Experiment 9

Student Name: Keshav **UID: 22BCS14552**
Branch: B.E. CSE **Section/Group: KRG - 2 B**
Semester: 6th **Date of Performance: 24/03/25**
Subject Name: PBLJ LAB **Subject Code: 22CSH-359**

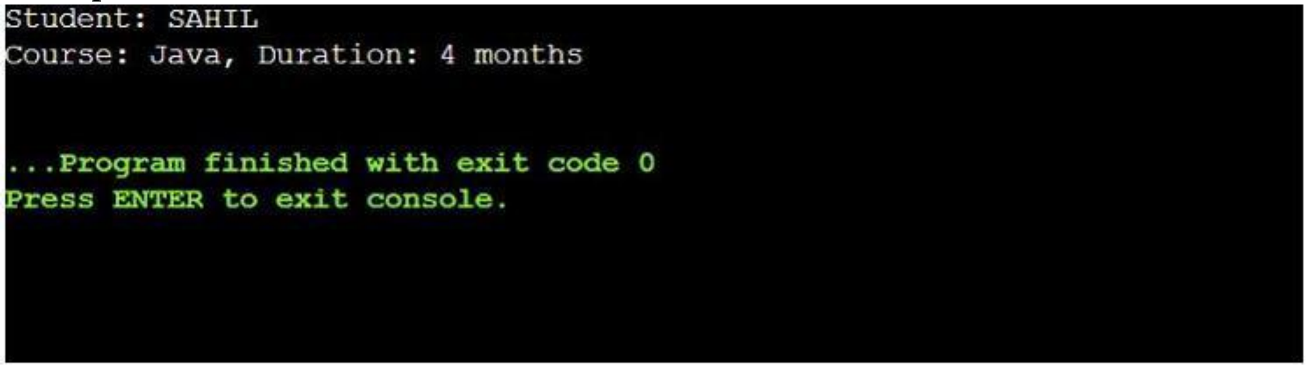
1. **Aim:** To demonstrate dependency injection using Spring Framework with Java-based configuration.

2. **Implementation/Code:**

```
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;
   }
}

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);
   }
}

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("Aman", course());
}
}
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();
   }
}
```

3. Output:



```
Student: SAHIL
Course: Java, Duration: 4 months


...Program finished with exit code 0
Press ENTER to exit console.
```

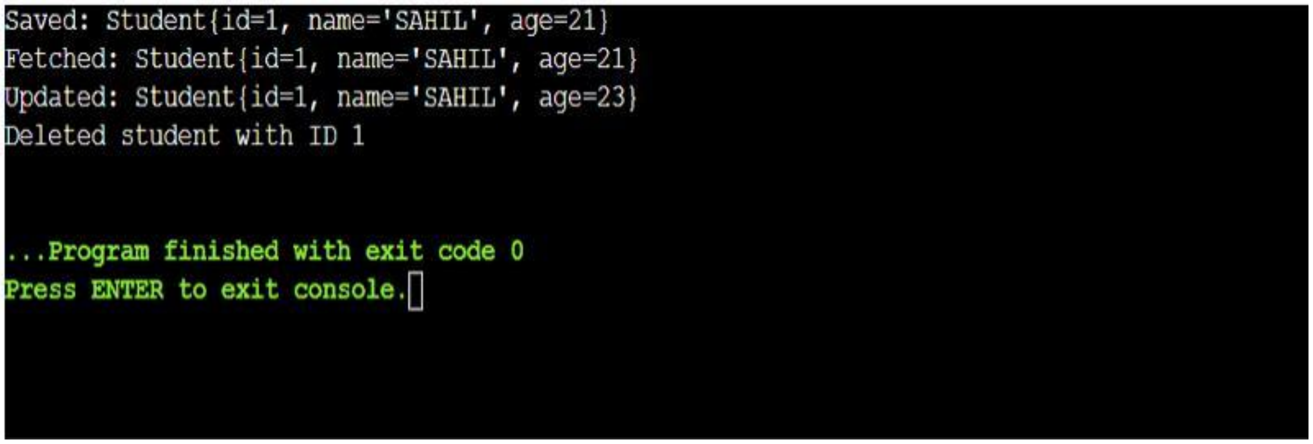
1. **Aim:** To perform CRUD operations on a Student entity using Hibernate ORM with MySQL.

2. Implementation/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;
    }
}
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();
        Transaction tx = session.beginTransaction();
        Student s1 = new Student("Aman", 22);
        session.save(s1);
        tx.commit();
        Student student = session.get(Student.class, 1);
        System.out.println(student);
        tx = session.beginTransaction();
        student.setAge(23);
        session.update(student);
        tx.commit();
        tx = session.beginTransaction();
        session.delete(student);
        tx.commit();
        session.close();
    }
}
```

3. Output:



```
Saved: Student{id=1, name='SAHIL', age=21}
Fetched: Student{id=1, name='SAHIL', age=21}
Updated: Student{id=1, name='SAHIL', age=23}
Deleted student with ID 1


...Program finished with exit code 0
Press ENTER to exit console.
```

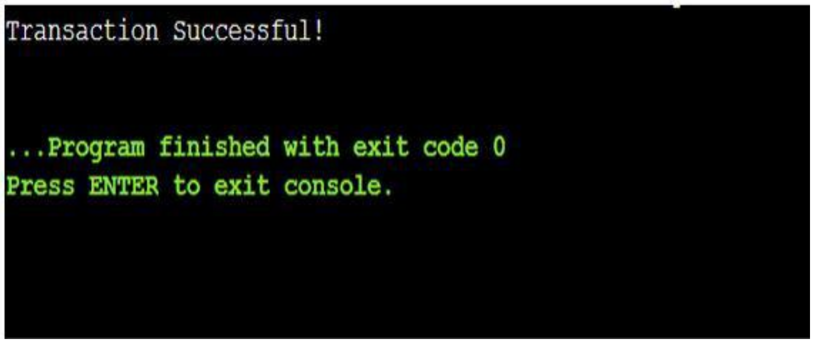
1. **Aim:** To implement a banking system using Spring and Hibernate that ensures transaction consistency during fund transfers.

2. Implementation/Code:

```
import javax.persistence.*;

@Entity
public class Account {
   @Id
   private int accountId;
   private String holderName;
   private double balance;
}
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();
}
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());
        }
        ctx.close();
    }
}
```

3. Output:



```
Transaction Successful!


...Program finished with exit code 0
Press ENTER to exit console.
```