

Q. 1) Define a JPA entity class named `Product` that maps to a database table named `products`. The `Product` entity should have the following attributes:

- `id` (Primary Key)
- `name`
- `price`

Use appropriate JPA annotations to map the entity to the database table.

-> Set up a Hibernate configuration file (`hibernate.cfg.xml`) to configure the data source, connection properties, and dialect. Ensure that Hibernate is set to create/update the database schema automatically.

-> Write Java code to perform CRUD (Create, Read, Update, Delete) operations on the `Product` entity using Hibernate. Implement methods to:

- Insert a new product into the database.
- Retrieve a product by its ID.
- Update the details of a product.
- Delete a product by its ID.

Program:

Entity Class(POJO)

```
package com.LabQuiz.labProject;

import javax.persistence.Column;
import javax.persistence.Entity;
import javax.persistence.Id;

@Entity
public class Product {
    @Id
    //attributes: id (Primary Key)of product
    private int id;

    @Column
    //attributes: name of product
    private String name;
    @Column
    //attributes: price of product
    private float price;

    //Getters and setters
    public int getId() {
        return id;
    }
    public void setId(int id) {
        this.id = id;
    }
    public String getName() {
        return name;
    }
    public void setName(String name) {
        this.name = name;
    }
    public float getPrice() {
        return price;
    }
    public void setPrice(float price) {
        this.price = price;
    }

    @Override
    public String toString() {
        return "Product [id=" + id + ", name=" + name + ", price=" + price + "];"
    }
}
```

```
}
```

Hibernate configuration file (`hibernate.cfg.xml`) to configure the data source, connection properties, and dialect. Ensure that Hibernate is set to create/update the database schema automatically.

```
<?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 configuration-->
<property name="connection.driver_class">com.mysql.cj.jdbc.Driver</property>
<property name="connection.url">jdbc:mysql://localhost:3306/labassessment</property>
<property name="connection.user">root</property>
<property name="connection.password">1234</property>

<!--Dialect config-->
<property name="dialect">org.hibernate.dialect.MySQL8Dialect</property>
<property name="hbm2ddl.auto">update</property>

<!--printing query in console if it is true-->
<property name="show_sql">true</property>

<!-- Mapping Configuration-->
<mapping class="com.LabQuiz.labProject.Product"/>

</session-factory>
</hibernate-configuration>
```

Java code to perform CRUD (Create, Read, Update, Delete) operations on the `Product` entity using Hibernate. Implement methods to:

- Insert a new product into the database.
- Update the details of a product.

```
package com.LabQuiz.labProject;

import org.hibernate.Session;
import org.hibernate.SessionFactory;
import org.hibernate.Transaction;
import org.hibernate.cfg.Configuration;

public class App
{
    public static void main( String[] args )
    {
        //Insert a new product into the database.

        Product pr = new Product();
        pr.setId(101);
        pr.setName("Biscuit");
        pr.setPrice(20);

        //step 1
        Configuration con = new Configuration();
        con.configure("hibernate.cfg.xml");
        //step 2
```

```

SessionFactory factory = con.buildSessionFactory();
//step 3
Session session = factory.openSession();

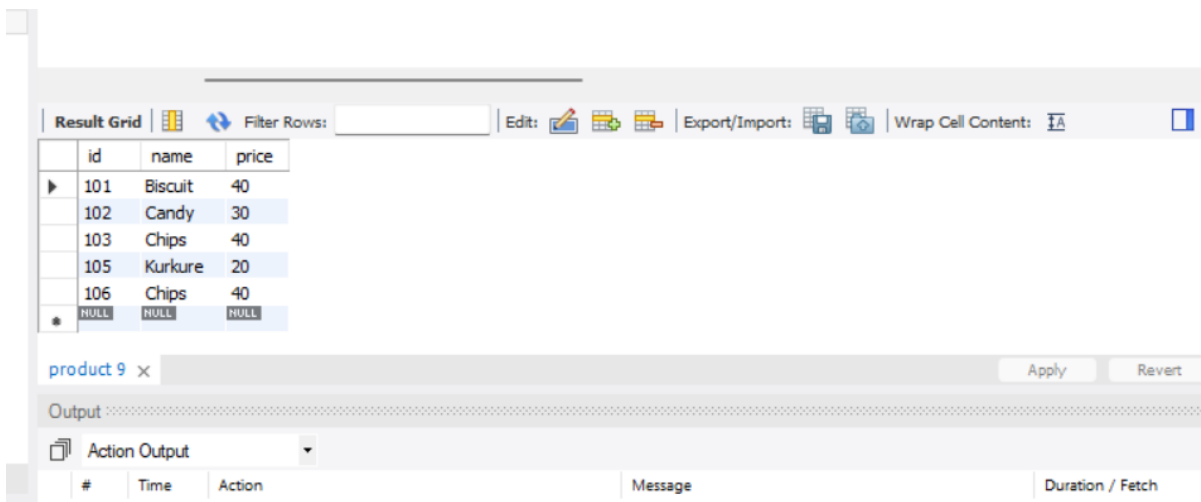
session.persist(pr);

//TCL
Transaction tx = session.beginTransaction();
tx.commit();

//closing
factory.close();
session.close();

}
}

```



The screenshot shows a Java IDE interface. At the top, there's a 'Result Grid' window displaying a table of products. Below it, there's an 'Output' window showing log messages.

id	name	price
101	Biscuit	40
102	Candy	30
103	Chips	40
105	Kurkure	20
106	Chips	40
NULL	NULL	NULL

Below the table, there's a tab labeled 'product 9' with 'Apply' and 'Revert' buttons. The 'Output' window shows a list of log messages, including 'Hibernate ORM core version 6.0.0.Alpha8' and 'Using dialect: org.hibernate.dialect.MySQL8Dialect'.

```

<terminated> App (2) [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (01-Oct-2023, 11:51:22 pm - 11:51:24 pm) [pid: 1576]
Oct 01, 2023 11:51:22 PM org.hibernate.Version logVersion
INFO: HHH0000412: Hibernate ORM core version 6.0.0.Alpha8
Oct 01, 2023 11:51:22 PM org.hibernate.annotations.common.reflection.java.JavaReflectionManager <clinit>
INFO: HCANN000001: Hibernate Commons Annotations {5.1.2.Final}
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl configure
WARN: HHH10001002: Using built-in connection pool (not intended for production use)
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001005: Loaded JDBC driver class: com.mysql.cj.jdbc.Driver
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001012: Connecting with JDBC URL [jdbc:mysql://localhost:3306/labassessment]
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001001: Connection properties: {password=****, user=root}
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001003: Autocommit mode: false
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl$PooledConnections <init>
INFO: HHH10001115: Connection pool size: 20 (min=1)
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.dialect.internal.DialectFactoryImpl logSelectedDialect
INFO: HHH0000400: Using dialect: org.hibernate.dialect.MySQL8Dialect
Oct 01, 2023 11:51:23 PM org.hibernate.engine.jdbc.dialect.internal.DialectFactoryImpl logSelectedDialect
WARN: HHH90000025: MySQL8Dialect has been deprecated; use org.hibernate.dialect.MySQLDialect instead
Oct 01, 2023 11:51:23 PM org.hibernate.resource.transaction.backend.jdbc.internal.DdlTransactionIsolatorNonJtaImpl getIsolatedConnection
INFO: HHH10001501: Connection obtained from JdbcConnectionAccess [org.hibernate.engine.jdbc.env.internal.JdbcEnvironmentInitiator$ConnectionProv
Oct 01, 2023 11:51:23 PM org.hibernate.engine.transaction.jta.platform.internal.JtaPlatformInitiator initiateService
INFO: HHH0000490: Using JtaPlatform implementation: [org.hibernate.engine.transaction.jta.platform.internal.NoJtaPlatform]
Hibernate: insert into Product (name, price, id) values (?, ?, ?)
Oct 01, 2023 11:51:24 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl$PoolState stop
INFO: HHH10001008: Cleaning up connection pool [jdbc:mysql://localhost:3306/labassessment]

```

- Retrieve a product by its ID.

```
package com.LabQuiz.labProject;
```

```
import org.hibernate.Session;
```

```

import org.hibernate.SessionFactory;
import org.hibernate.cfg.Configuration;

public class App1 {

    public static void main(String[] args) {

        //Retrieve a product by its ID.
        Product pr = new Product();

        Configuration con = new Configuration();
        con.configure("hibernate.cfg.xml");
        SessionFactory fact = con.buildSessionFactory();
        Session session = fact.openSession();

        Product p = session.get(Product.class,101);
        System.out.println(p);

        // ToString() -> gather info of object

        session.close();
        fact.close();

    }

}

```

```

<terminated> App1 (1) [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (01-Oct-2023, 11:57:56 pm - 11:57:58 pm) [pid: 8424]
Oct 01, 2023 11:57:56 PM org.hibernate.Version logVersion
INFO: HHH0000412: Hibernate ORM core version 6.0.0.Alpha8
Oct 01, 2023 11:57:57 PM org.hibernate.annotations.common.reflection.java.JavaReflectionManager <clinit>
INFO: HCANN000001: Hibernate Commons Annotations {5.1.2.Final}
Oct 01, 2023 11:57:57 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl configure
WARN: HHH10001002: Using built-in connection pool (not intended for production use)
Oct 01, 2023 11:57:57 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001005: Loaded JDBC driver class: com.mysql.cj.jdbc.Driver
Oct 01, 2023 11:57:57 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001012: Connecting with JDBC URL [jdbc:mysql://localhost:3306/labassessment]
Oct 01, 2023 11:57:58 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001001: Connection properties: {password=****, user=root}
Oct 01, 2023 11:57:57 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001003: Autocommit mode: false
Oct 01, 2023 11:57:57 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl$PooledConnections <init>
INFO: HHH10001115: Connection pool size: 20 (min=1)
Oct 01, 2023 11:57:57 PM org.hibernate.engine.jdbc.dialect.internal.DialectFactoryImpl logSelectedDialect
INFO: HHH0000400: Using dialect: org.hibernate.dialect.MySQL8Dialect
Oct 01, 2023 11:57:57 PM org.hibernate.engine.jdbc.dialect.internal.DialectFactoryImpl logSelectedDialect
WARN: HHH90000025: MySQL8Dialect has been deprecated; use org.hibernate.dialect.MySQLDialect instead
Oct 01, 2023 11:57:58 PM org.hibernate.resource.transaction.backend.jdbc.internal.DdlTransactionIsolatorNonJtaImpl getIsolatedConnection
INFO: HHH10001501: Connection obtained from JdbcConnectionAccess [org.hibernate.engine.jdbc.env.internal.JdbcEnvironmentInitiator$ConnectionProvider
Oct 01, 2023 11:57:58 PM org.hibernate.engine.transaction.jta.platform.internal.JtaPlatformInitiator initiateService
INFO: HHH0000490: Using JtaPlatform implementation: [org.hibernate.engine.transaction.jta.platform.internal.NoJtaPlatform]
Hibernate: select pl_0.id, pl_0.name, pl_0.price from Product as pl_0 where pl_0.id = ?
Product [id=101, name=Biscuit, price=40.0]
Oct 01, 2023 11:57:58 PM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl$PoolState stop
INFO: HHH10001008: Cleaning up connection pool [jdbc:mysql://localhost:3306/labassessment]

```

- Delete a product by its ID.

```

package com.LabQuiz.labProject;

import org.hibernate.Session;
import org.hibernate.SessionFactory;
import org.hibernate.Transaction;
import org.hibernate.cfg.Configuration;

public class App2 {

    public static void main(String[] args) {

        //Delete a product by its ID.

```

```

Configuration con = new Configuration();
con.configure("hibernate.cfg.xml");
SessionFactory factory = con.buildSessionFactory();
Session session = factory.openSession();

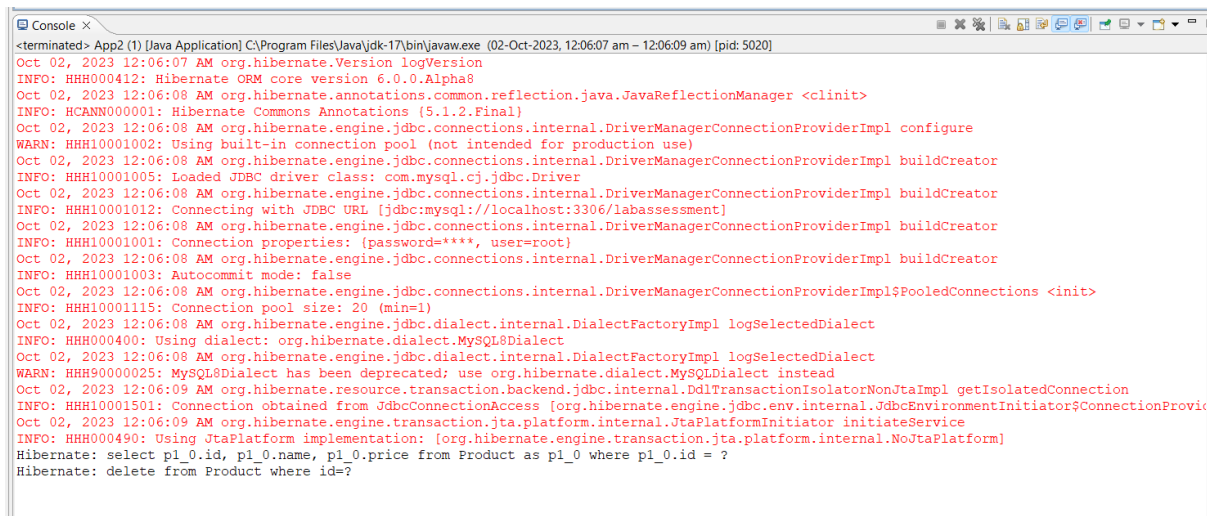
//load
Product st = session.get(Product.class,104);

Transaction trans = session.beginTransaction();
// remove() , delete()
//session.delete();
session.remove(st);
session.getTransaction();
trans.commit();

}

}

```



The screenshot shows a Java console window titled "Console x" with the following content:

```

<terminated> App2 (1) [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (02-Oct-2023, 12:06:07 am - 12:06:09 am) [pid: 5020]
Oct 02, 2023 12:06:07 AM org.hibernate.Version logVersion
INFO: HHH0000412: Hibernate ORM core version 6.0.0.Alpha8
Oct 02, 2023 12:06:08 AM org.hibernate.annotations.common.reflection.java.JavaReflectionManager <clinit>
INFO: HCANN0000001: Hibernate Commons Annotations (5.1.2.Final)
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl configure
WARN: HHH10001002: Using built-in connection pool (not intended for production use)
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001005: Loaded JDBC driver class: com.mysql.cj.jdbc.Driver
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001012: Connecting with JDBC URL [jdbc:mysql://localhost:3306/labassessment]
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001001: Connection properties: (password=****, user=root)
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl buildCreator
INFO: HHH10001003: Autocommit mode: false
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.connections.internal.DriverManagerConnectionProviderImpl$PooledConnections <init>
INFO: HHH10001115: Connection pool size: 20 (min=1)
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.dialect.internal.DialectFactoryImpl logSelectedDialect
INFO: HHH000400: Using dialect: org.hibernate.dialect.MySQL8Dialect
Oct 02, 2023 12:06:08 AM org.hibernate.engine.jdbc.dialect.internal.DialectFactoryImpl logSelectedDialect
WARN: HHH90000025: MySQL8Dialect has been deprecated; use org.hibernate.dialect.MySQLDialect instead
Oct 02, 2023 12:06:09 AM org.hibernate.resource.transaction.backend.jdbc.internal.DdlTransactionIsolatorNonJtaImpl getIsolatedConnection
INFO: HHH10001501: Connection obtained from JdbcConnectionAccess [org.hibernate.engine.jdbc.env.internal.JdbcEnvironmentInitiator$ConnectionProvid
Oct 02, 2023 12:06:09 AM org.hibernate.engine.transaction.jta.platform.internal.JtaPlatformInitiator initiateService
INFO: HHH000490: Using JtaPlatform implementation: [org.hibernate.engine.transaction.jta.platform.internal.NoJtaPlatform]
Hibernate: select p1_0.id, p1_0.name, p1_0.price from Product as p1_0 where p1_0.id = ?
Hibernate: delete from Product where id=?

```