### **1. Method Overloading**

import java.util.Scanner;

class ShapeCalculator {

double l, b, A, r, h;

void cal\_area() {

Scanner sc = new Scanner(System.in);

System.out.println("Enter length (l) and breadth (b) for rectangle:");

l = sc.nextDouble();

b = sc.nextDouble();

A = l \* b;

System.out.println("Area of rectangle = " + A);

}

void cal\_area(double r) {

this.r = r;

A = 3.14 \* r \* r;

System.out.println("Area of circle = " + A);

}

double cal\_area(double b, double h) {

this.b = b;

this.h = h;

A = 0.5 \* b \* h;

return A;

}

int max(int a, int b) {

return (a > b) ? a : b;

}

int max(int a, int b, int c) {

return Math.max(a, Math.max(b, c));

}

int add(int a, int b) {

return a + b;

}

int add(int a, int b, int c) {

return a + b + c;

}

}

public class MethodOverloadingDemo {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

ShapeCalculator shape = new ShapeCalculator();

shape.cal\_area();

System.out.println("Enter radius (r) for circle:");

double r = sc.nextDouble();

shape.cal\_area(r);

System.out.println("Enter base (b) and height (h) for triangle:");

double b = sc.nextDouble();

double h = sc.nextDouble();

double area = shape.cal\_area(b, h);

System.out.println("Area of triangle = " + area);

System.out.println("Maximum of 10 and 20: " + shape.max(10, 20));

System.out.println("Maximum of 10, 20, and 30: " + shape.max(10, 20, 30));

System.out.println("Sum of 10 and 20: " + shape.add(10, 20));

System.out.println("Sum of 10, 20, and 30: " + shape.add(10, 20, 30));

}

}

**Output:**

Enter length (l) and breadth (b) for rectangle:

5

10

Area of rectangle = 50.0

Enter radius (r) for circle:

7

Area of circle = 153.86

Enter base (b) and height (h) for triangle:

8

10

Area of triangle = 40.0

Maximum of 10 and 20: 20

Maximum of 10, 20, and 30: 30

Sum of 10 and 20: 30

Sum of 10, 20, and 30: 60

### **2. Method Overriding**

public class Animal {

public void eat() {

System.out.println("Eating...");

}

}

public class Dog extends Animal {

public void eat() {

System.out.println("Eating bread...");

}

}

public class Shape {

public void draw() {

System.out.println("Drawing...");

}

}

public class Rectangle extends Shape {

public void draw() {

System.out.println("Drawing rectangle...");

}

}

public class Circle extends Shape {

public void draw() {

System.out.println("Drawing circle...");

}

}

public class TestPolymorphism {

public static void main(String[] args) {

Animal a = new Dog();

a.eat();

Shape s;

s = new Shape();

s.draw();

s = new Rectangle();

s.draw();

s = new Circle();

s.draw();

}

}

**Output:**

Eating bread...

Drawing...

Drawing rectangle...

Drawing circle...

### **3. Inheritance and Method Overriding**

import java.util.Scanner;

class Date {

int dd, mm, yy;

public Date() { dd = mm = yy = 0; }

public Date(int d, int m, int y) {

dd = d;

mm = m;

yy = y;

}

public String toString() {

return dd + "/" + mm + "/" + yy;

}

}

class Employee {

int empID;

String ename;

Date bdate;

int wdays;

double rate;

public Employee() {}

public Employee(int eid, String n, Date d, int wd, double r) {

empID = eid;

ename = n;

bdate = d;

wdays = wd;

rate = r;

}

}

class Manager extends Employee {

double salary;

Manager() {

super();

salary = 0;

}

Manager(int eid, String s, Date d, int wd, double rate) {

super(eid, s, d, wd, rate);

}

public double computesal() {

return (wdays \* rate);

}

public String toString() {

return empID + "\n" + ename + "\n" + bdate + "\n" + wdays + "\n" + rate + "\n" + this.computesal();

}

}

class SalesManager extends Manager {

double sales, comm;

SalesManager() {

super();

sales = 0;

comm = 0;

}

SalesManager(int eid, String n, Date d, int wd, double r, double s, double c) {

super(eid, n, d, wd, r);

sales = s;

comm = c;

}

public double computesal() {

if (sales > 1000)

return (super.computesal() + sales \* comm);

else

return (super.computesal());

}

public String toString() {

return empID + "\n" + ename + "\n" + bdate + "\n" + wdays + "\n" + rate + "\n" + this.computesal();

}

public static void main(String[] args) {

Date d1 = new Date(14, 7, 1979);

Employee e1 = new Employee(10, "A", d1, 23, 100.50);

Manager m1 = new Manager(10, "B", d1, 23, 200.50);

System.out.println(m1);

Date d2 = new Date(12, 4, 2000);

SalesManager sm1 = new SalesManager(20, "C", d2, 27, 150, 1500, 10.5);

System.out.println(sm1);

}

}

**Output:**

10

B

14/7/1979

23

200.5

4650.0

20

C

12/4/2000

27

150.0

1500.0