Experiment -9

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Subject Name: Project-Based Learning in Java with Lab **Subject Code: 22CSH-359**

9.1.1.Aim: To demonstrate dependency injection using Spring Framework with Java-based configuration.

9.1.2 Objective:

Define Course and Student classes.
Use Configuration and Bean annotations to inject dependencies. Load Spring context and print student details.

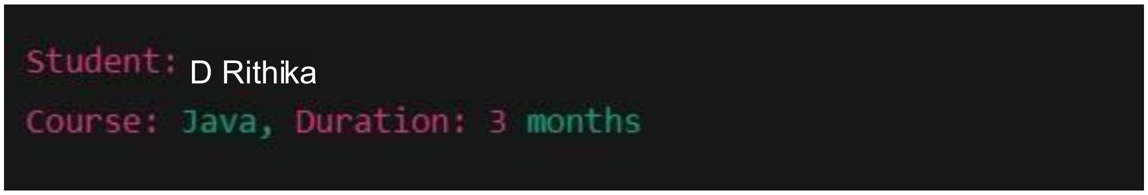
9.1.3 Code: // Course.java

```
public class Course { private
String courseName; private
String duration;

   public Course(String courseName, String duration) {  this.courseName
      = courseName; this.duration
      = duration;
   }

   public String getCourseName() { return courseName; } public
   String getDuration() { return duration; }

   @Override
   public String toString() { return "Course: " + courseName + ",
      Duration: " + duration;
   }
}
```

```
// Student.java public class
Student { private String
          name;          private
Course course; public
Student(String       name,
Course        course)        {
this.name      =       name;
this.course = course;
    }

    public void showDetails() {
        System.out.println("Student: " + name);
        System.out.println(course);
    }
}//      AppConfig.java     import org.springframework.context.annotation.*;

@Configuration     public
class AppConfig {  @Bean
    public Course course() { return new Course("Java", "3
        months");
    }

    @Bean
    public Student student() { return new Student("Rits",
    course()); }
}// MainApp.java
import          org.springframework.context.ApplicationContext;  import
org.springframework.context.annotation.AnnotationConfigApplicationContext;

public class MainApp { public static void
    main(String[]     args)   {
    ApplicationContext context = new
AnnotationConfigApplicationContext(AppConfig.class); Student
        student = context.getBean(Student.class);
        student.showDetails();
    }
```

}

Output:



```
Student: D Rithika
Course: Java, Duration: 3 months
```

9.2.1 Aim: To perform CRUD operations on a Student entity using Hibernate ORM with MySQL.

Objective: Define Course and Student classes.

Use Configuration and Bean annotations to inject dependencies.

Load Spring context and print student details.

9.2.2 Code:

```
        <hibernate-configuration>
            <session-factory>
                <property
name="hibernate.connection.driver_class">com.mysql.cj.jdbc.Driver</property>
                <property
name="hibernate.connection.url">jdbc:mysql://localhost:3306/testdb</property>
                <property name="hibernate.connection.username">root</property>
                <property name="hibernate.connection.password">password</property>
                <property
name="hibernate.dialect">org.hibernate.dialect.MySQL8Dialect</property>
                <property name="hibernate.hbm2ddl.auto">update</property>
                <mapping class="Student"/>
            </session-factory>
        </hibernate-configuration> import

javax.persistence.*;

Entity
```

```
public class Student {
    Id
    GeneratedValue(strategy = GenerationType.IDENTITY) private
    int id; private String name; private int age;

    public     Student()     {}         public
    Student(String    name,    int    age)    {
    this.name = name; this.age = age;
    }
    // Getters, setters, toString
}  import org.hibernate.SessionFactory;
import
org.hibernate.cfg.Configuration;

public class HibernateUtil { private static final SessionFactory
    sessionFactory;

    static                {                sessionFactory                =                new
       Configuration().configure().buildSessionFactory();
    }

    public static SessionFactory getSessionFactory() { return
       sessionFactory;
    }
}                    import

org.hibernate.*;

public class MainCRUD { public static void
    main(String[] args) {
       Session session = HibernateUtil.getSessionFactory().openSession();

       // Create
       Transaction tx = session.beginTransaction(); Student
       s1 = new Student("D Rithika", 22);
       session.save(s1);
```

```
tx.commit();

// Read
Student student = session.get(Student.class, 1);
System.out.println(student);
```

```
// Update  tx =
session.beginTransaction();
student.setAge(23);
session.update(student);
tx.commit();

// Delete
tx        =        session.beginTransaction(); session.delete(student);
```

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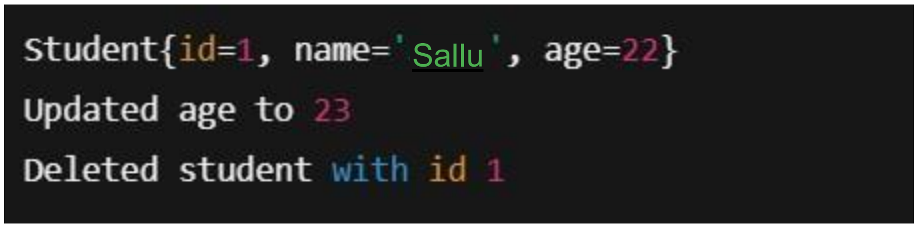
```
        tx.commit();

        session.close();
    }
}
```

9.2.3 Output:



```
Student{id=1, name='Sallu', age=22}
Updated age to 23
Deleted student with id 1
```

9.3.1 Aim: To implement a banking system using Spring and Hibernate that ensures transaction consistency during fund transfers.

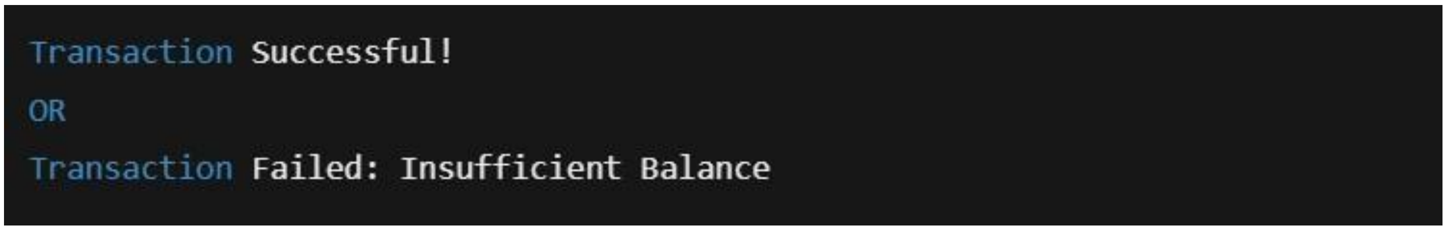
Objective:

Integrate Spring + Hibernate.
Handle transactions atomically (rollback on failure). Demonstrate success and failure cases.

Code:

```
import javax.persistence.*;

Entity
public  class  Account  {  @Id
   private int accountId; private
   String  holderName;  private
   double balance;

   // Constructors, getters, setters
}

import javax.persistence.*; import
java.util.Date;

@Entity  public class
BankTransaction { @Id
   @GeneratedValue(strategy = GenerationType.IDENTITY)
   private  int  txnId;  private  int  fromAcc;  private  int  toAcc;
   private double amount;
   private Date txnDate = new Date();

   // Constructors, getters, setters
}  import org.hibernate.*;  import
org.springframework.transaction.annotation.Transactional;
```

```
public class BankService { private SessionFactory
    sessionFactory;

    public BankService(SessionFactory sessionFactory) {
    this.sessionFactory = sessionFactory; }

    @Transactional  public void transferMoney(int fromId, int toId, double amount)
    { Session session = sessionFactory.getCurrentSession();

        Account from = session.get(Account.class, fromId); Account to
        = session.get(Account.class, toId);

        if   (from.getBalance()   <   amount)   {   throw   new
        RuntimeException("Insufficient Balance"); }

        from.setBalance(from.getBalance() - amount); to.setBalance(to.getBalance()
        + amount);

        session.update(from);
        session.update(to);

        BankTransaction txn = new BankTransaction(fromId, toId, amount); session.save(txn);
    }
}
@Configuration
@EnableTransactionManagement public
class AppConfig {
    @Bean
    public DataSource dataSource() {
        DriverManagerDataSource       ds      =      new   DriverManagerDataSource();
        ds.setDriverClassName("com.mysql.cj.jdbc.Driver");
        ds.setUrl("jdbc:mysql://localhost:3306/testdb");                 ds.setUsername("root");
        ds.setPassword("password");
        return ds;
    }

    @Bean
    public LocalSessionFactoryBean sessionFactory() {
        LocalSessionFactoryBean         lsf =   new LocalSessionFactoryBean();
        lsf.setDataSource(dataSource());
        lsf.setPackagesToScan("your.package");    Properties    props    =    new
        Properties();  props.put("hibernate.dialect",
         "org.hibernate.dialect.MySQL8Dialect"); props.put("hibernate.hbm2ddl.auto",
         "update"); lsf.setHibernateProperties(props); return lsf;  }

    @Bean
    public HibernateTransactionManager transactionManager(SessionFactory sf) { return
    new HibernateTransactionManager(sf); }

    @Bean
    public BankService bankService(SessionFactory sf) { return new
        BankService(sf);
    }
}

public class MainApp { public static void
    main(String[] args) {
        AnnotationConfigApplicationContext ctx = new
AnnotationConfigApplicationContext(AppConfig.class);
        BankService service = ctx.getBean(BankService.class);

        try { service.transferMoney(101, 102, 500);
            System.out.println("Transaction Successful!");
        } catch (Exception e) {
            System.out.println("Transaction Failed: " + e.getMessage());
        }
```



```
Transaction Successful!
OR
Transaction Failed: Insufficient Balance
```

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```
        ctx.close();
    }
}
```

OUTPUT