ASSIGNMENT – 1

Student Information System (SIS)

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Task 1: Define Classes

Student.java

```
package com.hexaware.sis.model;

import java.util.*;

public class Student {
   private int studentId;
   private String firstName;
   private String lastName;
   private Date dateOfBirth;
   private String email;
   private String phoneNumber;

   private List<Enrollment> enrollments = new ArrayList<>();
   private List<Payment> payments = new ArrayList<>();

   public Student(int studentId, String firstName, String lastName, Date dateOfBirth, String email,
String phoneNumber) {
      this.studentId = studentId;
      this.firstName = firstName;
      this.lastName = lastName;
      this.dateOfBirth = dateOfBirth;
      this.email = email;
      this.phoneNumber = phoneNumber;
```

```
    }

}
```

Course.java

```
package com.hexaware.sis.model;

import java.util.*;

public class Course {
    private int courseId;
    private String courseName;
    private String courseCode;
    private String instructorName;
    private Teacher teacher;

    private List<Enrollment> enrollments = new ArrayList<>();

    public Course(int courseId, String courseName, String courseCode, String instructorName) {
        this.courseId = courseId;
        this.courseName = courseName;
        this.courseCode = courseCode;
        this.instructorName = instructorName;
    }
}
```

Enrollment.java

```
package com.hexaware.sis.model;
```

```
import java.util.*;

public class Enrollment {
    private int enrollmentId;
    private Student student;
    private Course course;
    private Date enrollmentDate;

    public Enrollment(int enrollmentId, Student student, Course course, Date enrollmentDate) {
        this.enrollmentId = enrollmentId;
        this.student = student;
        this.course = course;
        this.enrollmentDate = enrollmentDate;
    }

}
```

Teacher.java

```
package com.hexaware.sis.model;
import java.util.*;
public class Teacher {
    private int teacherId;
    private String firstName;
    private String lastName;
    private String email;

    private List<Course> assignedCourses = new ArrayList<>();

    public Teacher(int teacherId, String firstName, String lastName, String email) {
        this.teacherId = teacherId;
        this.firstName = firstName;

        this.lastName = lastName;

        this.email = email;

    } }
```

Payment.java

```
package com.hexaware.sis.model;

import java.util.*;

public class Payment {
    private int paymentId;
    private Student student;
    private double amount;
    private Date paymentDate;

    public Payment(int paymentId, Student student, double amount, Date paymentDate) {
        this.paymentId = paymentId;
        this.student = student;
        this.amount = amount;
        this.paymentDate = paymentDate;
    }
}
```

Task 2: Implement Constructors

Already covered in each class above.

Task 3: Implement Methods

Student.java

```
package com.hexaware.sis.model;

import java.time.LocalDate;
import java.util.ArrayList;
import java.util.List;

public class Student {
   private int studentId;
   private String firstName;
   private String lastName;
   private LocalDate dateOfBirth;
   private String email;
   private String phoneNumber;
   private List<Enrollment> enrollments = new ArrayList<>();
   private List<Payment> payments = new ArrayList<>();

   public Student(int studentId, String firstName, String lastName, LocalDate dateOfBirth, String
email, String phoneNumber) {
      this.studentId = studentId;
      this.firstName = firstName;
      this.lastName = lastName;
      this.dateOfBirth = dateOfBirth;
      this.email = email;
      this.phoneNumber = phoneNumber;
```

```
    }

    public void enrollInCourse(Course course, int enrollmentId, LocalDate enrollmentDate) {
        Enrollment enrollment = new Enrollment(enrollmentId, this, course, enrollmentDate);
        enrollments.add(enrollment);
        course.getEnrollments().add(enrollment);
    }

    public void updateStudentInfo(String firstName, String lastName, LocalDate dateOfBirth, String
email, String phoneNumber) {
        this.firstName = firstName;
        this.lastName = lastName;
        this.dateOfBirth = dateOfBirth;
        this.email = email;
        this.phoneNumber = phoneNumber;
    }

    public void makePayment(int paymentId, double amount, LocalDate paymentDate) {
        Payment payment = new Payment(paymentId, this, amount, paymentDate);
        payments.add(payment);
    }

    public void displayStudentInfo() {
        System.out.println("Student ID: " + studentId);
        System.out.println("Name: " + firstName + " " + lastName);
        System.out.println("DOB: " + dateOfBirth);
        System.out.println("Email: " + email);
        System.out.println("Phone: " + phoneNumber);
    }

    public List<Course> getEnrolledCourses() {
        List<Course> courses = new ArrayList<>();
        for (Enrollment enrollment : enrollments) {
            courses.add(enrollment.getCourse());
        }
        return courses;
    }

    public List<Payment> getPaymentHistory() {
        return payments;
    }

    public int getStudentId() {
        return studentId;
    }

    public List<Enrollment> getEnrollments() {
        return enrollments;
    }
}
```

Course.java

```
package com.hexaware.sis.model;

import java.util.ArrayList;
import java.util.List;

public class Course {
    private int courseId;
    private String courseName;
    private String courseCode;
    private Teacher instructor;
    private List<Enrollment> enrollments = new ArrayList<>();

    public Course(int courseId, String courseName, String courseCode, Teacher instructor) {
        this.courseId = courseId;
        this.courseName = courseName;
        this.courseCode = courseCode;
        this.instructor = instructor;
    }

    public void assignTeacher(Teacher teacher) {
        this.instructor = teacher;
        teacher.getAssignedCourses().add(this);
    }

    public void updateCourseInfo(String courseCode, String courseName, String instructorName) {
        this.courseCode = courseCode;
        this.courseName = courseName;
    }

    public void displayCourseInfo() {
        System.out.println("Course ID: " + courseId);
        System.out.println("Name: " + courseName);
        System.out.println("Code: " + courseCode);
        if (instructor != null) {
            System.out.println("Instructor: " + instructor.getFirstName() + " " + instructor.getLastName());
        }
    }

    public List<Enrollment> getEnrollments() {
        return enrollments;
    }

    public Teacher getTeacher() {
        return instructor;
    }

    public String getCourseName() {
        return courseName;
    }

    public String getCourseCode() {
        return courseCode;
    }
}
```

Enrollment.java

```
package com.hexaware.sis.model;

import java.time.LocalDate;

public class Enrollment {
    private int enrollmentId;
    private Student student;
    private Course course;
    private LocalDate enrollmentDate;

    public Enrollment(int enrollmentId, Student student, Course course, LocalDate enrollmentDate) {
        this.enrollmentId = enrollmentId;
        this.student = student;
        this.course = course;
        this.enrollmentDate = enrollmentDate;
    }

    public Student getStudent() {
        return student;
    }

    public Course getCourse() {
        return course;
    }

    public int getEnrollmentId() {
        return enrollmentId;
    }

    public LocalDate getEnrollmentDate() {
        return enrollmentDate;
    }
}
```

Teacher.java

```
package com.hexaware.sis.model;

import java.util.ArrayList;
import java.util.List;

public class Teacher {
    private int teacherId;
    private String firstName;
    private String lastName;
    private String email;

    private String expertise;

    private List<Course> assignedCourses = new ArrayList<>();


    public Teacher(int teacherId, String firstName, String lastName, String email, String expertise) {

       this.teacherId = teacherId;

       this.firstName = firstName;

       this.lastName = lastName;

       this.email = email;

       this.expertise = expertise;

    }


    public void updateTeacherInfo(String name, String email, String expertise) {

       String[] names = name.split(" ");

       this.firstName = names[0];

       this.lastName = names.length > 1 ? names[1] : "";

       this.email = email;

       this.expertise = expertise;

    }


    public void displayTeacherInfo() {

       System.out.println("Teacher ID: " + teacherId);

       System.out.println("Name: " + firstName + " " + lastName);

       System.out.println("Email: " + email);

       System.out.println("Expertise: " + expertise);

    }


    public List<Course> getAssignedCourses() {

       return assignedCourses;

    }
```

```
    public String getFirstName() {
        return firstName;
    }

    public String getLastName() {
        return lastName;
    }
}
```

Payment.java

```
package com.hexaware.sis.model;

import java.time.LocalDate;

public class Payment {
    private int paymentId;
    private Student student;
    private double amount;
    private LocalDate paymentDate;

    public Payment(int paymentId, Student student, double amount, LocalDate paymentDate) {
        this.paymentId = paymentId;
        this.student = student;
        this.amount = amount;
        this.paymentDate = paymentDate;
    }

    public Student getStudent() {
        return student;
    }
    public double getPaymentAmount() {
        return amount;
    }

    public LocalDate getPaymentDate() {
        return paymentDate;
    }
}
```

Task 4: Exceptions handling and Custom Exceptions

DuplicateEnrollmentException.java

```
package com.hexaware.sis.exception;

public class DuplicateEnrollmentException extends Exception {
    public DuplicateEnrollmentException(String message) {
        super(message);
    }
}
```

CourseNotFoundException.java

```
package com.hexaware.sis.exception;

public class CourseNotFoundException extends Exception {
    public CourseNotFoundException(String message) {
        super(message);
    }
}
```

StudentNotFoundException.java

```
package com.hexaware.sis.exception;

public class StudentNotFoundException extends Exception {
    public StudentNotFoundException(String message) {
        super(message);
    }
}
```

TeacherNotFoundException.java

```
package com.hexaware.sis.exception;

public class TeacherNotFoundException extends Exception {
    public TeacherNotFoundException(String message) {
        super(message);
    }
}
```

PaymentValidationException.java

```
package com.hexaware.sis.exception;

public class PaymentValidationException extends Exception {
    public PaymentValidationException(String message) {
        super(message);
    }
}
```

InvalidStudentDataException.java

```
package com.hexaware.sis.exception;

public class InvalidStudentDataException extends Exception {
    public InvalidStudentDataException(String message) {
        super(message);
    }
}
```

InvalidCourseDataException.java

```
package com.hexaware.sis.exception;

public class InvalidCourseDataException extends Exception {
    public InvalidCourseDataException(String message) {
        super(message);
    }
}
```

InvalidEnrollmentDataException.java

```
package com.hexaware.sis.exception;

public class InvalidEnrollmentDataException extends Exception {
    public InvalidEnrollmentDataException(String message) {
        super(message);
    }
}
```

InvalidTeacherDataException.java

```
package com.hexaware.sis.exception;

public class InvalidTeacherDataException extends Exception {
    public InvalidTeacherDataException(String message) {
        super(message);
    }
}
```

InsufficientFundsException.java

```
package com.hexaware.sis.exception;

public class InsufficientFundsException extends Exception {
    public InsufficientFundsException(String message) {
        super(message);
    }
}
```

Task 5: Collections

Student.java

```
package com.hexaware.sis.model;

import java.time.LocalDate;
import java.util.ArrayList;
import java.util.List;

public class Student {
    private int studentId;
    private String firstName;
    private String lastName;
    private LocalDate dateOfBirth;
    private String email;
    private String phoneNumber;

    private List<Enrollment> enrollments;
    private List<Payment> payments;

    public Student(int studentId, String firstName, String lastName, LocalDate dateOfBirth, String
email, String phoneNumber) {
        this.studentId = studentId;
        this.firstName = firstName;
        this.lastName = lastName;
        this.dateOfBirth = dateOfBirth;
        this.email = email;
        this.phoneNumber = phoneNumber;
        this.enrollments = new ArrayList<>();
        this.payments = new ArrayList<>();
    }

    public int getStudentId() { return studentId; }
    public void setStudentId(int studentId) { this.studentId = studentId; }

    public String getFirstName() { return firstName; }
    public void setFirstName(String firstName) { this.firstName = firstName; }

    public String getLastName() { return lastName; }
    public void setLastName(String lastName) { this.lastName = lastName; }

    public LocalDate getDateOfBirth() { return dateOfBirth; }
    public void setDateOfBirth(LocalDate dateOfBirth) { this.dateOfBirth = dateOfBirth; }

    public String getEmail() { return email; }
    public void setEmail(String email) { this.email = email; }

    public String getPhoneNumber() { return phoneNumber; }
    public void setPhoneNumber(String phoneNumber) { this.phoneNumber = phoneNumber; }

    public List<Enrollment> getEnrollments() { return enrollments; }
    public void setEnrollments(List<Enrollment> enrollments) { this.enrollments = enrollments; }

    public List<Payment> getPayments() { return payments; }
    public void setPayments(List<Payment> payments) { this.payments = payments; }

    public void addEnrollment(Enrollment enrollment) {
        enrollments.add(enrollment);
    }

    public void addPayment(Payment payment) {
        payments.add(payment);
    }
}
```

Course.java

```
package com.hexaware.sis.model;

import java.util.ArrayList;
import java.util.List;

public class Course {
```

```
private int courseId;
private String courseName;
private String courseCode;
private String instructorName;

private List<Enrollment> enrollments;

public Course(int courseId, String courseName, String courseCode, String instructorName) {
   this.courseId = courseId;
   this.courseName = courseName;
   this.courseCode = courseCode;
   this.instructorName = instructorName;
   this.enrollments = new ArrayList<>();
}

public int getCourseId() { return courseId; }
public void setCourseId(int courseId) { this.courseId = courseId; }

public String getCourseName() { return courseName; }
public void setCourseName(String courseName) { this.courseName = courseName; }

public String getCourseCode() { return courseCode; }
public void setCourseCode(String courseCode) { this.courseCode = courseCode; }

public String getInstructorName() { return instructorName; }
public void setInstructorName(String instructorName) { this.instructorName = instructorName; }

public List<Enrollment> getEnrollments() { return enrollments; }
public void setEnrollments(List<Enrollment> enrollments) { this.enrollments = enrollments; }

public void addEnrollment(Enrollment enrollment) {
        enrollments.add(enrollment);
    }
}
```

Enrollment.java

```
package com.hexaware.sis.model;

import java.time.LocalDate;

public class Enrollment {
    private int enrollmentId;
    private Student student;
    private Course course;
    private LocalDate enrollmentDate;

    public Enrollment(int enrollmentId, Student student, Course course, LocalDate enrollmentDate) {
        this.enrollmentId = enrollmentId;
        this.student = student;
        this.course = course;
        this.enrollmentDate = enrollmentDate;
    }

    public int getEnrollmentId() { return enrollmentId; }
    public void setEnrollmentId(int enrollmentId) { this.enrollmentId = enrollmentId; }

    public Student getStudent() { return student; }
    public void setStudent(Student student) { this.student = student; }

    public Course getCourse() { return course; }
    public void setCourse(Course course) { this.course = course; }
    public LocalDate getEnrollmentDate() { return enrollmentDate; }
    public void setEnrollmentDate(LocalDate enrollmentDate) { this.enrollmentDate = enrollmentDate;
}
}
```

Teacher.java

```
package com.hexaware.sis.model;

import java.util.ArrayList;
import java.util.List;

public class Teacher {
    private int teacherId;
    private String firstName;
    private String lastName;
    private String email;

    private List<Course> assignedCourses;

    public Teacher(int teacherId, String firstName, String lastName, String email) {
        this.teacherId = teacherId;
        this.firstName = firstName;
        this.lastName = lastName;
        this.email = email;
        this.assignedCourses = new ArrayList<>();
    }

    public int getTeacherId() { return teacherId; }
    public void setTeacherId(int teacherId) { this.teacherId = teacherId; }
    public String getFirstName() { return firstName; }
    public void setFirstName(String firstName) { this.firstName = firstName; }

    public String getLastName() { return lastName; }
    public void setLastName(String lastName) { this.lastName = lastName; }

    public String getEmail() { return email; }
    public void setEmail(String email) { this.email = email; }

    public List<Course> getAssignedCourses() { return assignedCourses; }
    public void setAssignedCourses(List<Course> assignedCourses) { this.assignedCourses =
assignedCourses; }

    public void assignCourse(Course course) {
        assignedCourses.add(course);
    }
}
```

Payment.java

```
package com.hexaware.sis.model;

import java.time.LocalDate;

public class Payment {
    private int paymentId;
    private Student student;
    private double amount;
    private LocalDate paymentDate;

    public Payment(int paymentId, Student student, double amount, LocalDate paymentDate) {
        this.paymentId = paymentId;
        this.student = student;
        this.amount = amount;
        this.paymentDate = paymentDate;
    }

    public int getPaymentId() { return paymentId; }
    public void setPaymentId(int paymentId) { this.paymentId = paymentId; }

    public Student getStudent() { return student; }
    public void setStudent(Student student) { this.student = student; }

    public double getAmount() { return amount; }
    public void setAmount(double amount) { this.amount = amount; }

    public LocalDate getPaymentDate() { return paymentDate; }
    public void setPaymentDate(LocalDate paymentDate) { this.paymentDate = paymentDate; }
}
```

Task 6: Create Methods for Managing Relationships

SISService.java

```
package com.hexaware.sis.service;

import com.hexaware.sis.model.*;
import com.hexaware.sis.exception.*;

import java.time.LocalDate;
import java.util.*;
```

```
public class SISService {

    private List<Student> students;
    private List<Course> courses;
    private List<Teacher> teachers;
    private List<Enrollment> enrollments;
    private List<Payment> payments;

    public SISService() {
        students = new ArrayList<>();
        courses = new ArrayList<>();
        teachers = new ArrayList<>();
        enrollments = new ArrayList<>();
        payments = new ArrayList<>();
    }

    public void addStudent(Student student) {
        students.add(student);
    }

    public void addCourse(Course course) {
        courses.add(course);
    }

    public void addTeacher(Teacher teacher) {
        teachers.add(teacher);
    }

    public void addEnrollment(Student student, Course course, LocalDate enrollmentDate) throws
DuplicateEnrollmentException {
        for (Enrollment e : enrollments) {
            if (e.getStudent().getStudentId() == student.getStudentId() &&
                e.getCourse().getCourseId() == course.getCourseId()) {
                throw new DuplicateEnrollmentException("Student already enrolled in this course.");
            }
        }

        Enrollment enrollment = new Enrollment(enrollments.size() + 1, student, course,
enrollmentDate);
        enrollments.add(enrollment);
        student.getEnrollments().add(enrollment);
        course.getEnrollments().add(enrollment);
    }

    public void assignCourseToTeacher(Course course, Teacher teacher) {
        course.setInstructorName(teacher.getFirstName() + " " + teacher.getLastName());
        teacher.getAssignedCourses().add(course);
    }

    public void addPayment(Student student, double amount, LocalDate paymentDate) throws
PaymentValidationException {
        if (amount <= 0) {
            throw new PaymentValidationException("Payment amount must be greater than 0.");
        }

        Payment payment = new Payment(payments.size() + 1, student, amount, paymentDate);
        payments.add(payment);
        student.getPayments().add(payment);
    }

    public List<Enrollment> getEnrollmentsForStudent(Student student) {
        List<Enrollment> result = new ArrayList<>();
        for (Enrollment e : enrollments) {
            if (e.getStudent().getStudentId() == student.getStudentId()) {
                result.add(e);
            }
        }
        return result;
    }

    public List<Course> getCoursesForTeacher(Teacher teacher) {
        return teacher.getAssignedCourses();
    }

    // Utility methods to fetch entities
    public Student getStudentById(int id) throws StudentNotFoundException {
        return students.stream()
                .filter(s -> s.getStudentId() == id)
                .findFirst()
                .orElseThrow(() -> new StudentNotFoundException("Student with ID " + id + " not found."));
    }

    public Course getCourseByCode(String code) throws CourseNotFoundException {
        return courses.stream()
                .filter(c -> c.getCourseCode().equals(code))
                .findFirst()
                .orElseThrow(() -> new CourseNotFoundException("Course with code " + code + " not
found."));
    }

    public Teacher getTeacherByEmail(String email) throws TeacherNotFoundException {
        return teachers.stream()
                .filter(t -> t.getEmail().equals(email))
                .findFirst()
            .orElseThrow(() -> new TeacherNotFoundException("Teacher with email " + email + " not found."));
    }


    public List<Student> getAllStudents() {
        return students;
    }


    public List<Course> getAllCourses() {
        return courses;
    }


    public List<Enrollment> getAllEnrollments() {
        return enrollments;
    }


    public List<Teacher> getAllTeachers() {
        return teachers;
    }


    public List<Payment> getAllPayments() {
        return payments;
    }
}
```

Task 7: Database Connectivity

1.DBUtil.java

```
package com.hexaware.sis.util;
```

```
import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.SQLException;


public class DBUtil {


    private static final String url =
"jdbc:mysql://localhost:3306/sis?useSSL=false&allowPublicKeyRetrieval=true&serverTimezone=UTC"
;

    private static final String USERNAME = "root";

    private static final String PASSWORD = "deva1234"; // Replace with your password


    public static Connection getConnection() throws SQLException {

        return DriverManager.getConnection(URL, USERNAME, PASSWORD);

    }

}
```

2.DatabaseInitializer.java

```
package com.hexaware.sis.dao;


import com.hexaware.sis.util.DBUtil;


import java.sql.Connection;

import java.sql.Statement;


public class DatabaseInitializer {


    public static void initializeDatabase() {

        try (Connection conn = DBUtil.getConnection(); Statement stmt = conn.createStatement()) {


            String createStudentTable = "CREATE TABLE IF NOT EXISTS student (" +
        "student_id INT PRIMARY KEY AUTO_INCREMENT," +
        "first_name VARCHAR(50)," +
        "last_name VARCHAR(50)," +
        "dob DATE," +
        "email VARCHAR(100)," +
        "phone VARCHAR(20))";

String createCourseTable = "CREATE TABLE IF NOT EXISTS course (" +
        "course_id INT PRIMARY KEY AUTO_INCREMENT," +
        "course_name VARCHAR(100)," +
        "course_code VARCHAR(20)," +
        "instructor_name VARCHAR(100))";

String createTeacherTable = "CREATE TABLE IF NOT EXISTS teacher (" +
        "teacher_id INT PRIMARY KEY AUTO_INCREMENT," +
        "first_name VARCHAR(50)," +
        "last_name VARCHAR(50)," +
        "email VARCHAR(100)," +
        "expertise VARCHAR(100))";

String createEnrollmentTable = "CREATE TABLE IF NOT EXISTS enrollment (" +
        "enrollment_id INT PRIMARY KEY AUTO_INCREMENT," +
        "student_id INT," +
        "course_id INT," +
        "enrollment_date DATE," +
        "FOREIGN KEY(student_id) REFERENCES student(student_id)," +
        "FOREIGN KEY(course_id) REFERENCES course(course_id))";

String createPaymentTable = "CREATE TABLE IF NOT EXISTS payment (" +
        "payment_id INT PRIMARY KEY AUTO_INCREMENT," +
        "student_id INT," +
                "amount DECIMAL(10,2)," +
                "payment_date DATE," +
                "FOREIGN KEY(student_id) REFERENCES student(student_id))";

            stmt.execute(createStudentTable);
            stmt.execute(createCourseTable);
            stmt.execute(createTeacherTable);
            stmt.execute(createEnrollmentTable);
            stmt.execute(createPaymentTable);

            System.out.println("Database initialized successfully!");

        } catch (Exception e) {
            e.printStackTrace();
        }
    }
}
```

3.QueryBuilder

```
package com.hexaware.sis.dao;

public class QueryBuilder {

    public static String buildSelectQuery(String tableName, String[] columns, String condition, String
orderBy) {
        StringBuilder query = new StringBuilder("SELECT ");

        if (columns == null || columns.length == 0) {
            query.append("*");
        } else {
            query.append(String.join(", ", columns));
        }

        query.append(" FROM ").append(tableName);

        if (condition != null && !condition.trim().isEmpty()) {
            query.append(" WHERE ").append(condition);
        }

        if (orderBy != null && !orderBy.trim().isEmpty()) {
            query.append(" ORDER BY ").append(orderBy);
        }

        return query.toString();
    }
}
```

4.SISMain.java

```
package com.hexaware.sis.main;

import com.hexaware.sis.dao.DatabaseInitializer;

public class SISMain {
    public static void main(String[] args) {
        DatabaseInitializer.initializeDatabase();
    }
}
```

Task 8: Student Enrollment

StudentDAO.java

```
package com.hexaware.sis.dao;


import java.sql.*; // and other imports

import com.hexaware.sis.model.*;

import com.hexaware.sis.util.DBUtil;


public class StudentDAO {

  // class contents


        public int addStudent(Student student) {

          String sql = "INSERT INTO student (first_name, last_name, date_of_birth, email,
phone_number) VALUES (?, ?, ?, ?, ?)";

          try (Connection conn = DBUtil.getConnection();

             PreparedStatement ps = conn.prepareStatement(sql,
Statement.RETURN_GENERATED_KEYS)) {

            ps.setString(1, student.getFirstName());

            ps.setString(2, student.getLastName());

            ps.setDate(3, new java.sql.Date(student.getDateOfBirth().getTime()));

            ps.setString(4, student.getEmail());

            ps.setString(5, student.getPhoneNumber());


            ps.executeUpdate();


            ResultSet rs = ps.getGeneratedKeys();

            if (rs.next()) {

              return rs.getInt(1); // Return generated student_id

            }

          } catch (SQLException e) {

            e.printStackTrace();

          }

          return -1;
```

```
            }

}
```

CourseDAO.java

```
package com.hexaware.sis.dao;

import java.sql.*; // and other imports
import com.hexaware.sis.model.*;
import com.hexaware.sis.util.DBUtil;

public class CourseDAO {
   // class contents
            public Course getCourseByName(String name) {
               String sql = "SELECT * FROM course WHERE course_name = ?";
               try (Connection conn = DBUtil.getConnection();
                    PreparedStatement ps = conn.prepareStatement(sql)) {
                  ps.setString(1, name);
                  ResultSet rs = ps.executeQuery();
                  if (rs.next()) {
                     return new Course(rs.getInt("course_id"), rs.getString("course_name"),
rs.getString("course_code"));
                  }
               } catch (SQLException e) {
                  e.printStackTrace();
               }
               return null;
            }
}
```

EnrollmentDAO.java

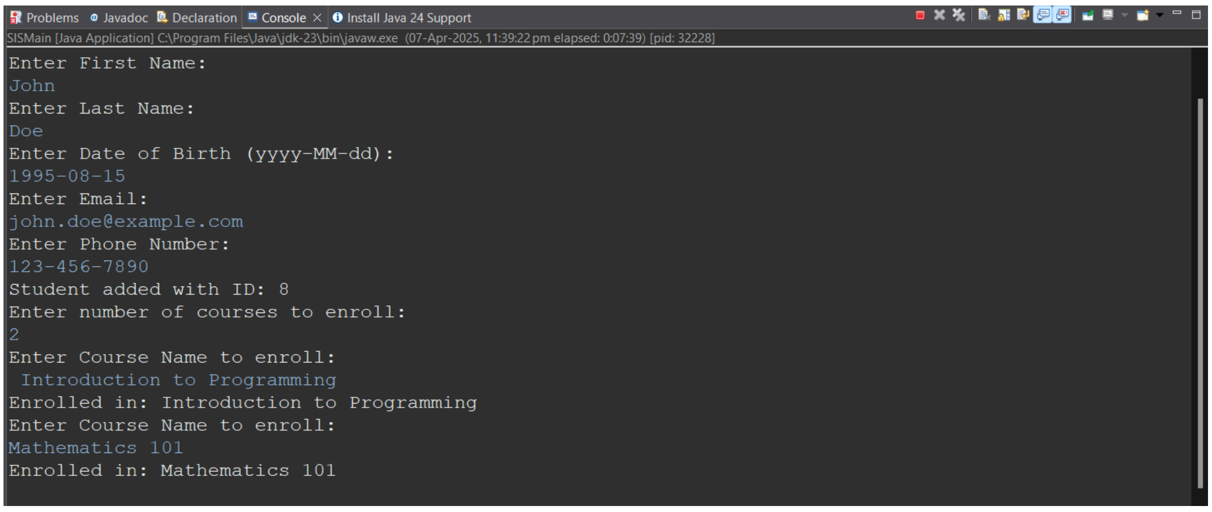
```
package com.hexaware.sis.dao;


import java.sql.*;

import java.util.Date;

import com.hexaware.sis.util.DBUtil;


public class EnrollmentDAO {

  // class contents

        public void enrollStudent(int studentId, int courseId, Date date) {

          String sql = "INSERT INTO enrollment (student_id, course_id, enrollment_date) VALUES (?,
?, ?)";

          try (Connection conn = DBUtil.getConnection();

             PreparedStatement ps = conn.prepareStatement(sql)) {

            ps.setInt(1, studentId);

            ps.setInt(2, courseId);

            ps.setDate(3, new java.sql.Date(date.getTime()));

            ps.executeUpdate();

          } catch (SQLException e) {

            e.printStackTrace();

          }

        }

}
```

SISMain.java

```
package com.hexaware.sis.main;
```

```
import com.hexaware.sis.dao.*;
import com.hexaware.sis.model.*;

import java.text.SimpleDateFormat;
import java.util.Date;
import java.util.Scanner;

public class SISMain {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        StudentDAO studentDAO = new StudentDAO();
        CourseDAO courseDAO = new CourseDAO();
        EnrollmentDAO enrollmentDAO = new EnrollmentDAO();

        try {
            // Input student details
            System.out.println("Enter First Name:");
            String firstName = sc.nextLine();

            System.out.println("Enter Last Name:");
            String lastName = sc.nextLine();

            System.out.println("Enter Date of Birth (yyyy-MM-dd):");
            String dobStr = sc.nextLine();
            Date dob = new SimpleDateFormat("yyyy-MM-dd").parse(dobStr);

            System.out.println("Enter Email:");
            String email = sc.nextLine();

            System.out.println("Enter Phone Number:");
            String phone = sc.nextLine();

            // Create student object and save to DB
            Student student = new Student(0, firstName, lastName, dob, email, phone);
            int studentId = studentDAO.addStudent(student);
            System.out.println("Student added with ID: " + studentId);

            // Input course names to enroll
            System.out.println("Enter number of courses to enroll:");
            int courseCount = Integer.parseInt(sc.nextLine());

            for (int i = 0; i < courseCount; i++) {
                System.out.println("Enter Course Name to enroll:");
                String courseName = sc.nextLine().trim();
                Course course = courseDAO.getCourseByName(courseName);
                if (course != null) {
                    enrollmentDAO.enrollStudent(studentId, course.getCourseId(), new Date());
                    System.out.println("Enrolled in: " + courseName);
                } else {
                    System.out.println("Course not found: " + courseName);
                }
            }
        } catch (Exception e) {
            e.printStackTrace();
        } finally {
            sc.close();
        }
    }
}
```

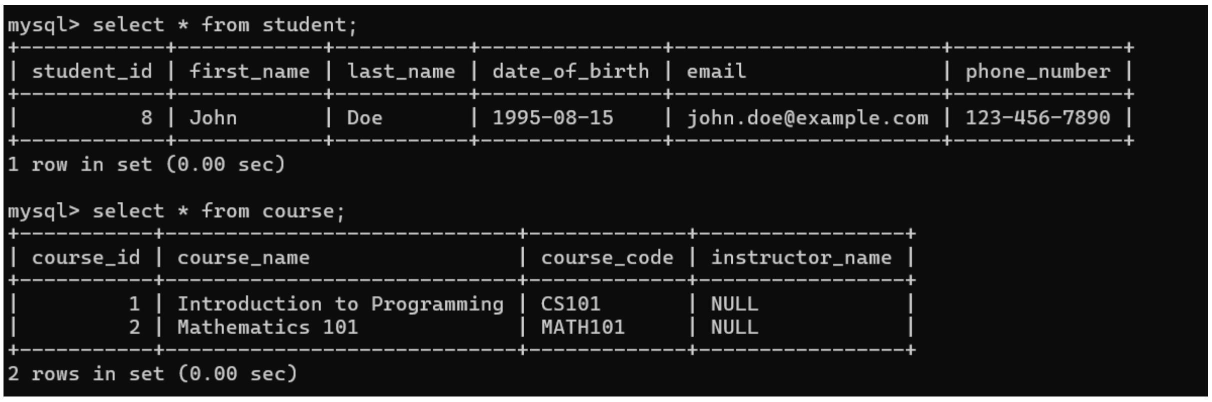
INPUT:



Problems
Javadoc
Declaration
Console
Install Java 24 Support
SISMain [Java Application] C:\Program Files\Java\jdk-23\bin\javaw.exe (07-Apr-2025, 11:39:22 pm elapsed: 0:07:39) [pid: 32228]

```
Enter First Name:
John
Enter Last Name:
Doe
Enter Date of Birth (yyyy-MM-dd):
1995-08-15
Enter Email:
john.doe@example.com
Enter Phone Number:
123-456-7890
Student added with ID: 8
Enter number of courses to enroll:
2
Enter Course Name to enroll:
 Introduction to Programming
Enrolled in: Introduction to Programming
Enter Course Name to enroll:
Mathematics 101
Enrolled in: Mathematics 101
```

OUPUT:



```
mysql> select * from student;
+------------+------------+-----------+---------------+----------------------+--------------+
| student_id | first_name | last_name | date_of_birth | email                | phone_number |
+------------+------------+-----------+---------------+----------------------+--------------+
|          8 | John       | Doe       | 1995-08-15    | john.doe@example.com | 123-456-7890 |
+------------+------------+-----------+---------------+----------------------+--------------+
1 row in set (0.00 sec)

mysql> select * from course;
+-----------+-----------------------------+-------------+-----------------+
| course_id | course_name                 | course_code | instructor_name |
+-----------+-----------------------------+-------------+-----------------+
|         1 | Introduction to Programming | CS101       | NULL            |
|         2 | Mathematics 101             | MATH101     | NULL            |
+-----------+-----------------------------+-------------+-----------------+
2 rows in set (0.00 sec)
```

Task 9: Teacher Assignment

TeacherDAO.java

```
package com.hexaware.sis.dao;


import com.hexaware.sis.model.Teacher;

import com.hexaware.sis.util.DBUtil;


import java.sql.*;


public class TeacherDAO {


       public int addTeacher(Teacher teacher) {

         int generatedId = -1;

         try (Connection conn = DBUtil.getConnection();

              PreparedStatement ps = conn.prepareStatement(

                "INSERT INTO teacher (first_name, last_name, email) VALUES (?, ?, ?)",

                Statement.RETURN_GENERATED_KEYS)) {


            ps.setString(1, teacher.getFirstName());

            ps.setString(2, teacher.getLastName());

            ps.setString(3, teacher.getEmail());


            int rows = ps.executeUpdate();

            if (rows > 0) {

              ResultSet rs = ps.getGeneratedKeys();

              if (rs.next()) {
                    generatedId = rs.getInt(1);
                  }
                }
            } catch (SQLException e) {
                e.printStackTrace();
            }
            return generatedId;
          }

}
```

CourseDAO.java

```
package com.hexaware.sis.dao;


import com.hexaware.sis.model.Course;
import com.hexaware.sis.util.DBUtil;


import java.sql.*;
import java.util.ArrayList;
import java.util.List;


public class CourseDAO {
   public int addCourse(Course course) {
        int courseId = -1;
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement stmt = conn.prepareStatement(
                "INSERT INTO course (course_name, course_code, instructor_name) VALUES (?, ?, ?)",
                Statement.RETURN_GENERATED_KEYS)) {


            stmt.setString(1, course.getCourseName());
            stmt.setString(2, course.getCourseCode());
            stmt.setString(3, course.getInstructorName());

            int rows = stmt.executeUpdate();
            if (rows > 0) {
                ResultSet rs = stmt.getGeneratedKeys();
                if (rs.next()) {
                    courseId = rs.getInt(1);
                }
            }
        } catch (SQLException e) {
            e.printStackTrace();
        }
        return courseId;
    }

    public Course getCourseByName(String courseName) {
        Course course = null;
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement stmt = conn.prepareStatement("SELECT * FROM course WHERE
course_name = ?")) {

            stmt.setString(1, courseName);
            ResultSet rs = stmt.executeQuery();
            if (rs.next()) {
                course = new Course(
                    rs.getInt("course_id"),
                    rs.getString("course_name"),
                    rs.getString("course_code"),
                    rs.getString("instructor_name")
                );
            }
        } catch (SQLException e) {
            e.printStackTrace();
        }
        return course;
    }

    public Course getCourseByCode(String courseCode) {
        Course course = null;
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement stmt = conn.prepareStatement("SELECT * FROM course WHERE
course_code = ?")) {

            stmt.setString(1, courseCode);
            ResultSet rs = stmt.executeQuery();
            if (rs.next()) {
                course = new Course(
                    rs.getInt("course_id"),
                    rs.getString("course_name"),
                    rs.getString("course_code"),
                    rs.getString("instructor_name")
                );
            }
        } catch (SQLException e) {
            e.printStackTrace();
        }
        return course;
    }

    public boolean assignTeacherToCourse(int courseId, String instructorName) {
        boolean updated = false;
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement stmt = conn.prepareStatement("UPDATE course SET instructor_name = ?
WHERE course_id = ?")) {

            stmt.setString(1, instructorName);
            stmt.setInt(2, courseId);

            int rows = stmt.executeUpdate();
            updated = rows > 0;
        } catch (SQLException e) {
            e.printStackTrace();
        }
        return updated;
    }

    public List<Course> getAllCourses() {
        List<Course> courseList = new ArrayList<>();
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement stmt = conn.prepareStatement("SELECT * FROM course");
             ResultSet rs = stmt.executeQuery()) {

            while (rs.next()) {
                Course course = new Course(
                    rs.getInt("course_id"),
                    rs.getString("course_name"),
                    rs.getString("course_code"),
                    rs.getString("instructor_name")
                );
                courseList.add(course);
            }
        } catch (SQLException e) {
            e.printStackTrace();
        }
        return courseList;
    }
}
```

SISMain.java

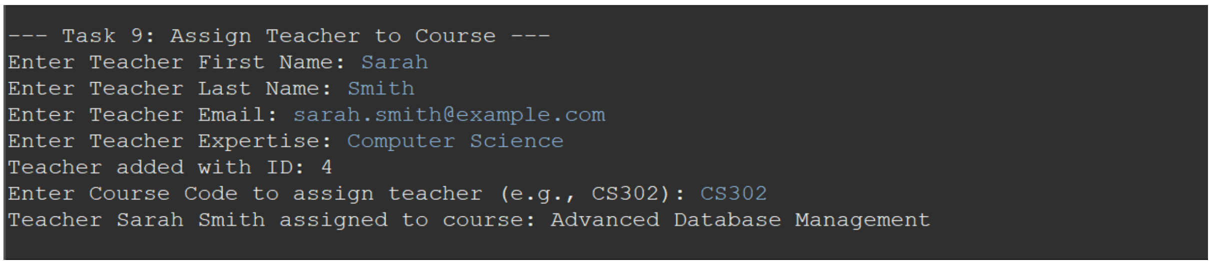
```
package com.hexaware.sis.main;

import com.hexaware.sis.dao.*;
import com.hexaware.sis.model.*;

import java.text.SimpleDateFormat;
import java.util.Date;
import java.util.Scanner;

public class SISMain {
    public static void main(String[] args) {

                //this line will call the DatabaseInitializer.java
                DatabaseInitializer.initializeDatabase();
        Scanner sc = new Scanner(System.in);
        StudentDAO studentDAO = new StudentDAO();
        CourseDAO courseDAO = new CourseDAO();
        EnrollmentDAO enrollmentDAO = new EnrollmentDAO();

        try {
            // ===== Task 8: Student Enrollment =====
            System.out.println("--- Task 8: Student Enrollment ---");

            // Input student details
```

```
System.out.println("Enter First Name:");
String firstName = sc.nextLine();

System.out.println("Enter Last Name:");
String lastName = sc.nextLine();

System.out.println("Enter Date of Birth (yyyy-MM-dd):");
String dobStr = sc.nextLine();
Date dob = new SimpleDateFormat("yyyy-MM-dd").parse(dobStr);

System.out.println("Enter Email:");
String email = sc.nextLine();

System.out.println("Enter Phone Number:");
String phone = sc.nextLine();

// Create student object and save to DB
Student student = new Student(0, firstName, lastName, dob, email, phone);
int studentId = studentDAO.addStudent(student);
System.out.println("Student added with ID: " + studentId);

// Input course names to enroll
System.out.println("Enter number of courses to enroll:");
int courseCount = Integer.parseInt(sc.nextLine());

for (int i = 0; i < courseCount; i++) {
   System.out.println("Enter Course Name to enroll:");
   String courseName = sc.nextLine().trim();
   Course course = courseDAO.getCourseByName(courseName);
   if (course != null) {
      enrollmentDAO.enrollStudent(studentId, course.getCourseId(), new Date());
```

```
        System.out.println("Enrolled in: " + courseName);
    } else {
        System.out.println("Course not found: " + courseName);
    }
}

// ===== Task 9: Teacher Assignment =====
System.out.println("\n--- Task 9: Assign Teacher to Course ---");

System.out.print("Enter Teacher First Name: ");
String teacherFirstName = sc.nextLine();

System.out.print("Enter Teacher Last Name: ");
String teacherLastName = sc.nextLine();

System.out.print("Enter Teacher Email: ");
String teacherEmail = sc.nextLine();

System.out.print("Enter Teacher Expertise: ");
String expertise = sc.nextLine();

Teacher teacher = new Teacher(0, teacherFirstName, teacherLastName, teacherEmail);
TeacherDAO teacherDAO = new TeacherDAO();
int teacherId = teacherDAO.addTeacher(teacher);
if (teacherId != -1) {
    teacher.setTeacherId(teacherId);
    System.out.println("Teacher added with ID: " + teacherId);
} else {
    System.out.println("Failed to add teacher.");
    return;
}
```

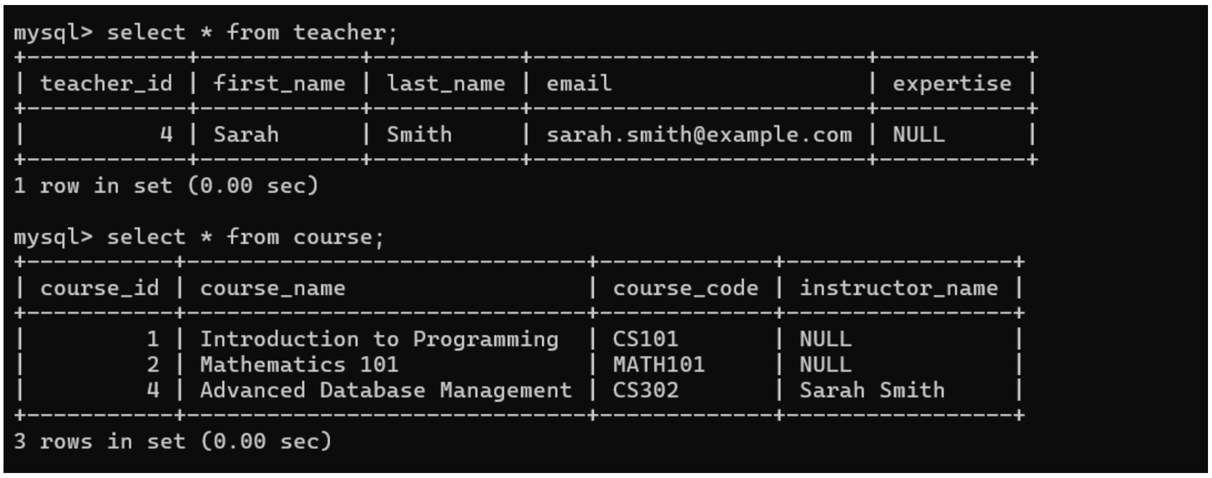
```
            System.out.print("Enter Course Code to assign teacher (e.g., CS302): ");
            String courseCode = sc.nextLine();

            Course courseToUpdate = courseDAO.getCourseByCode(courseCode);

            if (courseToUpdate != null) {
                boolean updated = courseDAO.assignTeacherToCourse(courseToUpdate.getCourseId(),
teacher.getFullName());
                if (updated) {
                    System.out.println("Teacher " + teacher.getFullName() +
                            " assigned to course: " + courseToUpdate.getCourseName());
                } else {
                    System.out.println("Failed to assign teacher to course.");
                }
            } else {
                System.out.println("Course not found with code: " + courseCode);
            }

        } catch (Exception e) {
            e.printStackTrace();
        } finally {
            sc.close();
        }
    }
}
```

INPUT:



```
--- Task 9: Assign Teacher to Course ---
Enter Teacher First Name: Sarah
Enter Teacher Last Name: Smith
Enter Teacher Email: sarah.smith@example.com
Enter Teacher Expertise: Computer Science
Teacher added with ID: 4
Enter Course Code to assign teacher (e.g., CS302): CS302
Teacher Sarah Smith assigned to course: Advanced Database Management
```

OUTPUT:



```
mysql> select * from teacher;
+------------+------------+-----------+-------------------------+-----------+
| teacher_id | first_name | last_name | email                   | expertise |
+------------+------------+-----------+-------------------------+-----------+
|          4 | Sarah      | Smith     | sarah.smith@example.com | NULL      |
+------------+------------+-----------+-------------------------+-----------+
1 row in set (0.00 sec)

mysql> select * from course;
+-----------+------------------------------+-------------+-----------------+
| course_id | course_name                  | course_code | instructor_name |
+-----------+------------------------------+-------------+-----------------+
|         1 | Introduction to Programming  | CS101       | NULL            |
|         2 | Mathematics 101              | MATH101     | NULL            |
|         4 | Advanced Database Management | CS302       | Sarah Smith     |
+-----------+------------------------------+-------------+-----------------+
3 rows in set (0.00 sec)
```

Task 10: Payment Record

Payment.java

```
package com.hexaware.sis.model;

import java.util.Date;

public class Payment {
    private int paymentId;

    private int studentId;

    private double amount;

    private Date paymentDate;


    public Payment(int paymentId, int studentId, double amount, Date paymentDate) {

        this.paymentId = paymentId;

        this.studentId = studentId;

        this.amount = amount;

        this.paymentDate = paymentDate;

    }


    // Getters and setters

    public int getPaymentId() { return paymentId; }

    public void setPaymentId(int paymentId) { this.paymentId = paymentId; }


    public int getStudentId() { return studentId; }

    public void setStudentId(int studentId) { this.studentId = studentId; }


    public double getAmount() { return amount; }

    public void setAmount(double amount) { this.amount = amount; }


    public Date getPaymentDate() { return paymentDate; }

    public void setPaymentDate(Date paymentDate) { this.paymentDate = paymentDate; }

}
```

Teacher.java

```
package com.hexaware.sis.model;
```

```
public class Teacher {
    private int teacherId;
    private String firstName;
    private String lastName;
    private String email;
    private String expertise;

    //  Add this constructor
    public Teacher(int teacherId, String firstName, String lastName, String email, String
expertise) {
        this.teacherId = teacherId;
        this.firstName = firstName;
        this.lastName = lastName;
        this.email = email;
        this.expertise = expertise;
    }

    // Getters and setters
    public int getTeacherId() {
        return teacherId;
    }

    public void setTeacherId(int teacherId) {
        this.teacherId = teacherId;
    }

    public String getFirstName() {
        return firstName;
    }
```

```
public void setFirstName(String firstName) {
    this.firstName = firstName;
}

public String getLastName() {
    return lastName;
}

public void setLastName(String lastName) {
    this.lastName = lastName;
}

public String getEmail() {
    return email;
}

public void setEmail(String email) {
    this.email = email;
}

public String getExpertise() {
    return expertise;
}

public void setExpertise(String expertise) {
    this.expertise = expertise;
}
```

```
    // Optional: helper method for full name
    public String getFullName() {
        return firstName + " " + lastName;
    }
}
```

PaymentDAO.java

```
package com.hexaware.sis.dao;

import com.hexaware.sis.model.Payment;
import com.hexaware.sis.util.DBUtil;

import java.sql.Connection;
import java.sql.PreparedStatement;

public class PaymentDAO {
    public boolean addPayment(Payment payment) {
        String sql = "INSERT INTO payment (student_id, amount, payment_date) VALUES (?, ?, 
?)";
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement ps = conn.prepareStatement(sql)) {
            ps.setInt(1, payment.getStudentId());
            ps.setDouble(2, payment.getAmount());
            ps.setDate(3, new java.sql.Date(payment.getPaymentDate().getTime()));
            int rows = ps.executeUpdate();
            return rows > 0;
        } catch (Exception e) {
            e.printStackTrace();
        }
        return false;
    }
}
```

SISMain.java

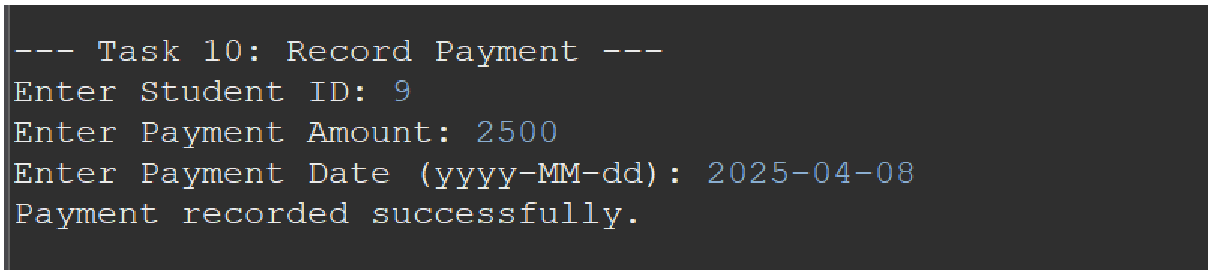
```
package com.hexaware.sis.main;

import com.hexaware.sis.dao.*;
import com.hexaware.sis.model.*;

import java.text.SimpleDateFormat;
import java.util.Date;
import java.util.Scanner;

public class SISMain {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        StudentDAO studentDAO = new StudentDAO();
        CourseDAO courseDAO = new CourseDAO();
        EnrollmentDAO enrollmentDAO = new EnrollmentDAO();
        TeacherDAO teacherDAO = new TeacherDAO();
        PaymentDAO paymentDAO = new PaymentDAO();

        try {
            // --- Task 8: Student Enrollment ---
            System.out.println("--- Task 8: Student Enrollment ---");
            System.out.println("Enter First Name:");
            String firstName = sc.nextLine();

            System.out.println("Enter Last Name:");
            String lastName = sc.nextLine();

            System.out.println("Enter Date of Birth (yyyy-MM-dd):");
            String dobStr = sc.nextLine();
            Date dob = new SimpleDateFormat("yyyy-MM-dd").parse(dobStr);

            System.out.println("Enter Email:");
            String email = sc.nextLine();

            System.out.println("Enter Phone Number:");
            String phone = sc.nextLine();

            Student student = new Student(0, firstName, lastName, dob, email, phone);
            int studentId = studentDAO.addStudent(student);
            System.out.println("Student added with ID: " + studentId);

            System.out.println("Enter number of courses to enroll:");
            int courseCount = Integer.parseInt(sc.nextLine());

            for (int i = 0; i < courseCount; i++) {
               System.out.println("Enter Course Name to enroll:");
               String courseName = sc.nextLine().trim();
               Course course = courseDAO.getCourseByName(courseName);
               if (course != null) {
                  enrollmentDAO.enrollStudent(studentId, course.getCourseId(), new Date());
```

```
        System.out.println("Enrolled in: " + courseName);
    } else {
        System.out.println("Course not found: " + courseName);
    }
}

// --- Task 9: Assign Teacher to Course ---
System.out.println("\n--- Task 9: Assign Teacher to Course ---");

System.out.print("Enter Teacher First Name: ");
String tFirstName = sc.nextLine();

System.out.print("Enter Teacher Last Name: ");
String tLastName = sc.nextLine();

System.out.print("Enter Teacher Email: ");
String tEmail = sc.nextLine();

System.out.print("Enter Teacher Expertise: ");
String expertise = sc.nextLine();

Teacher teacher = new Teacher(0, tFirstName, tLastName, tEmail, expertise);
int teacherId = teacherDAO.addTeacher(teacher);
if (teacherId != -1) {
    teacher.setTeacherId(teacherId);
    System.out.println("Teacher added with ID: " + teacherId);
} else {
    System.out.println("Failed to add teacher.");
    return;
```

```
        }


        System.out.print("Enter Course Code to assign teacher (e.g., CS302): ");
        String courseCode = sc.nextLine();


        Course course = courseDAO.getCourseByCode(courseCode);


        if (course != null) {
            boolean updated = courseDAO.assignTeacherToCourse(course.getCourseId(),
teacher.getFirstName() + " " + teacher.getLastName());
            if (updated) {
                System.out.println("Teacher " + teacher.getFirstName() + " " +
teacher.getLastName() +
                        " assigned to course: " + course.getCourseName());
            } else {
                System.out.println("Failed to assign teacher to course.");
            }
        } else {
            System.out.println("Course not found with code: " + courseCode);
        }


        // --- Task 10: Record Payment ---
        System.out.println("\n--- Task 10: Record Payment ---");


        System.out.print("Enter Student ID: ");
        int payStudentId = Integer.parseInt(sc.nextLine());


        System.out.print("Enter Payment Amount: ");
        double amount = Double.parseDouble(sc.nextLine());
```

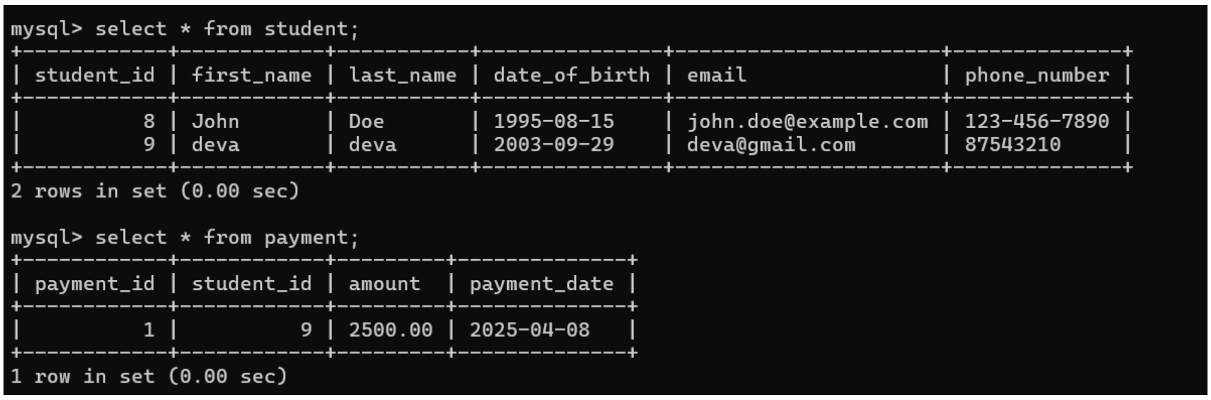
```
            System.out.print("Enter Payment Date (yyyy-MM-dd): ");
            String paymentDateStr = sc.nextLine();
            Date paymentDate = new SimpleDateFormat("yyyy-MM-dd").parse(paymentDateStr);

            Payment payment = new Payment(0, payStudentId, amount, paymentDate);
            boolean paymentSuccess = paymentDAO.addPayment(payment);
            if (paymentSuccess) {
                System.out.println("Payment recorded successfully.");
            } else {
                System.out.println("Failed to record payment.");
            }

        } catch (Exception e) {
            e.printStackTrace();
        } finally {
            sc.close();
        }
    }
}
```

INPUT:



```
--- Task 10: Record Payment ---
Enter Student ID: 9
Enter Payment Amount: 2500
Enter Payment Date (yyyy-MM-dd): 2025-04-08
Payment recorded successfully.
```

OUTPUT:



```
mysql> select * from student;
+------------+------------+-----------+---------------+----------------------+--------------+
| student_id | first_name | last_name | date_of_birth | email                | phone_number |
+------------+------------+-----------+---------------+----------------------+--------------+
|          8 | John       | Doe       | 1995-08-15    | john.doe@example.com | 123-456-7890 |
|          9 | deva       | deva      | 2003-09-29    | deva@gmail.com       | 87543210     |
+------------+------------+-----------+---------------+----------------------+--------------+
2 rows in set (0.00 sec)

mysql> select * from payment;
+------------+------------+---------+--------------+
| payment_id | student_id | amount  | payment_date |
+------------+------------+---------+--------------+
|          1 |          9 | 2500.00 | 2025-04-08   |
+------------+------------+---------+--------------+
1 row in set (0.00 sec)
```

Task 11: Enrollment Report Generation

EnrollmentDAO.java

```
package com.hexaware.sis.dao;


import com.hexaware.sis.model.Student;

import com.hexaware.sis.util.DBUtil;


import java.sql.*;

import java.util.ArrayList;

import java.util.Date;

import java.util.List;


public class EnrollmentDAO {


    // Method to enroll a student in a course

    public void enrollStudent(int studentId, int courseId, Date date) {

        String sql = "INSERT INTO enrollment (student_id, course_id, enrollment_date) VALUES
(?, ?, ?)";
```

```
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement ps = conn.prepareStatement(sql)) {
            ps.setInt(1, studentId);
            ps.setInt(2, courseId);
            ps.setDate(3, new java.sql.Date(date.getTime()));
            ps.executeUpdate();
        } catch (SQLException e) {
            e.printStackTrace();
        }
    }

    // Method to retrieve students enrolled in a specific course by course name
    public List<Student> getEnrolledStudentsByCourseName(String courseName) {
        List<Student> students = new ArrayList<>();
String query = "SELECT s.student_id, s.first_name, s.last_name, s.email, s.phone_number " +
                "FROM student s " +
                "JOIN enrollment e ON s.student_id = e.student_id " +
                "JOIN course c ON e.course_id = c.course_id " +
                "WHERE c.course_name = ?";
        try (Connection conn = DBUtil.getConnection();
             PreparedStatement ps = conn.prepareStatement(query)) {
            ps.setString(1, courseName);
            ResultSet rs = ps.executeQuery();
            while (rs.next()) {
                Student student = new Student(
                    rs.getInt("student_id"),
                    rs.getString("first_name"),
                    rs.getString("last_name"),
                    null, // dob is not required for this report
                    rs.getString("email"),
                    rs.getString("phone_number")
                );
                students.add(student);
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
        return students;
    }
  }
```

Student.java

```
package com.hexaware.sis.model;

import java.util.Date;

public class Student {
  private int studentId;
  private String firstName;
  private String lastName;
  private Date dateOfBirth;
  private String email;
  private String phoneNumber;

  // Full constructor
  public Student(int studentId, String firstName, String lastName, Date dateOfBirth, String
email, String phoneNumber) {
      this.studentId = studentId;
```

```
        this.firstName = firstName;

        this.lastName = lastName;

        this.dateOfBirth = dateOfBirth;

        this.email = email;

        this.phoneNumber = phoneNumber;

    }


    // Constructor without studentId

    public Student(String firstName, String lastName, Date dateOfBirth, String email, String
phoneNumber) {

        this(0, firstName, lastName, dateOfBirth, email, phoneNumber);

    }


    // Getters

    public int getStudentId() {

        return studentId;

    }


    public String getFirstName() {

        return firstName;

    }


    public String getLastName() {

        return lastName;

    }


    public Date getDateOfBirth() {

        return dateOfBirth;

    }
```

```
public String getEmail() {
    return email;
}

public String getPhoneNumber() {
    return phoneNumber;
}

// Alias for consistency with SISMain
public String getPhone() {
    return phoneNumber;
}

// Setters
public void setStudentId(int studentId) {
    this.studentId = studentId;
}

public void setFirstName(String firstName) {
    this.firstName = firstName;
}

public void setLastName(String lastName) {
    this.lastName = lastName;
}

public void setDateOfBirth(Date dateOfBirth) {
    this.dateOfBirth = dateOfBirth;
}
```

```
    public void setEmail(String email) {
        this.email = email;
    }

    public void setPhoneNumber(String phoneNumber) {
        this.phoneNumber = phoneNumber;
    }
}
```

SISMain.java

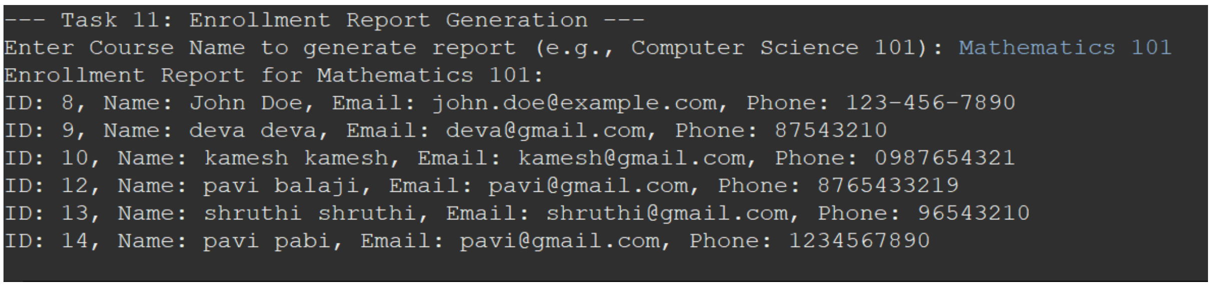
```
package com.hexaware.sis.main;

import com.hexaware.sis.dao.*;
import com.hexaware.sis.model.*;

import java.text.SimpleDateFormat;
import java.util.Date;
import java.util.Scanner;
import java.util.List;


public class SISMain {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        StudentDAO studentDAO = new StudentDAO();
        CourseDAO courseDAO = new CourseDAO();
        EnrollmentDAO enrollmentDAO = new EnrollmentDAO();
```

```
TeacherDAO teacherDAO = new TeacherDAO();
PaymentDAO paymentDAO = new PaymentDAO();

try {
    // --- Task 8: Student Enrollment ---
    System.out.println("--- Task 8: Student Enrollment ---");

    System.out.println("Enter First Name:");
    String firstName = sc.nextLine();

    System.out.println("Enter Last Name:");
    String lastName = sc.nextLine();

    System.out.println("Enter Date of Birth (yyyy-MM-dd):");
    String dobStr = sc.nextLine();
    Date dob = new SimpleDateFormat("yyyy-MM-dd").parse(dobStr);

    System.out.println("Enter Email:");
    String email = sc.nextLine();

    System.out.println("Enter Phone Number:");
    String phone = sc.nextLine();

    Student student = new Student(0, firstName, lastName, dob, email, phone);
    int studentId = studentDAO.addStudent(student);
    System.out.println("Student added with ID: " + studentId);

    System.out.println("Enter number of courses to enroll:");
    int courseCount = Integer.parseInt(sc.nextLine());
```

```
for (int i = 0; i < courseCount; i++) {
    System.out.println("Enter Course Name to enroll:");
    String courseName = sc.nextLine().trim();
    Course course = courseDAO.getCourseByName(courseName);
    if (course != null) {
        enrollmentDAO.enrollStudent(studentId, course.getCourseId(), new Date());
        System.out.println("Enrolled in: " + courseName);
    } else {
        System.out.println("Course not found: " + courseName);
    }
}

// --- Task 9: Assign Teacher to Course ---
System.out.println("\n--- Task 9: Assign Teacher to Course ---");

System.out.print("Enter Teacher First Name: ");
String tFirstName = sc.nextLine();

System.out.print("Enter Teacher Last Name: ");
String tLastName = sc.nextLine();

System.out.print("Enter Teacher Email: ");
String tEmail = sc.nextLine();

System.out.print("Enter Teacher Expertise: ");
String expertise = sc.nextLine();

Teacher teacher = new Teacher(0, tFirstName, tLastName, tEmail, expertise);
```

```
        int teacherId = teacherDAO.addTeacher(teacher);
        if (teacherId != -1) {
            teacher.setTeacherId(teacherId);
            System.out.println("Teacher added with ID: " + teacherId);
        } else {
            System.out.println("Failed to add teacher.");
            return;
        }

        System.out.print("Enter Course Code to assign teacher (e.g., CS302): ");
        String courseCode = sc.nextLine();

        Course course = courseDAO.getCourseByCode(courseCode);

        if (course != null) {
            boolean updated = courseDAO.assignTeacherToCourse(course.getCourseId(),
teacher.getFirstName() + " " + teacher.getLastName());
            if (updated) {
                System.out.println("Teacher " + teacher.getFirstName() + " " +
teacher.getLastName() +
                        " assigned to course: " + course.getCourseName());
            } else {
                System.out.println("Failed to assign teacher to course.");
            }
        } else {
            System.out.println("Course not found with code: " + courseCode);
        }

        // --- Task 10: Record Payment ---
        System.out.println("\n--- Task 10: Record Payment ---");
        System.out.print("Enter Student ID: ");
        int payStudentId = Integer.parseInt(sc.nextLine());

        System.out.print("Enter Payment Amount: ");
        double amount = Double.parseDouble(sc.nextLine());

        System.out.print("Enter Payment Date (yyyy-MM-dd): ");
        String paymentDateStr = sc.nextLine();
        Date paymentDate = new SimpleDateFormat("yyyy-MM-dd").parse(paymentDateStr);

        Payment payment = new Payment(0, payStudentId, amount, paymentDate);
        boolean paymentSuccess = paymentDAO.addPayment(payment);
        if (paymentSuccess) {
          System.out.println("Payment recorded successfully.");
        } else {
          System.out.println("Failed to record payment.");
        }

        System.out.println("--- Task 11: Enrollment Report Generation ---");
        System.out.print("Enter Course Name to generate report (e.g., Computer Science
101): ");
        String courseName = sc.nextLine().trim();

        List<Student> enrolledStudents =
enrollmentDAO.getEnrolledStudentsByCourseName(courseName);

        if (enrolledStudents.isEmpty()) {
          System.out.println("No students enrolled in: " + courseName);
        } else {
            System.out.println("Enrollment Report for " + courseName + ":");
            for (Student s : enrolledStudents) {
                System.out.println("ID: " + s.getStudentId() + ", Name: " + s.getFirstName() + " " +
s.getLastName()
                        + ", Email: " + s.getEmail() + ", Phone: " + s.getPhone());
            }
        }



    } catch (Exception e) {
        e.printStackTrace();
    } finally {
        sc.close();
    }
  }
}
```

OUTPUT:



```
--- Task 11: Enrollment Report Generation ---
Enter Course Name to generate report (e.g., Computer Science 101): Mathematics 101
Enrollment Report for Mathematics 101:
ID: 8, Name: John Doe, Email: john.doe@example.com, Phone: 123-456-7890
ID: 9, Name: deva deva, Email: deva@gmail.com, Phone: 87543210
ID: 10, Name: kamesh kamesh, Email: kamesh@gmail.com, Phone: 0987654321
ID: 12, Name: pavi balaji, Email: pavi@gmail.com, Phone: 8765433219
ID: 13, Name: shruthi shruthi, Email: shruthi@gmail.com, Phone: 96543210
ID: 14, Name: pavi pabi, Email: pavi@gmail.com, Phone: 1234567890
```