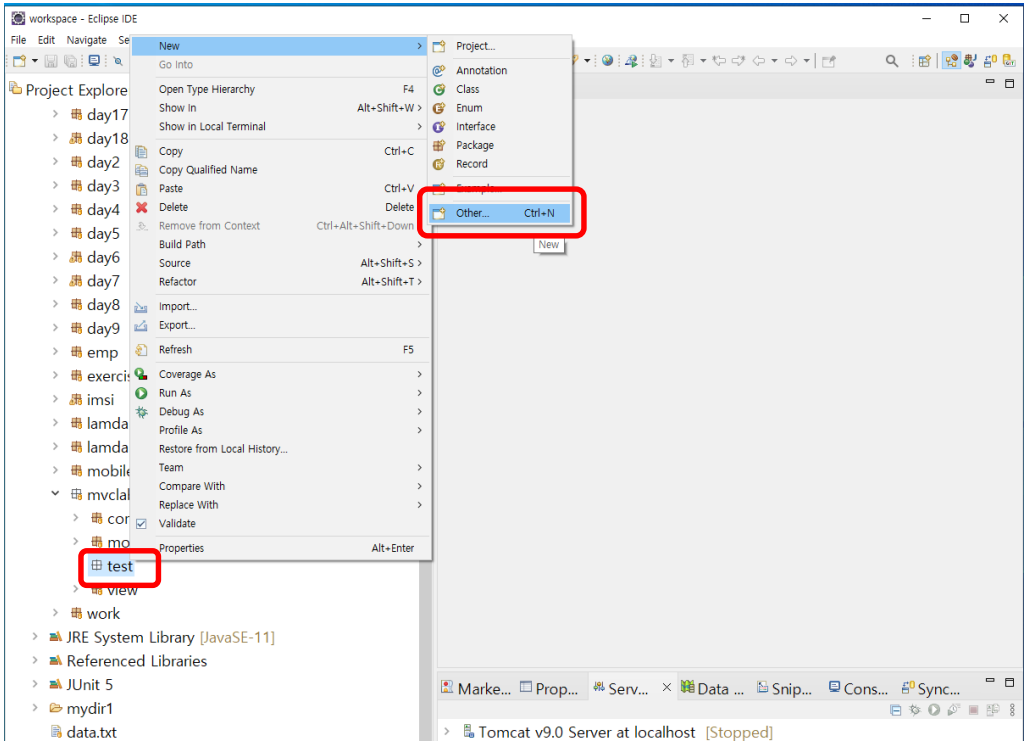
Classpath 항목을 선택한 후에 Add Library 버튼을 클릭한다.







[단위 테스트 클래스 만들기]



New JUnit Test Case

Select the name of the new JUnit test case. Specify the class under test to select methods to be tested on the next page.

☐ 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?

☐ @BeforeAll setUpBeforeClass()
 ☐ @AfterAll tearDownAfterClass()

☐ @BeforeEach setUp()
 ☐ @AfterEach tearDown()

☐ constructor

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

☐ Generate comments

Class under test:

eclipse-workspace - javaedu/src/mvclab/test/MySQLConnectTest.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer x JUnit

- day9
- emp
- exercise
- imsi
- lamdalab
- mobile
- mvclab
 - controller
 - model
 - StudentDAO.java
 - StudentDTO.java
 - test
 - MySQLConnectTest.java
 - StudentDAOTest1.java
 - view
 - StudentApp.java
- work
- JRE System Library [JavaSE-11]

```

1 package mvclab.test;
2
3 import static org.junit.jupiter.api.Assertions.assumeTrue;
4
11
12 @DisplayName("첫 번째 JUnit 테스트 클래스")
13 class MySQLConnectTest {
14
15     @DisplayName("DB서버 접속 확인")
16     @Test
17     void test() {
18         assumeTrue(MySQLConnect.connect() instanceof Connection);
19     }
20 }
21
22
  
```

Git Repositories x

- repository [master] - C:\Users\UNICO\g...

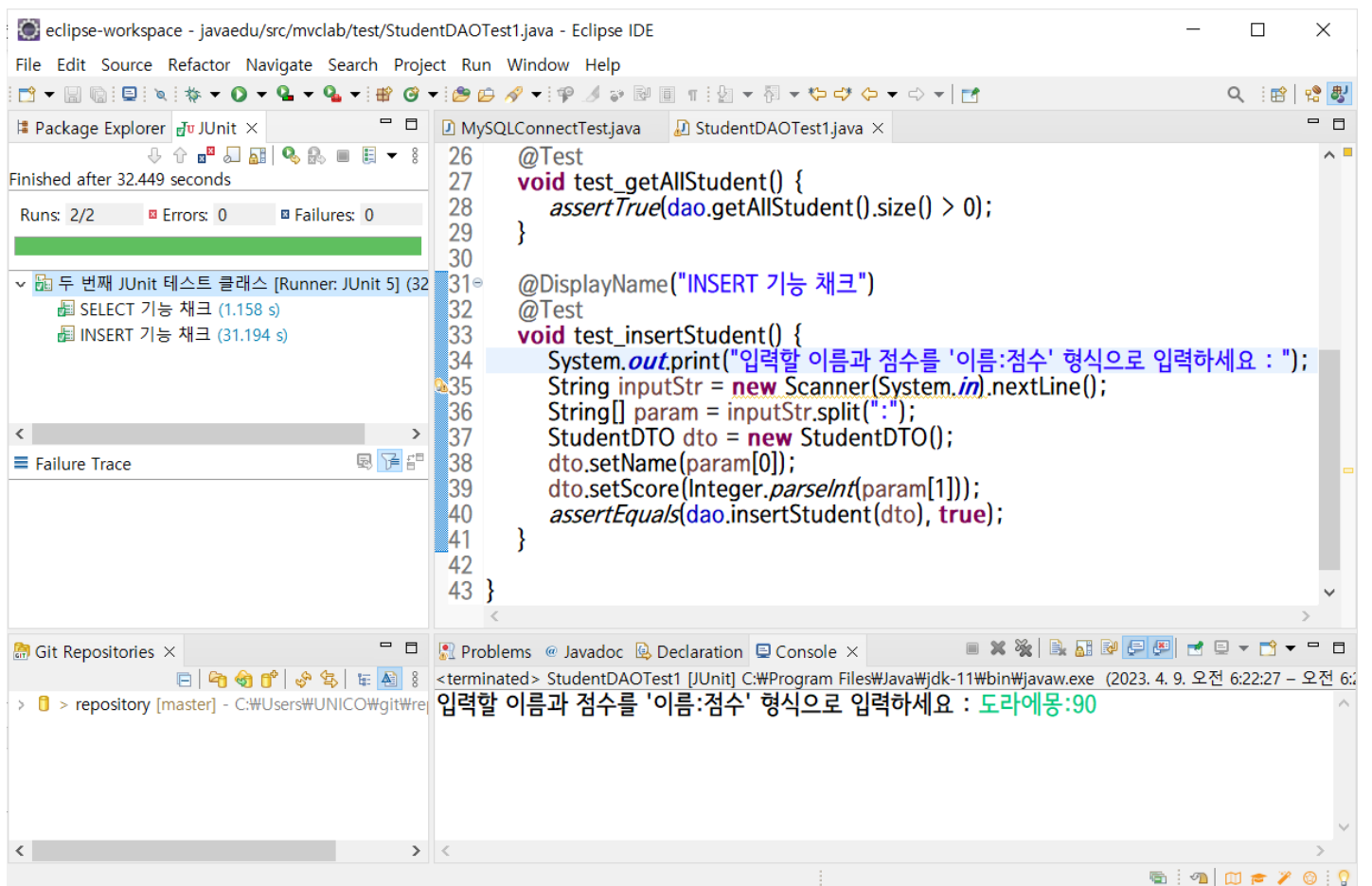
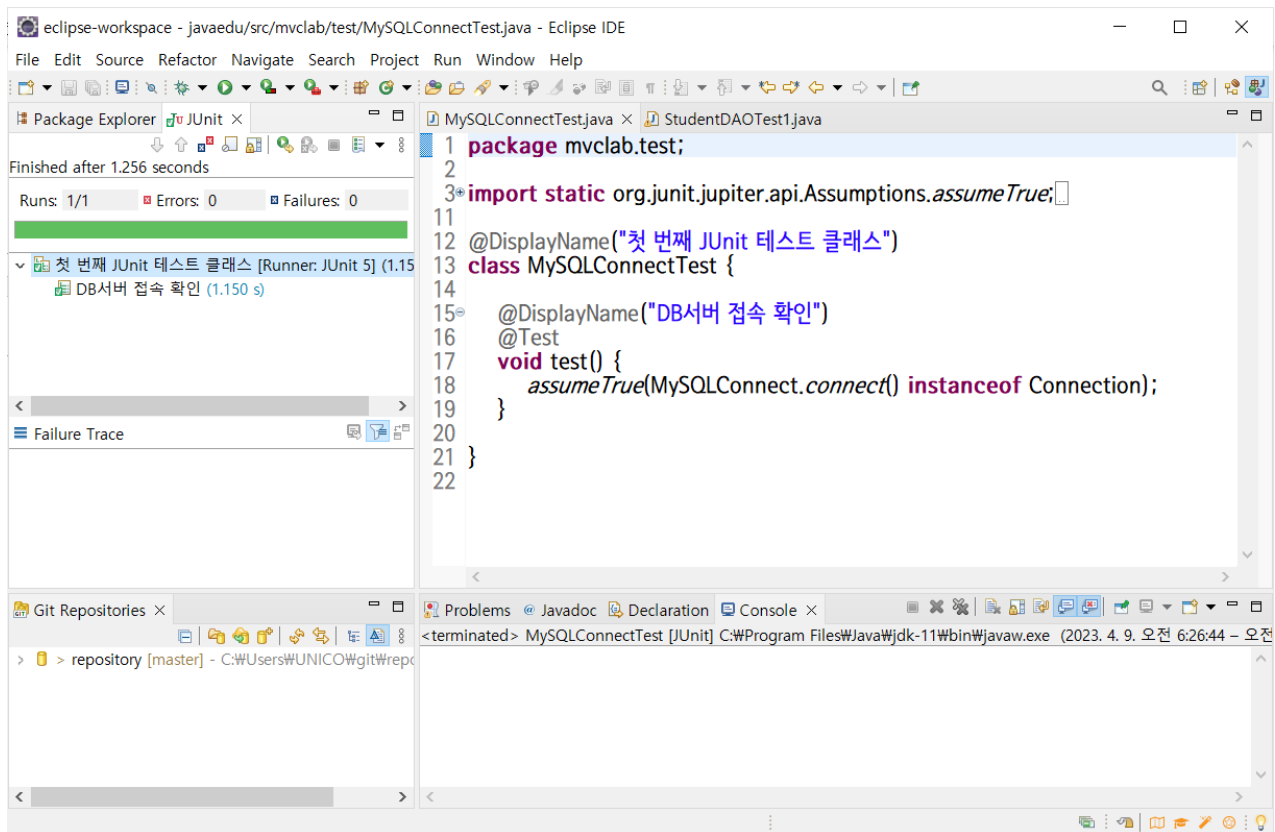
Problems x Javadoc x Declaration x Console x

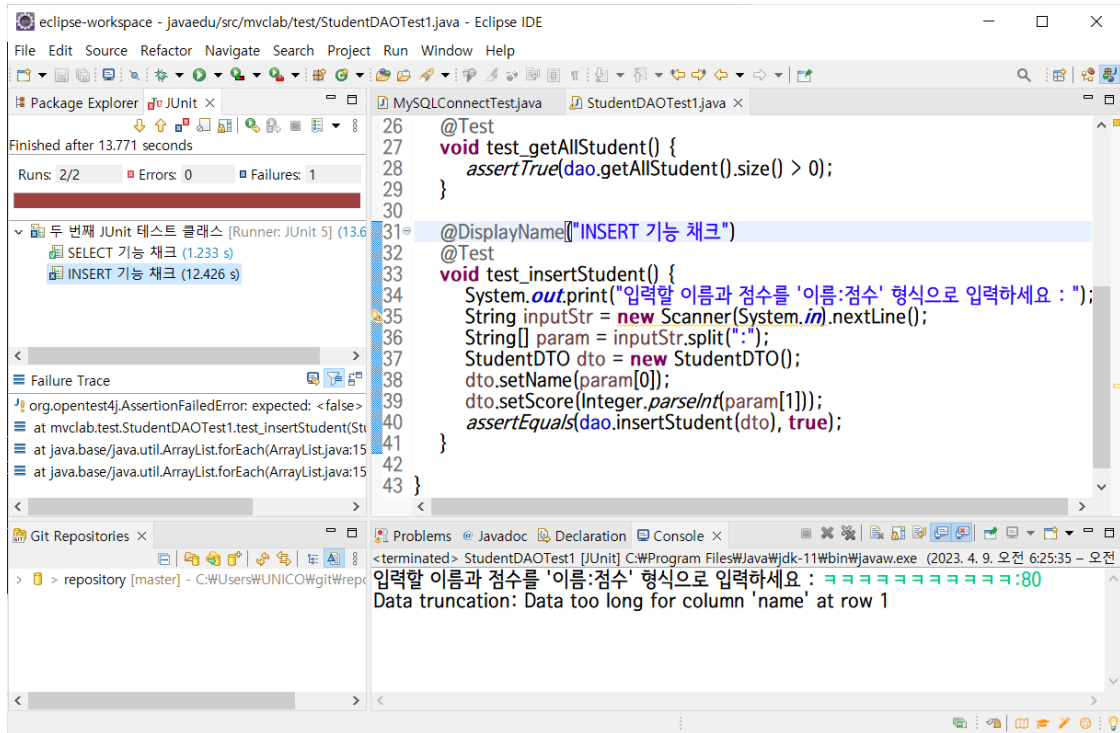
<terminated> StudentApp [Java Application] C:\Program Files\Java\jdk-11\bin\javaw.exe (2023. 4. 8. 오후 7:07:10 - 오후 1

```

4. 학생 정보 수정
5. 학생 점수 확인
6. 종료
입력 : 1
[[이름 : 돌리, 점수 : 100]
, [이름 : 포치, 점수 : 90]
  
```

Writable Smart Insert 1 : 1 : 0

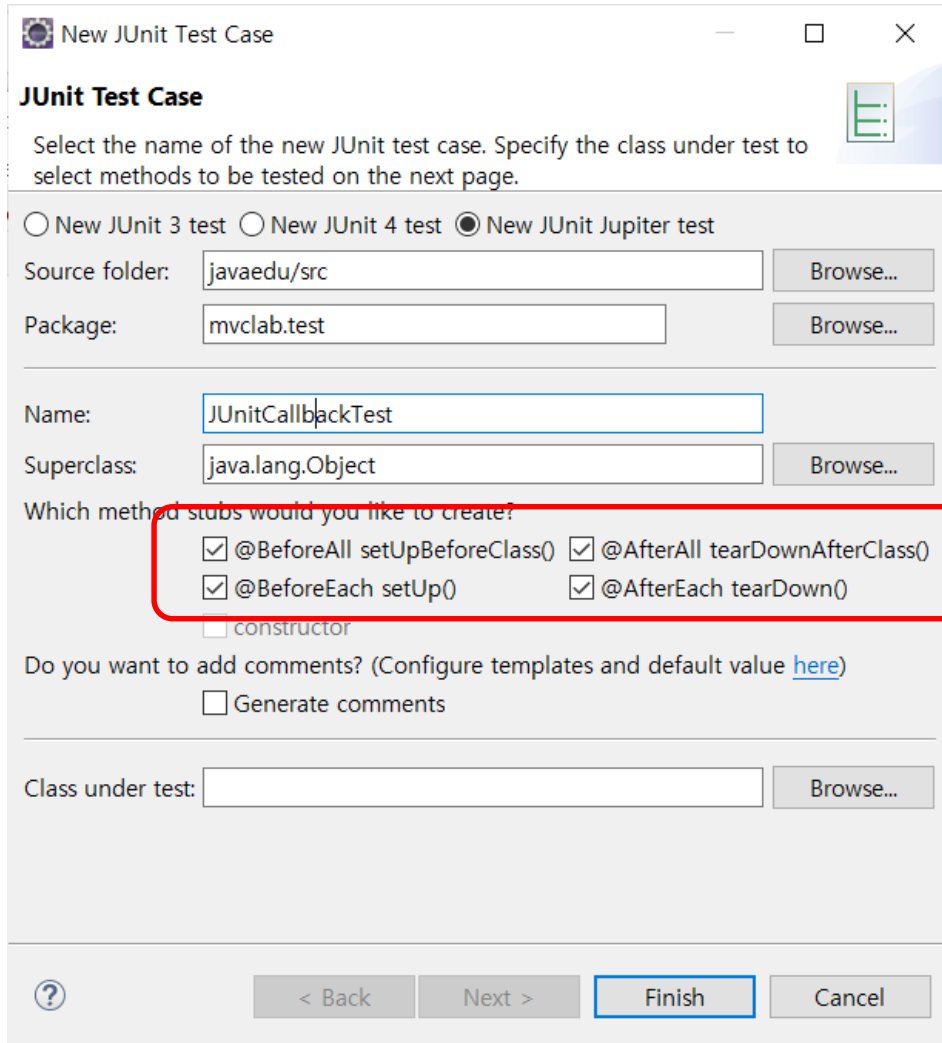




[JUnit 5 기본 어노테이션]

JUnit 5 에는 테스트를 위해 다양한 어노테이션을 제공하고 있는데 아래에 있는 어노테이션만 알아도 어느정도 테스트가 가능하다.

어노테이션	설명
@Test	테스트 메서드를 나타내는 어노테이션(필수)
@BeforeEach	각 테스트 메서드 시작 전에 실행되는 메서드
@AfterEach	각 테스트 메서드 종료 후에 실행되는 메서드
@BeforeAll	테스트 시작 전에 실행되는 메서드(static 메서드여야만 함)
@AfterAll	테스트 종료 후에 실행되는 메서드(static 메서드여야만 함)
@Disabled	실행되지 않아야 하는 테스트 메서드

The image shows a 'New JUnit Test Case' dialog box. It has a title bar with a gear icon and standard window controls. The main area is titled 'JUnit Test Case' and contains instructions: 'Select the name of the new JUnit test case. Specify the class under test to select methods to be tested on the next page.' There are three radio buttons: 'New JUnit 3 test', 'New JUnit 4 test', and 'New JUnit Jupiter test' (which is selected). Below these are input fields for 'Source folder' (javaedu/src) and 'Package' (mvclab.test), each with a 'Browse...' button. The 'Name' field contains 'JUnitCallbackTest' and the 'Superclass' field contains 'java.lang.Object', both with 'Browse...' buttons. A section titled 'Which method stubs would you like to create?' is highlighted with a red rectangle. It contains four checked checkboxes: '@BeforeAll setUpBeforeClass()', '@AfterAll tearDownAfterClass()', '@BeforeEach setUp()', and '@AfterEach tearDown()'. There is also an unchecked checkbox for 'constructor'. Below this is a section 'Do you want to add comments? (Configure templates and default value [here](#))' with an unchecked 'Generate comments' checkbox. At the bottom, there is a 'Class under test' field with a 'Browse...' button. The footer contains a help icon, '< Back', 'Next >', 'Finish' (highlighted with a blue border), and 'Cancel' buttons.

New JUnit Test Case

Select the name of the new JUnit test case. Specify the class under test to select methods to be tested on the next page.

☐ 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?

☒ @BeforeAll setUpBeforeClass() ☒ @AfterAll tearDownAfterClass()
☒ @BeforeEach setUp() ☒ @AfterEach tearDown()
☐ constructor

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

Class under test:



package mvclab.test;

```
import static org.junit.jupiter.api.Assertions.*;
import org.junit.jupiter.api.AfterAll;
import org.junit.jupiter.api.AfterEach;
import org.junit.jupiter.api.BeforeAll;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;
```

```
class JUnitCallbackTest {

    @BeforeAll
    static void setUpBeforeClass() throws Exception {
        System.out.println("모든 테스트 메서드 수행 전 최초로 수행~~");
    }

    @AfterAll
    static void tearDownAfterClass() throws Exception {
        System.out.println("모든 테스트 메서드 수행 후 마지막 수행~~");
    }

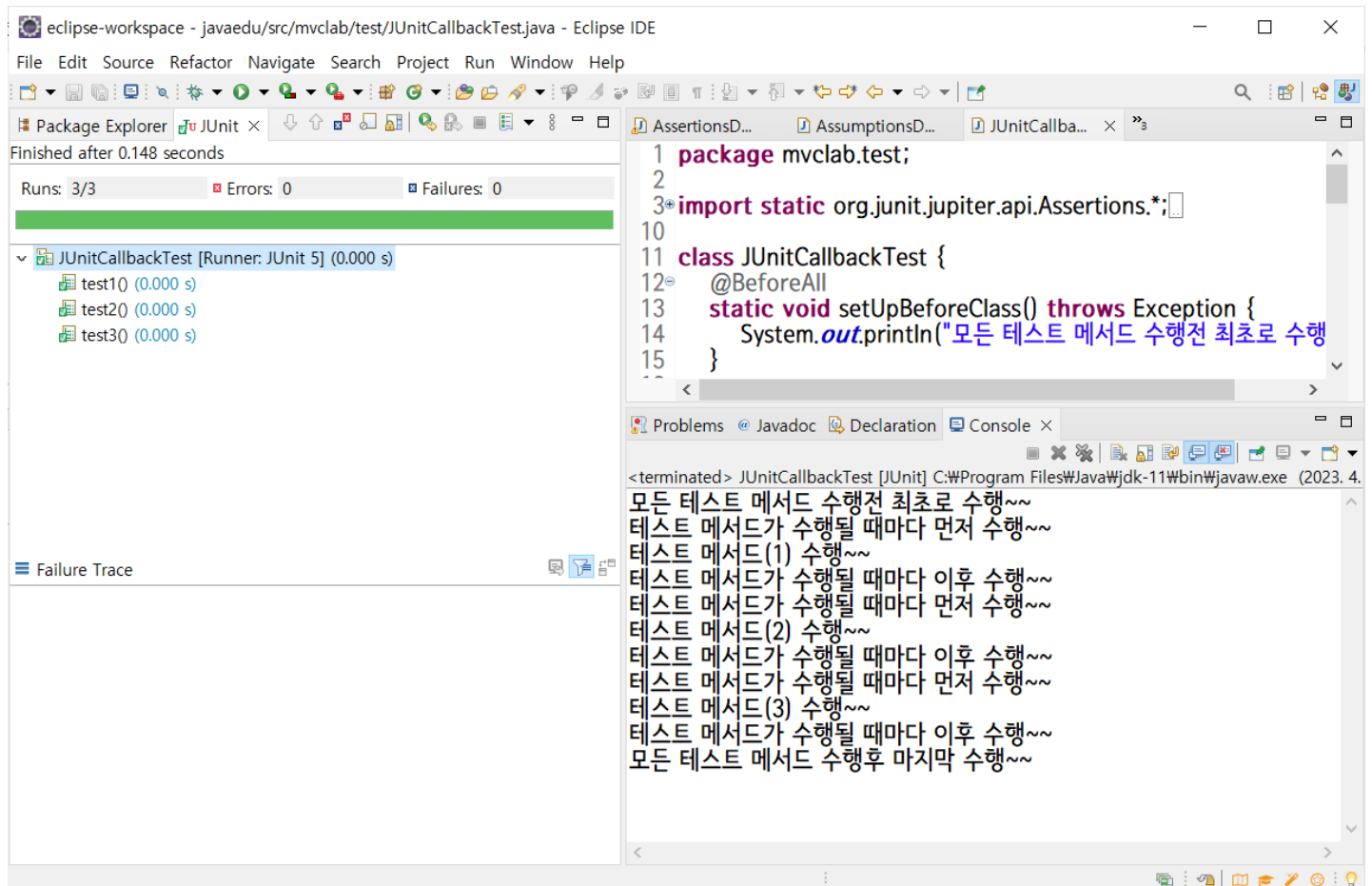
    @BeforeEach
    void setUp() throws Exception {
```



```

        System.out.println("테스트 메서드가 수행될 때마다 먼저 수행~~");
    }
    @AfterEach
    void tearDown() throws Exception {
        System.out.println("테스트 메서드가 수행될 때마다 이후 수행~~");
    }
    @Test
    void test1() {
        assertEquals(1, Integer.parseInt("1"));
        System.out.println("테스트 메서드(1) 수행~~");
    }
    @Test
    void test2() {
        assertEquals(2, Integer.parseInt("2"));
        System.out.println("테스트 메서드(2) 수행~~");
    }
    @Test
    void test3() {
        assertEquals(3, Integer.parseInt("3"));
        System.out.println("테스트 메서드(3) 수행~~");
    }
}

```



[Unit 5 Assertions]

Assertion이 한글 뜻으로 주장이라는 뜻인데 테스트가 원하는 결과를 제대로 리턴하는지 에러는 발생하지 않는지 확인할 때 사용하는 메서드를 말한다. 개발자가 테스트하고 싶은 인자 값을 넣었을 때 예상한 결과가 나오는지 테스트 해볼 경우 사용한다.

메서드명	설명
fail	무조건 실패 (레거시에 사용하면 좋다.)
assertTrue	조건이 성공이면 True
assertFalse	조건이 실패면 True
assertNull	조건이 Null이면 True
aseertNotNull	조건이 Not Null이면 True
assertEquals(expected, actual)	expected와 actual이 동일하면 True
assertArrayEquals	두 Array가 동일하면 True
assertIterableEquals	두 Iterable이 동일하면 True
assertLinesMatch	두 Stream이 동일하면 True
assertNotEquals	expected와 actual이 다르면 True
assertSame	동일한 Object면 True
assertNotSame	다른 Object면 True
assertAll	여러 Assertion이 True면 True
assertThrows	예상한 에러가 발생하면 True
assertDoesNotThrow	에러가 발생하지 않으면 True
assertTimeout	테스트가 지정한 시간보다 오래 걸리지 않으면 True 지정한 시간보다 오래 걸려도 테스트가 끝날 때까지 대기
assertTimeoutPreemptively	테스트가 지정한 시간보다 오래 걸리지 않으면 True 지정한 시간보다 오래 걸린 경우 바로 테스트 종료

```
@Test
```

```
void testAssertTrue() {  
    assertTrue(1 == 1);  
}
```

```
@Test
```

```
void testAssertFalse() {  
    assertFalse(1 != 1);  
}
```

```
@Test
```

```
void testAssertNull() {  
    assertNull(null);  
}
```

```

}
@Test
void testAssertNotNull() {
    assertNotNull(1);
}
@Test
void testAssertEquals() {
    assertEquals(1, 0 + 1);
}
@Test
void testAssertThrows() {
    assertThrows(ArithmeticException.class, () -> {int i = 1/0;});
}
@Test
void testAssertTimeout() {
    String actualResult = assertTimeout(ofSeconds(1), () -> {
        Thread.sleep(2000);
        return "a result";
    });
    assertEquals("a result", actualResult);
}
@Test
void testAssertTimeoutPreemptively() {
    String actualResult = assertTimeoutPreemptively(ofSeconds(1), () -> {
        Thread.sleep(2000);
        return "a result";
    });
    assertEquals("a result", actualResult);
}

```

eclipse-workspace - javaedu/src/mvclab/test/AssertionsDemo.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer JUnit x

Finished after 3.174 seconds

Runs: 8/8 Errors: 0 Failures: 2

AssertionsDemo [Runner: JUnit 5] (3.076 s)

- testAssertNotNull() (0.016 s)
- testAssertTimeoutPreemptively() (1.041 s)
- testAssertTimeout() (2.010 s)
- testAssertFalse() (0.001 s)
- testAssertEquals() (0.001 s)
- testAssertThrows() (0.002 s)
- testAssertNull() (0.001 s)
- testAssertTrue() (0.001 s)

Failure Trace

org.opentest4j.AssertionFailedError: execution exceeded timeout of 1000 ms by 1007
at mvclab.test.AssertionsDemo.testAssertTimeout(AssertionsDemo.java:48)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1541)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1541)

```
43 assertThrows(ArithmeticException.class, () -> {in
44 }
45
46 @Test
47 void testAssertTimeout() {
48     String actualResult = assertTimeout(ofSeconds(1)
49         Thread.sleep(2000);
50         return "a result";
51     });
52
53     assertEquals("a result", actualResult);
54 }
55
56 @Test
57 void testAssertTimeoutPreemptively() {
58     String actualResult = assertTimeoutPreemptively(
59         Thread.sleep(2000);
60         return "a result";
61     });
62
63     assertEquals("a result", actualResult);
64 }
```

Problems Javadoc Declaration Console x

<terminated> AssertionsDemo [JUnit] C:\Program Files\Java\jdk-11\bin\javaw.exe (2

eclipse-workspace - javaedu/src/mvclab/test/AssertionsDemo.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer JUnit x

Finished after 3.174 seconds

Runs: 8/8 Errors: 0 Failures: 2

AssertionsDemo [Runner: JUnit 5] (3.076 s)

- testAssertNotNull() (0.016 s)
- testAssertTimeoutPreemptively() (1.041 s)
- testAssertTimeout() (2.010 s)
- testAssertFalse() (0.001 s)
- testAssertEquals() (0.001 s)
- testAssertThrows() (0.002 s)
- testAssertNull() (0.001 s)
- testAssertTrue() (0.001 s)

Failure Trace

org.opentest4j.AssertionFailedError: execution timed out after 1000 ms
at mvclab.test.AssertionsDemo.testAssertTimeoutPreemptively(AssertionsDemo.java:59)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1541)
at java.base/java.util.ArrayList.forEach(ArrayList.java:1541)
at java.base@11.0.18/java.lang.Thread.sleep(Native Method)
at app//mvclab.test.AssertionsDemo.lambda\$2\$2(AssertionsDemo.java:59)
at app//mvclab.test.AssertionsDemo\$\$Lambda\$350/0x00000008001b0040.get(Unknown Source)
at java.base@11.0.18/java.util.concurrent.FutureTask.run(FutureTask.java:264)
at java.base@11.0.18/java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:630)
at java.base@11.0.18/java.util.concurrent.ThreadPoolExecutor\$Worker.run(ThreadPoolExecutor.java:438)
at java.base@11.0.18/java.lang.Thread.run(Thread.java:834)

```
43 assertThrows(ArithmeticException.class, () -> {in
44 }
45
46 @Test
47 void testAssertTimeout() {
48     String actualResult = assertTimeout(ofSeconds(1)
49         Thread.sleep(2000);
50         return "a result";
51     });
52
53     assertEquals("a result", actualResult);
54 }
55
56 @Test
57 void testAssertTimeoutPreemptively() {
58     String actualResult = assertTimeoutPreemptively(
59         Thread.sleep(2000);
60         return "a result";
61     });
62
63     assertEquals("a result", actualResult);
64 }
```

Problems Javadoc Declaration Console x

<terminated> AssertionsDemo [JUnit] C:\Program Files\Java\jdk-11\bin\javaw.exe (2

[JUnit 5 Assumptions]

assumption은 한글로 추정이라는 뜻으로 메서드별 조건을 만족할 경우 진행시키고 아닌 경우 스킵하는 메서드이다. if 문과 비슷한 용도로 사용한다.

메서드명	설명
assumeTrue	테스트가 실패하면 예러 발생
assumeFalse	테스트가 성공하면 예러 발생
assumingThat(boolean, executable)	첫 번째 인자가 True면 두 번째 인자로 들어온 함수 실행 첫 번째 인자가 false면 두 번째 인자로 들어온 함수 실행

◎Test

```
public void testAssumeTrue() {  
    assumeTrue(true);  
    // remainder of test  
}
```

◎Test

```
public void testAssumeTrue2() {  
    assumeTrue(false);  
    // remainder of test  
}
```

◎Test

```
public void testAssumeFalse() {  
    assumeFalse(false);  
    // remainder of test  
}
```

◎Test

```
public void testAssumingThatTrue() {  
    assumingThat(true, () -> {  
        //실행 O  
        System.out.println("success");  
    });  
}
```

◎Test

```
public void testAssumingThatFalse() {  
    assumingThat(false, () -> {  
        //실행 X  
        System.out.println("success");  
    });  
}
```

eclipse-workspace - javaedu/src/mvclab/test/AssumptionsDemo.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer JUnit x

Finished after 0.119 seconds

Runs: 5/5 (1 skipped) Errors: 0 Failures: 0

AssumptionsDemo [Runner: JUnit 5] (0.026 s)

- testAssumeTrue() (0.013 s)
- testAssumingThatFalse() (0.001 s)
- testAssumingThatTrue() (0.001 s)
- testAssumeFalse() (0.001 s)
- testAssumeTrue2() (0.007 s)

Failure Trace

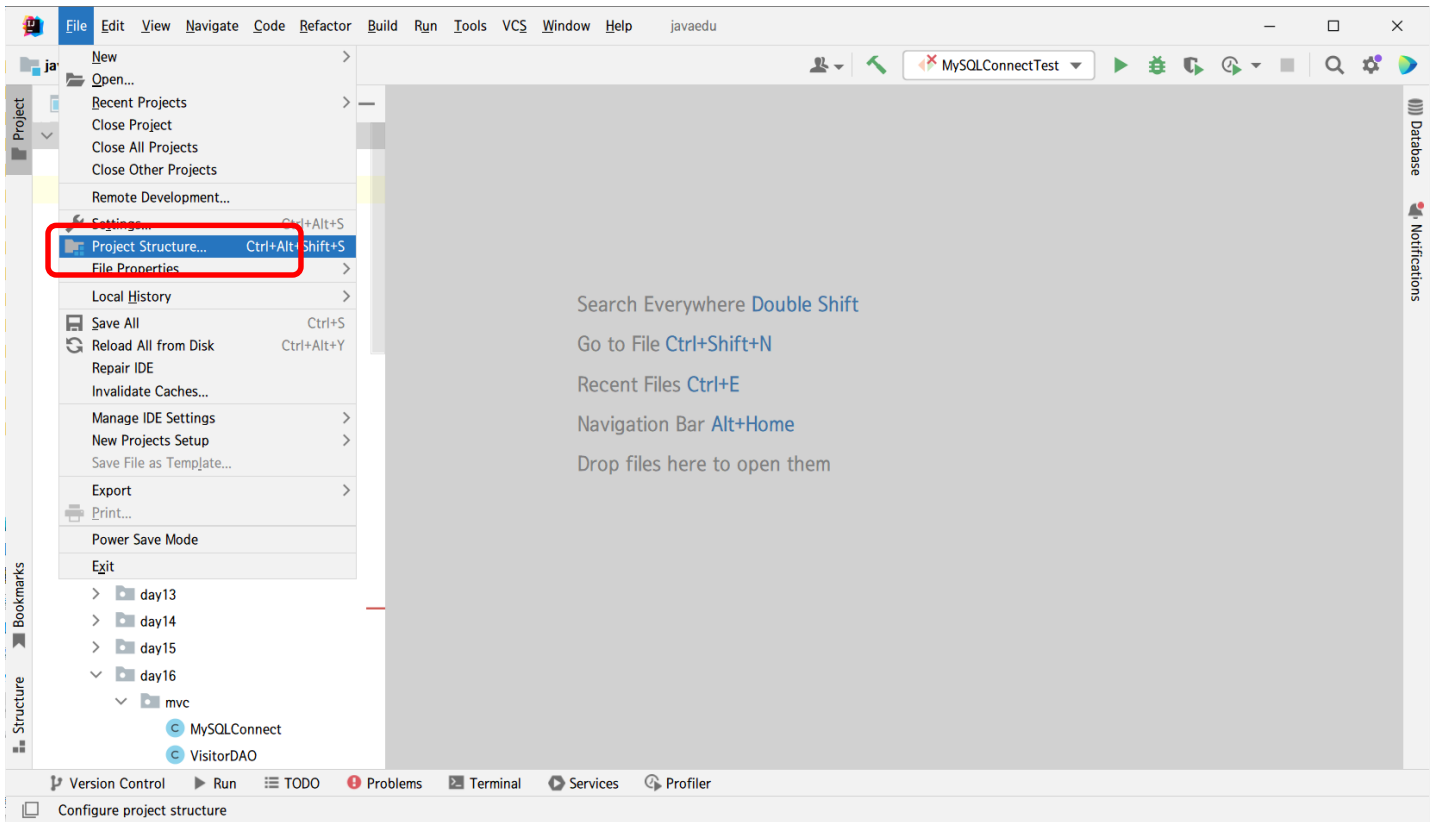
```
2 package org.junit.jupiter.api;
3 import static org.junit.jupiter.api.Assertions.*;
4
5
6
7
8
9 class AssumptionsDemo {
10     @Test
11     public void testAssumeTrue() {
12         assumeTrue(true);
13         // remainder of test
14     }
15
16     @Test
17     public void testAssumeTrue2() {
18         assumeTrue(false);
19         // remainder of test
20     }
21
22     @Test
23     public void testAssumeFalse() {
24         assumeFalse(false);
25     }
26 }
```

Problems Javadoc Declaration Console x

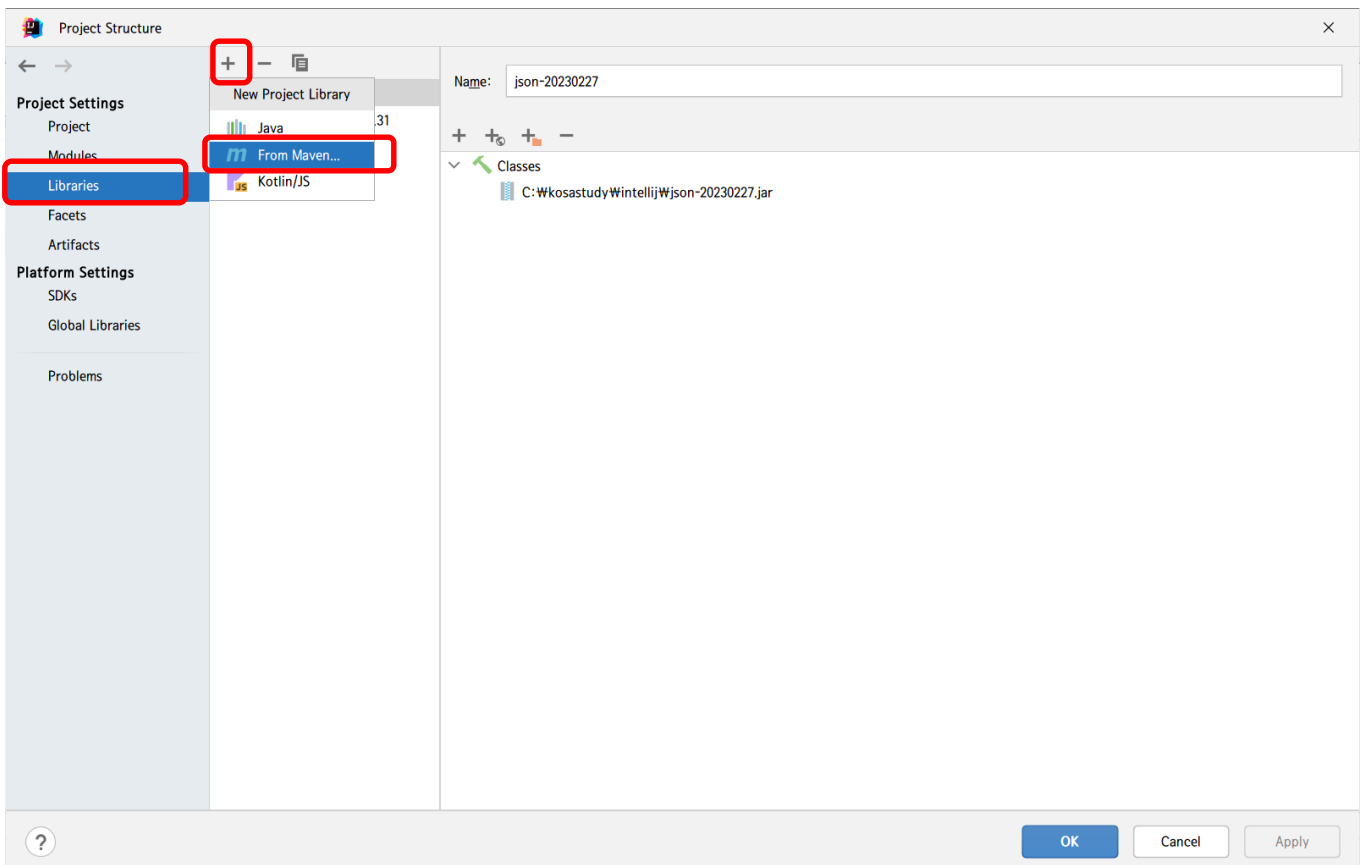
<terminated> AssumptionsDemo [JUnit] C:\Program Files\Java\jdk-11\bin\javaw.exe
success1

[인텔리제이의 Junit]

javaedu 프로젝트의 인텔리제이 윈도우를 열고 File>Project Structure 를 선택한다.



Project Structure 창이 출력되면 Libraries를 선택한 후에 +>From Maven 을 선택한다.



다음과 같이 Download Library from Maven Repository 창이 출력되면

Download Library from Maven Repository

Found: 0
Showing: 0

keyword or class name to search by or exact Maven coordinates, i.e. 'spring', 'Logger' or 'ant:ant-junit:1.6.5'

☐ Download to: C:\Wkosastudy\Wintellij\Wjavaedu\Wlib

☒ Transitive dependencies ☐ Sources ☐ Javadoc ☐ Annotations

OK

Cancel

Download Library from Maven Repository

Please enter valid coordinate, discover it or select one from the list

junit

Found: 317
Showing: 317

keyword or class name to search by or exact Maven coordinates, i.e. 'spring', 'Logger' or 'ant:ant-junit:1.6.5'

org.junit.jupiter:junit-jupiter:5.6.1

org.junit.jupiter:junit-jupiter:5.5.2

org.junit.jupiter:junit-jupiter:5.5.0

org.junit.jupiter:junit-jupiter:5.4.2

org.junit.jupiter:junit-jupiter:5.4.1

org.junit.jupiter:junit-jupiter:5.4.0

org.junit.platform:junit-platform-engine:1.5.0-RC1

Found: 0
Showing: 0

☐ Javadoc ☐ Annotations

OK

Cancel

Download Library from Maven Repository

org.junit.jupiter:junit-jupiter:5.5.0

Found: 0
Showing: 0

keyword or class name to search by or exact Maven coordinates, i.e. 'spring', 'Logger' or 'ant:ant-junit:1.6.5'

☐ Download to: C:\Wkosastudy\Wintellij\Wjavaedu\Wlib

☒ Transitive dependencies ☐ Sources ☐ Javadoc ☐ Annotations

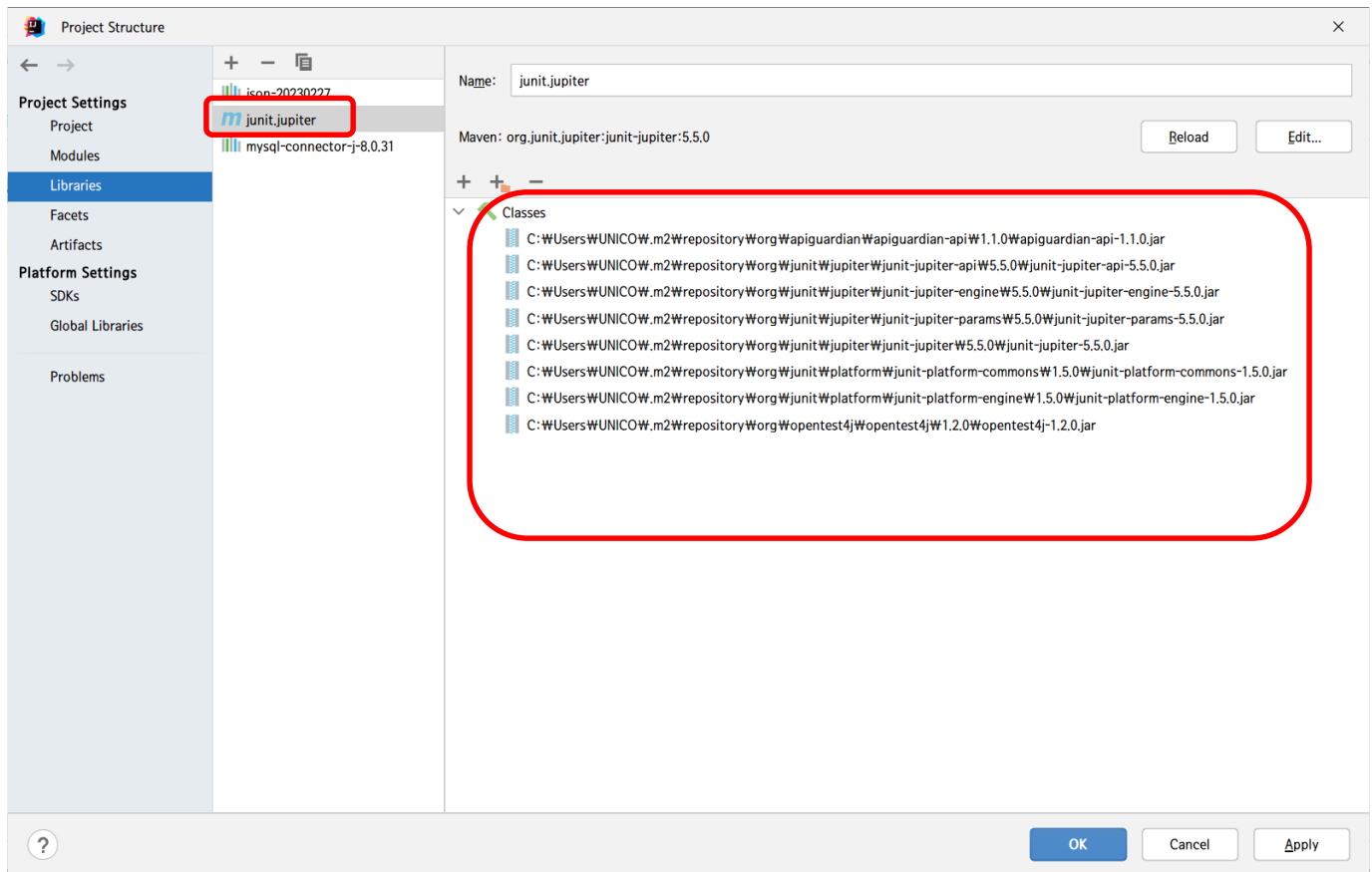
OK

Cancel

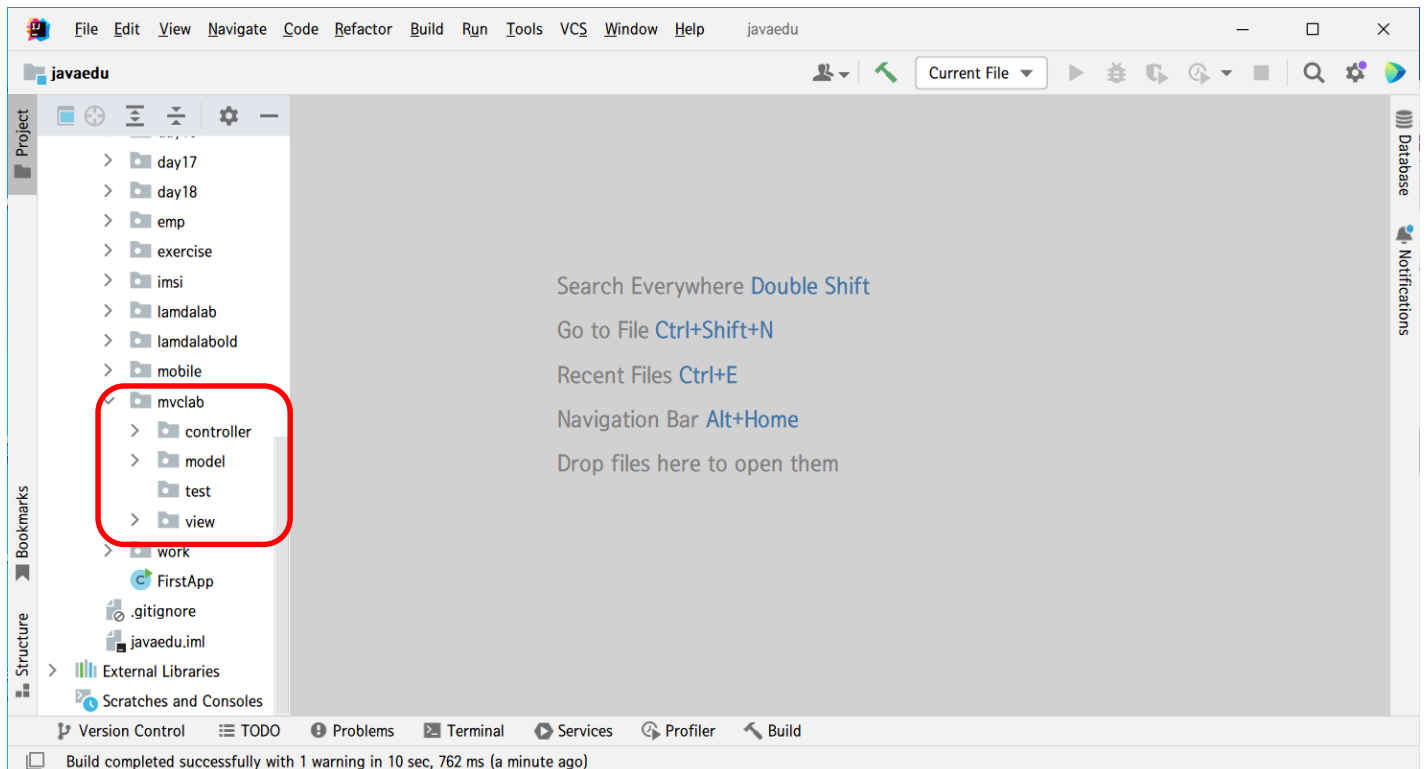
Resolving Maven Dependencies...

...Worg\Wjunit\Wplatform\Wjunit-platform-engine\W1.5.0\Wjunit-platform-engine-1.5.0.pom

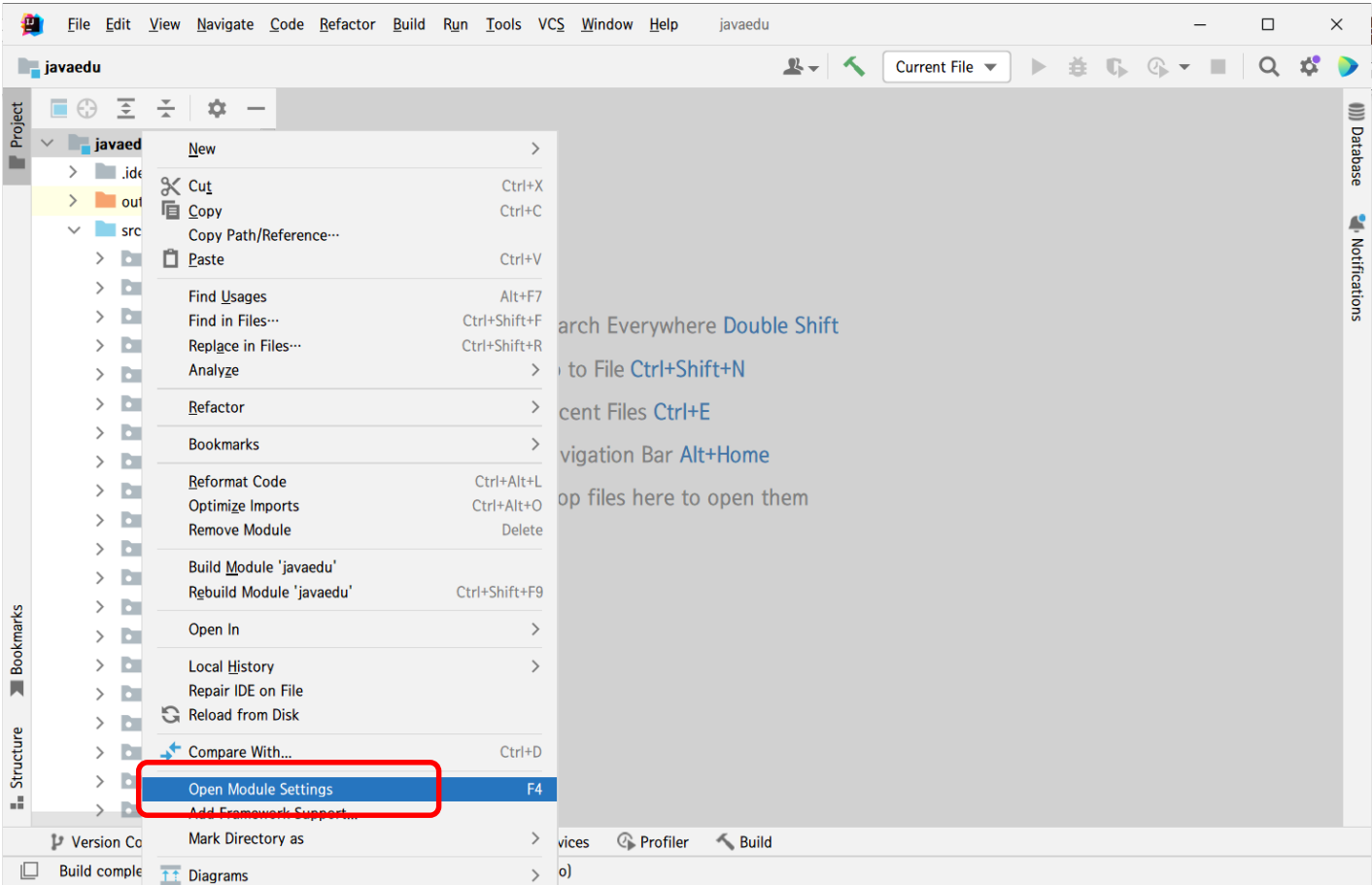
Cancel



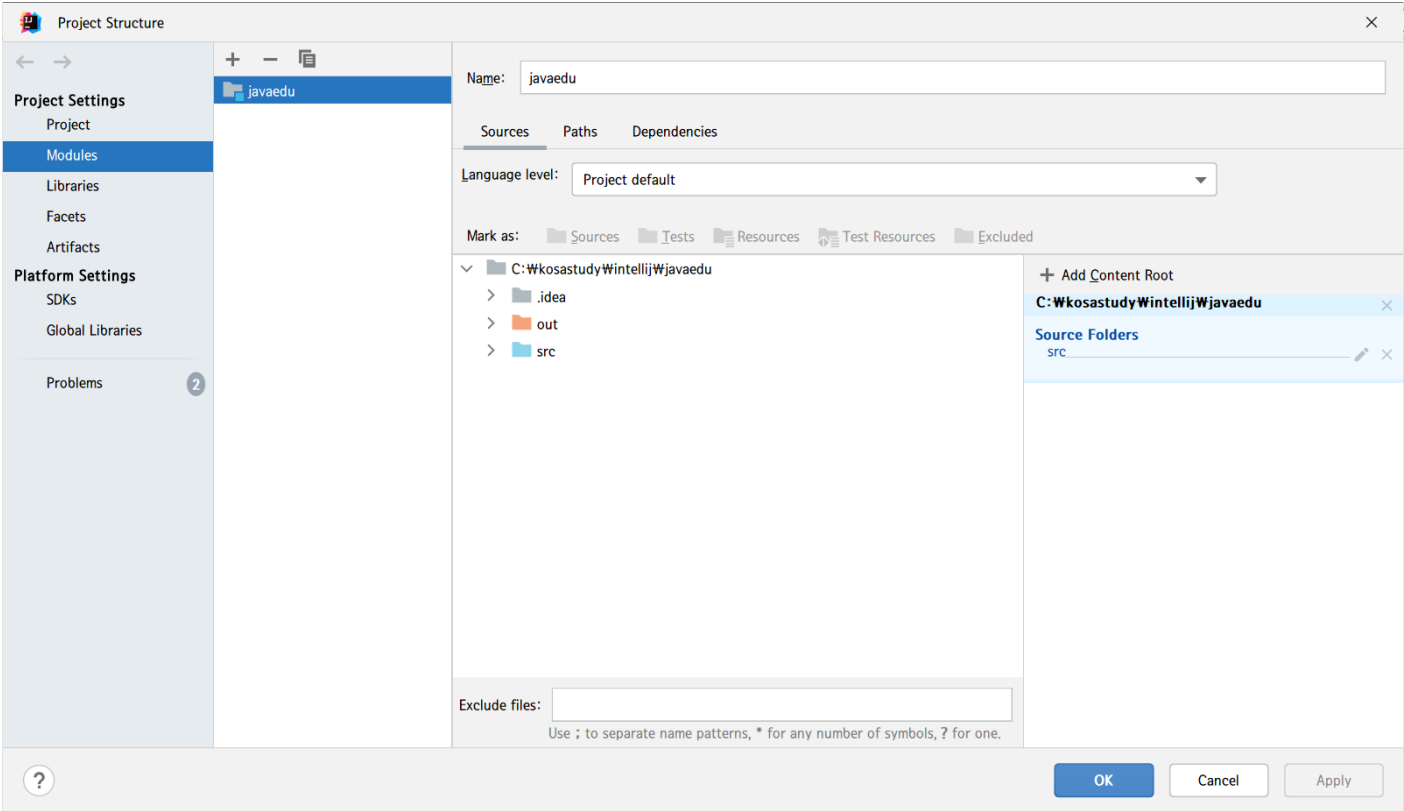
javaedu 프로젝트의 mvclab 패키지에서 test 라는 서브패키지를 생성한다.



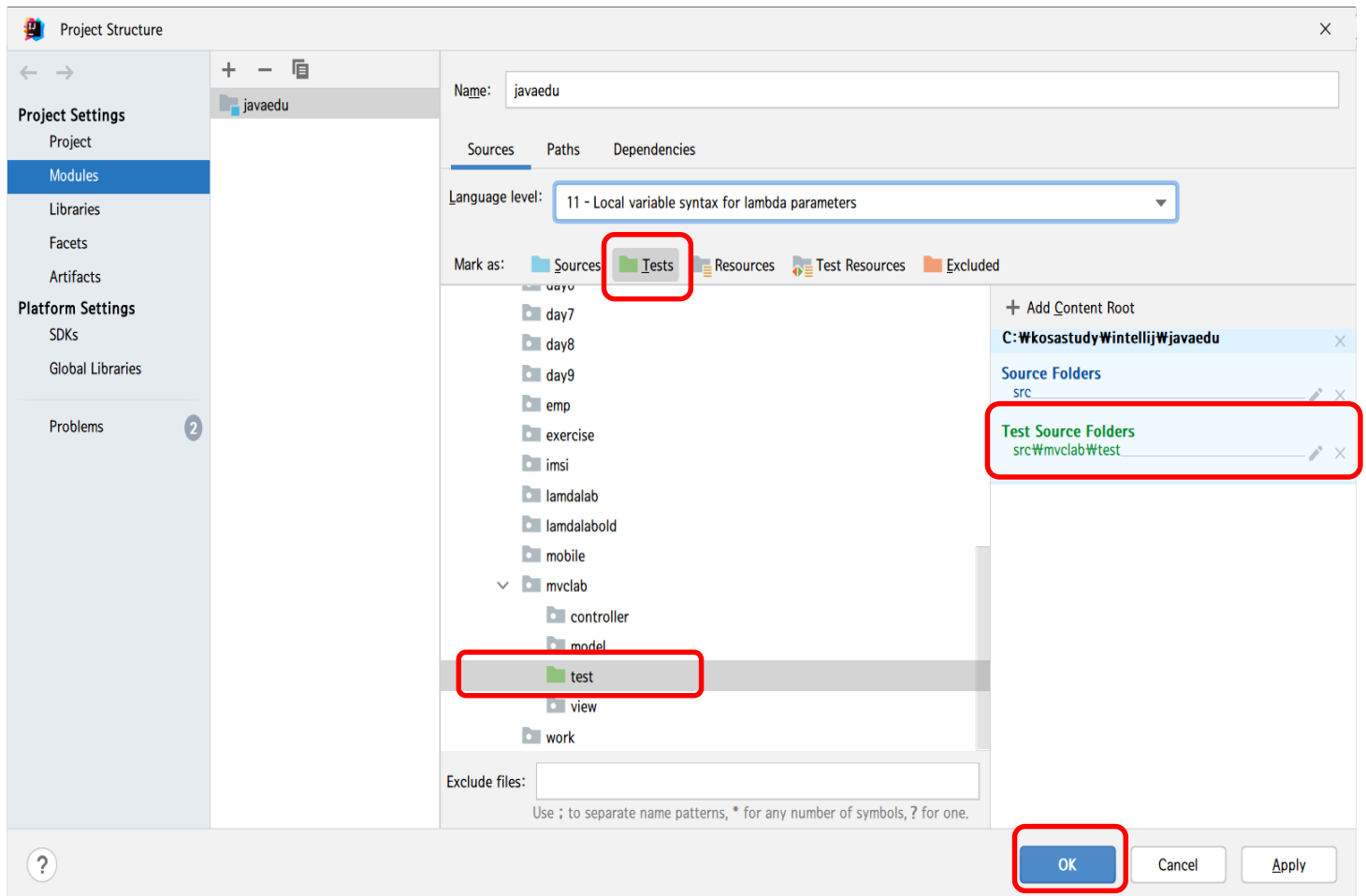
프로젝트 이름을 선택하고 오른쪽 버튼을 클릭하고 Open Module Settings 를 선택한다.



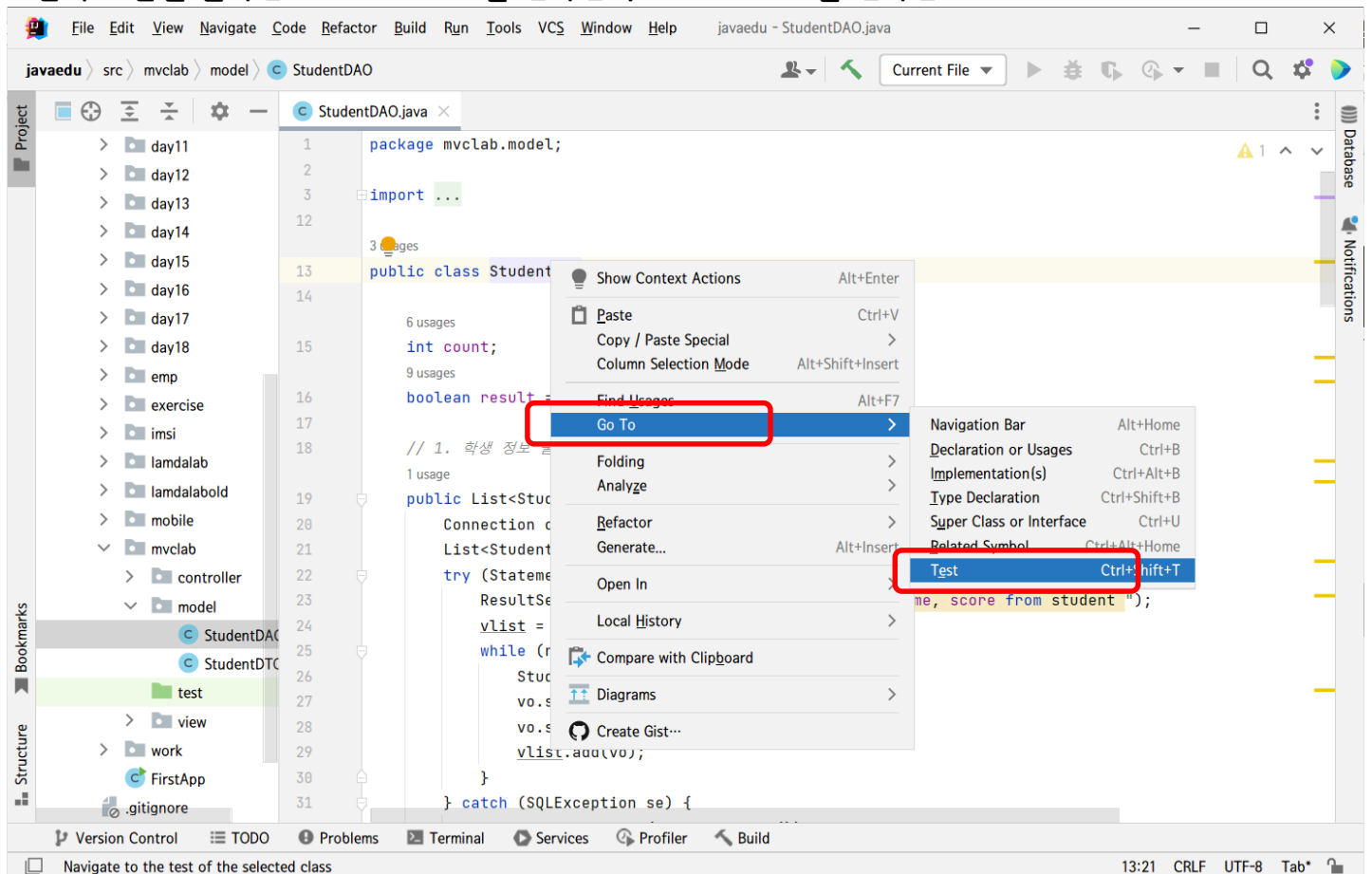
그러면 다음과 같이 javaedu 프로젝트에 대한 Project Structure 창이 출력된다.

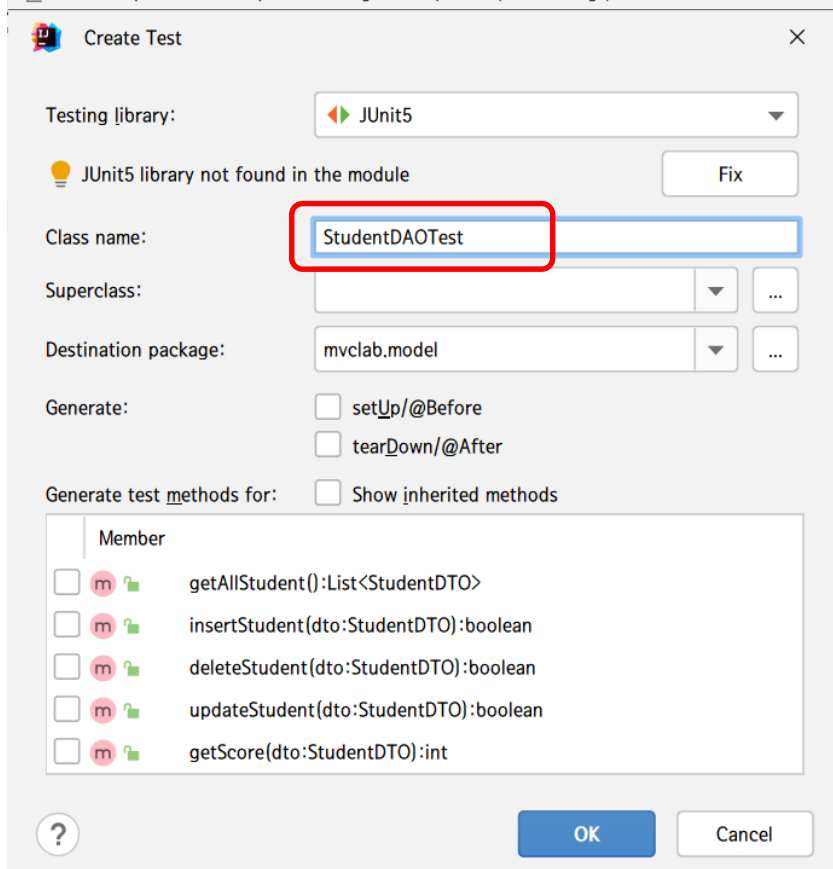
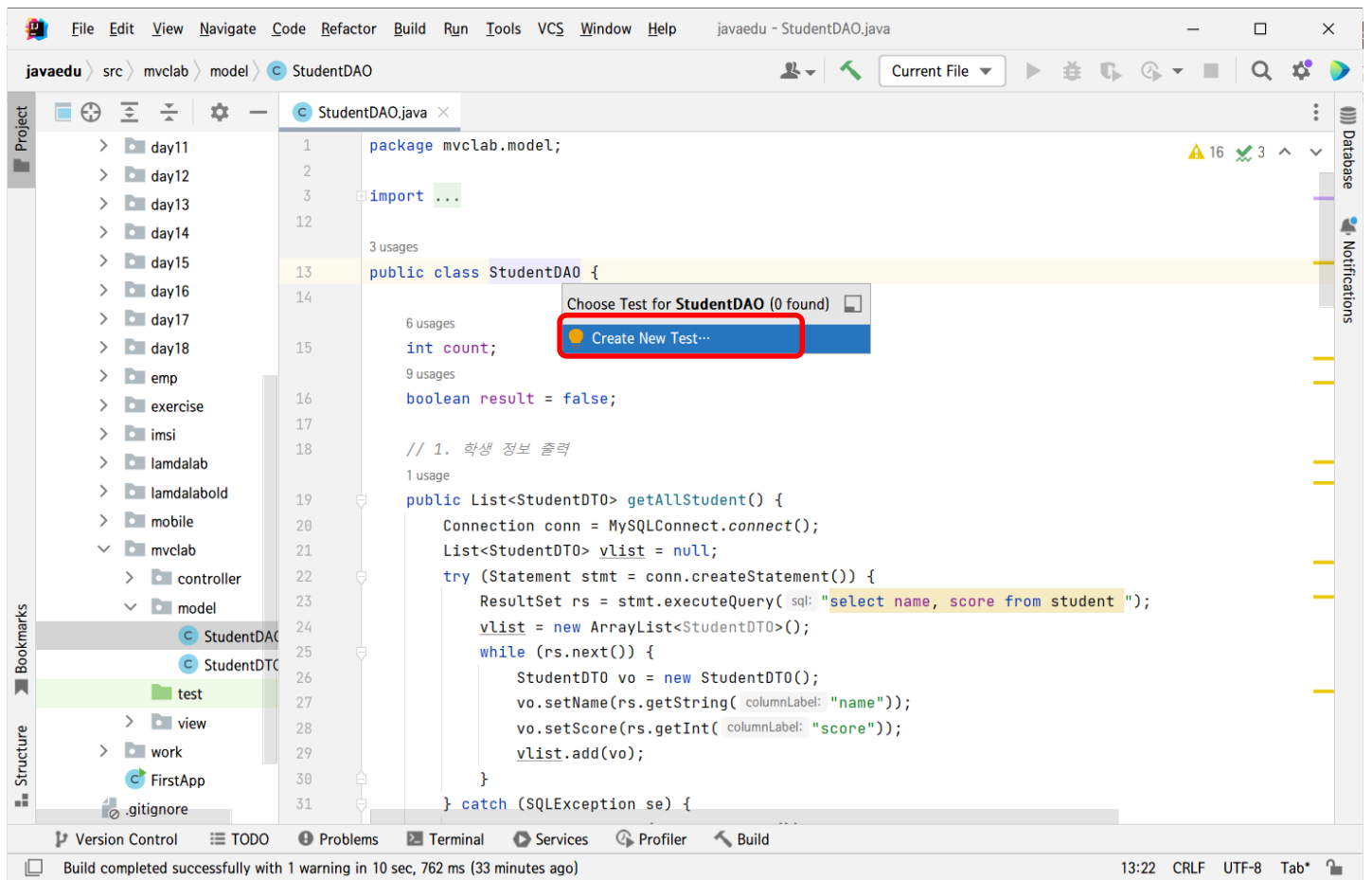


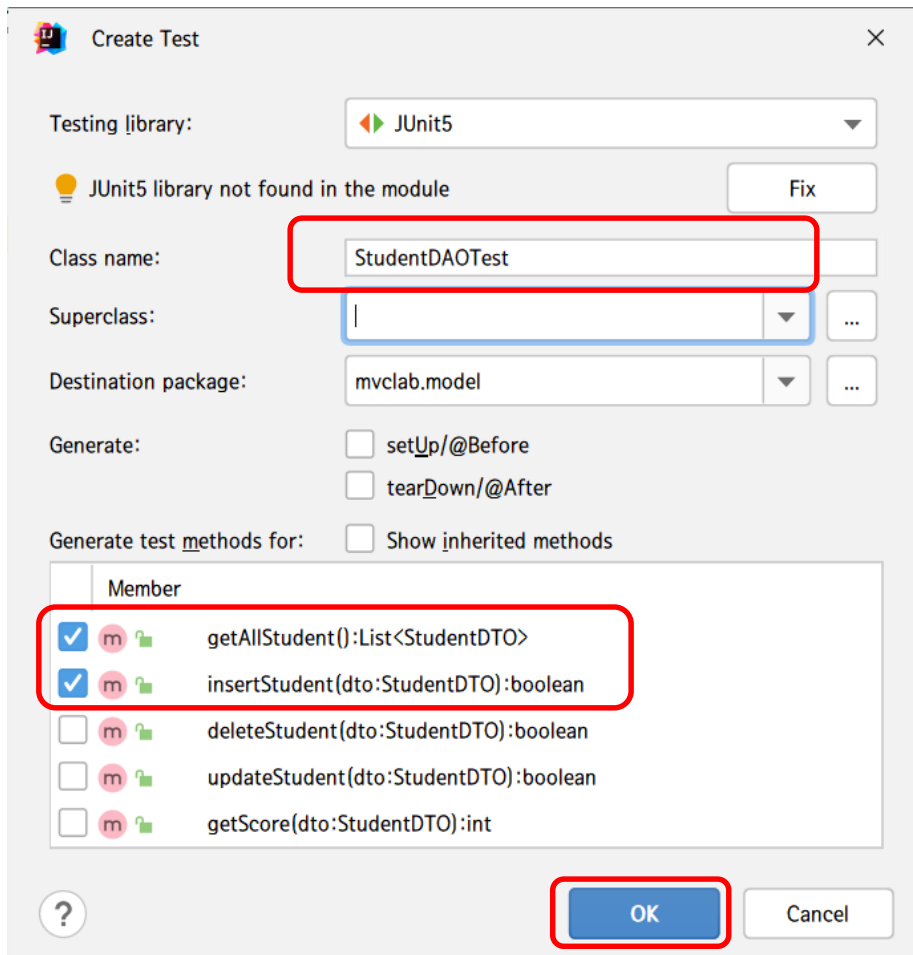
생성해 놓은 test 폴더를 선택한 후에 위의 Tests Mark 를 선택해서 테스트 파일 폴더로 설정한다.



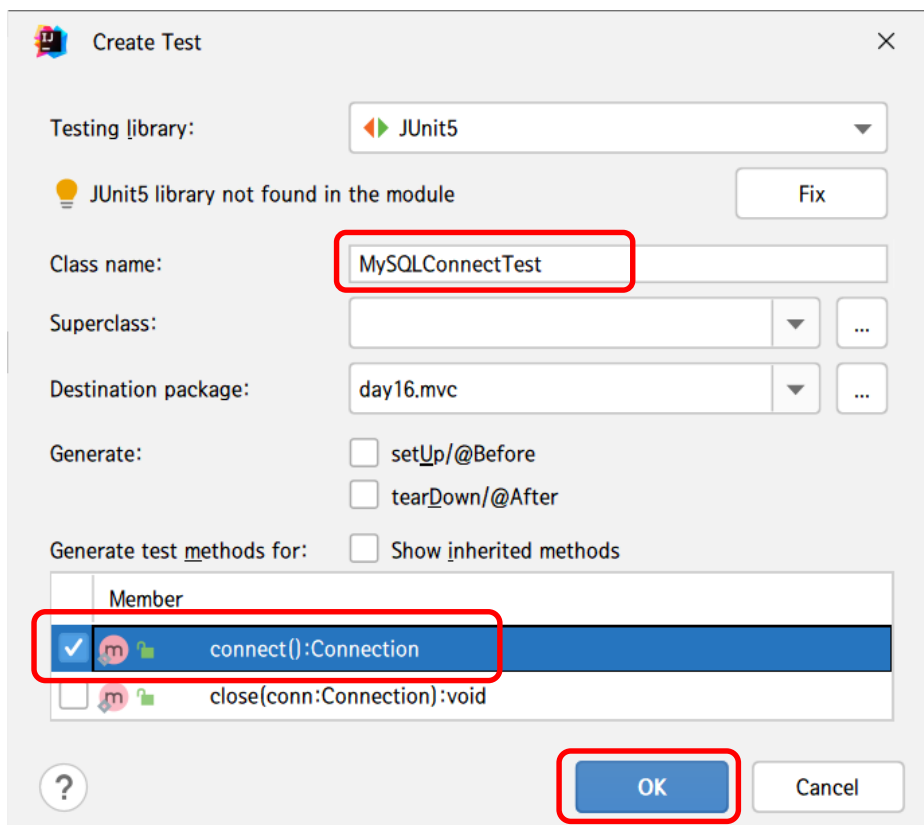
테스트 클래스를 작성하고자 하는 클래스의 소스를 열고 클래스명에 마우스를 올린 다음 마우스 오른쪽 버튼을 클릭한다. Go To 메뉴를 선택한 후에 Test 메뉴를 선택한다.

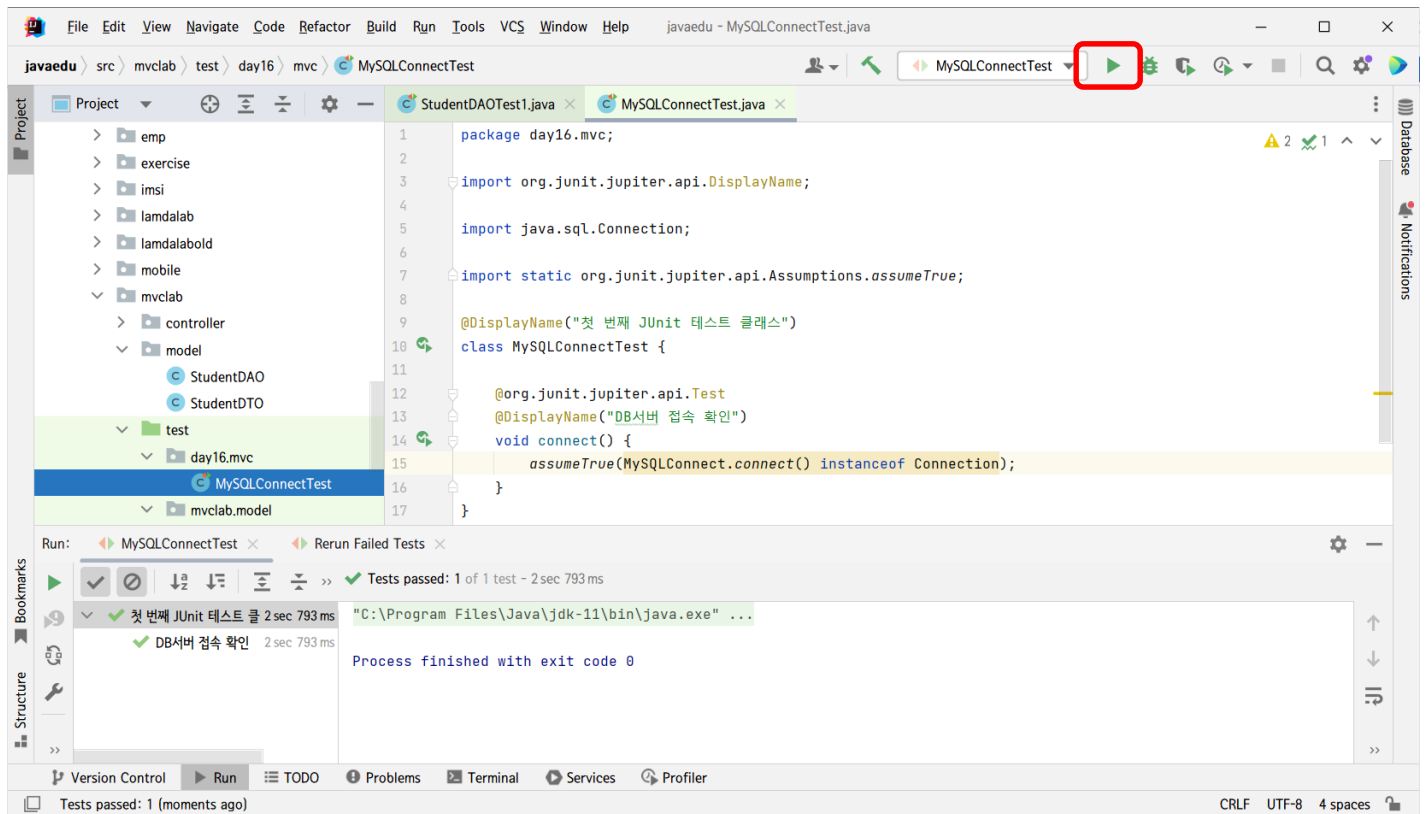
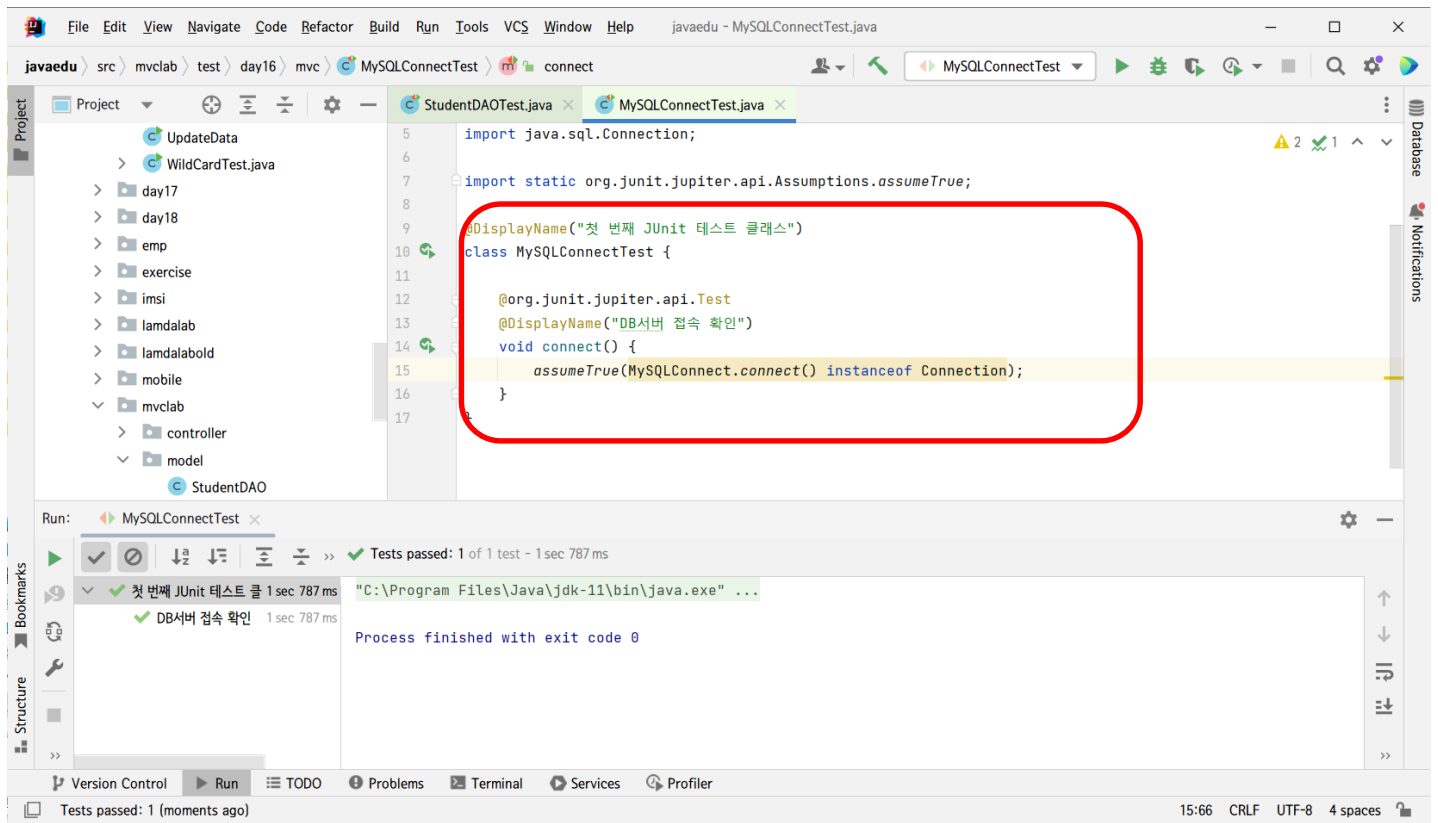






MySQLConnect.java 소스를 오픈하여 클래스명에서 오른쪽버튼>Go To>Test 를 선택한다.





javaedu - StudentDAOTest1.java

Project: mvclab > test > mvclab > model > StudentDAOTest1

```
@DisplayName("INSERT 기능 체크")
@Test
void test_insertStudent() {
    //System.out.print("입력할 이름과 점수를 '이름: 점수' 형식으로 입력하세요 : ");
    //String inputStr = new Scanner(System.in).nextLine();
    String inputStr = "토토로:88";
    String[] param = inputStr.split(" ");
    StudentDTO dto = new StudentDTO();
    dto.setName(param[0]);
}
```

Run: StudentDAOTest1 x Rerun Failed Tests x

Tests passed: 2 of 2 tests - 1 sec 640 ms

두 번째 JUnit 테스트 클 1 sec 640 ms

SELECT 기능 체크 1 sec 583 ms

INSERT 기능 체크 57 ms

Process finished with exit code 0

Version Control Run TODO Problems Terminal Services Profiler

Tests passed: 2 (moments ago) CRLF UTF-8 4 spaces