Relational Databases with MySQL Week 12 Coding Assignment

URL to GitHub Repository: https://github.com/Lawson-Ray/Java_Week12.git

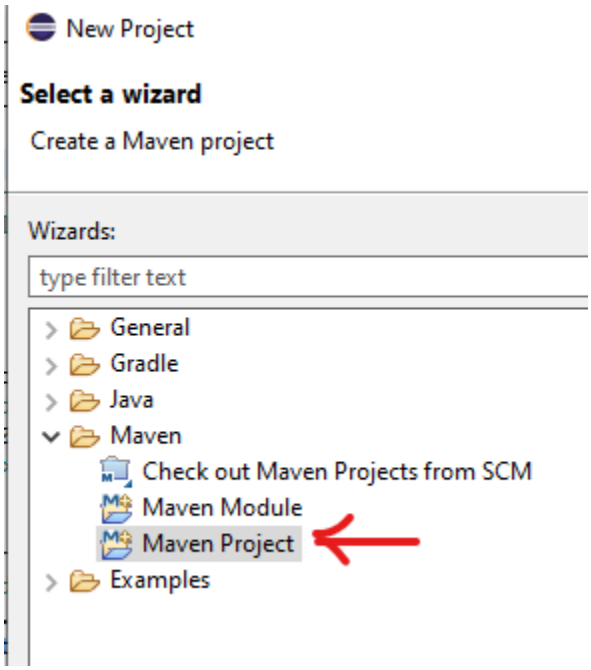
URL to Public Link of your Video: https://youtu.be/XNaFsRixfh8

Instructions :

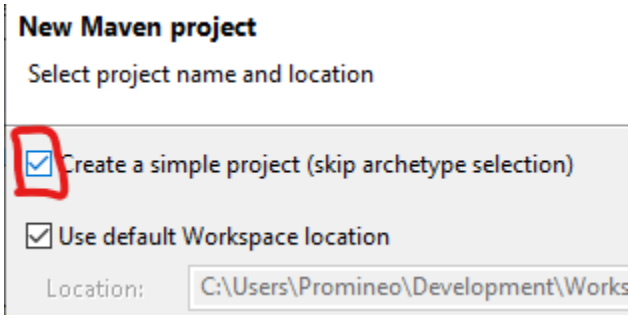
1. Follow the **Coding Steps** below to complete this assignment.
    - In Eclipse, or an IDE of your choice, write the code that accomplishes the objectives listed below. Ensure that the code compiles and runs as directed.
    - Create a new repository on GitHub for this week's assignment and push your 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:

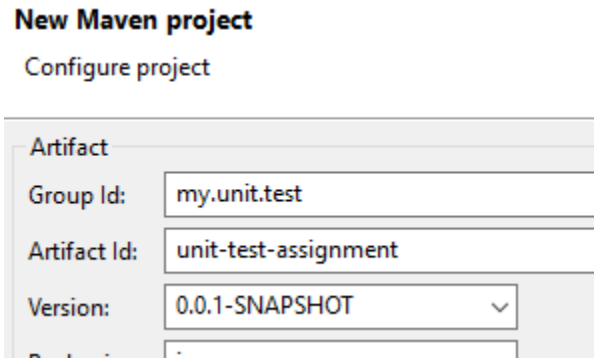
1. Create a new Maven project. In Eclipse…
    a. Right-click in Project Explorer, select "New / Project". Expand "Maven". Select "Maven Project". Click "Next".



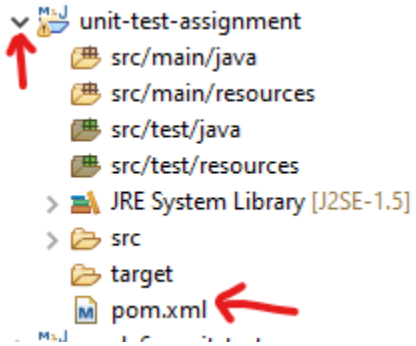
    b. Check "Create a simple project (skip archetype selection)". Click "Next".



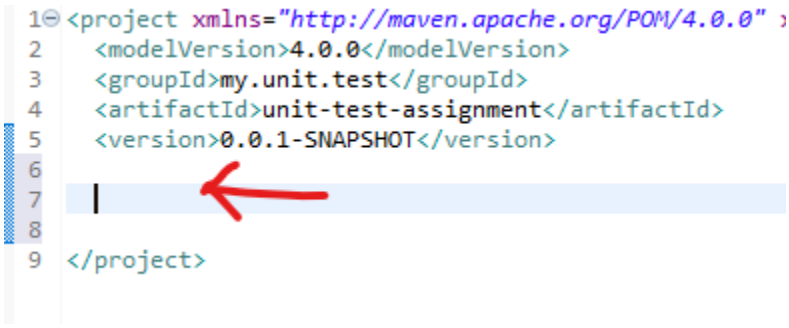
c. Enter the Group Id: "my.unit.test". Enter the Artifact Id: "unit-test-assignment". Click "Finish".



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>`.



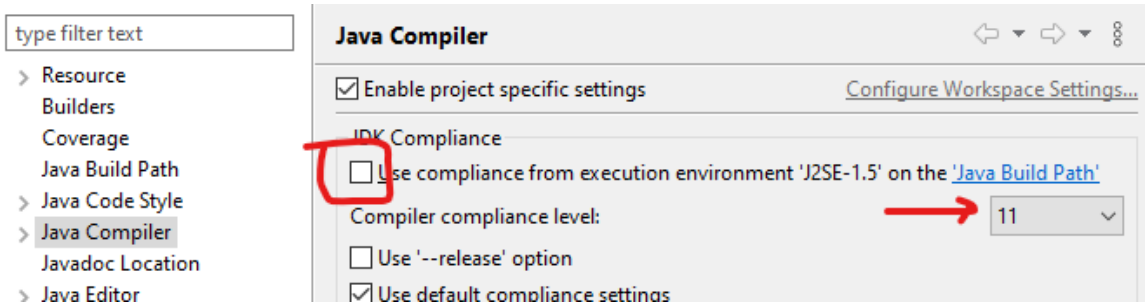
f. Copy and paste the following code into the blank area you just created.

```
<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>
```

```
 <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>
```

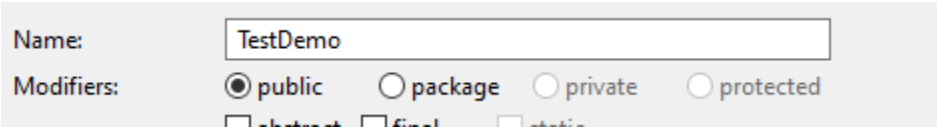
g. Save the file.

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".



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".)



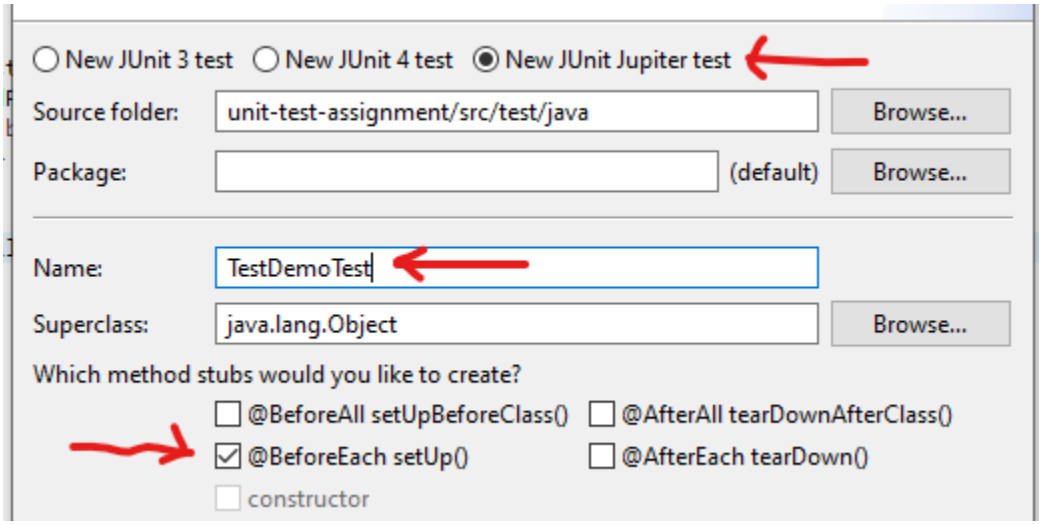
a. Create an instance method (not static) named addPositive. It should take two int parameters and return an int.

```
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".



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.

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 `isInstanceOf(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))
        .isInstanceOf(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`.

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.

l. 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.

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.