

# HIBERNATE & JPA COURSE

## HELLO WORLD WITH HIBERNATE/JPA



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By the expert: Ubaldo Acosta



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# EXERCISE OBJECTIVE

Create an application to make a HelloWorld with Hibernate / JPA.

```
Output - Run (HelloWorldHibernate) x
--- exec-maven-plugin:1.2.1:exec (default-cli) @ HibernateExample1 ---
17:19:53 [main] INFO org.hibernate.jpa.internal.util.LogHelper - HHH000204: Processing PersistenceUnitInfo [
    name: HelloWorldExample1
    ...]
17:19:53 [main] INFO org.hibernate.Version - HHH000412: Hibernate Core {5.3.6.Final}
17:19:53 [main] INFO org.hibernate.cfg.Environment - HHH000206: hibernate.properties not found
17:19:53 [main] INFO org.hibernate.annotations.common.Version - HCANN000001: Hibernate Commons Annotations {5.0.4.Final}
17:19:53 [main] WARN org.hibernate.orm.connections.pooling - HHH10001002: Using Hibernate built-in connection pool (not for production use!)
17:19:53 [main] INFO org.hibernate.orm.connections.pooling - HHH10001005: using driver [com.mysql.jdbc.Driver] at URL [jdbc:mysql://localhost:3306/test?useSSL=true]
17:19:53 [main] INFO org.hibernate.orm.connections.pooling - HHH10001001: Connection properties: {user=root, password=****}
17:19:53 [main] INFO org.hibernate.orm.connections.pooling - HHH10001003: Autocommit mode: false
17:19:53 [main] INFO org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl - HHH000115: Hibernate connection pool size: 20 (min=1)
17:19:53 [main] INFO org.hibernate.dialect.Dialect - HHH000400: Using dialect: org.hibernate.dialect.MySQL57Dialect
17:19:54 [main] INFO org.hibernate.hql.internal.QueryTranslatorFactoryInitiator - HHH000397: Using ASTQueryTranslatorFactory
17:19:54 [main] DEBUG org.hibernate.SQL - select person0_id_person as id_persol_0_, person0_name as name2_0_ from Person person0_
Hibernate: select person0_id_person as id_persol_0_, person0_name as name2_0_ from Person person0_
17:19:54 [main] INFO test.HelloWorldHibernate - Person:Person{idPerson=1, name=John}
17:19:54 [main] INFO test.HelloWorldHibernate - Person:Person{idPerson=2, name=Katty}
```



# CREATE MYSQL DATABASE

First of all, we need to create a mysql database. Follow the next guide to create the database, the table and insert some rows. If you already has created this database you can omit this step:

<http://icursos.net/en/Installations/CJ-B-Exercise-03-MySqlDataBase.pdf>



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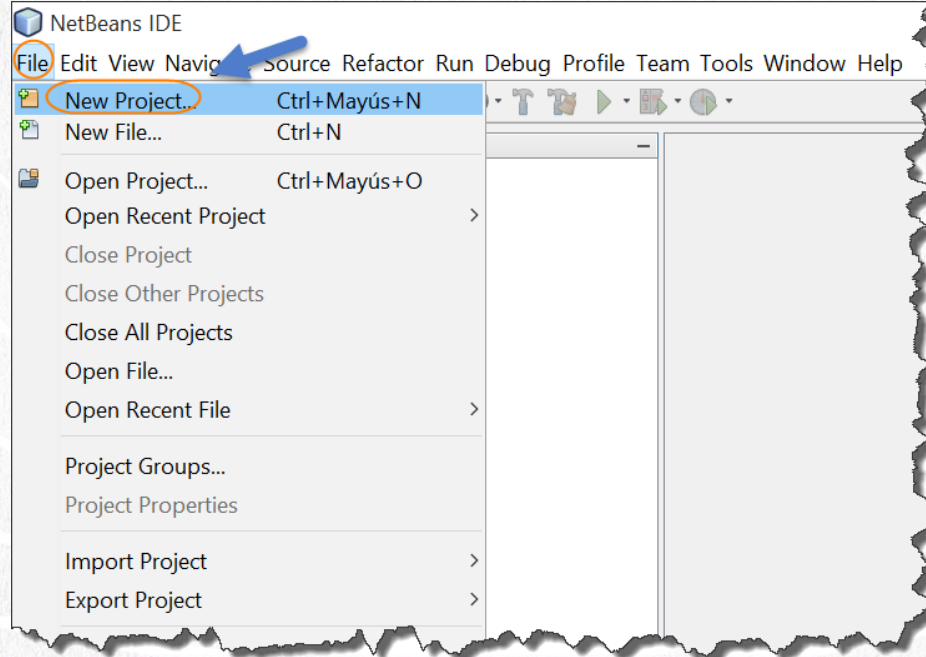
# 1. CREATE A NEW PROJECT

- We will use Maven to create our course projects applying the Hibernate / JPA framework.
- Maven is a technology that, among other things, allows us to manage the libraries of our Java application, be it a standard application, a Web application, Business application or any type of Java application that uses several libraries.
- In the case of the Hibernate framework many libraries are used, so the use of Maven in the creation of projects with Hibernate is ideal for the administration and deployment of applications with this framework. For more information about maven, you can consult the following link:  
  
<https://maven.apache.org/>



# 1. CREATE A NEW PROJECT

- We create a new Java project :

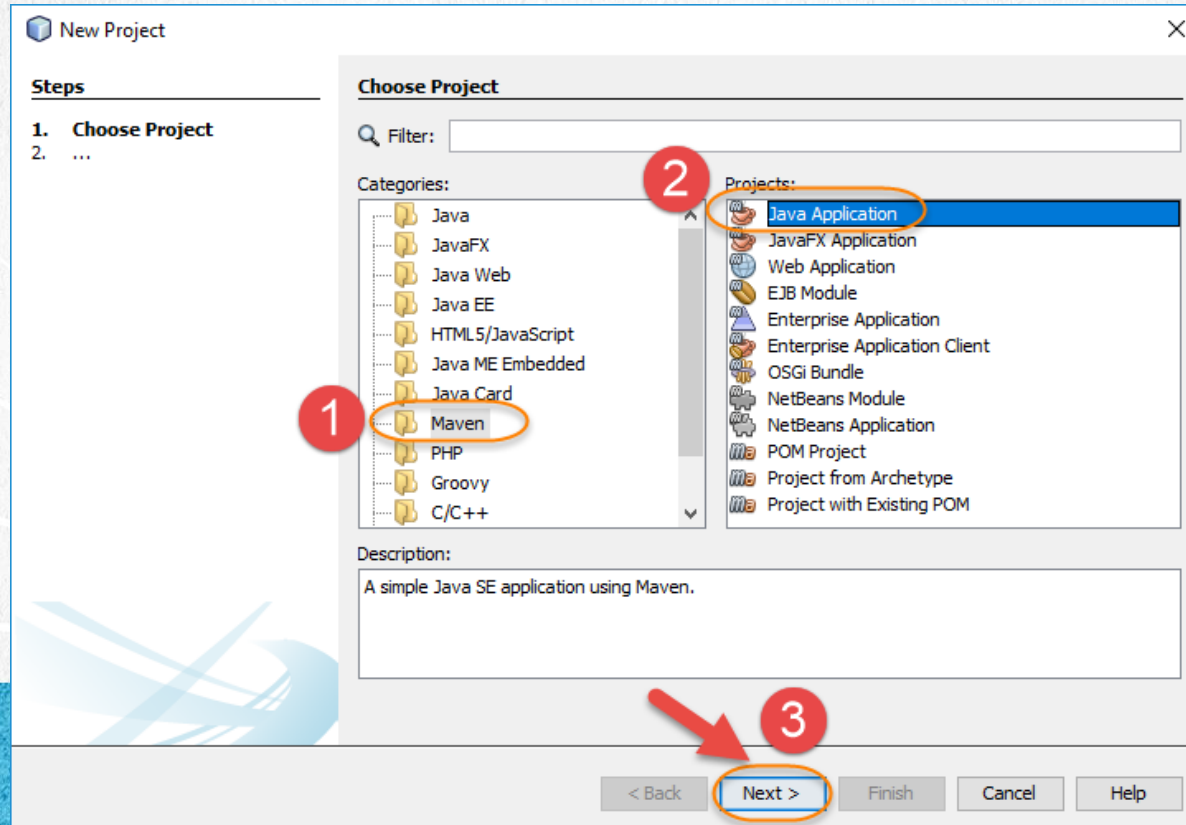


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# 1. CREATE A NEW PROJECT

- We created a new Java project using Maven:



# 1. CREATE A NEW PROJECT

- We create a new Java project. We write the values as shown:

**New Java Application** [X]

**Steps**

1. Choose Project
2. **Name and Location**

**Name and Location**

Project Name:

Project Location:

Project Folder:

Artifact Id:

Group Id:

Version:

Package:  (Optional)

< Back   Next >   **Finish**   Cancel   Help

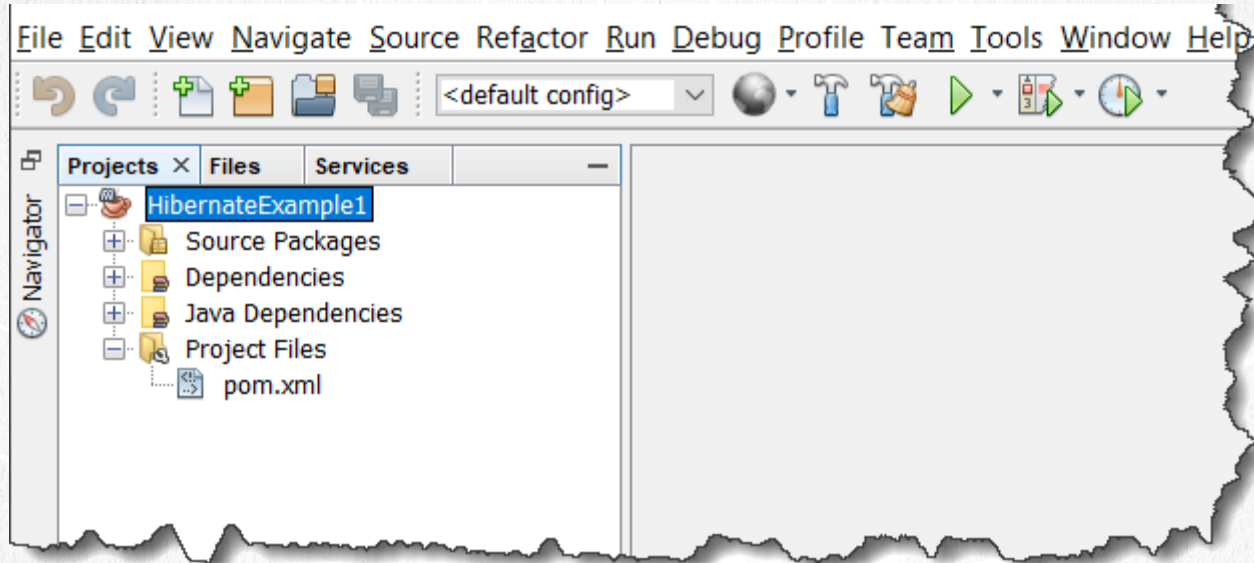
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# 1. CREATE A NEW PROJECT

- This is the result of the creation of the Java project with Maven:



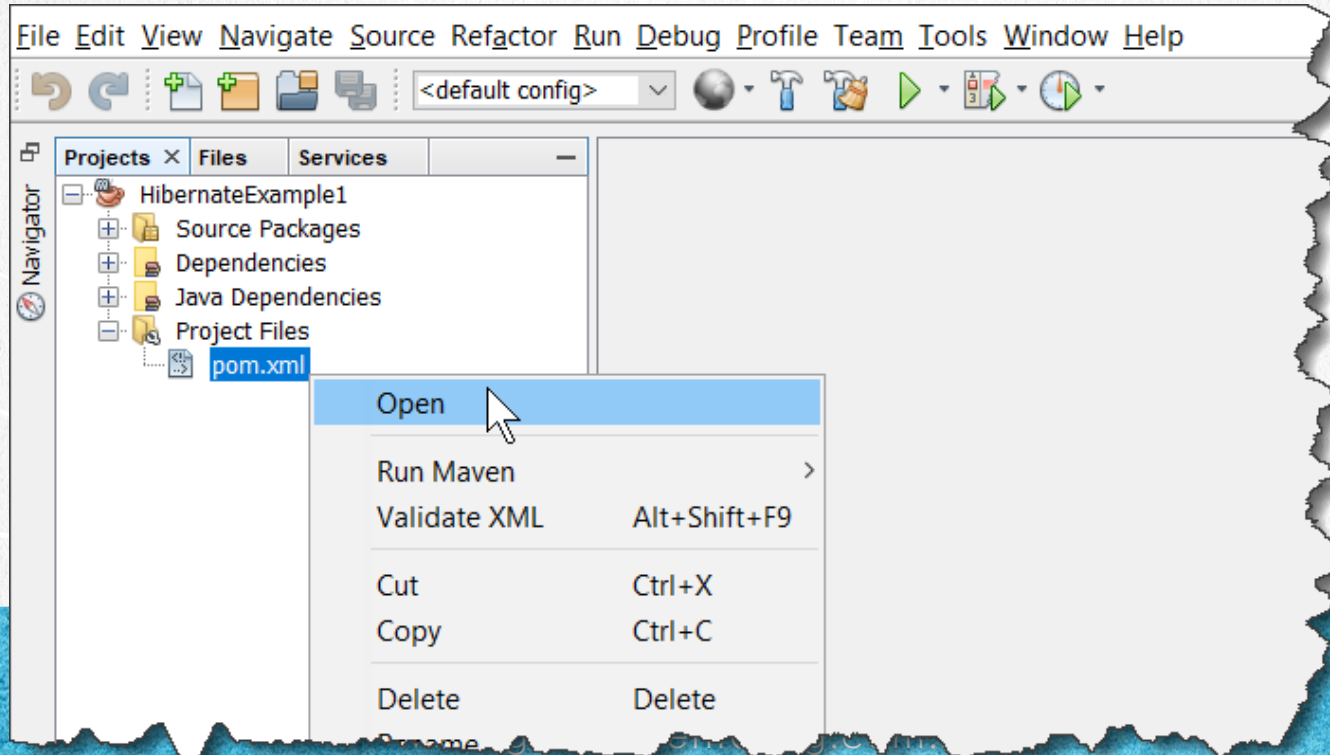
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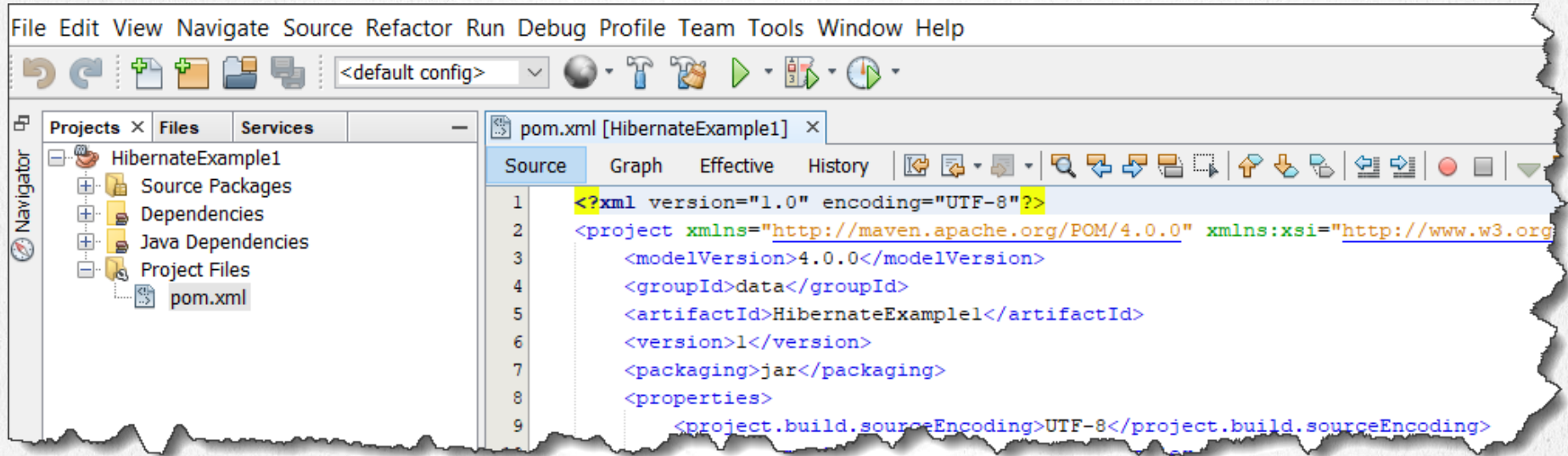
## 2. OPEN MAVEN'S POM.XML FILE

- The maven pom.xml file manages the Java libraries we are going to use. We open the pom.xml file to modify it with the following code:



## 2. OPEN MAVEN'S POM.XML FILE

- Once opened, we will modify the information completely of this file, with the information provided below:





# 3. MODIFY THE CODE

[pom.xml:](#)

[Click to download](#)

```
<?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>data</groupId>
  <artifactId>HibernateExample1</artifactId>
  <version>1</version>
  <packaging>jar</packaging>
  <properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    <maven.compiler.source>1.8</maven.compiler.source>
    <maven.compiler.target>1.8</maven.compiler.target>
  </properties>
  <dependencies>
    <dependency>
      <groupId>org.hibernate</groupId>
      <artifactId>hibernate-core</artifactId>
      <version>5.3.6.Final</version>
    </dependency>
    <dependency>
      <groupId>mysql</groupId>
      <artifactId>mysql-connector-java</artifactId>
      <version>5.1.46</version>
    </dependency>
  </dependencies>
</project>
```

### 3. MODIFY THE CODE

[pom.xml](#):

[Click to download](#)

```
<dependency>
  <groupId>org.apache.logging.log4j</groupId>
  <artifactId>log4j-api</artifactId>
  <version>2.11.1</version>
</dependency>
<dependency>
  <groupId>org.apache.logging.log4j</groupId>
  <artifactId>log4j-core</artifactId>
  <version>2.11.1</version>
</dependency>
</dependencies>
</project>
```

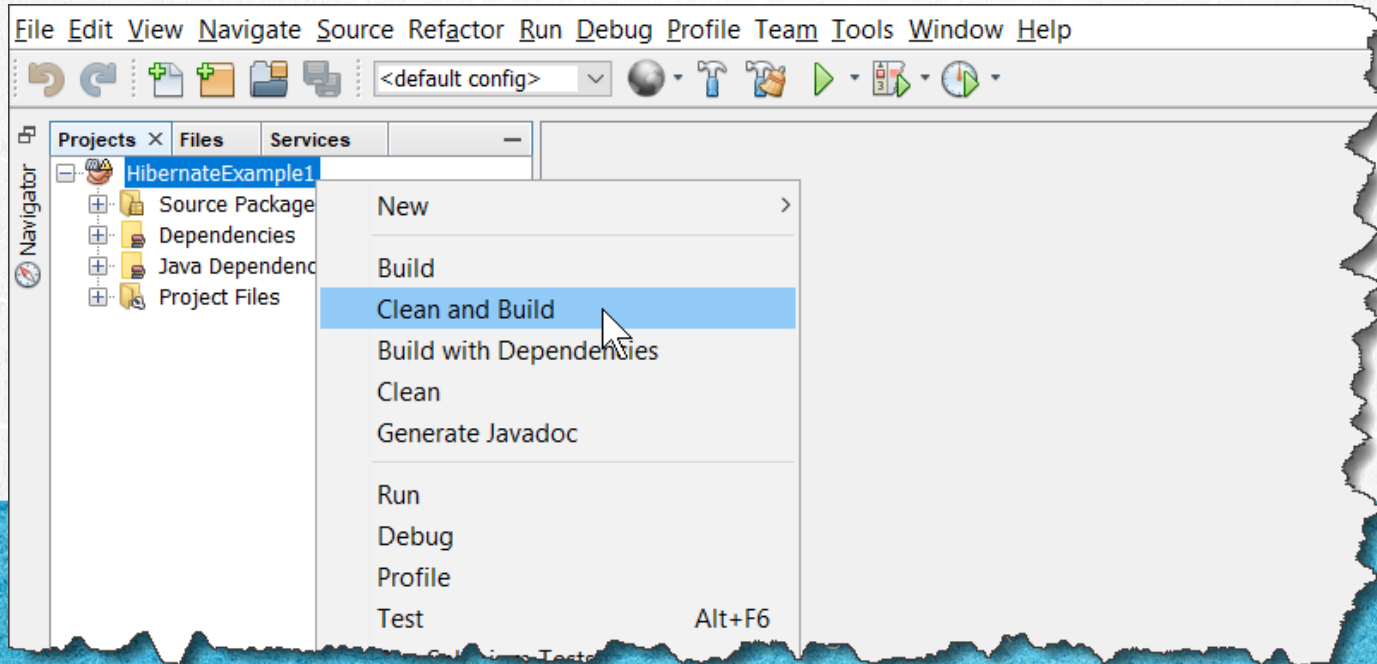
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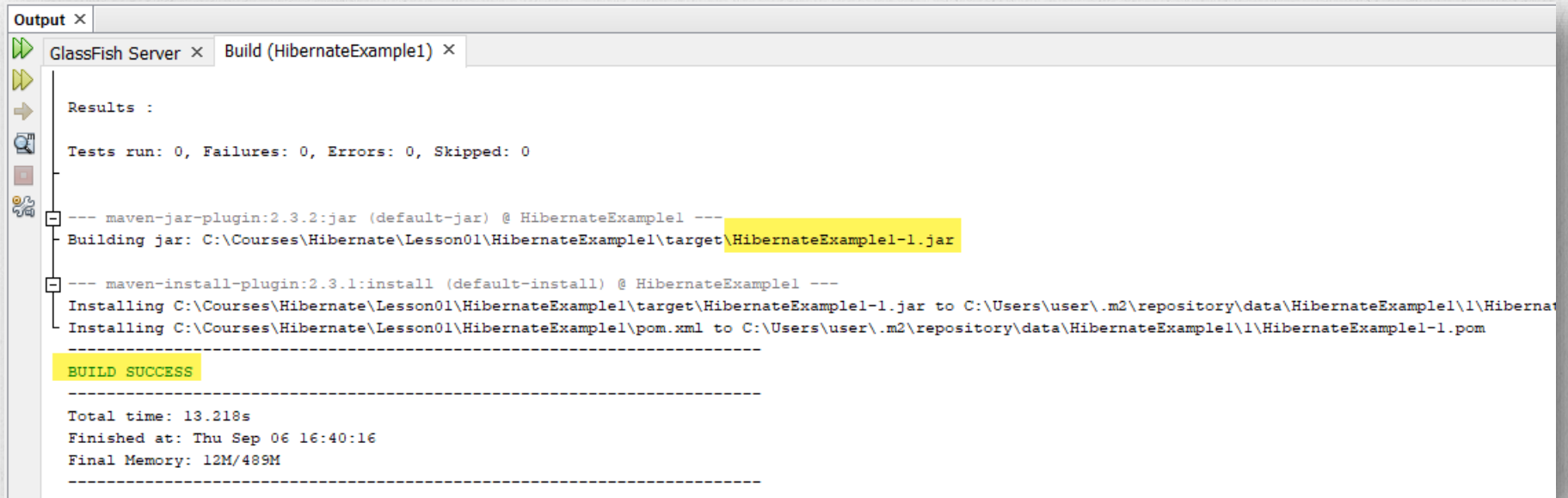
## 4. EXECUTE CLEAN & BUILD

- To download the libraries, we make Clean & Build the project. If for some reason this process fails, you must disable any software such as antivirus, Windows defender or firewall during this process so that the download of Java .jar files is not prevented. Once finished, these services can be activated again. This process may take several minutes depending on your internet speed:



## 4. EXECUTE CLEAN & BUILD

- Once the process is finished, an output similar to the following should be shown:



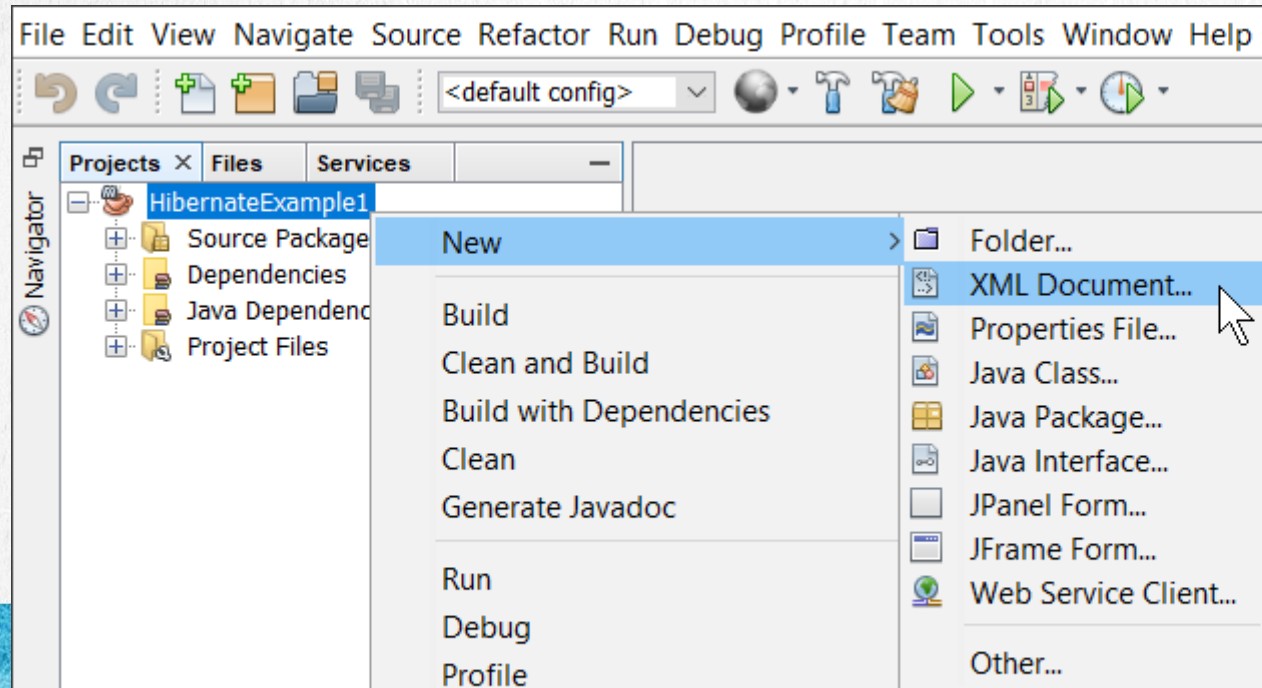
The screenshot shows an IDE's Output window with two tabs: 'GlassFish Server' and 'Build (HibernateExample1)'. The 'Build (HibernateExample1)' tab is active, displaying the following text:

```
Results :  
  
Tests run: 0, Failures: 0, Errors: 0, Skipped: 0  
  
--- maven-jar-plugin:2.3.2:jar (default-jar) @ HibernateExample1 ---  
Building jar: C:\Courses\Hibernate\Lesson01\HibernateExample1\target\HibernateExample1-1.jar  
  
--- maven-install-plugin:2.3.1:install (default-install) @ HibernateExample1 ---  
Installing C:\Courses\Hibernate\Lesson01\HibernateExample1\target\HibernateExample1-1.jar to C:\Users\user\.m2\repository\data\HibernateExample1\1\HibernateExample1-1.jar  
Installing C:\Courses\Hibernate\Lesson01\HibernateExample1\pom.xml to C:\Users\user\.m2\repository\data\HibernateExample1\1\HibernateExample1-1.pom  
-----  
BUILD SUCCESS  
-----  
  
Total time: 13.218s  
Finished at: Thu Sep 06 16:40:16  
Final Memory: 12M/489M  
-----
```



## 5. CREATE AN XML FILE

- We create the persistence.xml file. The persistence.xml file has the configuration of connection to the database, in this case mysql, among other values, such as the entity classes that we are going to use in the project, and the provider of the Entity Manager:



## 5. CREATE AN XML FILE

- We create the persistence.xml file. We deposit it in the indicated path:

**New XML Document**

**Steps**

1. Choose File Type
2. **Name and Location**
3. Select Document Type
4. ...

**Name and Location**

File Name: persistence

Project: HibernateExample1

Folder: src/main/resources/META-INF Browse...

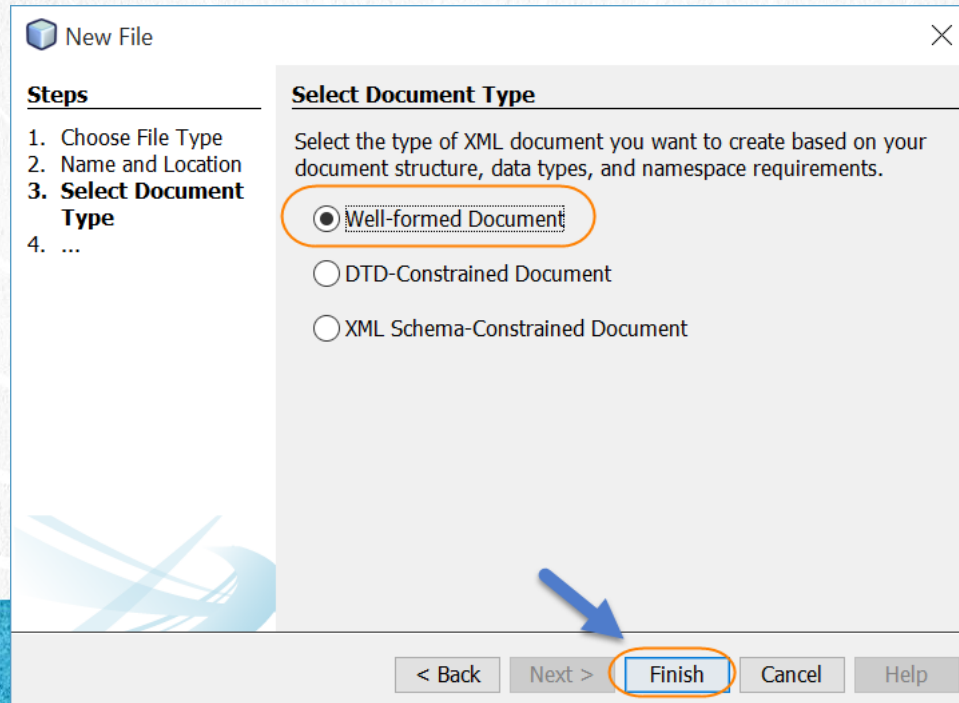
Created File: C:\Courses\Hibernate\Lesson01\HibernateExample1\src\main\resources\META-INF\persistence.xml

< Back **Next >** Finish Cancel Help



## 5. CREATE AN XML FILE

- In this step we select any option, it is not important since we are going to overwrite the file:



## 6. MODIFY THE CODE

[persistence.xml](#):

Click to download

```
<?xml version="1.0" encoding="UTF-8"?>
<persistence xmlns="http://xmlns.jcp.org/xml/ns/persistence"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/persistence
    http://xmlns.jcp.org/xml/ns/persistence/persistence_2_2.xsd"
  version="2.2">
  <persistence-unit name="HibernateExample1" transaction-type="RESOURCE_LOCAL">
    <provider>org.hibernate.jpa.HibernatePersistenceProvider</provider>
    <class>domain.Person</class>
    <properties>
      <property name="javax.persistence.jdbc.url" value="jdbc:mysql://localhost:3306/test?useSSL=true"/>
      <property name="javax.persistence.jdbc.user" value="root"/>
      <property name="javax.persistence.jdbc.password" value="admin"/>
      <property name="javax.persistence.jdbc.driver" value="com.mysql.jdbc.Driver"/>
      <property name="hibernate.show_sql" value="true" />
    </properties>
  </persistence-unit>
</persistence>
```

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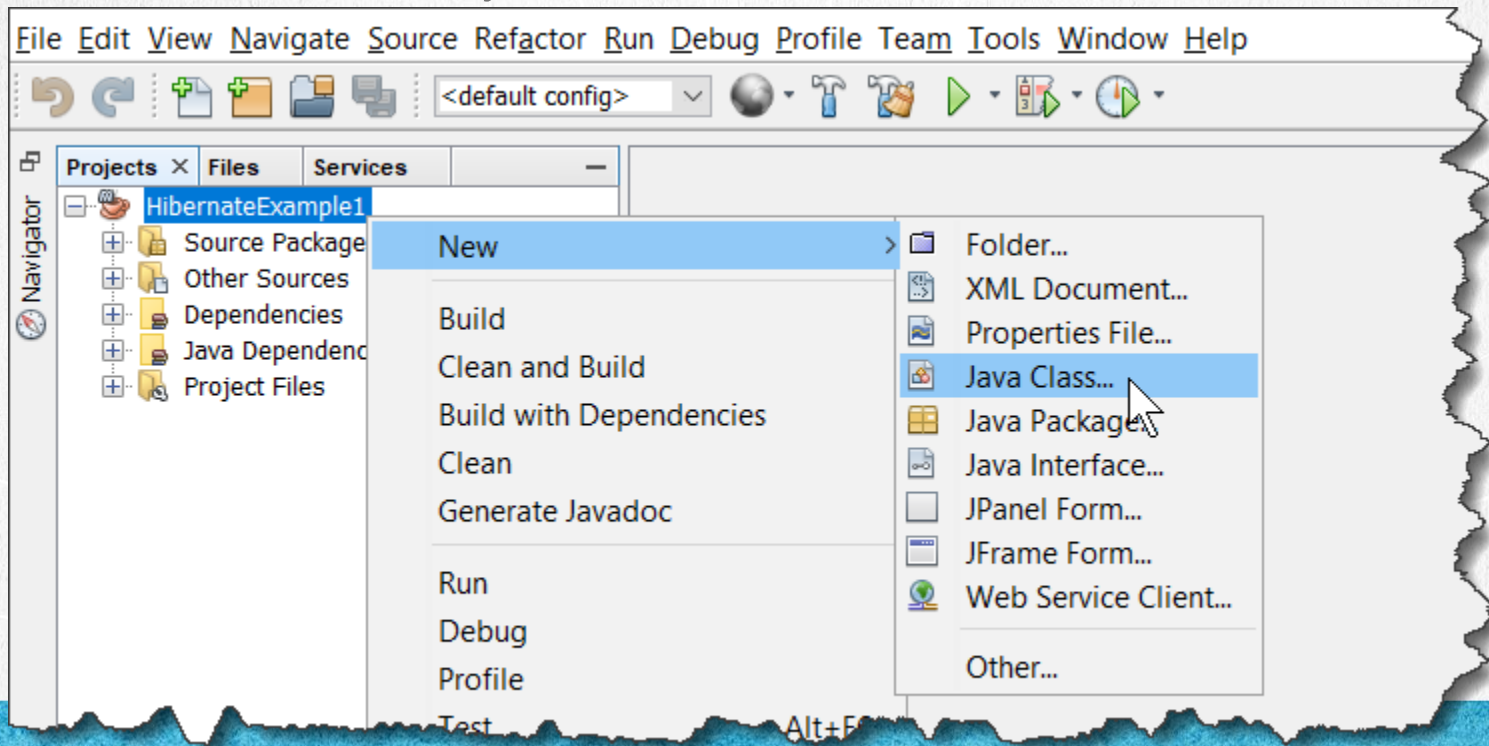


## 7. CREATE A JAVA CLASS

- We create the class `Persona.java`.
- This is an Entity class, so it maps with the person table in the "test" database in MySQL.
- Later we will see in detail how to create the classes of Entity, in this example it is only to be able to carry out the first test with Hibernate.
- Let's see how our class of Entity called Person is.

# 7. CREATE A JAVA CLASS

- We create the Persona.java class:



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# 7. CREATE A JAVA CLASS

- We create the Persona.java class:

**New Java Class**

**Steps**

1. Choose File Type
2. **Name and Location**

**Name and Location**

Class Name:

Project:

Location:

Package:

Created File:

< Back   Next >   **Finish**   Cancel   Help

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# 8. MODIFY THE CODE

Person.java:

[Click to download](#)

```
package domain;

import java.io.Serializable;
import javax.persistence.*;

@Entity
public class Person implements Serializable {

    private static final long serialVersionUID = 1L;

    @Column(name = "id_person")
    @Id
    private int idPerson;

    private String name;

    public Person() {
    }

    public int getIdPerson() {
        return this.idPerson;
    }

    public void setIdPerson(int idPerson) {
        this.idPerson = idPerson;
    }
}
```



## 8. MODIFY THE CODE

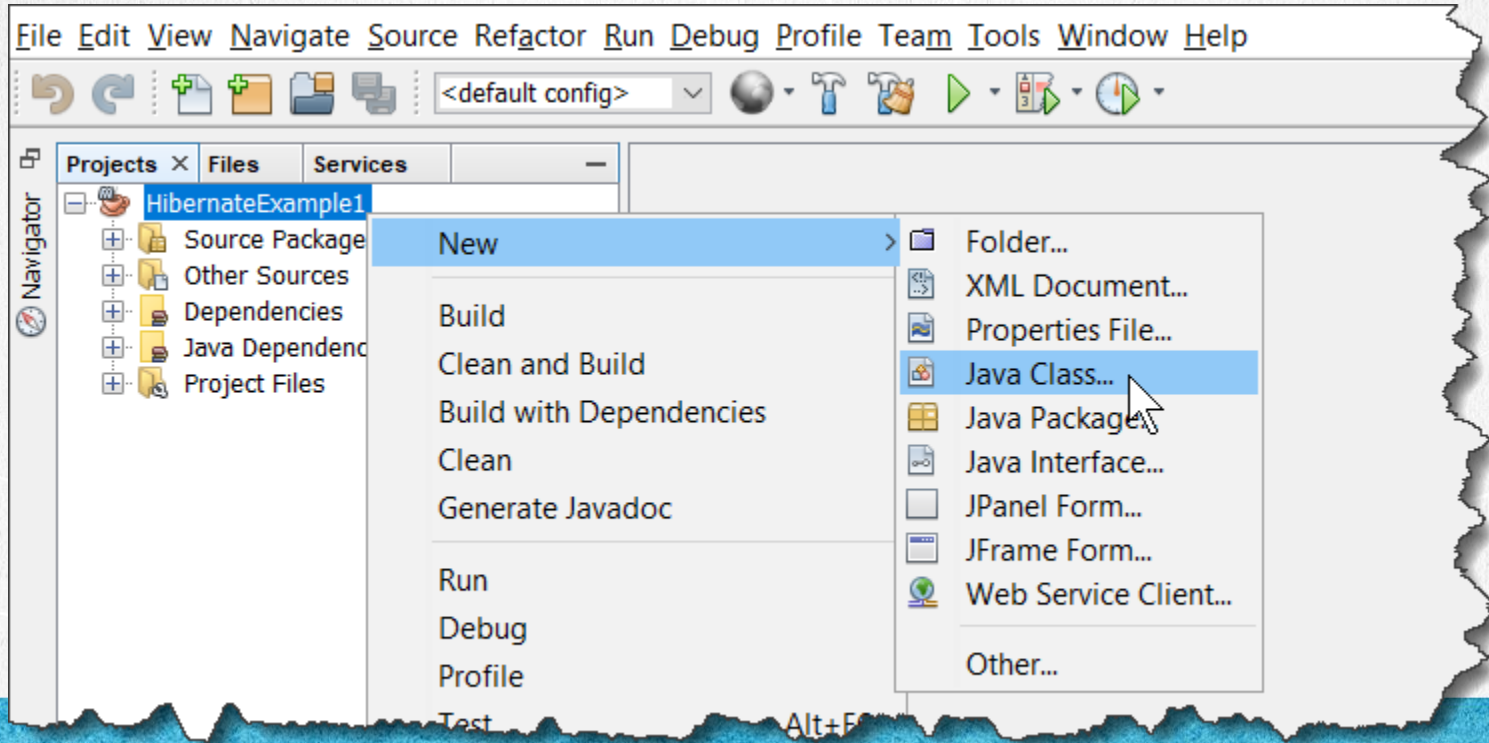
Person.java:

[Click to download](#)

```
public String getName() {  
    return this.name;  
}  
  
public void setName(String name) {  
    this.name = name;  
}  
  
@Override  
public String toString() {  
    return "Person{" + "idPerson=" + idPerson + ", name=" + name + '}';  
}  
}
```

## 9. CREATE A JAVA CLASS

- We created the HelloWorldHibernate.java class. This will be our test class:



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# 9. CREATE A JAVA CLASS

- We created the HelloWorldHibernate.java class:

**New Java Class**

**Steps**

1. Choose File Type
2. **Name and Location**

**Name and Location**

Class Name: HelloWorldHibernate

Project: HibernateExample1

Location: Source Packages

Package: test

Created File: C:\Courses\Hibernate\Lesson01\HibernateExample1\src\main\java\test\HelloWorldHibernate.java

< Back Next > **Finish** Cancel Help

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# 10. MODIFY THE CODE

## HelloWorldHibernate.java:

Click to download

```
package test;

import domain.Person;
import java.util.List;
import javax.persistence.*;
import org.apache.logging.log4j.*;

public class HelloWorldHibernate {

    static Logger log = LogManager.getLogger(HelloWorldHibernate.class);

    public static void main(String[] args) {
        String hql = "SELECT p FROM Person p";
        EntityManagerFactory factory = Persistence.createEntityManagerFactory("HibernateExample1");
        EntityManager entityManager = factory.createEntityManager();
        Query query = entityManager.createQuery(hql);
        List<Person> list = query.getResultList();
        for (Person p : list) {
            log.info("Person:" + p);
        }
    }
}
```

# 11. CREATE AN XML FILE

We create a log4j2.xml file. The log4j API allows us to manage the log or log of a Java application in a simpler way.

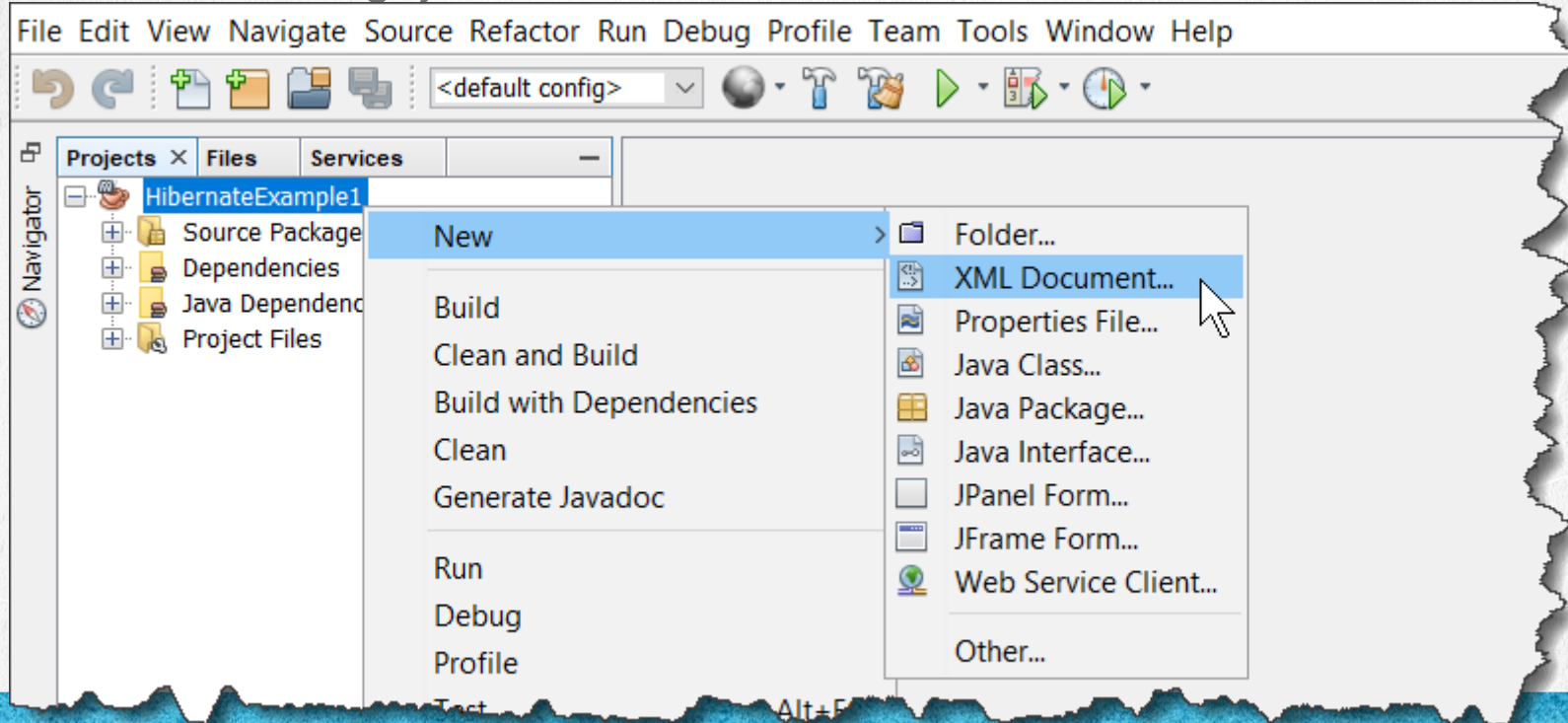
In order to use this API it is only necessary to add the log4j libraries which have already been added to the maven pom.xml file, and the log4j2.xml file somewhere that recognizes the classpath, for example in the project's resources folder .

With this we will be ready to specify what information we want to be sent to the console or other places, such as a file. For more information about this API consult:

<https://logging.apache.org/log4j/2.x/>

# 11. CREATE AN XML FILE

- We create the log4j2.xml file:



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# 11. CREATE AN XML FILE

- We created the log4j2.xml file:

**New XML Document**

**Steps**

1. Choose File Type
- 2. Name and Location**
3. Select Document Type
4. ...

**Name and Location**

File Name:

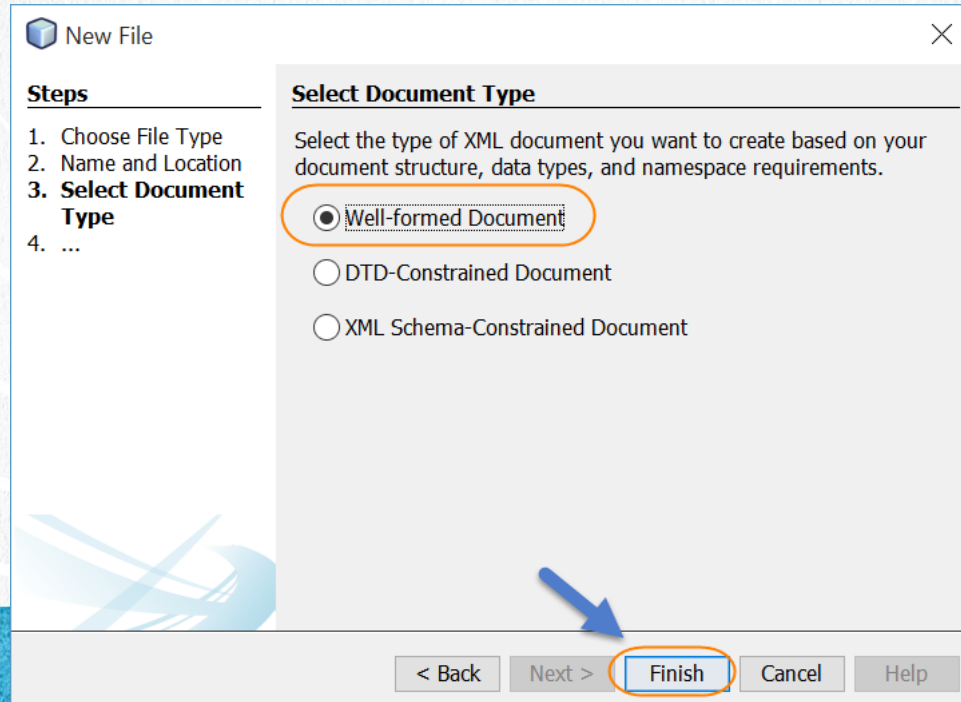
Project:

Folder:

Created File:

# 11. CREATE AN XML FILE

- We create the log4j2.xml file. In this step we select any option, it is not important since we are going to overwrite the file:



# 12. MODIFY THE CODE

log4j2.xml:

[Click to download](#)

```
<?xml version="1.0" encoding="UTF-8"?>
<Configuration status="INFO">
  <Appenders>
    <Console name="Console" target="SYSTEM_OUT">
      <PatternLayout pattern="%d{HH:mm:ss} [%t] %-5level %logger{36} - %msg%n" />
    </Console>
  </Appenders>
  <Loggers>
    <Logger name="org.hibernate.SQL" level="debug" additivity="false">
      <AppenderRef ref="Console"/>
    </Logger>
    <logger name="org.hibernate.type.descriptor.sql.BasicBinder" level="trace" additivity="false">
      <AppenderRef ref="Console"/>
    </logger>
    <Root level="info">
      <AppenderRef ref="Console" />
    </Root>
  </Loggers>
</Configuration>
```

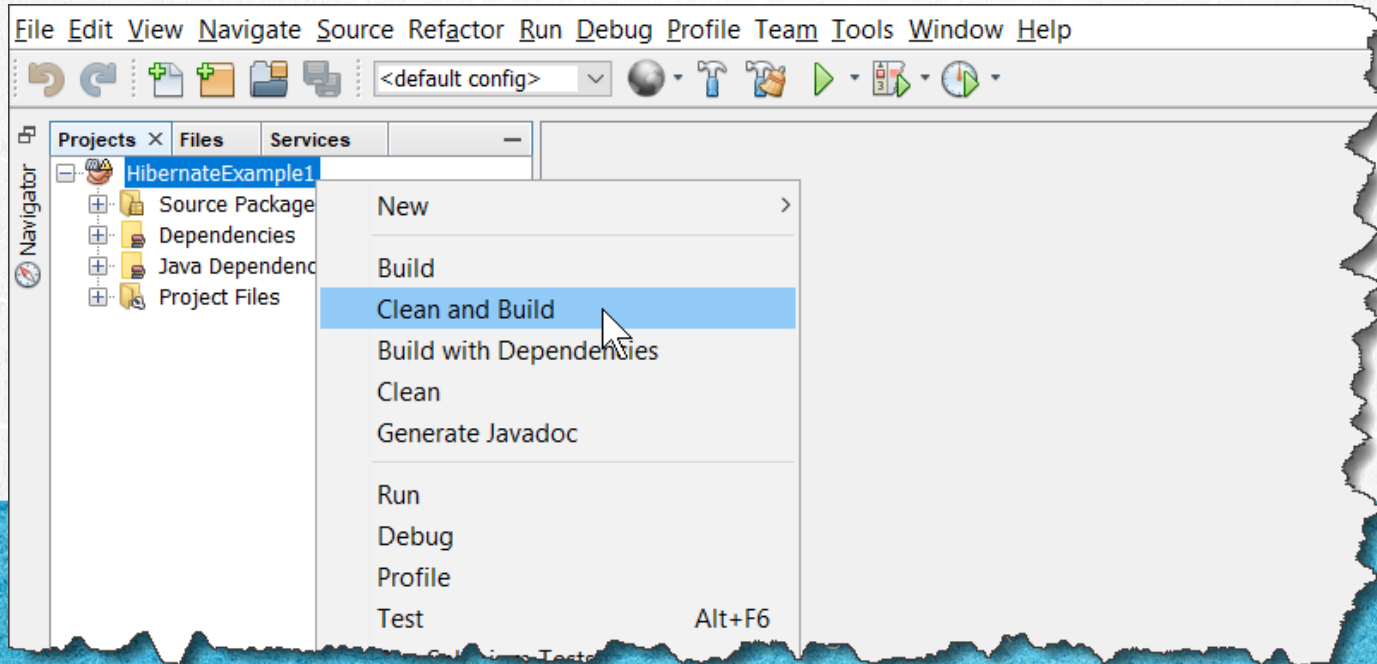
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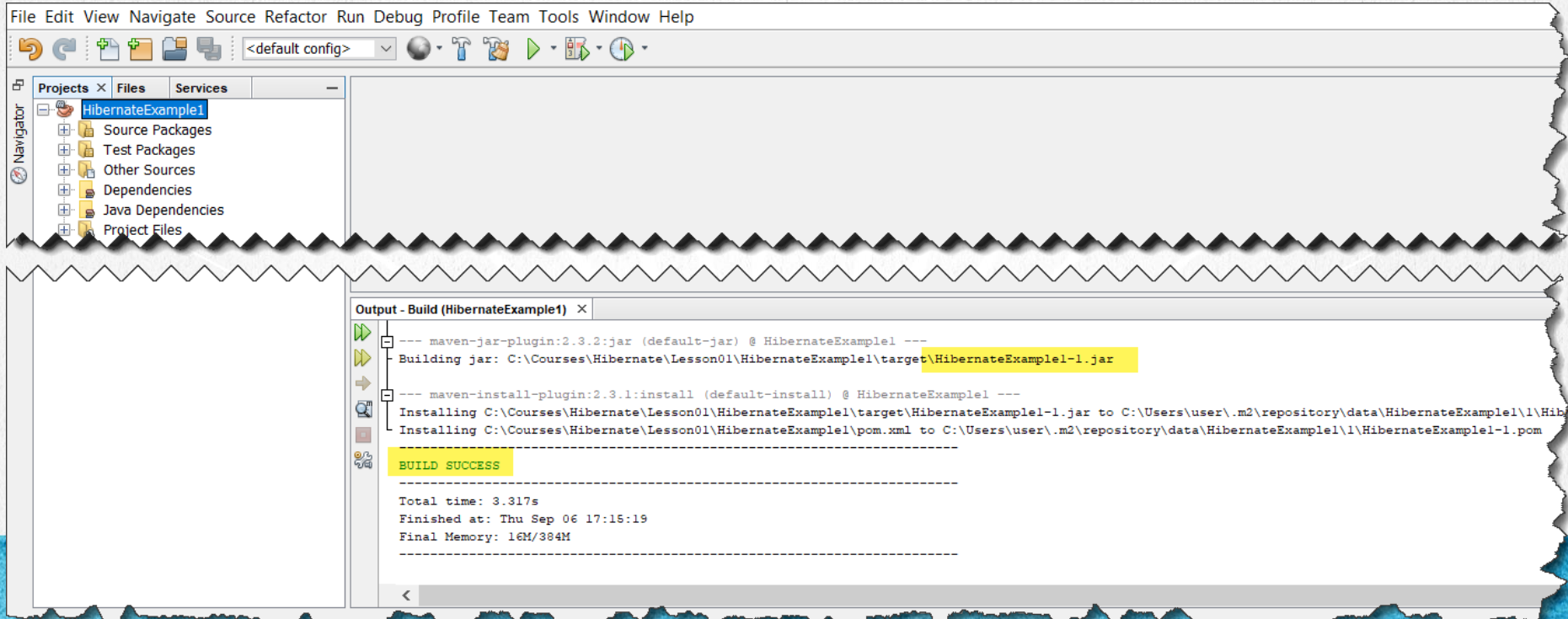
# 13. EXECUTE CLEAN & BUILD

- To download the libraries, we make Clean & Build the project. If for some reason this process fails, you must disable any software such as antivirus, Windows defender or firewall during this process so that the download of Java .jar files is not prevented. Once finished, these services can be activated again. This process may take several minutes depending on your internet speed:



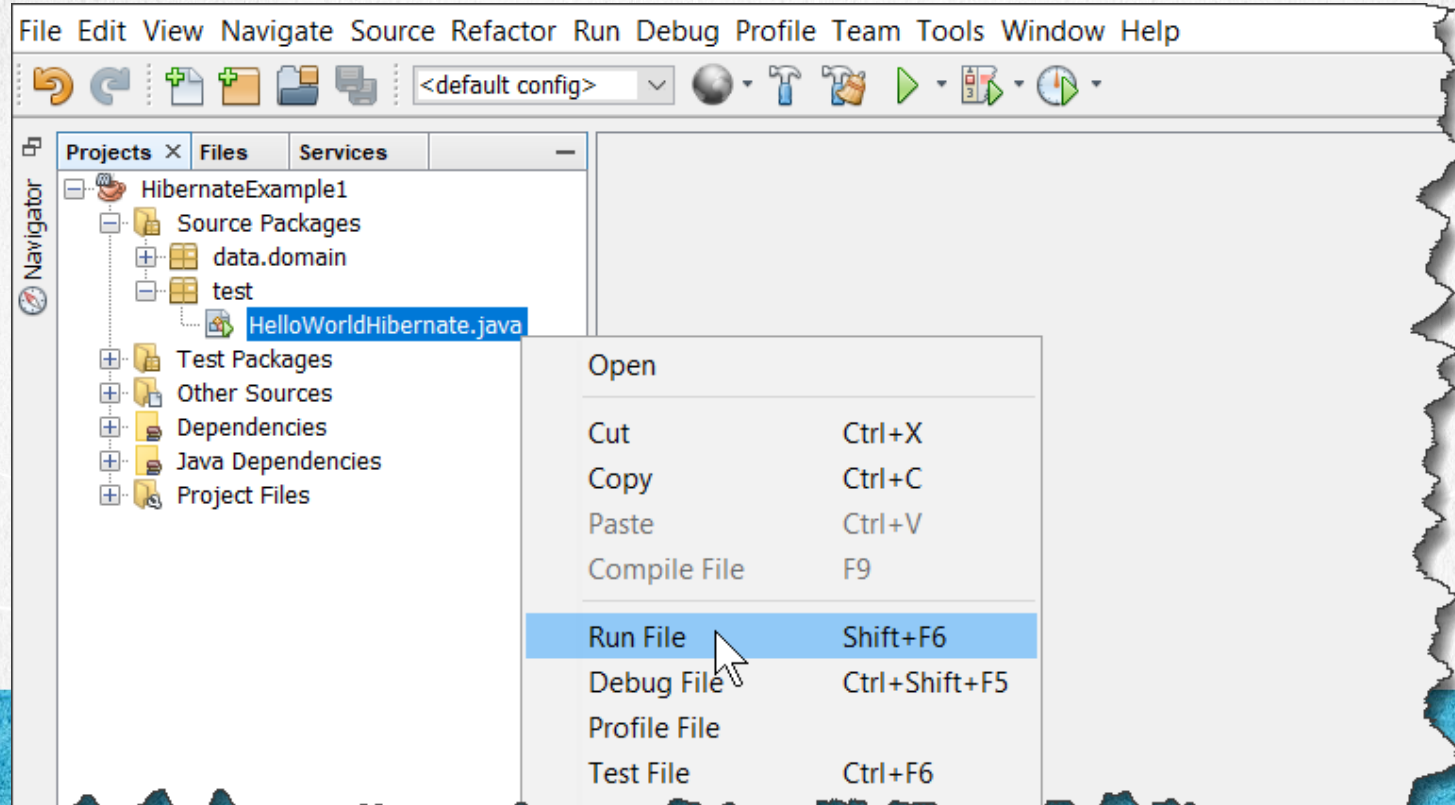
# 13. EXECUTE CLEAN & BUILD

- Once the process is finished, an output similar to the following should be shown:



# 14. EXECUTE THE APPLICATION

- We run the application from the HelloWorldHibernate.java class:





# 14. EXECUTE THE APPLICATION

- We see that the people stored in the People table are listed through the Hibernate / JPA query that we have executed:

```
Output - Run (HelloWorldHibernate) X
--- exec-maven-plugin:1.2.1:exec (default-cli) @ HibernateExample1 ---
17:19:53 [main] INFO org.hibernate.jpa.internal.util.LogHelper - HHH000204: Processing PersistenceUnitInfo [
    name: HelloWorldHibernate
    ...]
17:19:53 [main] INFO org.hibernate.Version - HHH000412: Hibernate Core (5.3.6.Final)
17:19:53 [main] INFO org.hibernate.cfg.Environment - HHH000206: hibernate.properties not found
17:19:53 [main] INFO org.hibernate.annotations.common.Version - HCANN000001: Hibernate Commons Annotations (5.0.4.Final)
17:19:53 [main] WARN org.hibernate.orm.connections.pooling - HHH10001002: Using Hibernate built-in connection pool (not for production use!)
17:19:53 [main] INFO org.hibernate.orm.connections.pooling - HHH10001005: using driver [com.mysql.jdbc.Driver] at URL [jdbc:mysql://localhost:3306/test?useSSL=true]
17:19:53 [main] INFO org.hibernate.orm.connections.pooling - HHH10001001: Connection properties: {user=root, password=****}
17:19:53 [main] INFO org.hibernate.orm.connections.pooling - HHH10001003: Autocommit mode: false
17:19:53 [main] INFO org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl - HHH000115: Hibernate connection pool size: 20 (min=1)
17:19:53 [main] INFO org.hibernate.dialect.Dialect - HHH000400: Using dialect: org.hibernate.dialect.MySQL57Dialect
17:19:54 [main] INFO org.hibernate.hql.internal.QueryTranslatorFactoryInitiator - HHH000397: Using ASTQueryTranslatorFactory
17:19:54 [main] DEBUG org.hibernate.SQL - select person0_id_person as id_persol_0_, person0_name as name2_0_ from Person person0_
Hibernate: select person0_id_person as id_persol_0_, person0_name as name2_0_ from Person person0_
17:19:54 [main] INFO test.HelloWorldHibernate - Person:Person{idPerson=1, name=John}
17:19:54 [main] INFO test.HelloWorldHibernate - Person:Person{idPerson=2, name=Katty}
```

# EXERCISE CONCLUSION

With this exercise we have created our first project with Hibernate Framework.

Using both Eclipse and Netbeans, or any other IDE, is practically the same, since we are not using any Wizard of the IDEs, which can be used, but in our case we will teach the concepts from scratch, therefore it will not be necessary to use the Wizards, more than to automate certain tasks the minimum necessary.

However, knowing the concepts applied and learned in the course, you can quickly apply the Wizards and advantages that your IDE preferably offers, however the idea of the course is not to learn to use an IDE, but to apply these concepts to any IDE, be it Eclipse, Netbeans, IntelliJ Idea or any other IDE.

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