Experiment Number : 07 **Date: 05.02.2026**

METHOD OVERLOADING AND METHOD OVERRIDING

Aim:

To understand and implement method overloading and method overriding.

PRE LAB EXERCISE

QUESTIONS

- ✓ What is method overloading?

  Method overloading is a feature in Java where multiple methods have the same name but different parameter lists within the same class. It is an example of compile-time polymorphism.

- ✓ What is method overriding?

  Method overriding is a feature where a subclass provides its own implementation of a method that is already defined in its parent class. It is an example of runtime polymorphism.

- ✓ Difference between overloading and overriding.

Method Overloading	Method Overriding
Same method name, different parameters	Same method name and same parameters
Occurs in same class	Occurs in parent-child classes
Compile-time polymorphism	Runtime polymorphism
Return type can vary	Return type must be same or covariant

IN LAB EXERCISE

Objective:

To demonstrate compile-time and runtime polymorphism.

PROGRAMS:

1.Student Result System (Method Overriding)

Description:

- Base class Student has method displayResult().
- Subclasses UGStudent and PGStudent override the method to show different grading systems.

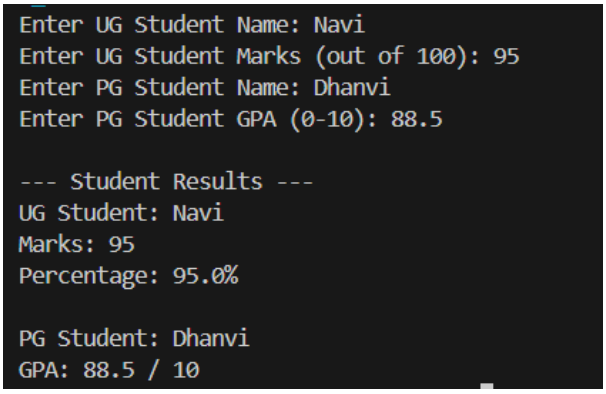
Code :

```
import java.util.Scanner;
// Base class
class Student {
   String name;
   void displayResult() {
      System.out.println("Student Result");
   }
}
// UG Student subclass
class UGStudent extends Student {
   int marks;
   UGStudent(String n, int m) {
      name = n;
      marks = m;
   }
   @Override
   void displayResult() {
      double percentage = (marks / 100.0) * 100;
      System.out.println("UG Student: " + name);
      System.out.println("Marks: " + marks);
      System.out.println("Percentage: " + percentage + "%");}}
```

```
// PG Student subclass
class PGStudent extends Student {
    double gpa;
    PGStudent(String n, double g) {
        name = n;
        gpa = g;}
    @Override
    void displayResult() {
        System.out.println("PG Student: " + name);
        System.out.println("GPA: " + gpa + " / 10");}}
// Main class
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        // Input for UG student
        System.out.print("Enter UG Student Name: ");
        String ugName = sc.nextLine();
        System.out.print("Enter UG Student Marks (out of 100): ");
        int ugMarks = sc.nextInt();
        sc.nextLine(); // consume newline
        // Input for PG student
        System.out.print("Enter PG Student Name: ");
        String pgName = sc.nextLine();
        System.out.print("Enter PG Student GPA (0-10): ");
        double pgGpa = sc.nextDouble();
        // Create objects
        Student s1 = new UGStudent(ugName, ugMarks);
        Student s2 = new PGStudent(pgName, pgGpa);
        System.out.println("\n--- Student Results ---");
        s1.displayResult();
        System.out.println();
```

```
    s2.displayResult();
    sc.close();}}
```

OUTPUT:



2. Calculator Program (Method Overloading)

Description:
Create a Calculator class with multiple add() methods to calculate:

- Addition of 2 integers
- Addition of 3 integers
- Addition of 2 double numbers

Code:

```
import java.util.Scanner;
class Calculator {
   int add(int a, int b) {
      return a + b;
   }
   int add(int a, int b, int c) {
      return a + b + c;
   }
   double add(double a, double b) {
      return a + b;
   }}
```

```
public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Calculator calc = new Calculator();
        System.out.print("Enter two integers: ");
        int x = sc.nextInt();
        int y = sc.nextInt();
        System.out.println("Sum of two integers: " + calc.add(x, y));
        System.out.print("Enter three integers: ");
        int p = sc.nextInt();
        int q = sc.nextInt();
        int r = sc.nextInt();
        System.out.println("Sum of three integers: " + calc.add(p, q, r));
        System.out.print("Enter two decimal numbers: ");
        double a = sc.nextDouble();
        double b = sc.nextDouble();
        System.out.println("Sum of two doubles: " + calc.add(a, b));
        sc.close();}}
```

Output:

```
Enter two integers: 20
30
Sum of two integers: 50
Enter three integers: 55
62
69
Sum of three integers: 186
Enter two decimal numbers: 2.5
3.6
Sum of two doubles: 6.1
```

POST LAB EXERCISE

- ✓ Is return type important in method overloading and method overriding?
  - In **method overloading**, return type alone is not enough; parameters must differ.
  - In **method overriding**, return type must be the same or covariant.

- ✓ Can you overload a method by changing only the return type?

  No, a method cannot be overloaded by changing only the return type. The parameter list must be different.

- ✓ Can static methods be overridden? Can they be overloaded?
  - Static methods **cannot be overridden**.
  - Static methods **can be overloaded**.

- ✓ Can a method be overridden if the parameter list is different?

  No, if the parameter list is different, it becomes method overloading, not overriding.

Result:

Thus the method overloading and overriding concepts were implemented and executed successfully.

ASSESSMENT

Description	Max Marks	Marks Awarded
Pre Lab Exercise	**5**	
In Lab Exercise	**10**	
Post Lab Exercise	**5**	
Viva	**10**	
Total	**30**	
	Faculty Signature	