**Creating Tables**

**DROP** **TABLE** **IF** **EXISTS** `colors`;

/\*!40101 SET @saved\_cs\_client = @@character\_set\_client \*/;

/\*!40101 SET character\_set\_client = utf8 \*/;

**CREATE** **TABLE** `colors` (

`ID` bigint(20) NOT NULL AUTO\_INCREMENT,

`color\_name` varchar(40) DEFAULT NULL,

`idx` int(11) DEFAULT NULL,

`product\_id` bigint(20) DEFAULT NULL,

**PRIMARY** **KEY** (`ID`)

) ENGINE=InnoDB AUTO\_INCREMENT=6 DEFAULT CHARSET=latin1;

/\*!40101 SET character\_set\_client = @saved\_cs\_client \*/;

--

Dumping data for table `colors`

--

**LOCK** **TABLES** `colors` **WRITE**;

/\*!40000 ALTER TABLE `colors` DISABLE KEYS \*/;

**INSERT** **INTO** `colors` **VALUES** (1,'Red',0,1),(2,'Silver',1,1),(3,'Gray',0,2),(4,'White',1,2),(5,'Maroon',0,3);

/\*!40000 ALTER TABLE `colors` ENABLE KEYS \*/;

**UNLOCK** **TABLES**;

--

-- Table structure for table `eproduct`

--

**DROP** **TABLE** **IF** **EXISTS** `eproduct`;

/\*!40101 SET @saved\_cs\_client = @@character\_set\_client \*/;

/\*!40101 SET character\_set\_client = utf8 \*/;

**CREATE** **TABLE** `eproduct` (

`ID` bigint(20) NOT NULL AUTO\_INCREMENT,

`name` varchar(100) DEFAULT NULL,

`price` decimal(10,2) DEFAULT NULL,

`date\_added` timestamp NOT NULL DEFAULT **CURRENT\_TIMESTAMP**,

**PRIMARY** **KEY** (`ID`)

) ENGINE=InnoDB AUTO\_INCREMENT=4 DEFAULT CHARSET=latin1;

/\*!40101 SET character\_set\_client = @saved\_cs\_client \*/;

--

-- Dumping data for table `eproduct`

--

**LOCK** **TABLES** `eproduct` **WRITE**;

/\*!40000 ALTER TABLE `eproduct` DISABLE KEYS \*/;

**INSERT** **INTO** `eproduct` **VALUES** (1,'HP Laptop ABC',21900.00,'2019-06-04 07:18:57'),(2,'Acer Laptop ABC',23300.00,'2019-06-04 07:19:07'),(3,'Lenovo Laptop ABC',33322.00,'2019-06-04 07:19:19');

/\*!40000 ALTER TABLE `eproduct` ENABLE KEYS \*/;

**UNLOCK** **TABLES**;

--

-- Table structure for table `finance`

--

**DROP** **TABLE** **IF** **EXISTS** `finance`;

/\*!40101 SET @saved\_cs\_client = @@character\_set\_client \*/;

/\*!40101 SET character\_set\_client = utf8 \*/;

**CREATE** **TABLE** `finance` (

`ID` bigint(20) NOT NULL AUTO\_INCREMENT,

`ftype` varchar(10) DEFAULT NULL,

`name` varchar(30) DEFAULT NULL,

`product\_id` bigint(20) DEFAULT NULL,

**PRIMARY** **KEY** (`ID`)

) ENGINE=InnoDB AUTO\_INCREMENT=6 DEFAULT CHARSET=latin1;

/\*!40101 SET character\_set\_client = @saved\_cs\_client \*/;

--

-- Dumping data for table `finance`

--

**LOCK** **TABLES** `finance` **WRITE**;

/\*!40000 ALTER TABLE `finance` DISABLE KEYS \*/;

**INSERT** **INTO** `finance` **VALUES** (1,'CREDITCARD','EMI on Citibank Card',1),(3,'BANK','40% finance from SBI',2),(4,'BANK','60% finance from ICICI',3),(5,'BANK','20% finance from ICICI',1);

/\*!40000 ALTER TABLE `finance` ENABLE KEYS \*/;

**UNLOCK** **TABLES**;

--

-- Table structure for table `os`

--

**DROP** **TABLE** **IF** **EXISTS** `os`;

/\*!40101 SET @saved\_cs\_client = @@character\_set\_client \*/;

/\*!40101 SET character\_set\_client = utf8 \*/;

**CREATE** **TABLE** `os` (

`ID` bigint(20) NOT NULL AUTO\_INCREMENT,

`name` varchar(30) DEFAULT NULL,

`product\_id` bigint(20) DEFAULT NULL,

**PRIMARY** **KEY** (`ID`)

) ENGINE=InnoDB AUTO\_INCREMENT=6 DEFAULT CHARSET=latin1;

/\*!40101 SET character\_set\_client = @saved\_cs\_client \*/;

--

-- Dumping data for table `os`

--

**LOCK** **TABLES** `os` **WRITE**;

/\*!40000 ALTER TABLE `os` DISABLE KEYS \*/;

**INSERT** **INTO** `os` **VALUES** (1,'Windows 10',1),(2,'Windows 10',2),(3,'FreeDOS',2),(4,'RedHat Linux',2),(5,'Windows 10',3);

/\*!40000 ALTER TABLE `os` ENABLE KEYS \*/;

**UNLOCK** **TABLES**;

--

-- Table structure for table `screensizes`

--

**DROP** **TABLE** **IF** **EXISTS** `screensizes`;

/\*!40101 SET @saved\_cs\_client = @@character\_set\_client \*/;

/\*!40101 SET character\_set\_client = utf8 \*/;

**CREATE** **TABLE** `screensizes` (

`ID` bigint(20) NOT NULL AUTO\_INCREMENT,

`size` varchar(10) DEFAULT NULL,

`product\_id` bigint(20) DEFAULT NULL,

**PRIMARY** **KEY** (`ID`)

) ENGINE=InnoDB AUTO\_INCREMENT=5 DEFAULT CHARSET=latin1;

/\*!40101 SET character\_set\_client = @saved\_cs\_client \*/;

--

-- Dumping data for table `screensizes`

--

**LOCK** **TABLES** `screensizes` **WRITE**;

/\*!40000 ALTER TABLE `screensizes` DISABLE KEYS \*/;

**INSERT** **INTO** `screensizes` **VALUES** (1,'12 in',1),(2,'14.5 in',2),(3,'14.9 in',2),(4,'15.5 in',3);

/\*!40000 ALTER TABLE `screensizes` ENABLE KEYS \*/;

**UNLOCK** **TABLES**;

**Class Color**

**package** com.ecommerce;

**public** **class** Color {

**private** **long** COLORID;

**private** String name;

**public** Color() {

}

**public** Color(String name) {

**this**.COLORID = 0;

**this**.name = name;

}

**public** **long** getCOLORID() {**return** **this**.COLORID; }

**public** String getName() { **return** **this**.name;}

**public** **void** setCOLORID(**long** id) { **this**.COLORID = id;}

**public** **void** setName(String name) { **this**.name = name;}

}

**Class Eproduct**

**package** com.ecommerce;

**import** java.math.BigDecimal;

**import** java.util.Collection;

**import** java.util.Date;

**import** java.util.List;

**import** java.util.Set;

**import** java.util.Map;

**public** **class** EProduct {

**private** **long** ID;

**private** String name;

**private** BigDecimal price;

**private** Date dateAdded;

**private** List<Color> colors;

**private** Set<Finance> finance;

**private** PDescription pdescrip;

**public** EProduct() {

}

**public** **long** getID() {**return** **this**.ID; }

**public** String getName() { **return** **this**.name;}

**public** BigDecimal getPrice() { **return** **this**.price;}

**public** Date getDateAdded() { **return** **this**.dateAdded;}

**public** List<Color> getColors() { **return** **this**.colors;}

**public** Set<Finance> getFinance() { **return** **this**.finance;}

**public** PDescription getPdescrip() { **return** **this**.pdescrip;}

**public** **void** setID(**long** id) { **this**.ID = id;}

**public** **void** setName(String name) { **this**.name = name;}

**public** **void** setPrice(BigDecimal price) { **this**.price = price;}

**public** **void** setDateAdded(Date date) { **this**.dateAdded = date;}

**public** **void** setColors(List<Color> colors) { **this**.colors = colors;}

**public** **void** setFinance(Set<Finance> finance) { **this**.finance = finance;}

**public** **void** setPdescrip(PDescription pdescrip) { **this**.pdescrip = pdescrip;}

}

**Class Finance**

**package** com.ecommerce;

**public** **class** Finance {

**private** **long** FINANCEID;

**private** String name;

**private** String ftype;

**public** Finance() {

}

**public** Finance(String name, String ftype) {

**this**.FINANCEID = 0;

**this**.name = name;

**this**.ftype = ftype;

}

**public** **long** getFINANCEID() {**return** **this**.FINANCEID; }

**public** String getName() { **return** **this**.name;}

**public** String getFtype() { **return** **this**.ftype;}

**public** **void** setFINANCEID(**long** id) { **this**.FINANCEID = id;}

**public** **void** setName(String name) { **this**.name = name;}

**public** **void** setFtype(String ftype) { **this**.ftype= ftype;}

}

**OS class**

**package** com.ecommerce;

**public** **class** OS {

**private** **long** OSID;

**private** String name;

**public** OS() {

}

**public** OS(String name) {

**this**.OSID = 0;

**this**.name = name;

}

**public** **long** getOSID() {**return** **this**.OSID; }

**public** String getName() { **return** **this**.name;}

**public** **void** setOSID(**long** id) { **this**.OSID = id;}

**public** **void** setName(String name) { **this**.name= name;}

}

**ScreenSizes Class**

**package** com.ecommerce;

**public** **class** ScreenSizes {

**private** **long** SCREENID;

**private** String size;

**public** ScreenSizes() {

}

**public** ScreenSizes(String size) {

**this**.SCREENID = 0;

**this**.size = size;

}

**public** **long** getSCREENID() {**return** **this**.SCREENID; }

**public** String getSize() { **return** **this**.size;}

**public** **void** setSCREENID(**long** id) { **this**.SCREENID = id;}

**public** **void** setSize(String size) { **this**.size = size;}

}

HibernateUtil class

**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***;

}

}

Color.hbm.xml

<?xml version=*"1.0"*?>

<!DOCTYPE hibernate-mapping PUBLIC

"-//Hibernate/Hibernate Mapping DTD 3.0//EN"

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

<hibernate-mapping package=*"com.ecommerce"*>

<class name=*"Color"* table=*"colors"*>

<id name=*"COLORID"* type=*"long"* column=*"ID"*>

<generator class=*"identity"*/>

</id>

<property name=*"name"* type=*"string"* column=*"COLOR\_NAME"*/>

</class>

</hibernate-mapping>

EProduct.hbm.xml

<?xml version=*"1.0"*?>

<!DOCTYPE hibernate-mapping PUBLIC

"-//Hibernate/Hibernate Mapping DTD 3.0//EN"

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

<hibernate-mapping package=*"com.ecommerce"*>

<class name=*"EProduct"* table=*"eproduct"*>

<id name=*"ID"* type=*"long"* column=*"ID"*>

<generator class=*"identity"*/>

</id>

<property name=*"name"* type=*"string"* column=*"NAME"*/>

<property name=*"price"* type=*"big\_decimal"* column=*"PRICE"*/>

<property name=*"dateAdded"* type=*"timestamp"* column=*"DATE\_ADDED"*/>

<list name=*"colors"* cascade=*"all"* lazy=*"true"*>

<key column=*"product\_id"* />

<list-index column=*"idx"* />

<one-to-many class=*"com.ecommerce.Color"* />

</list>

<bag name=*"screensizes"* cascade=*"all"* lazy=*"true"*>

<key column=*"product\_id"*></key>

<one-to-many class=*"com.ecommerce.ScreenSizes"*/>

</bag>

<set name = *"os"* cascade=*"all"* lazy=*”true”*>

<key column = *"product\_id"*/>

<one-to-many class=*"OS"*/>

</set>

<map name = *"finance"* cascade=*"all"*>

<key column = *"product\_id"*/>

<index column = *"ftype"* type = *"string"*/>

<one-to-many class=*"com.ecommerce.Finance"*/>

</map>

</class>

</hibernate-mapping>

Finance.hbm.xml

<?xml version=*"1.0"*?>

<!DOCTYPE hibernate-mapping PUBLIC

"-//Hibernate/Hibernate Mapping DTD 3.0//EN"

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

<hibernate-mapping package=*"com.ecommerce"*>

<class name=*"Finance"* table=*"finance"*>

<id name=*"FINANCEID"* type=*"long"* column=*"ID"*>

<generator class=*"identity"*/>

</id>

<property name=*"name"* type=*"string"* column=*"NAME"*/>

<property name=*"ftype"* type=*"string"* column=*"FTYPE"*/>

</class>

</hibernate-mapping>

Os.hbm.xml

<?xml version=*"1.0"*?>

<!DOCTYPE hibernate-mapping PUBLIC

"-//Hibernate/Hibernate Mapping DTD 3.0//EN"

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

<hibernate-mapping package=*"com.ecommerce"*>

<class name=*"OS"* table=*"os"*>

<id name=*"OSID"* type=*"long"* column=*"ID"*>

<generator class=*"identity"*/>

</id>

<property name=*"name"* type=*"string"* column=*"NAME"*/>

</class>

</hibernate-mapping>

ScreenSizes.hbm.xml

<?xml version=*"1.0"*?>

<!DOCTYPE hibernate-mapping PUBLIC

"-//Hibernate/Hibernate Mapping DTD 3.0//EN"

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

<hibernate-mapping package=*"com.ecommerce"*>

<class name=*"ScreenSizes"* table=*"screensizes"*>

<id name=*"SCREENID"* type=*"long"* column=*"ID"*>

<generator class=*"identity"*/>

</id>

<property name=*"size"* type=*"string"* column=*"SIZE"*/>

</class>

</hibernate-mapping>

hibernate.cfg.xml

<?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"*>root</property>

<property name=*"connection.password"*>master</property>

<mapping resource=*"com/ecommerce/EProduct.hbm.xml"*/>

<mapping resource=*"com/ecommerce/Color.hbm.xml"*/>

<mapping resource=*"com/ecommerce/ScreenSizes.hbm.xml"*/>

<mapping resource=*"com/ecommerce/Os.hbm.xml"*/>

<mapping resource=*"com/ecommerce/Finance.hbm.xml"*/>

</session-factory>

</hibernate-configuration>

**HTML**

<!DOCTYPE html>

<html>

<head>

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

<title>Hibernate Collection Mapping With XML</title>

</head>

<body>

<a href=*"details"*>Product Details</a><br>

</body>

</html>

ProductDetails servlet

**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.math.BigDecimal;

**import** java.util.ArrayList;

**import** java.util.Calendar;

**import** java.util.Collection;

**import** java.util.List;

**import** java.util.Map;

**import** java.util.Set;

**import** org.hibernate.Session;

**import** org.hibernate.SessionFactory;

**import** org.hibernate.Transaction;

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

**import** com.ecommerce.Color;

**import** com.ecommerce.EProduct;

**import** com.ecommerce.Finance;

**import** com.ecommerce.HibernateUtil;

**import** com.ecommerce.PDescription;

/\*\*

\* Servlet implementation class ProductDetails

\*/

@WebServlet("/ProductDetails")

**public** **class** ProductDetails **extends** HttpServlet {

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

/\*\*

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

\*/

**public** ProductDetails() {

**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** {

SessionFactory factory = HibernateUtil.*getSessionFactory*();

Session session = factory.openSession();

List<EProduct> list = session.createQuery("from EProduct").list();

PrintWriter out = response.getWriter();

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

out.println("<b>One to One Mapping</b><br>");

**for**(EProduct p: list) {

out.println("ID: " + String.*valueOf*(p.getID()) + ", Name: " + p.getName() +

", Price: " + String.*valueOf*(p.getPrice()) + ", Date Added: " + p.getDateAdded().toString());

PDescription descrip = p.getPdescrip();

out.println("<br>Description:" + descrip.getDescrip());

out.println("<hr>");

}

out.println("<b>One to Many and Many to One Mapping</b><br>");

**for**(EProduct p: list) {

out.println("ID: " + String.*valueOf*(p.getID()) + ", Name: " + p.getName() +

", Price: " + String.*valueOf*(p.getPrice()) + ", Date Added: " + p.getDateAdded().toString());

List<Color> colors = p.getColors();

out.println("<br>Colors: <ul>");

**for**(Color c: colors) {

out.print("<li>" + c.getName() + "</li>");

}

out.println("</ul>");

out.println("<hr>");

}

out.println("<b>Many to Many Mapping</b><br>");

**for**(EProduct p: list) {

out.println("ID: " + String.*valueOf*(p.getID()) + ", Name: " + p.getName() +

", Price: " + String.*valueOf*(p.getPrice()) + ", Date Added: " + p.getDateAdded().toString());

Set<Finance> finances= p.getFinance();

out.println("<br>Finance Options : <ul>");

**for**(Finance f: finances) {

out.print("<li>" + f.getFtype() + "</li>");

}

out.println("</ul>");

out.println("<hr>");

}

session.close();

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);

}

}

web.xml

<?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>HibernateLazyCollections</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>ProductDetails</servlet-name>

<servlet-class>ProductDetails</servlet-class>

</servlet>

<servlet-mapping>

<servlet-name>ProductDetails</servlet-name>

<url-pattern>/details</url-pattern>

</servlet-mapping>

</web-app>