

**/\*Program to implement the following class hierarchy: Student: id, name  
StudentExam (derived from Student): Marks of 3subjects, total marks  
StudentResult (derived from StudentExam) : percentage, grade  
Define appropriate methods to accept and calculate grade based on existing  
criteria and display details of N students\*/**

```
import java.io.*;
class Student{
    int ID;
    String Name;
}
class StudentExam extends Student
{
    int Marks1, Marks2, Marks3;
    double percentage;
    void acceptDetails(){
        Console console = System.console();
        System.out.print("Enter Student ID => ");
        ID=Integer.parseInt(console.readLine());
        System.out.print("Enter Student Name => ");
        Name=console.readLine();
        System.out.print("Enter Student Marks1 => ");
        Marks1=Integer.parseInt(console.readLine());
        System.out.print("Enter Student Marks2 => ");
        Marks2=Integer.parseInt(console.readLine());
        System.out.print("Enter Student Marks3 => ");
        Marks3=Integer.parseInt(console.readLine());
    }
}
class StudentResult extends StudentExam{
    double percentage;
    String Grade;
    void calc()
    {
        percentage= ((Marks1 + Marks2 + Marks3)*100)/300;
        if ((percentage) >= (90.0))
        {
            Grade="A+";
        }
        else {
            if ((percentage) >= (70.0))
```

```

        {Grade="A";}
    else
        { if ((percentage) >= (60.0))
            Grade="B";
          else
            Grade="C";
        }
    }
}

void dispDetails()
{
    System.out.println("Student ID => "+ ID);
    System.out.println("Student Name => "+ Name);
    System.out.println("Student Marks1 => "+ Marks1);
    System.out.println("Student Marks2 => "+ Marks2);
    System.out.println("Student Marks3 => "+ Marks3);
    System.out.println("Student Percentage => "+ percentage);
    System.out.println("Student Grade => "+ Grade);
}
}

class StudentDetails{
    public static void main(String args[])
    {
        StudentResult[] std=new StudentResult[10];
        int n,i;
        Console console = System.console();
        System.out.print("Enter Number of Students => ");
        n=Integer.parseInt(console.readLine());
        for (i=0;i<n;i++)
        {
            std[i]=new StudentResult();
            std[i].acceptDetails();
        }
        System.out.print("*****Students Details***** =>\n ");
        i=0;
        while (n>0)
        {
            std[i].calc();
            std[i].dispDetails();
            i++;
        }
    }
}

```

```

        n--;
    }
}
}

```

**/\*Write aProgram to calculate marks of a student using multiple inheritance implemented through interface. Class Student with data members rollNo, name, Stringcls and methods to set and put data. Create another class test extended by class Student with data members mark1, mark2, mark3 and methods to set and put data. Create interface sports with members sportsWt = 5 and putWt(). Now let the class results extends class test and implements interface sports. Write a Java program to read required data and display details in a neat format.**

**Note: Input to be read\*/**

```

import java.io.*;
interface Sports
{
    int sportsWt=5;
    void dispWt();
}
class student{
    int rollNo;
    String Name,Class;
    void setStudent(){
        Console console = System.console();
        System.out.print("Enter Roll No => ");
        rollNo=Integer.parseInt(console.readLine());
        System.out.print("Enter Student Name => ");
        Name=console.readLine();
        System.out.print("Enter Class => ");
        Class=console.readLine();
    }
}

class test extends student{
    int java,DS,maths;
    void setMarks(){
        Console console = System.console();
    }
}

```

```

System.out.print("Enter Marks in java => ");
java=Integer.parseInt(console.readLine());
System.out.print("Enter Student Marks in DS => ");
DS=Integer.parseInt(console.readLine());
System.out.print("Enter Marks in maths => ");
maths=Integer.parseInt(console.readLine());
}
void dispMarks()
{
    System.out.println("Marks in java => "+java);
    System.out.println("Marks in DS => "+DS);
    System.out.println("Marks in Maths => "+maths);
}
}
class result extends test implements Sports{
    int results;
    public void dispWt(){
        System.out.println("Sport Weightage => "+sportsWt);
    }
    void dispDetails(){
        System.out.println("Student Details With results");
        System.out.println("Roll Number=> "+rollNo);
        System.out.println("Student Name is => "+Name);
    }
    void dispResult(){
        results= java+DS+maths+sportsWt;
        System.out.println("Total Marks => "+results);
    }
}
class StdResult{
    public static void main(String args[])
    {
        result std= new result();
        std.setStudent();
        std.setMarks();
        std.dispDetails();
        std.dispMarks();
        std.dispWt();
        std.dispResult();
    }
}

```

```
}
```

**/\*Create a package to convert temperature in centigrade into Fahrenheit,  
and one more package to calculate the simple Interest. \*/**

```
package pack1;
import java.io.*;
public class centFarh{
double centi,farh;
public centFarh()
{

    Console console = System.console();
    System.out.print("Enter Temperature => ");
    centi=Double.parseDouble(console.readLine());
}
public void calcCF()
{
    farh=(centi * 9/5) +32;
    System.out.println("Farhnheit is => "+farh);
}
}
```

---

```
package pack1;
import java.io.*;
public class simpleInt{
double amount,term,rate,interest;
public simpleInt()
{
    Console console = System.console();
    System.out.print("Enter Principle => ");
    amount=Double.parseDouble(console.readLine());
    System.out.print("Enter Term => ");
    term=Double.parseDouble(console.readLine());
    System.out.print("Enter Interest Rate => ");
    rate=Double.parseDouble(console.readLine());
}
public void calc()
```

```

        {
            interest=((amount*rate)/100.0)*term;
            System.out.println("Interest on deposit => "+interest);
        }
    }
}

/*MAIN PROGRAM*/
import pack1.simpleInt;
import pack1.centFarh;
class UseOfPack{
    public static void main(String args[]){
        simpleInt i=new simpleInt();
        i.calc();
        centFarh f=new centFarh();
        f.calcCF();
    }
}

```

**/\*Write a Program that implements a multi-threaded program has three threads. First thread generates a random integer every second, and if the value is even, second thread computes the square of the number and prints. If the value is odd the third thread will print the value of cube of the number.[Multithreading] \*/**

```

import java.util.Random;
class SquareInt extends Thread
{
    int x;
    SquareInt(int n)
    {
        x = n;
    }
    public void run()
    {
        int sqr = x * x;
        System.out.println("Square of => " + x + " = " + sqr );
    }
}
class CubeInt extends Thread
{
    int x;

```

```

CubeInt(int n)
{
x = n;
}
public void run()
{
int cub = x * x * x;
System.out.println("Cube of => " + x + " = " + cub );
}
}
class Num extends Thread
{
public void run()
{
Random random = new Random();
for(int i=0; i<12; i++)
{
int randomInteger = random.nextInt(50);
System.out.println("Random Integer generated : " + randomInteger);
if (randomInteger%2 == 0)
{
SquareInt sq = new SquareInt(randomInteger);
sq.start();
}
else
{
CubeInt cb = new CubeInt(randomInteger);
cb.start();
}
}
try {
System.out.println("Sleeping for 1000 milliseconds...");
Thread.sleep(1000);
}
catch (InterruptedException e) {
System.out.println(e);
}
}
}
}
public class OddEvenThread {

```

```

public static void main(String args[])
{
    Num n = new Num();
    n.start();
}
}

```

**Program that creates a user interface to perform basic integer operations. The user enters two numbers in the TextFields - Num1 and Num2. The result of operations must be displayed in the Result TextField when the “=” button is clicked. Appropriate Exception handling message to be displayed in the Result TextField when Num1 or Num2 is not an integer or Num2 is Zero when division operation is applied**

```

import java.awt.*;
import java.applet.*;
import java.awt.event.*;
import javax.swing.*;
/*<applet code="ArithmeticApplet" width=800 height=200>
</applet>*/
public class ArithmeticApplet extends Applet implements ActionListener {
    Label Lb1,Lb2,Lb3,Lb4;
    TextField Txt1,Txt2,Txt3,Result;
    Button Bt1;
    public void init() {
        Lb1=new Label("Enter First Num :");
        add(Lb1);
        Txt1=new TextField(10);
        add(Txt1);
        Lb2=new Label("Enter Second Num :");
        add(Lb2);
        Txt2=new TextField(10);
        add(Txt2);
        Lb3=new Label("Enter Operator: ");
        add(Lb3);
        Txt3=new TextField(10);
        add(Txt3);
        Bt1=new Button(" = ");
        add(Bt1);
        Lb4=new Label("Result is: ");

```



```

Result=new TextField(10);
add(Result);
Bt1.addActionListener(this);
}
public void actionPerformed(ActionEvent e) {
    int value1,value2;
    double result=0.0;
    char op;
    if(e.getSource()==Bt1) {
        try {
            value1=Integer.parseInt(Txt1.getText());
            value2=Integer.parseInt(Txt2.getText());
            op=Txt3.getText().trim().charAt(0);
            switch(op){
                case '+': result=value1+value2;
                           break;
                case '-': result=value1-value2;
                           break;
                case '*': result=value1*value2;
                           break;
                case '/': result=value1/value2;
                           break;
            }

            Result.setText(String.valueOf(result));
        }
        catch(NumberFormatException nfe) {
            Result.setText("Not a Number ");
        }
        catch(ArithmeticException ae) {
            Result.setText("Division by Zero ");
        }
    }
}
}

```