**Abstraction / Encapsulation**

**Exercise 1:** *Consider user has N eggs. Then display the no of eggs in gross (144 eggs make one gross) and no of eggs in dozen (12 eggs make one dozen) and the no of eggs that is left out remaining.*

*The total no of eggs is input.The program should display how many gross, how many dozen, and how many left over eggs the user has.*

*Ans:-*

***package com.egg.oops;***

***public class Egg\_dis {***

***private int total;***

***private int gross=144;***

***private int dozen=12;***

***private int num\_gross;***

***private int num\_dozen;***

***private int rem\_eggs=0;***

***public void setTotal(int total) {***

***this.total = total;***

***}***

***public int getNum\_gross() {***

***grosscal();***

***return num\_gross;***

***}***

***public int getNum\_dozen() {***

***dozencal();***

***return num\_dozen;***

***}***

***public int getRem\_eggs() {***

***return rem\_eggs;***

***}***

***public void grosscal() {***

***num\_gross=total/gross;***

***rem\_eggs=total%gross;***

***}***

***public void dozencal() {***

***if(rem\_eggs>=12) {***

***num\_dozen=rem\_eggs/dozen;***

***rem\_eggs=rem\_eggs%dozen;***

***}***

***}***

***}***

*//main*

***package com.egg.oops;***

***public class Egg\_main {***

***public static void main(String[] args) {***

***// TODO Auto-generated method*** *stub*

***Egg\_dis ed=new Egg\_dis();***

***ed.setTotal(184);***

***System.out.println(ed.getNum\_gross()+" number of gross eggs");***

***System.out.println(ed.getNum\_dozen()+" number of dozen eggs");***

***System.out.println(ed.getRem\_eggs()+" number of remaining eggs");***

***}***

***}***

**Overloading**

**Exercise 2:***Create a class called shape with the following methods*

1. *area*
2. *perimeter*

*Overload the area and perimeter method to calculate for both square and rectangle.*

*Create a main class and invoke the area method to calculate the area of the square and*

*rectangle. Also invoke the perimeter method to calculate the perimeter of the square*

*and rectangle.*

***Ans:***

**public class Shape {**

**int area,perimeter;**

**public void area(int side) {**

**area=side\*side;**

**System.out.println("Area of Squre is "+area);**

**}**

**public void area(int length,int width) {**

**area=length\*width;**

**System.out.println("Area of Rectangle is "+area);**

**}**

**public void perimeter(int side)**

**{**

**perimeter=4\*side;**

**System.out.println("Perimeter of Spuare is "+perimeter);**

**}**

**public void perimeter(int length,int width) {**

**perimeter=2\*(length+width);**

**System.out.println("Perimeter of Rectangle is "+perimeter);**

**}**

**}**

//main

**public class ShapeMain {**

**public static void main(String[] args) {**

**Shape shape1=new Shape();**

**shape1.area(15);**

**shape1.area(15, 20);**

**shape1.perimeter(15);**

**shape1.perimeter(25, 30);**

**}**

**}**

**Exercise 3:***Create a class called Calculator which has 4 different methods add, diff, mul and div which*

*accepts two numbers as parameters. Overload the methods such that the parameters can be*

*of the following pattern.*

1. *Both are of int data type.*
2. *Both are of double data type.*
3. *First parameter is of int data type and second parameter is of double data type.*
4. *First parameter is of double data type and second parameter is of int data type.*

*Create anobject to access these methods and invoke these methods with different type of*

*numbers and display the result in the corresponding methods.*

**Ans:**

**public class Calculator {**

**//addition methods**

**public void addition(int a,int b )**

**{**

**int add=a+b;**

**System.out.println("Addition of a,b is "+add);**

**}**

**public void addition(double a,double b )**

**{**

**double add=a+b;**

**System.out.println("Addition of a,b is "+add);**

**}**

**public void addition(int a,double b )**

**{**

**double add=a+b;**

**System.out.println("Addition of a,b is "+add);**

**}**

**public void addition(double a,int b )**

**{**

**double add=a+b;**

**System.out.println("Addition of a,b is "+add);**

**}**

**//multiplication methods**

**public void multiplication(int a,int b) {**

**int multiplicatin=a\*b;**

**System.out.println("Multiplication of a,b is "+multiplicatin);**

**}**

**public void multiplication(double a,double b) {**

**double multiplicatin=a\*b;**

**System.out.println("Multiplication of a,b is "+multiplicatin);**

**}**

**public void multiplication(int a,double b) {**

**double multiplicatin=a\*b;**

**System.out.println("Multiplication of a,b is "+multiplicatin);**

**}**

**public void multiplication(double a,int b) {**

**double multiplicatin=a\*b;**

**System.out.println("Multiplication of a,b is "+multiplicatin);**

**}**

**//Difference methods**

**public void difference(int a,int b)**

**{**

**int defference=a-b;**

**System.out.println("Difference of a,b is "+defference);**

**}**

**public void difference(double a,double b)**

**{**

**double defference=a-b;**

**System.out.println("Difference of a,b is/n "+defference);**

**}**

**public void difference(double a,int b)**

**{**

**double defference=a-b;**

**System.out.println("Difference of a,b is "+defference);**

**}**

**public void difference(int a,double b)**

**{**

**double defference=a-b;**

**System.out.println("Difference of a,b is "+defference);**

**}**

**//Division methods**

**public void division(int a,int b)**

**{**

**int division=a/b;**

**System.out.println("division of a,b is "+division);**

**}**

**public void division(double a,double b)**

**{**

**double division=a/b;**

**System.out.println("division of a,b is "+division);**

**}**

**public void division(double a,int b)**

**{**

**double division=a/b;**

**System.out.println("division of a,b is "+division);**

**}**

**public void division(int a,double b)**

**{**

**double division=a/b;**

**System.out.println("division of a,b is "+division);**

**}**

**}**

**//main**

**public class CalculatorMain {**

**public static void main(String[] args) {**

**Calculator cal=new Calculator();**

**cal.addition(2, 2);**

**cal.addition(2.9, 9.6);**

**cal.addition(5.8, 6);**

**cal.addition(6, 8.9);**

**cal.difference(5, 4);**

**cal.difference(7.9, 6.6);**

**cal.difference(10.8, 4);**

**cal.difference(5, 3.2);**

**cal.multiplication(20, 9);**

**cal.multiplication(2.6, 8.5);**

**cal.multiplication(27.8, 9);**

**cal.multiplication(2, 9.7);**

**cal.division(10, 5);**

**cal.division(10.9, 5.6);**

**cal.division(10.8, 5);**

**cal.division(10, 5.1);**

**}**

**}**

**Packages**

**Exercise 4:**

1. *Create a new project in which create a package named org.animals. In that create various classes like Lion, Tiger, Deer, Monkey, Elephant and Giraffe. In each class create data members like color, weight,age etc. Create methods like isVegetarian, canClimb, sound etc*
2. *Create another project and in that create a package called zoo and create a class called DelhiZoo and create objects for the animals that are existing in zoo and print the characteristic of each animal.*

**Constructor**

**Exercise 5:** *Create a class called employee with the following data members*

1. *empName*
2. *empId*
3. *empAge*
4. *empdesgn*
5. *empLocation*
6. *empExpInYrs*

*All these data members should be initialized using constructors. Use constructor overloading*

*and demonstrate by creating different employee objects with*

1. *Employee name alone*
2. *Employee name and id*
3. *Employee name, id and age*
4. *Employee name, id and designation*
5. *Employee name, id, age and designation*
6. *Employee name, id, age and location*
7. *Employee name, id, age and experience*
8. *Employee name, id, designation and experience*
9. *Employee name, id, designation, location and experience*
10. *Employee name, id, age, designation, location and experience*