WEEK 9 – Interfaces and Access Modifiers Exercises

Lab Exercise 1: Student Management System

Problem Statement: Develop a Java application to manage student data, incorporating the principles of packages and access modifiers. The application should consist of the following components.

Student Class: Should be inside the edu.manipal.mit.student package.

Attributes:

name (String, private): Student's name.

rollNumber (int, private): Unique roll number.

department (String, protected): Student's department (e.g., CSE, AI/ML, FinTech etc.).

gpa (double, public): Grade point average.

Course Class: Should be inside the edu.manipal.mit.course package.

Attributes:

courseName (String, private): Name of the course.

instructor (String, protected): Course instructor.

credits (int, public): Number of credits.

Registration Class: Should be inside the edu.manipal.mit.registration package.

Attributes:

student (Student, private): Student object

course (Course, private): Course object

Methods:

registerStudent() (public): this method is used to register the student to the course. Print student and course information in System.out

Main Class: Should be inside the edu.manipal.mit.main package

Test the application by creating student , course and registration objects and registering the student to the course.

Requirements:

- Utilize appropriate access modifiers (private, protected, public) for attributes and methods to control visibility and access.
- Implement necessary constructors, getter methods for all classes as required

Lab Exercise 2: Employee Management System

Problem Statement:

Develop a Java application for managing employee data within a company, demonstrating the use of packages and access modifiers. The application should consist of the following components:

Employee Class: Located in the edu.manipal.mahe.employee package.

Attributes:

employeeId (int, private): Unique employee ID.

name (String, private): Employee's name.

age (int, protected): Employee's age.

basicSalary (double, public): Employee's basic salary.

Department Class: Located in the edu.manipal.mahe.department package.

Attributes:

departmentName (String, private): Name of the department.

manager (String, protected): Department manager.

location (String, public): Department location.

Payroll Class: Located in the edu.manipal.mahe.payroll package.

Attributes:

employee (Employee, private): Employee object

department (Department, private): Department object

Methods:

- calculateNetSalary() (private): Calculates an employee's net salary as per following calculation.
  DA = 52% of Basic Salary, Gross Salary= Basic Salary + DA, IT = 30% of the Gross Salary, Net Salary = (Gross Salary – IT)
- generatePaySlip() (public): Generates an employee's pay slip showing following output (for basic salary of 50000.0)

Payslip for January 2025
Employee name: Arun
Employee age: 53200.0

Employee department name: IT Department
Employee Net Salary : 53200.0

Main Class: Should be inside the edu.manipal.mahe.main package

Test the application by creating employee, department and payroll objects, calculating net salaries, and generating pay slips.

Requirements:

- Utilize appropriate access modifiers (private, protected, public) for attributes and methods to control visibility and access.
- Demonstrate the use of packages to organize classes logically.
- Implement necessary constructors, getter methods for all classes as required