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 concept in which multiple methods in the same class have the same method name but different parameter lists. The difference may be in the number, type, or order of parameters. It improves code readability and is resolved at compile time.

- ✓ What is method overriding?

  Method overriding occurs when a subclass provides its own implementation of a method that is already defined in its parent class. The method signature must be the same in both classes. It supports runtime polymorphism and is resolved at runtime.

- ✓ Difference between overloading and overriding.

  Method overloading occurs within the same class and involves methods with the same name but different parameters, whereas method overriding occurs between parent and child classes with the same method signature. Overloading is decided at compile time, while overriding is decided at runtime. Overloading does not require inheritance, but overriding always requires inheritance.

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:

Sample Input:

Enter UG Student Name: sanjula

Enter UG Student Marks (out of 100): 99

Enter PG Student Name: sanju

Enter PG Student GPA (0-10): 9

Output:

--- Student Results ---

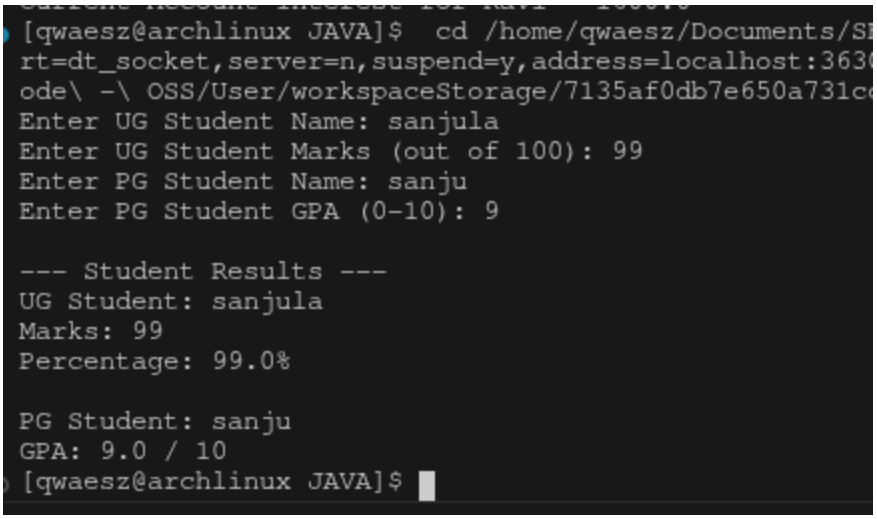
UG Student: sanjula

Marks: 99

Percentage: 99.0%

PG Student: sanju

GPA: 9 / 10



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:

Sample Input:

Enter two integers: 44 77

Enter three integers: 11 22 33

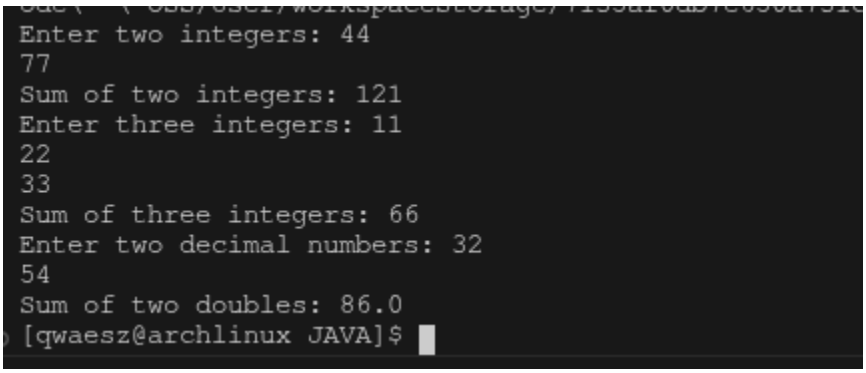
Enter two decimal numbers: 32 54

Output:

Sum of two integers: 121

Sum of three integers: 66

Sum of two doubles: 86.0



POST LAB EXERCISE

- ✓ Is return type important in method overloading and method overriding?
  In method overloading, the return type is not important because overloading depends on the parameter list, not on the return type. In method overriding, the return type must be the same or a compatible (covariant) return type to ensure proper runtime method execution.

- ✓ 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; otherwise, the compiler cannot distinguish between the methods.

- ✓ Can static methods be overridden? Can they be overloaded?
  Static methods cannot be overridden because they belong to the class, not to the object. However, static methods can be overloaded by changing the parameter list.

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

  No, a method cannot be overridden if the parameter list is different. For overriding, the method name and parameter list must be exactly the same; otherwise, it is treated as method overloading.

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	