**Assisted Practice: 3.4 Hibernate Logging by Log4j**

This section will guide you to:

* Set up Eclipse to work with Hibernate
* Configure log4j to do logging
* Create an HTML page to call a servlet
* Create a servlet that will initialize Hibernate with enabled logging and then close it

**Development Environment**

* Eclipse IDE for Enterprise Java Developers v2019-03 (4.11.0)
* Apache Tomcat Server v9.0
* JRE: OpenJDK Runtime Environment 11.0.2
* Hibernate for Java 5.2.1
* MySQL Connector for Java 8.0.16
* JTA v 1.1
* Java XML Bind (no version)
* JAXB OSGI v.2.4.0
* Java Activation (no version)
* Log4J framework v12

This log has thirteen subsections, namely:

* + 1. Creating a dynamic web project
    2. Adding the jar files for Hibernate, Log4j, and its dependencies
    3. Configuring Hibernate with hibernate.cfg.xml
    4. Configuring log4j with log4j.properties
    5. Creating an HTML page index.html
    6. Creating a HibernateUtil class to initiate Hibernate in code
    7. Creating an InitHibernate servlet
    8. Configuring web.xml
    9. Checking for servlet-api.jar
    10. Building the project
    11. Publishing and starting the project
    12. Running the project
    13. Pushing the code to your GitHub repositories

**Step 3.4.1:** Creating a dynamic web project

* Open Eclipse
* Go the **File** menu. Choose **New->Dynamic Web Project**
* Enter the project name as **HibernateConfig**. Click on **Next**
* Enter nothing in the next screen and click on **Next**
* Check the checkbox **Generate web.xml deployment descriptor** and click on **Finish**
* This will create the project files in the Project Explorer

**Step 3.4.2:** Adding the jar files for Hibernate and its dependencies

* **Hibernate.jar** file is already present in your practice lab. (Refer FSD: Lab Guide - Phase 2)
* Take **hibernate.jar** from folder mentioned in the lab guide for phase 2 and add it to your project’s **WebContent/WEB-INF/lib** folder
* **mysql-connector-java.jar** file is present in your practice lab. (Refer FSD: Lab Guide - Phase 2)
* Take **mysql-connector-java.jar file** from the folder mentioned in the lab guide for phase 2 and add it to your project’s **WebContent/WEB-INF/lib** folder
* Go to <http://www.java2s.com/Code/Jar/j/Downloadjta11jar.htm>
* Click on **jta-1\_1.jar.zip** link to download it
* Extract **jta-1\_1.jar** from it and put it to your project’s **WebContent/WEB-INF/lib** folder
* Go to <http://www.java2s.com/Code/Jar/j/Downloadjavaxxmlbindjar.htm>
* Click on **javax.xml/javax.xml.bind.jar.zip** link to download it
* Extract **javax.xml.bind.jar** from it and add it to your project’s **WebContent/WEB-INF/lib** folder
* Go to <https://jar-download.com/artifacts/com.sun.xml.bind>
* Click on the button **Download jaxb-osgi.jar** to download it
* Extract **jaxb-osgi-2.4.0-b180830.0438.jar** from it and add it to your project’s **WebContent/WEB-INF/lib** folder.
* Go to <http://java2s.com/Code/Jar/s/Downloadslf4jlog4j12jar.htm>
* Click on the link s**lf4j-log4j12/slf4j-log4j12.jar.zip( 7 k)** to download it
* Extract all 3 jar files in the zip and add them to your project’s **WebContent/WEB-INF/lib** folder

**Step 3.4.3:** Configuring Hibernate with hibernate.cfg.xml

* In the Project Explorer, expand **HibernateConfig->Java Resources**
* Right click on **src** and choose **New->Other**
* Select **General->File** and click on **Next**
* In filename, enter **hibernate.cfg.xml** and click on **Finish**
* Enter the following code:

<?xml version='1.0' encoding='utf-8'?>

<!DOCTYPE hibernate-configuration PUBLIC

"-//Hibernate/Hibernate Configuration DTD 3.0//EN"

"http://www.hibernate.org/dtd/hibernate-configuration-3.0.dtd">

<hibernate-configuration>

<session-factory>

<!-- Database connection settings -->

<property name="connection.driver\_class">com.mysql.jdbc.Driver</property>

<property name="connection.url">jdbc:mysql://localhost:3306/ecommerce</property>

<property name="connection.username">mysql user id</property>

<property name="connection.password">mysql password</property>

</session-factory>

</hibernate-configuration>

**Step 3.4.4:** Configuring log4j with log4j.properties

* In the Project Explorer, expand **HibernateConfig->Java Resources**
* Right click on **src** and choose **New->Other**
* Select **General->File** and click on **Next**
* In filename, enter **log4j.properties** and click on **Finish**
* Enter the following code:

# Direct log messages to a log file

log4j.appender.file=org.apache.log4j.RollingFileAppender

log4j.appender.file.File=/home/oem/Downloads/hibernate.log

log4j.appender.file.MaxFileSize=1MB

log4j.appender.file.MaxBackupIndex=1

log4j.appender.file.layout=org.apache.log4j.PatternLayout

log4j.appender.file.layout.ConversionPattern=%d{ABSOLUTE} %5p %c{1}:%L - %m%n

# Direct log messages to stdout

log4j.appender.**stdout**=org.apache.log4j.ConsoleAppender

log4j.appender.**stdout**.Target=System.out

log4j.appender.**stdout**.layout=org.apache.log4j.PatternLayout

log4j.appender.**stdout**.layout.ConversionPattern=%d{ABSOLUTE} %5p %c{1}:%L - %m%n

# Root logger option

log4j.rootLogger=INFO, file, **stdout**

# Log everything. Good for troubleshooting

log4j.logger.org.hibernate=INFO

# Log all JDBC parameters

log4j.logger.org.hibernate.type=ALL

* Be sure to change the path of the log file **log4j.appender.file.File=xxxxx** to an actual path in your disk

**Step 3.4.5:** Creating an HTML page index.html

* In the Project Explorer, expand the project **HibernateConfig**
* Expand **WebContent**. Right click on **WebContent**. Choose **New->HTML File**
* Enter the filename as **index.html** and click on **Finish**
* Enter the following code:

<!DOCTYPE html>

<**html**>

<**head**>

<**meta** charset="UTF-8">

<**title**>Hibernate Configuration Example</**title**>

</**head**>

<**body**>

<**a** href="init">Initialize Hibernate</**a**><**br**>

</**body**>

</**html**>

* Click on the **Save** icon

**Step 3.4.6:** Creating a HibernateUtil class to initiate Hibernate in code

* In the Project Explorer, expand **HibernateConfig->Java Resources**
* Right click on **src** and choose **New->Class**
* In Package Name, enter **com.ecommerce** and in **Name** enter **HibernateUtil** and click on **Finish**
* Enter the following code:

**package** com.ecommerce;

**import** org.hibernate.SessionFactory;

**import** org.hibernate.boot.Metadata;

**import** org.hibernate.boot.MetadataSources;

**import** org.hibernate.boot.registry.StandardServiceRegistry;

**import** org.hibernate.boot.registry.StandardServiceRegistryBuilder;

**public** **class** HibernateUtil {

**private** **static** **final** SessionFactory sessionFactory;

**static** {

**try** {

StandardServiceRegistry standardRegistry = **new** StandardServiceRegistryBuilder()

.configure("hibernate.cfg.xml").build();

Metadata metaData = **new** MetadataSources(standardRegistry).getMetadataBuilder().build();

sessionFactory = metaData.getSessionFactoryBuilder().build();

} **catch** (**Throwable** th) {

**throw** **new** **ExceptionInInitializerError**(th);

}

}

**public** **static** SessionFactory getSessionFactory() {

**return** sessionFactory;

}

}

**Step 3.4.7** Creating an InitHibernate servlet

* In the Project Explorer, expand **HibernateConfig->Java Resources**
* Right click on **src** and choose **New->Servlet**
* In **Class Name,** enter **InitHibernate** and click on **Finish**
* Enter the following code:

**import** java.io.IOException;

**import** java.io.PrintWriter;

**import** javax.servlet.ServletConfig;

**import** javax.servlet.ServletException;

**import** javax.servlet.annotation.WebServlet;

**import** javax.servlet.http.HttpServlet;

**import** javax.servlet.http.HttpServletRequest;

**import** javax.servlet.http.HttpServletResponse;

**import** javax.transaction.**\***;

**import** javax.xml.bind.**\***;

**import** java.io.Serializable;

**import** java.util.List;

**import** org.hibernate.Session;

**import** org.hibernate.SessionFactory;

**import** org.hibernate.Transaction;

**import** org.hibernate.cfg.Configuration;

**import** com.ecommerce.EProduct;

**import** com.ecommerce.HibernateUtil;

/\*\*

**\*** Servlet implementation class InitHibernate

\*/

**@WebServlet("/InitHibernate")**

**public** **class** InitHibernate **extends** HttpServlet {

**private** **static** **final** long serialVersionUID = 1L;

/\*\*

**\*** **@see** HttpServlet**#**HttpServlet()

\*/

**public** InitHibernate() {

**super**();

// TODO Auto-generated constructor stub

}

/\*\*

**\*** **@see** HttpServlet**#**doGet(HttpServletRequest request**,** HttpServletResponse response)

\*/

**protected** void doGet(HttpServletRequest request, HttpServletResponse response) **throws** ServletException, **IOException** {

// TODO Auto-generated method stub

**try** {

**PrintWriter** out = response.getWriter();

out.println("<html><body>");

SessionFactory factory = HibernateUtil.getSessionFactory();

Session session = factory.openSession();

out.println("Hibernate Session opened.<br>");

session.close();

out.println("Hibernate Session closed.<br>");

out.println("</body></html>");

} **catch** (**Exception** ex) {

**throw** ex;

}

}

/\*\*

**\*** **@see** HttpServlet**#**doPost(HttpServletRequest request**,** HttpServletResponse response)

\*/

**protected** void doPost(HttpServletRequest request, HttpServletResponse response) **throws** ServletException, **IOException** {

// TODO Auto-generated method stub

doGet(request, response);

}

}

**Step 3.4.8:** Configuring web.xml

* In the Project Explorer, expand **HibernateConfig->WebContent->WEB-INF**
* Double click on **web.xml** to open it in the editor
* Enter the following script:

<?xml version="1.0" encoding="UTF-8"?>

<web-app xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://xmlns.jcp.org/xml/ns/javaee" xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee http://xmlns.jcp.org/xml/ns/javaee/web-app\_4\_0.xsd" id="WebApp\_ID" version="4.0">

<display-name>HibernateLogging</display-name>

<welcome-file-list>

<welcome-file>index.html</welcome-file>

<welcome-file>index.htm</welcome-file>

<welcome-file>index.jsp</welcome-file>

<welcome-file>default.html</welcome-file>

<welcome-file>default.htm</welcome-file>

<welcome-file>default.jsp</welcome-file>

</welcome-file-list>

<servlet>

<servlet-name>InitHibernate</servlet-name>

<servlet-class>InitHibernate</servlet-class>

</servlet>

<servlet-mapping>

<servlet-name>InitHibernate</servlet-name>

<url-pattern>/init</url-pattern>

</servlet-mapping>

</web-app>

**Step 3.4.9:** Checking for servlet-api.jar

* Before building the project, we need to add **servlet-api.jar** to the project
* Servlet-api.jar file is already present in your practice lab. (Refer FSD: Lab Guide - Phase 2)
* To add it to the project, follow the below mentioned steps:
  + In the Project Explorer, right click on **HibernateConfig** and choose **Properties**
  + Select **Java Build Path** from the options on the left
  + Click on **Libraries** tab on the right
  + Under **ClassPath,** expand the node that says **Apache Tomcat**
  + If there is an existing entry for **servlet-api.jar,** then click on **Cancel** and exit the window
  + If it is not there, then click on **Classpath** entry and click on **Add External JARs** button on the right
  + From the file list, select **servlet-api.jar** file and click on **Ok**
  + Click on **Apply and Close**

**Step 3.4.10:** Building the project

* From the **Project** menu at the top, click on **Build**
* If any compile errors are shown, fix them as required

**Step 3.4.11:** Publishing and starting the project

* If you do not see the **Servers** tab near the bottom of the IDE, go to **Window** menu and click on **Show View->Servers**
* Right click on the **Server** entry and choose **Add and Remove**
* Click the **Add** button to move **HibernateConfig** from the **Available** list to the **Configured** list
* Click on **Finish**
* Right click on the **Server** entry and click on **Publish**
* Right click on the **Server** entry and click on **Start**
* This will start the server

**Step 3.4.12:** Running the project

* To run the project, open a web browser and type: [**http://localhost:8080/**](http://localhost:8080/ServletConcept)**HibernateConfig**

**Step 3.4.13:** Pushing the code to your GitHub repositories

* Open your command prompt and navigate to the folder where you have created your files.

**cd <folder path>**

* Initialize your repository using the following command:

**git init**

* Add all the files to your git repository using the following command:

**git add .**

* Commit the changes using the following command:

**git commit . -m “Changes have been committed.”**

* Push the files to the folder you initially created using the following command:

**git push -u origin master**