

## USCS302: Core JAVA

### Practical 5: Method Overloading and Method Overriding

#### Learning Objectives

Students will be able to:

#### Content:

- Understand the concept of Polymorphism.

#### Process:

- To understand the concept of Method Overloading.
- To understand the concept of Method Overriding.
- 

#### Prior Knowledge

- Knowledge of inheritance and polymorphism.

1. Write a Class, having 2 member variables “FirstName” and “LastName”. Demonstrate, method overloading for the class, wherein the methods can take “FirstName”, “LastName” or “FirstName, LastName”. Display the output appropriately.

#### Source Code:

```
class Janhavi_P1
{
    String FirstName;
    char LastName;
    void name(String f)
    {
        FirstName=f;
        System.out.println("First Name: "+f);
    }
    void name(char l)
    {
        LastName=l;
        System.out.println("Last Name is: "+LastName);
    }
    void name(String f, char l)
    {
        FirstName=f;
        LastName=l;
        System.out.println("Full Name is: "+FirstName+ " "+LastName);
    }
    public static void main(String args[])
    {
        Janhavi_P1 p = new Janhavi_P1();
        p.name("Janhavi");
    }
}
```

```
p.name( 'D' ) ;  
p.name("Janhavi",'D');  
}  
}
```

## Output:

```
Select Command Prompt  
  
C:\Users\91766\OneDrive\Documents\javapracs\prac5>javac Janhavi_P1.java  
  
C:\Users\91766\OneDrive\Documents\javapracs\prac5>java Janhavi_P1  
First Name: Janhavi  
Last Name is: D  
Full Name is: Janhavi D
```

2. Write a Java Program to overload a method called add(). The first version of add () is used to add two integer numbers, the second version is used to add two floating point numbers and the third version is to concatenate two strings.

## Source Code:

```
class Janhavi_P2  
{  
    void add(int a,int b)  
    {  
        System.out.println("Sum of two Integers= "+(a+b));  
    }  
    void add(float a, float b)  
    {  
        System.out.println("Sum of the two Floating point numbers =" +(a+b));  
    }  
    void add (String a, String b)  
    {  
        System.out.println("String concatenation "+a+" "+b);  
    }  
    public static void main(String args[])  
    {  
        Janhavi_P2 s = new Janhavi_P2();  
        s.add(10,15);  
        s.add(10.20f,20.22f);  
        s.add("Janhavi","Dhakate");  
    }  
}
```

Batch: B2 / Roll No: \_\_\_\_\_

## Output:

```
C:\Users\91766\OneDrive\Documents\javapracs\prac5>javac Janhavi_P2.java
C:\Users\91766\OneDrive\Documents\javapracs\prac5>java Janhavi_P2
Sum of two Integers= 25
Sum of the two Floating point numbers =30.419998
String concatenation Janhavi Dhakate
```

3. Write Java program to define following classes:

A class having three overloaded methods. The first method accepts no parameters, the second method accept one string and third method accept one string and an integer.

These methods display the following messages:

- (i) Rose is beautiful flower once using first method.
- (ii) Sunflower is beautiful flower twice using second method.
- (iii) Marigold is beautiful flower n number of times using third method (where n is passed as integer value to the third method).

## Source Code:

```
class Overload
{
    void method()
    {
        System.out.println("Rose is BEAUTIFUL Flower");
    }
    void method(String str)
    {
        System.out.println(str);
        System.out.println(str);
    }
    void method(String str,int n)
    {
        for(int i=1;i<=n;i++)
            System.out.println(str);
    }
}
class Janhavi_P3
{
    public static void main(String args[])
    {
        Overload over = new Overload();
        System.out.println(" ");
        System.out.println("Method 1: ");
        over.method();
        System.out.println(" ");
    }
}
```

```
System.out.println("Method 2: ");
over.method("Sunflower is BEAUTIFUL flower",2);
System.out.println(" ");
System.out.println("Method 3: ");
over.method("Marigold is BEAUTIFUL flower",5);
}
}
```

## Output:

Select Command Prompt

```
C:\Users\91766\OneDrive\Documents\javapracs\prac5>javac Janhavi_P3.java
```

```
C:\Users\91766\OneDrive\Documents\javapracs\prac5>java Janhavi_P3
```

```
Method 1:
```

```
Rose is BEAUTIFUL Flower
```

```
Method 2:
```

```
Sunflower is BEAUTIFUL flower
```

```
Sunflower is BEAUTIFUL flower
```

```
Method 3:
```

```
Marigold is BEAUTIFUL flower
```

```
Marigold is BEAUTIFUL flower
```

```
Marigold is BEAUTIFUL flower
```

```
Marigold is BEAUTIFUL flower
```

Batch: B2 / Roll No: \_\_\_\_\_

4. Write a Java Program to find Area of Square, Rectangle and Circle using Method Overloading.

**Source Code:**

```
class overloadDemo
{
    void area(int x)
    {
        System.out.println("The area of the square is "+x*x+" sq units");
    }
    void area(float x, float y)
    {
        System.out.println("The area of the rectangle is "+x*y+" sq units");
    }
    void area(double x)
    {
        double z = 3.14 * x * x;
        System.out.println("The area of the circle is "+z+" sq units");
    }
}
class Janhavi_P4
{
    public static void main(String args[])
    {
        overloadDemo ob = new overloadDemo();
        ob.area(5);
        ob.area(11.3f,12.2f);
        ob.area(2.5);
    }
}
```

**Output:**

```
C:\Users\91766\OneDrive\Documents\javapracs\prac5>javac Janhavi_P4.java
C:\Users\91766\OneDrive\Documents\javapracs\prac5>java Janhavi_P4
The area of the square is 25 sq units
The area of the rectangle is 137.86 sq units
The area of the circle is 19.625 sq units
```

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5. Write a Java program to find sum, multiplication and division of any two numbers using method overriding.

## Source Code:

```
class Add
{
    public void getResult(int a, int b)
    {
        System.out.println("Sum of "+a +" and "+b +" is "+(a+b));
    }
}
class Multiply extends Add
{
    public void getResult(int a,int b)
    {
        super.getResult(a,b);
        System.out.println("Product of "+a +" and "+ b + " is "+(a*b));
    }
}
class Divide extends Multiply
{
    public void getResult(int a,int b)
    {
        super.getResult(a,b);
        System.out.println("Division of "+a +" and "+ b + " is "+(a/b));
    }
}
class Janhavi_P5
{
    public static void main(String args[])
    {
        Divide d = new Divide();
        d.getResult(12,6);
    }
}
```

## Output:

Select Command Prompt

```
C:\Users\91766\OneDrive\Documents\javapracs\prac5>javac Janhavi_P5.java
C:\Users\91766\OneDrive\Documents\javapracs\prac5>java Janhavi_P5
Sum of 12 and 6 is 18
Product of 12 and 6 is 72
Division of 12 and 6 is 2
```

Batch: B2 / Roll No: \_\_\_\_\_

6. Write a Java program that creates a superclass called Figure that stores the dimensions of a two-dimensional object. It also defines a method called area( ) that computes the area of an object. The program derives two subclasses from Figure. The first is Rectangle and the second is Triangle. Each of these subclasses overrides area( ) so that it returns the area of a rectangle and a triangle, respectively.

Note: Use Dynamic Method Dispatch

Source Code:

```
class Figure
{
    double dim1;
    double dim2;
    Figure(double a, double b)
    {
        dim1 = a;
        dim2 = b;
    }
    double area()
    {
        System.out.println("Area of Figure is undefined.");
        return 0;
    }
}
class Rectangle extends Figure
{
    Rectangle(double a, double b)
    {
        super(a,b);
    }
    //override area for rectangle
    double area()
    {
        System.out.println("Inside Area for Rectangle.");
        return dim1 * dim2;
    }
}
class Triangle extends Figure
{
    Triangle (double a, double b)
    {
        super(a,b);
    }
    //override area for right triangle
    double area()
    {
```

```
        System.out.println("Inside Area for Triangle.");
        return dim1 * dim2 / 2;
    }
}
class Janhavi_P6
{
    public static void main(String args[])
    {
        Figure figref = new Rectangle(9,5);
        System.out.println("Area is " + figref.area());
        figref = new Triangle(10,8);
        System.out.println("Area is " + figref.area());
        figref = new Figure(10,10);
        System.out.println("Area is " + figref.area());
    }
}
```

## Output:

```
C:\Users\91766\OneDrive\Documents\javapracs\prac5>javac Janhavi_P6.java
C:\Users\91766\OneDrive\Documents\javapracs\prac5>java Janhavi_P6
Inside Area for Rectangle.
Area is 45.0
Inside Area for Triangle.
Area is 40.0
Area of Figure is undefined.
Area is 0.0
```

Batch: B2 / Roll No: \_\_\_\_\_



7. Write Java classes as follows: A class A contains an instance variable x with a constructor. Define a method display () to display a message pass using the instance of the class. A class B inherits class A and contains instance variable y. Define a constructor to initialize x and y. Define methods to find G.C.D. and L.C.M. of x and y. To show the result another method display () is used without any parameter. A class defines an object of class B, which will invoke methods of A and B. The output should be as follows:

- a. GCD of 12 and 24 is 12
- b. LCM of 12 and 24 is 24

**Source Code:**

```
class A
{
    int x;
    A()
    {
    }
    public void display()
    {
        System.out.println("GCD and LCM Program ");
    }
}
class B extends A
{
    int y,Gcd,Lcm;
    B(int x, int y)
    {
        super.x=x;
        this.y=y;
    }
    public void gcd()
    {
        int i=1, m;
        m=(x>y)?x:y;
        for (i=m;m>=i;i--)
        {
            if(x%i==0 && y%i==0)
            {
                Gcd=i;
                break;
            }
        }
    }
    public void lcm()
    {
        Lcm=(x*y)/Gcd;
    }
    public void display()
    {
        super.display();
    }
}
```

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```
        System.out.println("GCD of "+x+" and "+y+" is " +Gcd);
        System.out.println("LCM of "+x+" and "+y+" is " +Lcm);
    }
}
class Janhavi_P7
{
    public static void main(String args[])
    {

        B b=new B(12,30);
        b.gcd();
        b.lcm();
        b.display();
    }
}
```

## Output:

```
C:\Users\91766\OneDrive\Documents\javapracs\prac5>javac Janhavi_P7.java
C:\Users\91766\OneDrive\Documents\javapracs\prac5>java Janhavi_P7
GCD and LCM Program
GCD of 12 and 30 is 6
LCM of 12 and 30 is 60
C:\Users\91766\OneDrive\Documents\javapracs\prac5>
```

Date: 30-08-2021 Teacher's Signature: \_\_\_\_\_

Batch: B2 / Roll No: \_\_\_\_\_