Lab 29

Task: Write a program to demonstrate different access modifiers

Java program that demonstrates the use of access modifiers, including `public`, `private`, `protected`, and default (package-private):

In this example, we have three classes: Student, Teacher, and School.

// Student.java

public class Student {

// Public variable accessible from anywhere

public String studentName;

// Private variable accessible only within this class

private int studentID;

// Protected variable accessible within this class and its subclasses

protected int age;

// Default (package-private) variable accessible within the same package

String address;

// Constructor to initialize student details

public Student(String name, int id, int studentAge, String studentAddress) {

studentName = name;

studentID = id;

age = studentAge;

address = studentAddress;

}

// Public method to display student details

public void displayStudentDetails() {

System.out.println("Name: " + studentName);

System.out.println("ID: " + studentID);

System.out.println("Age: " + age);

System.out.println("Address: " + address);

}

}

// Teacher.java

public class Teacher {

// Public method to access the student's name (public variable) from another class

public String getStudentName(Student student) {

return student.studentName;

}

}

// School.java

public class School {

public static void main(String[] args) {

// Creating instances of Student and Teacher classes

Student student1 = new Student("Alice", 101, 16, "123 Main St");

Student student2 = new Student("Bob", 102, 15, "456 Elm St");

Teacher teacher = new Teacher();

// Accessing and displaying student details using public methods

student1.displayStudentDetails();

// Accessing the student's name using a public method from another class

String studentName = teacher.getStudentName(student2);

System.out.println("Student's Name (from Teacher class): " + studentName);

// Attempting to access private, protected, and default variables directly

// Uncommenting these lines will result in compilation errors.

// int studentID = student1.studentID; // Error: private variable

// int studentAge = student1.age; // Error: protected variable

// String studentAddress = student1.address; // Error: default variable

}

}

In this program:

- The `Student` class has variables with different access modifiers (`public`, `private`, `protected`, and default) and a `public` method (`displayStudentDetails`) to display student details.

- The `Teacher` class has a `public` method (`getStudentName`) to access the `studentName` of a `Student` object.

- The `School` class is the main class that creates instances of `Student` and `Teacher` and demonstrates the use of access modifiers by accessing and displaying student details and attempting to access variables with different access modifiers.

Please note that trying to access private, protected, or default variables directly outside their respective classes will result in compilation errors, as indicated in the comments in the `School` class. Access should be done through public methods when necessary.