Exercise on Packages and Interface

1. Write a program to create interface A in this interface we have two method meth1 and meth2. Implements this interface in another class named MyClass.

A. Code:-

```
import java.util.*;
interface  A{
  void m1();
  void m2();
}
class MyClass implements A{
  public void m1(){
    System.out.println("Hello");
}
public void m2(){
System.out.println("World");
}
}
public class hello
{
public static void main(String[] args)
{
MyClass ob = new MyClass();
ob.m1();
ob.m2();
}
}
```

SAMPLE INPUT AND SAMPLE OUTPUT:

```
C:\Users\MOHITH>cd..

C:\Users>d:

D:\>cd java

D:\JAVA>javac hello.java

D:\JAVA>java hello
Hello
World
```

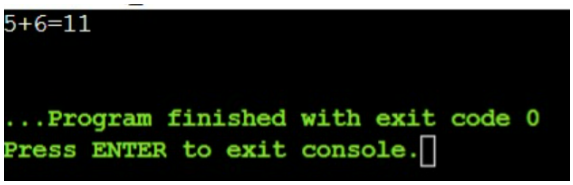
*3. Write a program called Arithmetic that takes three command-line arguments: two integers followed by an arithmetic operator (+, -, * or /). The program shall perform the corresponding operation on the two integers and print the result.*

A. Code:-

```
public class Main {
    public static void main (String[] args){
        int a = Integer.parseInt(args[0]);
        int b = Integer.parseInt(args[1]);
        String op = args[2];
        switch (op){
            case "+" :
                System.out.println(args[0] + "+" + args[1] + "=" + (a+b));
                break;
            case "-" :
                System.out.println(args[0] + "-" + args[1] + "=" + (a-b));
                break;
            case "*" :
                System.out.println(args[0] + "*" + args[1] + "=" + (a*b));
                break;
            case "/" :
```

```
            System.out.println(args[0] + "+" + args[1] + "=" + ((float)a / (float)b));
            break;
         default:
            System.out.println("INVALID OPERATOR");
      }
   }
}
```

SAMPLE INPUT AND SAMPLE OUTPUT:



2. Write a program to give example for multiple inheritance in Java.

A. Code:-

```
interface StudentRead {
   void Code();
}
interface StudentTravel {
   void Compile();
}
class Student implements StudentRead, StudentTravel{
   public void Code() {
      System.out.println("Hello ");
   }
   public void Compile() {
      System.out.println("This is Lohith");
   }
}
public class Multiple {
   public static void main(String args[]) {
      Student a = new Student();
      a.Code();
```

```
    a.Compile();
  }
}
```

SAMPLE INPUT AND SAMPLE OUTPUT:

```
D:\JAVA>javac Multiple.java

D:\JAVA>java Multiple
Hello
This is Lohith
```

4. Define a package named gradepack. The gradepack consists of a class named operations. The operations class consists of the methods to compute the average, minimum, maximum, median and standard deviation.

A. Code:-

```
package gradepack;
public class Operations
{
 public double average(int[] arr)
 {
  int n=arr.length;
  int sum=0;
  for(int i=0;i<n;i++)
  {
   sum=sum+arr[i];
  }
  double avg=(double)sum/n;
  return avg;
 }
 public int minimum(int[] arr)
```

```
{
 int n=arr.length;
 int mini=arr[0];
 for(int i=0;i<n;i++)
 {
  if(arr[i]<mini)
  mini=arr[i];
 }
 return mini;
}
public int maximum(int[] arr)
{
 int n=arr.length;
 int maxi=arr[0];
 for(int i=0;i<n;i++)
 {
  if(arr[i]>maxi)
  maxi=arr[i];
 }
 return maxi;
}
public double median(int[] arr)
{
 int n=arr.length;
 double m;
 int mid;
 if(n%2==0)
{
 mid=n/2;
 m=(double)arr[mid];
}
 else
 {
  mid=(n+1)/2;
  m=(double)arr[mid];
  }
 return m;
}
public double standardDeviation(int[] arr)
{
```

```
 int n=arr.length;
 int sum=0;
 double std=0.0;
 for(int i=0;i<n;i++)
 sum=sum+arr[i];
 double mean=sum/n;
 for(int i=0;i<n;i++)
 std=std+Math.pow(arr[i]-mean,2);
 return Math.sqrt(std/n);
}
}
import gradepack.Operations;
import java.util.*;
class GradesStatistics
{
public static void main(String args[])
{
  Scanner sc=new Scanner(System.in);
  System.out.print("Enter the number of students: ");
  int n=sc.nextInt();
  int[] arr=new int[n];
  for(int i=0;i<n;i++)
  {
   System.out.print("Enter the grade for student "+(i+1)+": ");
   arr[i]=sc.nextInt();
   if(arr[i] >0 && arr[i]<100)
   continue;
   else
   break;
   }
  System.out.print("The grades are: [");
  for(int i=0;i<n;i++)
  {
   if(i==(n-1))
    System.out.println(arr[i]+"]");
    else
     System.out.print(arr[i]+", ");
  }
   Operations op=new Operations();
   System.out.printf("The average: %.2f\n",op.average(arr));
```

```
   System.out.printf("The median: %.2f\n",op.median(arr));
   System.out.println("The minimum: "+op.minimum(arr));
   System.out.println("The maximum: "+op.maximum(arr));
   System.out.printf("The standard deviation is: %.2f",op.standardDeviation(arr));
 }
}
```

SAMPLE INPUT AND SAMPLE OUTPUT:

```
PS D:\JAVA\q4\q4> java GradesStatistics
Enter the number of students: 3
Enter the grade for student 1: 50
Enter the grade for student 2: 51
Enter the grade for student 3: 56
The grades are: [50, 51, 56]
The average: 52.33
The median: 56.00
The minimum: 50
The maximum: 56
The standard deviation is: 2.65
```

5. Create a package named persondatabase. It contains two different classes namely, Student and Employee. These classes are derived from a base class Person. Define another two classes Staff and Faculty. Staff and Faculty classes are derived from Employee class. The Person class has name and age data and display method to display the name and age of a person. The Student class has data like rollNo and branch and display method to display name, age, rollNo and branch of the student. Stuff has ecNo and doj(date of joining) data and display method to display name, age, ecNo, doj of the stuff. Faculty has

designation data (Assistant Professor, Associate Professor and Professor) and display method to display the name, age, ecNo, doj and designation of the Faculty. Staff has designation data (Technical and Clerical) and display method to display the name, age, ecNo, doj and designation of the Staff. Each class have their own constructor to initialize the value of each data field. Finally create an object of each class and print the values (pass arguments in the runtime via terminal) of all objects in that Main Class.

A. Code:-

```
import persondatabase.Person;
import persondatabase.Employee;
import persondatabase.Student;
import persondatabase.Faculty;
import persondatabase.Staff;

import java.util.*;

public class Q5 {
    public static void main(String[] args){
        String name,rollNo,branch,ecNo,doj,designation;
        int age;
        Scanner sc = new Scanner(System.in);

        System.out.println("\n");
        System.out.print("ENTER PERSON'S NAME : ");
        name = sc.next();
        System.out.print("ENTER PERSON'S AGE : ");
        age = sc.nextInt();
        Person ob1 = new Person(name, age);

        System.out.println("\n");
```

```
System.out.print("ENTER STUDENT'S NAME : ");
name = sc.next();
System.out.print("ENTER STUDENT'S AGE : ");
age = sc.nextInt();
System.out.print("ENTER STUDENT'S ROLLNO : ");
rollNo = sc.next();
System.out.print("ENTER STUDENT'S BRANCH : ");
branch = sc.next();
Student ob2  = new Student(name, age, rollNo, branch);

System.out.println("\n");
System.out.print("ENTER EMPLOYEE'S NAME : ");
name = sc.next();
System.out.print("ENTER EMPLOYEE'S AGE : ");
age = sc.nextInt();
System.out.print("ENTER EMPOLYEE'S EcNo : ");
ecNo = sc.next();
System.out.print("ENTER EMPLOYEE'S DATE OF JOINING : ");
doj = sc.next();
Employee ob3 = new Employee(name, age, ecNo, doj);

System.out.println("\n");
System.out.print("ENTER FACULTY'S NAME : ");
name = sc.next();
System.out.print("ENTER FACULTY'S AGE : ");
age = sc.nextInt();
System.out.print("ENTER FACULTY'S EcNo : ");
ecNo = sc.next();
System.out.print("ENTER FACULTY'S DATE OF JOINING : ");
doj = sc.next();
System.out.print("ENTER FACULTY'S DESIGNATION : ");
designation = sc.next();
Faculty ob4 = new Faculty(name, age, ecNo, doj, designation);

System.out.println("\n");
System.out.print("ENTER STAFF'S NAME : ");
name = sc.next();
System.out.print("ENTER STAFF'S AGE : ");
age = sc.nextInt();
System.out.print("ENTER STAFF'S EcNo : ");
```

```
        ecNo = sc.next();
        System.out.print("ENTER STAFF'S DATE OF JOINING : ");
        doj = sc.next();
        System.out.print("ENTER STAFF'S DESIGNATION : ");
        designation = sc.next();
        Staff ob5 = new Staff(name, age, ecNo, doj, designation);

        System.out.println("\n\n-------PERSON'S DATA----------");
        ob1.display();
        System.out.println("\n---------STUDENT'S DATA---------");
        ob2.display();
        System.out.println("\n-------EMPLOYEE'S DATA----------");
        ob3.display();
        System.out.println("\n-------FACULTY'S DATA----------");
        ob4.display();
        System.out.println("\n------STAFF'S DATA--------------");
        ob5.display();
    }
}
// class Employee
package persondatabase;
public class Employee extends Person {
    String ecNo;
    String doj;
    public Employee(String n,int a,String e,String d){
        super(n, a);
        ecNo = e;
        doj = d;
    }
    public void display(){
        super.display();
        System.out.println("EcNo : "+ecNo);
        System.out.println("DOJ : "+doj);
    }
}

package persondatabase;
public class Faculty extends Employee {
    String designation;
    public Faculty(String n,int a,String e,String d,String dsg){
```

```
        super(n, a, e, d);
        designation = dsg;
    }
    public void display(){
        super.display();
        System.out.println("DESIGNATION : "+designation);
    }
}
package persondatabase;
public class Person {
    String name;
    int age;
    public Person(String n,int a){
        name = n;
        age = a;
    }
    public void display(){
        System.out.println("Name : "+name);
        System.out.println("AGE : "+age);
    }
}

package persondatabase;
public class Staff extends Employee {
    String designation;
    public Staff(String n,int a,String e,String d,String dsg){
        super(n, a, e, d);
        designation = dsg;
    }
    public void display(){
        super.display();
        System.out.println("DESIGNATION : "+designation);
    }
}

package persondatabase;
public class Student extends Person{
    String rollNo;
    String branch;
    public Student(String n,int a,String r,String b){
```

```
        super(n, a);
        rollNo = r;
        branch = b;
    }
    public void display(){
        super.display();
        System.out.println("RollNo : "+rollNo);
        System.out.println("BRANCH : "+branch);
    }
```

SAMPLE INPUT AND SAMPLE OUTPUT:

```
PS D:\JAVA\Java Assignment\Packages and Interfaces> javac Q5.java
PS D:\JAVA\Java Assignment\Packages and Interfaces> java Q5
++++++++++++++++++++++++
ENTER PERSON'S NAME : kandula
ENTER PERSON'S AGE : 20

++++++++++++++++++++++++
ENTER STUDENT'S NAME : lohith
ENTER STUDENT'S AGE : 19
ENTER STUDENT'S ROLLNO : AP20110010161
ENTER STUDENT'S BRANCH : cse

++++++++++++++++++++++++
ENTER EMPLOYEE'S NAME : rangandh
ENTER EMPLOYEE'S AGE : 30
ENTER EMPOLYEE'S EcNo : 1234556
ENTER EMPLOYEE'S DATE OF JOINING : 12-6-2015

++++++++++++++++++++++++
ENTER FACULTY'S NAME : ravi
ENTER FACULTY'S AGE : 40
ENTER FACULTY'S EcNo : 7843929
ENTER FACULTY'S DATE OF JOINING : 12-3-2000
ENTER FACULTY'S DESIGNATION : ceo

++++++++++++++++++++++++
ENTER STAFF'S NAME : dyhsjnj
ENTER STAFF'S AGE : 34
```

```
ENTER STAFF'S AGE : 34
ENTER STAFF'S EcNo : 7890238
ENTER STAFF'S DATE OF JOINING : 8-2-2010
ENTER STAFF'S DESIGNATION : gm


+++++PERSON'S DATA+++++
Name : kandula
AGE : 20

+++++STUDENT'S DATA+++++
Name : lohith
AGE : 19
RollNo : AP20110010161
BRANCH : cse

+++++EMPLOYEE'S DATA+++++
Name : rangandh
AGE : 30
EcNo : 1234556
DOJ : 12-6-2015

+++++FACULTY'S DATA+++++
Name : ravi
AGE : 40
EcNo : 7843929
DOJ : 12-3-2000
DESIGNATION : ceo

+++++STAFF'S DATA+++++
```

```
Name : dyhsjnj
AGE : 34
EcNo : 7890238
DOJ : 8-2-2010
DESIGNATION : gm
```

6. Define a package with name myInterface and create an interface with name GeoAnalyzer which contains methods such as area(), perimeter() and pi value as 3.142F. Create three class with names Circle, Ellipse, and Rectangle with display method to display respective area and perimeter of objects by implementing GeoAnalyzer.

A. Code:-

```
package myInterface;

interface GeoAnalyzer
{
   final static float pi=3.142F;
   float area();
   float perimeter();
}
class Circle implements GeoAnalyzer
{
   float a,b,r=4;
   public float area()
   {

      a=pi*r*r;
      return a;
   }
   public float perimeter()
   {
      r=9;
      b=2*pi*r;
```

```
        return b;
    }
    void display()
    {
        System.out.println("Circle Area ="+a);
        System.out.println("\nPerimeter ="+b);
    }

}
class Ellipse implements GeoAnalyzer
{
    float c,d,i=5,j=2;
    public float area()
    {


        c=pi*i*j;
        return c;
    }
    public float perimeter()
    {

        d=2*pi*(((i*i+j*j)/2)*1/2);
        return d;
    }
    void display()
    {
        System.out.println("Ellipse Area ="+c);
        System.out.println("\nPerimeter="+d);
    }
}
class Rectangle implements GeoAnalyzer
{
    float e,f,l=4,b=2;
    public float area()
    {
        e=l*b;
        return e;
    }
    public float perimeter()
```

```
    {
        f=2*(l+b);
        return f;
    }
    void display()
    {
        System.out.println("Rectangle Area ="+e);
        System.out.println("Perimeter ="+f);
    }
}
class Main
{
    public static void main (String[] args) {
        Circle c=new Circle();
        Ellipse e=new Ellipse();
        Rectangle r=new Rectangle();
        c.area();
        c.perimeter();
        c.display();
        e.area();
        e.perimeter();
        e.display();
        r.area();
        r.perimeter();
        r.display();
    }
}
```

SAMPLE INPUT AND SAMPLE OUTPUT:

```
PS D:\JAVA\Java Assignment\Packages and Interfaces> javac Q6.java
PS D:\JAVA\Java Assignment\Packages and Interfaces> java Q6
ENTER THE RADIUS OF CIRCLE : 2


ENTER THE LENGTH OF RECTANGLE : 3
ENTER THE BREADTH : 4


ENTER THE MINOR OF ELLIPSE : 5
ENTER THE MAJOR OF ELLIPSE : 6



+++++CIRCLE+++++
AREA : 12.568
PERIMETER : 12.568

+++++RECTANGLE+++++
AREA : 12.0
PERIMETER : 14.0

+++++ELLIPSE+++++
AREA : 94.26
PERIMETER : 34.562
PS D:\JAVA\Java Assignment\Packages and Interfaces>
```