



## Relational Databases with MySQL Week 12 Coding Assignment

URL to GitHub Repository: <https://github.com/CobeLawson/Unit-Testing-Demo.git>

URL to Public Link of your Video: <https://youtu.be/Z6Bk6efshYc>

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### Instructions :

1. Follow the **Coding Steps** below to complete this assignment.

- In Eclipse, or an IDE of your choice, write the code that accomplishes the objectives listed below. Ensure that the code compiles and runs as directed.
- Create a new repository on GitHub for this week's assignment and push your completed code to this dedicated repo.
- Create a video showcasing your work:
  - In this video: record and present your project verbally while showing the results of the working project.
  - Easy way to Create a video: Start a meeting in Zoom, share your screen, open Eclipse with the code and your Console window, start recording & record yourself describing and running the program showing the results.
  - Your video should be a maximum of 5-minutes.
  - Upload your video with a public link.
  - Easy way to Create a Public Video Link: Upload your video recording to YouTube with a public link.

2. In addition, please include the following in your Coding Assignment Document:

- The URL for this week's GitHub repository.
- The URL of the public link of your video.

3. Save the Coding Assignment Document as a .pdf and do the following:

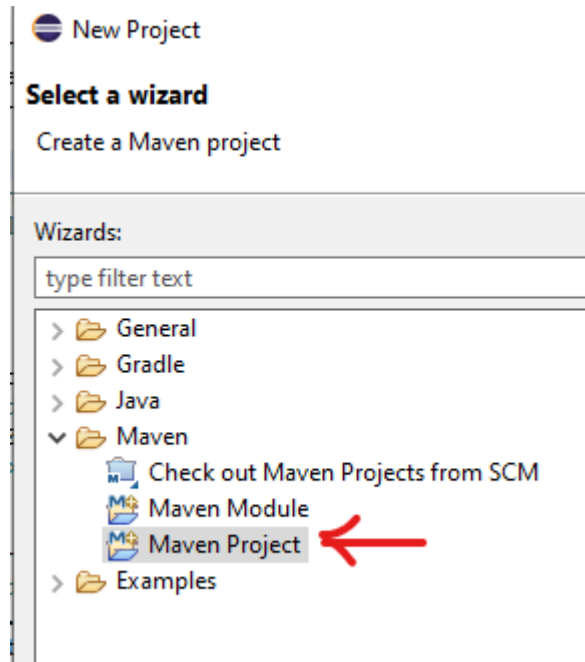
- Push the .pdf to the GitHub repo for this week.
  - Upload the .pdf to the LMS in your Coding Assignment Submission.
- 

### Coding Steps:

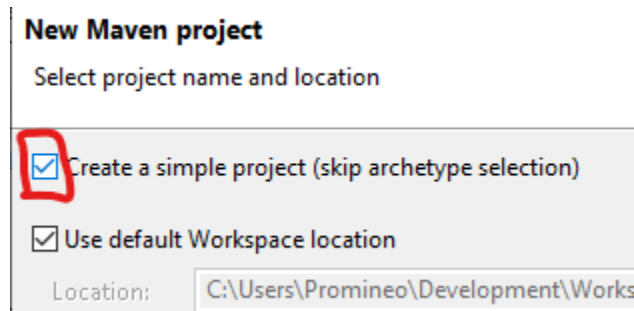


## Relational Databases with MySQL Week 12 Coding Assignment

1. Create a new Maven project. In Eclipse...
  - a. Right-click in Project Explorer, select "New / Project". Expand "Maven". Select "Maven Project". Click "Next".



- b. Check "Create a simple project (skip archetype selection)". Click "Next".





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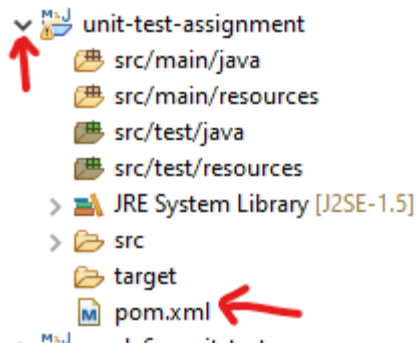
- c. Enter the Group Id: "my.unit.test". Enter the Artifact Id: "unit-test-assignment". Click "Finish".

### New Maven project

Configure project

Artifact	
Group Id:	my.unit.test
Artifact Id:	unit-test-assignment
Version:	0.0.1-SNAPSHOT

- d. The project "unit-test-assignment" should appear in the Package Explorer. Click the down arrow next to "unit-test-assignment" to expand it. Double-click on "pom.xml" to open it in the editor.



- e. Put a couple of blank lines between `<version>0.0.1-SNAPSHOT</version>` and `</project>`.

```
1 <project xmlns="http://maven.apache.org/POM/4.0.0" >
2   <modelVersion>4.0.0</modelVersion>
3   <groupId>my.unit.test</groupId>
4   <artifactId>unit-test-assignment</artifactId>
5   <version>0.0.1-SNAPSHOT</version>
6
7   |
8
9 </project>
```



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f. Copy and paste the following code into the blank area you just created.

```
<properties>
  <java.version>11</java.version>
  <project.build.sourceEncoding>utf-8</project.build.sourceEncoding>
</properties>

<dependencies>
  <dependency>
    <groupId>com.google.guava</groupId>
    <artifactId>guava</artifactId>
    <version>30.1.1-jre</version>
  </dependency>

  <dependency>
    <groupId>org.junit.jupiter</groupId>
    <artifactId>junit-jupiter</artifactId>
    <version>5.7.2</version>
    <scope>test</scope>
  </dependency>

  <dependency>
    <groupId>org.assertj</groupId>
    <artifactId>assertj-core</artifactId>
    <version>3.20.2</version>
    <scope>test</scope>
  </dependency>
```



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```
<dependency>

  <groupId>org.mockito</groupId>

  <artifactId>mockito-junit-jupiter</artifactId>

  <version>3.11.2</version>

  <scope>test</scope>

</dependency>

</dependencies>

<build>

  <plugins>

    <plugin>

      <groupId>org.apache.maven.plugins</groupId>

      <artifactId>maven-compiler-plugin</artifactId>

      <version>3.8.1</version>

      <configuration>

        <source>${java.version}</source>

        <target>${java.version}</target>

      </configuration>

    </plugin>

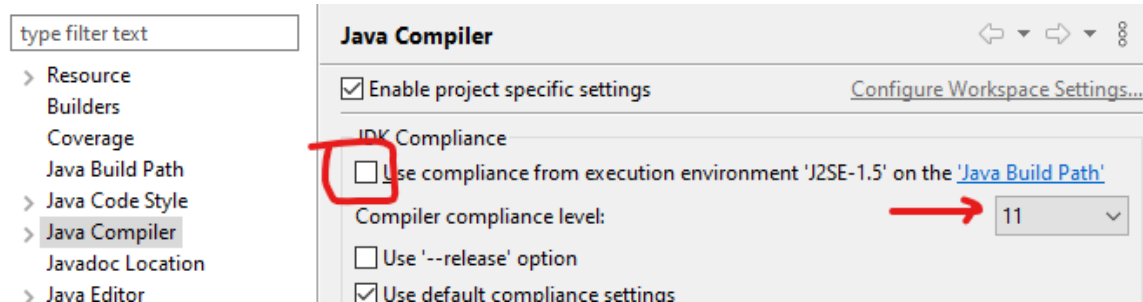
  </plugins>

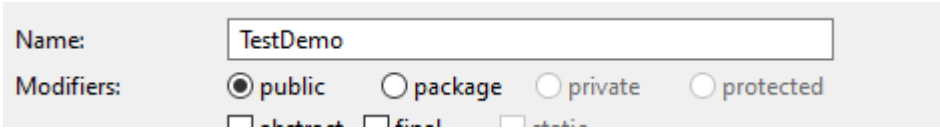
</build>
```

- g. Save the file.
- h. For Eclipse only: right-click on "unit-test-assignment" in the Project Explorer. Click on "Properties". Click "Java Compiler". Make sure "Enable project specific settings" is checked. Uncheck "Use compliance from execution environment 'J2SE-1.5' on the 'Java Build Path'". Set "Compiler compliance level" to 11. Click "Apply and Close".



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- i. If asked to rebuild the project, click "Yes".
  2. Create a class named "TestDemo" under src/main/java in the default package. (In Package Explorer, expand "unit-test-assignment". Right-click on "src/main/java" and select "New / Class". Enter "TestDemo" in the "Name" field and click "Finish".)
- 
- a. Create an instance method (not static) named addPositive. It should take two int parameters and return an int.

```
public int addPositive(int a, int b) {}
```
    - b. If both parameters are positive (greater than zero) return the sum of the parameters. If either parameter is zero or negative, throw an `IllegalArgumentException` with the message "Both parameters must be positive!". `IllegalArgumentException` is in the `java.lang` package so you won't need an import statement.
    - c. Save the file.
  3. In Package Explorer, find "src/test/java" and right-click on it. Select "New / JUnit Test Case". In the "Name" field, enter "TestDemoTest". Make sure that "New JUnit Jupiter test" is selected. Make sure that "@BeforeEach setUp()" is checked. Click "Finish".



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☐ 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

4. In TestDemoTest.java, add a private instance variable of type TestDemo named testDemo.
  - a. In the setUp method, create the TestDemo object. This will ensure that a new TestDemo object is created before each test.
  - b. Change "@Test" to "@ParameterizedTest". Add the import statement for `org.junit.jupiter.params.ParameterizedTest`.
  - c. Change the name of method "test" to "assertThatTwoPositiveNumbersAreAddedCorrectly".
  - d. Add four parameters to `assertThatTwoPositiveNumbersAreAddedCorrectly` as shown:

Type	Name
int	a
int	b
int	expected
Boolean	expectException

e.



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- f. Write the test. Remove the "fail" line. Test the value of `expectException`. If it is false, assert that when `TestDemo.addPositive` is called with values `a` and `b`, that the result is the same as the parameter `expected`. The assertion should look like this:

```
if(!expectException) {  
    assertThat(testDemo.addPositive(a, b)).isEqualTo(expected);  
}
```

- g. Add the test for the thrown exception in an else clause. Use `assertThatThrownBy` for this. Add the static import

```
org.assertj.core.api.Assertions.assertThatThrownBy;
```

- h. As a parameter to `assertThatThrownBy`, add a Lambda expression with no parameters. The Lambda body should be the method call to `testDemo.addPositive`.

- i. Use the assertion `assertInstanceOf(IllegalArgumentException.class)` to ensure that the correct exception is thrown.

- j. If this is too confusing, you can "cheat" and copy this:

```
assertThatThrownBy(() ->  
    testDemo.addPositive(a, b))  
    .assertInstanceOf(IllegalArgumentException.class);
```

- k. Add the parameter source method.

- i. Create a static method named `argumentsForAddPositive`. It should not have any parameters and it should return a Stream of Arguments. The imports are: `java.util.stream.Stream` and `org.junit.jupiter.params.provider.Arguments`.

- ii. The method should return a Stream as in `Stream.of()`;

- iii. Each parameter set should be wrapped in an `arguments()` method call. Add the static import for arguments:  
`org.junit.jupiter.params.provider.Arguments.arguments.`





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- iv. So, if you are adding 2 and 4 to get the value of 6 and are not expecting an exception, you need to do:

```
arguments(2, 4, 6, false)
```

- v. Add as many arguments lines as needed to test the `addPositive` method thoroughly. Make sure to add some zero or negative arguments.

- 1. Just below the `@ParameterizedTest` annotation, add the annotation `@MethodSource`. Pass a single parameter to `@MethodSource`. It must be the fully-qualified (includes package) class name of the test followed by a `#` sign followed by the name of the method that supplies the parameters. Since the test is in the default package, there is no package in the fully-qualified class name. So,

```
@MethodSource("TestDemoTest#argumentsForAddPositive")
```

- 5. In `TestDemo.java`, add another method named `randomNumberSquared`. This method obtains a random int between 1 and 10 and then returns the square of the number.

- a. `randomNumberSquared` should return an int and not take any parameters.
- b. It should call another method in the same class named `getRandomInt`. This method takes no parameters and must be package visibility so that the test can see it. `getRandomInt` should look like this:

```
int getRandomInt() {  
    Random random = new Random();  
    return random.nextInt(10) + 1;  
}
```

The `Random` class is in the `java.util` package.

- c. `randomNumberSquared` should return the value obtained from `getRandomInt` multiplied by itself.
- 6. Write a test for `randomNumberSquared` in `TestDemoTest.java`. Since you don't know what `getRandomInt` will return (that's the point of random, after all), you will need to mock it out and supply a known value.
    - a. Create a method annotated with `@Test` named `assertThatNumberSquaredIsCorrect`. The method must have package visibility (not public!) or JUnit won't find it. The annotation `@Test` is in the `org.junit.jupiter.api` package.



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- b. To mock the `TestDemo` class, use `Mockito.spy`. The `spy` method can be imported with a static import of `org.mockito.Mockito.spy`.

```
TestDemo mockDemo = spy(testDemo);
```

- c. Program the mocked `TestDemo` object to return 5 when the `getRandomInt` method is called. Remember to use the form:

```
doReturn(aValue).when(mockedObject).methodCall(); You can use a static import for doReturn: import static org.mockito.Mockito.doReturn;

doReturn(5).when(mockDemo).getRandomInt();
```

- d. Call the method `randomNumberSquared` on the mocked `TestDemo` object. This will call the stubbed out (mocked) method `getRandomInt`, which now should return the value 5.

```
int fiveSquared = mockDemo.randomNumberSquared();
```

- e. Use `assertThat` to test that the value returned from `randomNumberSquared` is equal to 5 squared.

```
assertThat(fiveSquared).isEqualTo(25);
```

- f. You don't need to verify the mocked method call – you know it was called since the return value is correct.