

1. Add a maven dependency and

```
<dependencies>
  <dependency>
    <groupId>org.hibernate</groupId>
    <artifactId>hibernate-core</artifactId>
    <version>5.6.5.Final</version>
    <scope>compile</scope>
  </dependency>
```

its related repository URL

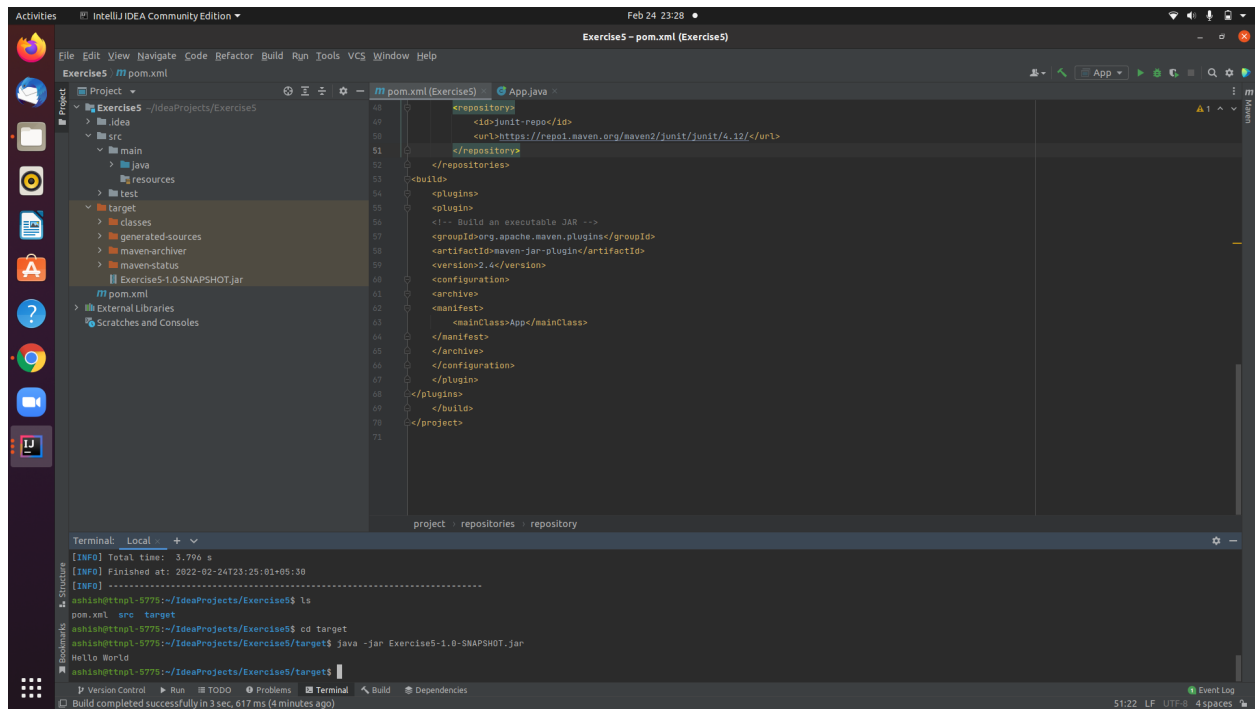
```
<repositories>
  <repository>
    <id>hibernate-repo</id>
    <url>https://repo1.maven.org/maven2/org/hibernate/hibernate-core/5.6.5.Final/</url>
  </repository>
```

2. Add a new repository in the pom.xml and use its dependencies.

```
<repository>
  <id>junit-repo</id>
  <url>https://repo1.maven.org/maven2/junit/junit/4.12/</url>
</repository>
```

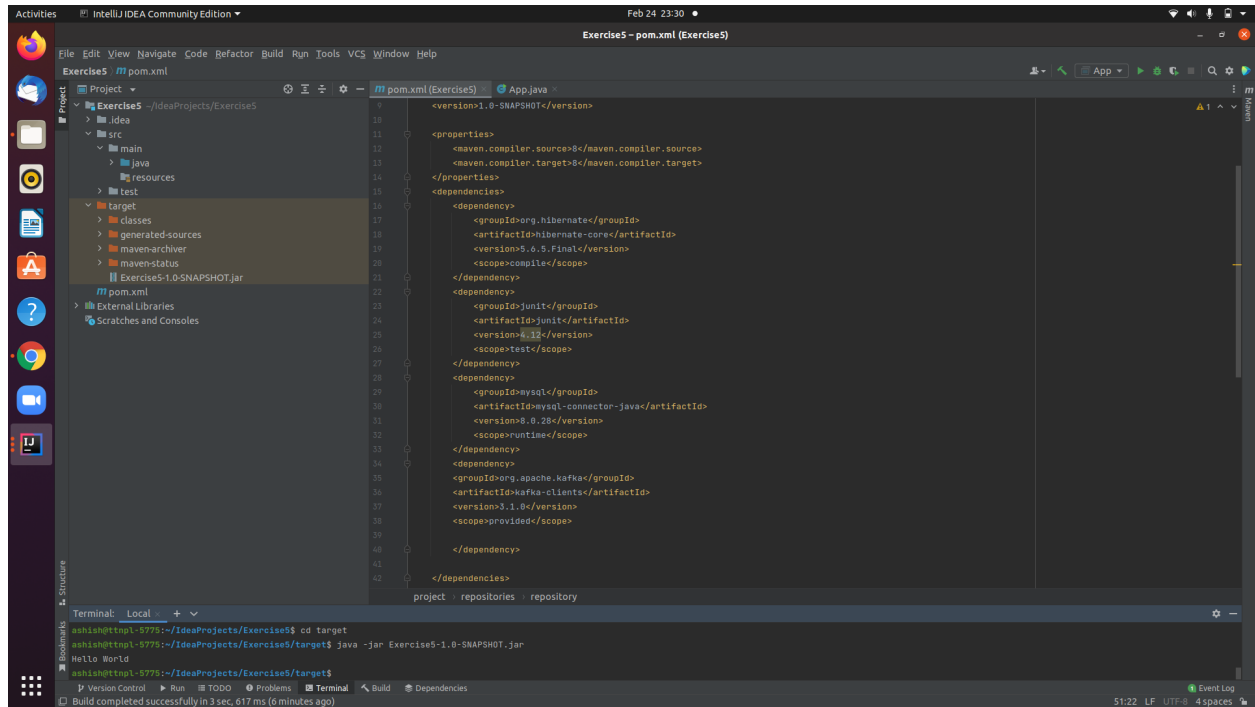
```
<dependency>
  <groupId>junit</groupId>
  <artifactId>junit</artifactId>
  <version>4.12</version>
  <scope>test</scope>
</dependency>
```

3. Using JAR plugin, make changes in the pom.xml to make the jar executable. Using `java -jar JAR_NAME`, the output should be printed as "Hello World"



```
ashish@ttnpl-5775:~/IdeaProjects/Exercise5$ ls
pom.xml  src  target
ashish@ttnpl-5775:~/IdeaProjects/Exercise5$ cd target
ashish@ttnpl-5775:~/IdeaProjects/Exercise5/target$ java -jar Exercise5-1.0-SNAPSHOT.jar
Hello World
```

4. Differentiate between the different dependency scopes: compile, runtime, test, provided using different dependencies being defined in your pom.xml.



The screenshot shows the IntelliJ IDEA Community Edition interface. The main editor displays the `pom.xml` file for a project named "Exercise5". The file contains the following XML content:

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>
    <groupId>org.example</groupId>
    <artifactId>Exercise5</artifactId>
    <version>1.0-SNAPSHOT</version>
    <properties>
        <maven.compiler.source>8</maven.compiler.source>
        <maven.compiler.target>8</maven.compiler.target>
    </properties>
    <dependencies>
        <dependency>
            <groupId>org.hibernate</groupId>
            <artifactId>hibernate-core</artifactId>
            <version>5.6.5.Final</version>
            <scope>compile</scope>
        </dependency>
        <dependency>
            <groupId>junit</groupId>
            <artifactId>junit</artifactId>
            <version>4.12</version>
            <scope>test</scope>
        </dependency>
        <dependency>
            <groupId>mysql</groupId>
            <artifactId>mysql-connector-java</artifactId>
            <version>8.0.28</version>
            <scope>runtime</scope>
        </dependency>
        <dependency>
            <groupId>org.apache.kafka</groupId>
            <artifactId>kafka-clients</artifactId>
            <version>1.0</version>
            <scope>provided</scope>
        </dependency>
    </dependencies>
</project>
```

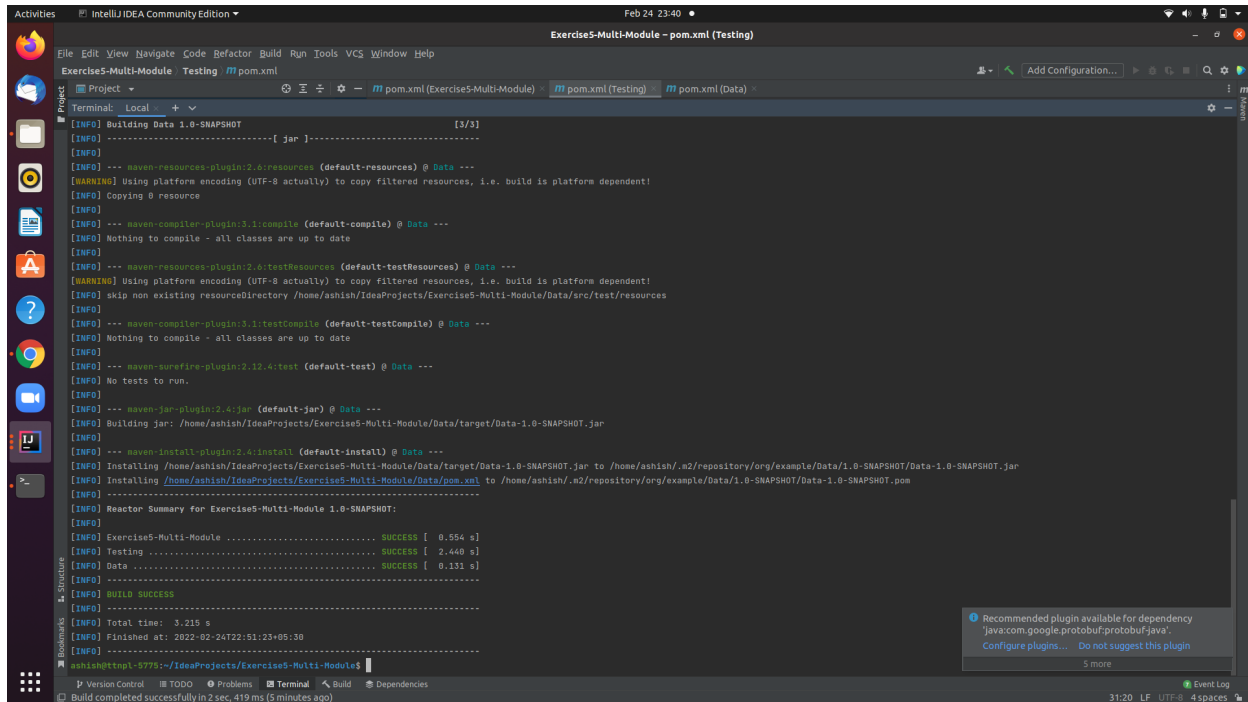
The bottom panel shows the Terminal with the following commands and output:

```
ashish@tmp1-9779:~/IdeaProjects/Exercise5$ cd target
ashish@tmp1-9779:~/IdeaProjects/Exercise5/target$ java -jar Exercise5-1.0-SNAPSHOT.jar
Hello World
ashish@tmp1-9779:~/IdeaProjects/Exercise5/target$
```

The status bar at the bottom indicates "Build completed successfully in 3 sec, 617 ms (6 minutes ago)".

5.

Create a multi-module project. Run package command at the top level to make jar of every module.



The screenshot shows the IntelliJ IDEA interface with the Maven tool window open. The build output for the 'Exercise5-Multi-Module' project is displayed, showing the execution of the 'package' goal for the 'Data' module. The build is successful, and the resulting JAR file is located at `/home/ashish/.m2/repository/org/example/Data/1.0-SNAPSHOT/Data-1.0-SNAPSHOT.jar`. The Maven Summary for the project is also shown, indicating that the build was successful and the total time was 3.215 seconds.

```
[INFO] Building Data 1.0-SNAPSHOT [3/3]
[INFO] -----[ jar ]-----
[INFO]
[INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ Data ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ Data ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:2.6:testResources (default-testResources) @ Data ---
[WARNING] Using platform encoding (UTF-8 actually) to copy filtered resources, i.e. build is platform dependent!
[INFO] skip non existing resourceDirectory /home/ashish/IdeaProjects/Exercise5-Multi-Module/Data/src/test/resources
[INFO]
[INFO] --- maven-compiler-plugin:3.1:testCompile (default-testCompile) @ Data ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ Data ---
[INFO] No tests to run.
[INFO]
[INFO] --- maven-jar-plugin:2.4:jar (default-jar) @ Data ---
[INFO] Building jar: /home/ashish/IdeaProjects/Exercise5-Multi-Module/Data/target/Data-1.0-SNAPSHOT.jar
[INFO]
[INFO] --- maven-install-plugin:2.4:install (default-install) @ Data ---
[INFO] Installing /home/ashish/IdeaProjects/Exercise5-Multi-Module/Data/target/Data-1.0-SNAPSHOT.jar to /home/ashish/.m2/repository/org/example/Data/1.0-SNAPSHOT/Data-1.0-SNAPSHOT.jar
[INFO] Installing /home/ashish/IdeaProjects/Exercise5-Multi-Module/Data/pom.xml to /home/ashish/.m2/repository/org/example/Data/1.0-SNAPSHOT/Data-1.0-SNAPSHOT.pom
[INFO]
[INFO] Reactor Summary for Exercise5-Multi-Module 1.0-SNAPSHOT:
[INFO]
[INFO] Exercise5-Multi-Module ..... SUCCESS [ 0.554 s]
[INFO] Testing ..... SUCCESS [ 2.440 s]
[INFO] Data ..... SUCCESS [ 0.131 s]
[INFO] -----
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 3.215 s
[INFO] Finished at: 2022-02-24T22:51:23+05:30
[INFO] -----
ashish@tnpl-9775:~/IdeaProjects/Exercise5-Multi-Modules
```

Recommended plugin available for dependency 'java.com.google.protobuf:protobuf-java'.  
Configure plugins... Do not suggest this plugin  
5 more

