Problem 1:

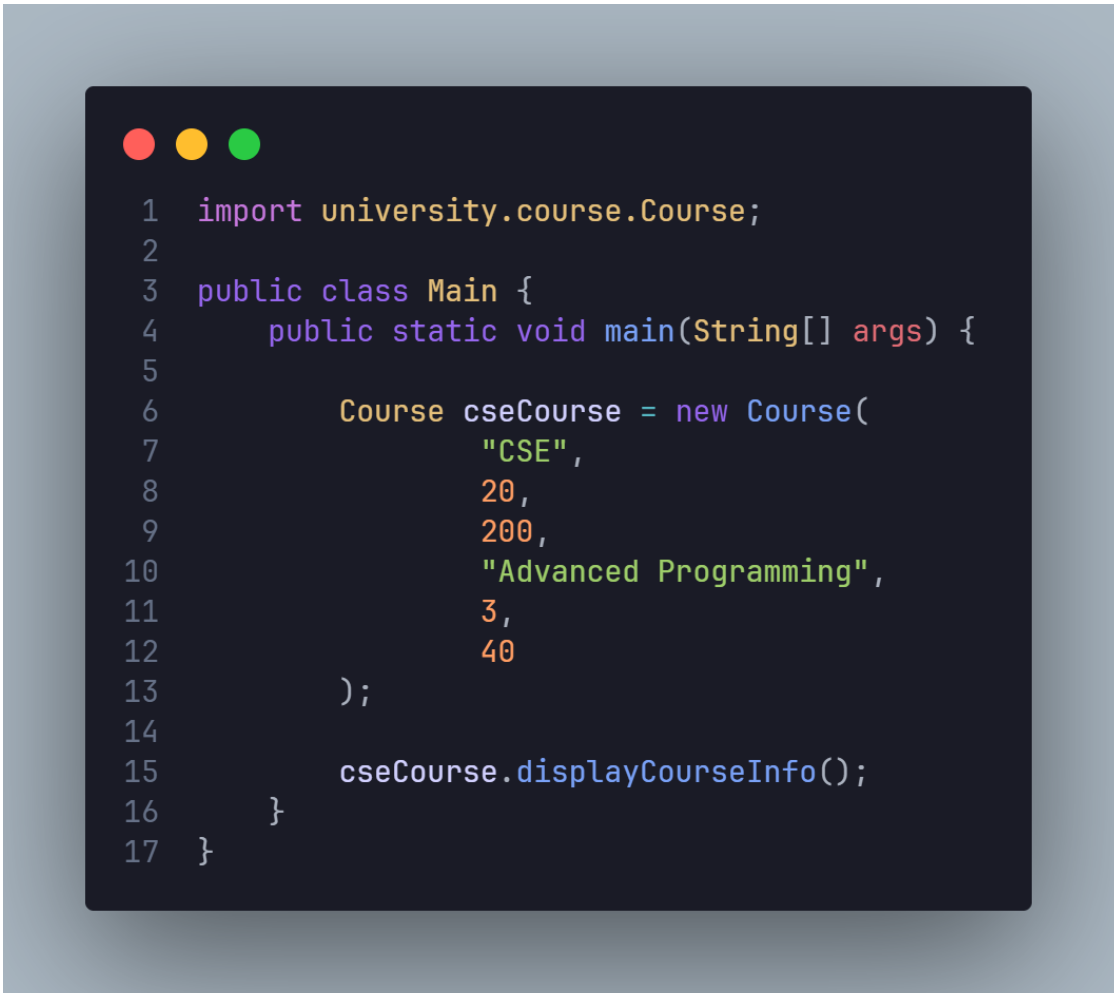
File : Problem_1\src\university\course\Course.java

```java
package university.course;
import university.department.Department;

public class Course extends Department {
    private String courseTitle;
    private int creditHours;
    private int courseStudents;

    public Course(String deptName, int facultyCount, int totalStudents,
                  String courseTitle, int creditHours, int courseStudents) {
        super(deptName, facultyCount, totalStudents);
        this.courseTitle = courseTitle;
        this.creditHours = creditHours;
        this.courseStudents = courseStudents;
    }

    public void displayCourseInfo() {
        super.showDepartmentInfo();

        System.out.println("\n----- Course Information -----");
        System.out.println("Course Title: " + this.courseTitle);
        System.out.println("Credit Hours: " + this.creditHours);
        System.out.println("Students in this Course: " + this.courseStudents);

        if (facultyCount > 0) {
            double ratio = (double) totalStudents / facultyCount;
            System.out.println("\n----- Department Ratio -----");
            System.out.printf("Student-to-Faculty Ratio: %.1f students per faculty\n", ratio);
        } else {
            System.out.println("\n----- Department Ratio -----");
            System.out.println("Cannot calculate ratio: Number of faculty is zero.");
        }
    }
}
```

File : Problem_1\src\university\department\Department.java

```java
package university.department;

public class Department {
    protected String deptName;
    protected int facultyCount;
    protected int totalStudents;

    public Department(String deptName, int facultyCount, int totalStudents) {
        this.deptName = deptName;
        this.facultyCount = facultyCount;
        this.totalStudents = totalStudents;
    }

    protected void showDepartmentInfo() {
        System.out.println("----- Department Information -----");
        System.out.println("Department Name: " + this.deptName);
        System.out.println("Number of Faculty: " + this.facultyCount);
        System.out.println("Total Students Enrolled: " + this.totalStudents);
    }
}

```

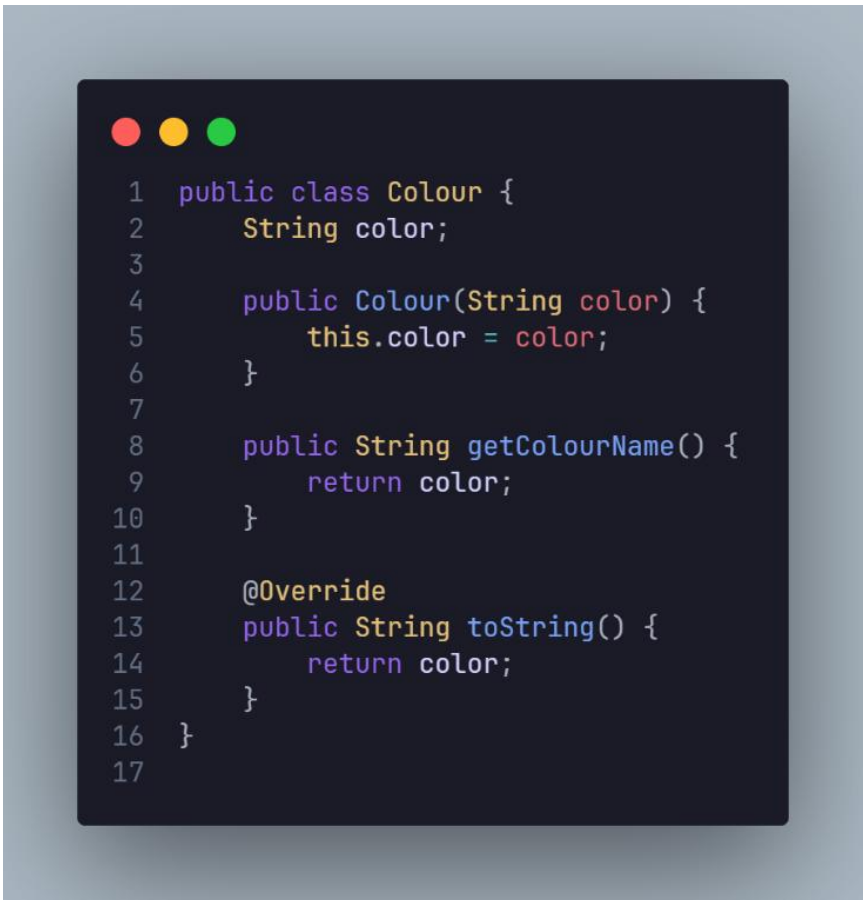
File : Problem_1\src\Main.java



```java
import university.course.Course;

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

        Course cseCourse = new Course(
                "CSE",
                20,
                200,
                "Advanced Programming",
                3,
                40
        );

        cseCourse.displayCourseInfo();
    }
}
```

Problem 2:

File : Problem_2\src\Colour.java



```java
public class Colour {
    String color;

    public Colour(String color) {
        this.color = color;
    }

    public String getColourName() {
        return color;
    }

    @Override
    public String toString() {
        return color;
    }
}
```

File : Problem_2\src\Product.java

```java
public interface Product {
    Colour getColour();
}
```

File : Problem_2\src\Shelf.java

```java
public class Shelf implements Product {
    private Colour colour;

    public Shelf(Colour colour) {
        this.colour = colour;
    }
    @Override
    public Colour getColour() {
        return colour;
    }
}

```

File : Problem_2\src\Desk.java

```java
public class Desk implements Product{
    private Colour colour;

    public Desk(Colour colour) {
        this.colour = colour;
    }
    @Override
    public Colour getColour() {
        return colour;
    }
}

```

File : Problem_2\src\Main.java

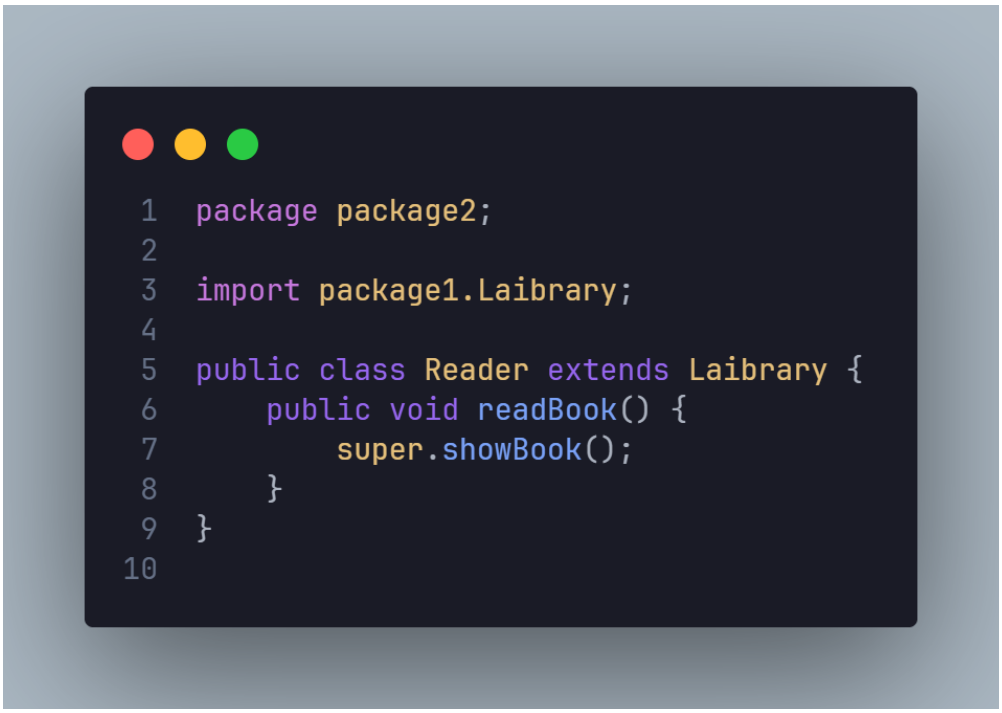
```java
public class Main {
    public static void main(String[] args) {
        Colour colour1 = new Colour("Red");
        Colour colour2 = new Colour("Green");

        Product self = new Shelf(colour1);
        Product desk = new Shelf(colour2);

        System.out.println(self.getColour());
        System.out.println(desk.getColour());
    }
}
```

Problem 3 :

File : Problem_3\src\package1\Laibrary.java

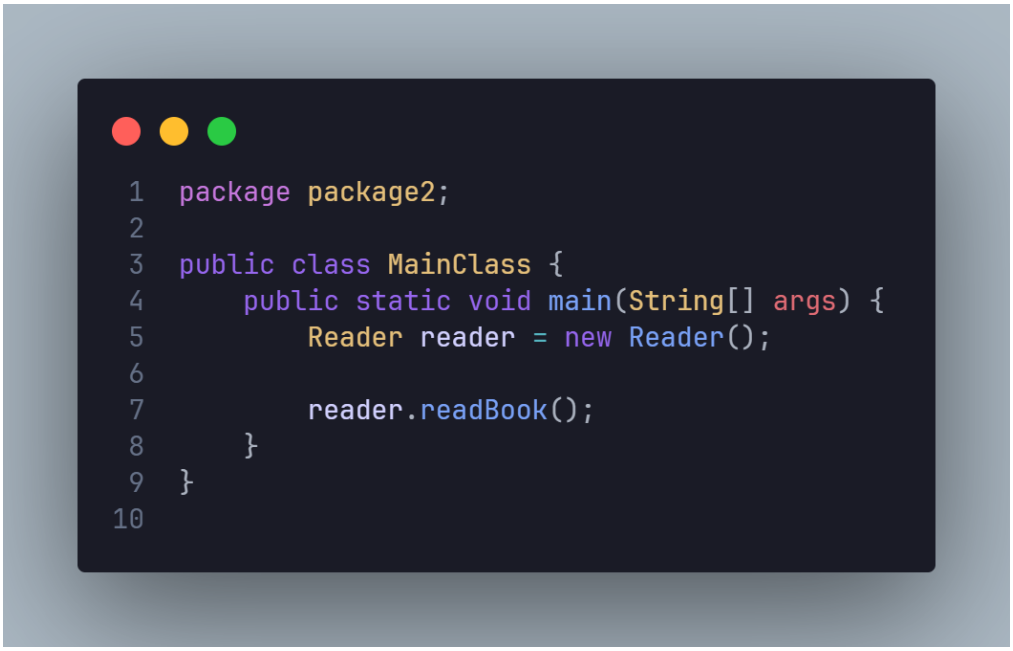
```java
package package1;

public class Laibrary {
    protected void showBook() {
        System.out.println("Book available: Java Programming");
    }
}

```

File : Problem_3\src\package2\Reader.java



```java
package package2;

import package1.Laibrary;

public class Reader extends Laibrary {
    public void readBook() {
        super.showBook();
    }
}

```

File : Problem_3\src\package2\MainClass.java



```java
package package2;

public class MainClass {
    public static void main(String[] args) {
        Reader reader = new Reader();

        reader.readBook();
    }
}

```

Problem 4 :

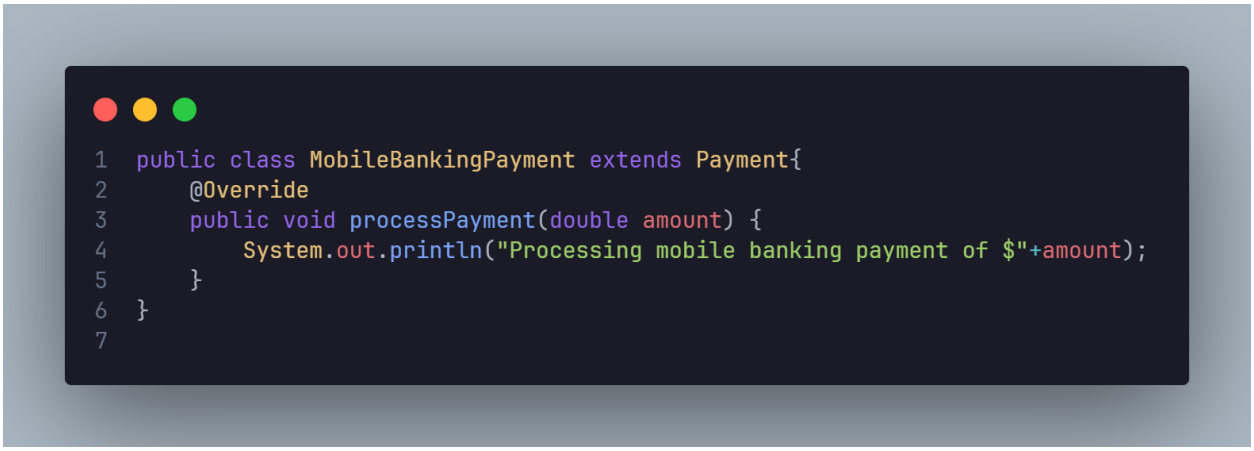
File : Problem_4\src\Payment.java

```java
abstract public class Payment {
    abstract void processPayment(double amount);
    public void paymentSuccess() {
        System.out.println("Payment completed successfully!");
    }
}

```

File : Problem_4\src\CreditCardPayment.java

```java
public class CreditCardPayment extends Payment{
    @Override
    public void processPayment(double amount) {
        System.out.println("Processing credit card payment of $"+amount);
    }
}

```

File : Problem_4\src\MobileBankingPayment.java



```java
public class MobileBankingPayment extends Payment{
    @Override
    public void processPayment(double amount) {
        System.out.println("Processing mobile banking payment of $"+amount);
    }
}

```

File : Problem_4\src\Main.java

```java
public class Main {
    public static void main(String[] args) {
        CreditCardPayment creditCardPayment = new CreditCardPayment();
        creditCardPayment.processPayment(50.00);

        MobileBankingPayment mobileBankingPayment = new MobileBankingPayment();
        mobileBankingPayment.processPayment(60.00);
    }
}
```