1.Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a, b, c and use the quadratic formula. If the discriminant b2-4ac is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;
class First{
public static void main(String args[]){
int a,b,c;
double r1,r2,d;
System.out.println("enter the coefficients of quadratic equation");
Scanner s1= new Scanner(System.in);
a=s1.nextInt();
b=s1.nextInt();
c=s1.nextInt();
if(a==0){
System.out.println("coefficients are invalid");
}
else{
d=b*b-(4*a*c);
if(d>0){
System.out.println("it has real and distinct roots");
r1=((-b+Math.sqrt(d)))/(2*a);
r2=((-b-Math.sqrt(d)))/(2*a);
System.out.println("the roots are "+r1+" and "+r2);
}
else if(d==0){
System.out.println("it has real and equal roots");
r1=(-b)/(2*a);
System.out.println("the roots are "+r1+" and "+r1);
}
else{
System.out.println("it has no real roots");
```

```
}
}
}
}
```

## Output:

2. Develop a Java program to create a class Student with members usn ,name ,and array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

```
import java.util.*;
class student6{
int usn;
int credits[]=new int[5];
float marks[]=new float[5];
float sgpa;
void studdetails(int usn,int credits[],float marks[]){
this.usn=usn;
this.credits=credits;
this.marks=marks;
}
void printdetails(){
System.out.println("the usn of student is"+usn);
System.out.println("the number of credits of subjects is");
for(int i=0;i<5;i++){
System.out.println(credits[i]);
}
System.out.println("the marks of student is");
for(int i=0;i<5;i++){
System.out.println(marks[i]);
}
}
float studsgpa(){
int sum=0;
int creditssum=0;
for(int i=0;i<5;i++){
if(marks[i] >= 90){
```

```
sum=sum+(credits[i]*10);
}
else if(marks[i]>=80){
sum=sum+(credits[i]*9);
}
else if(marks[i]>=70){
sum=sum+(credits[i]*8);
}
else if(marks[i]>=60){
sum=sum+(credits[i]*7);
}
else if(marks[i]>=50){
sum=sum+(credits[i]*6);
}
else if(marks[i]>=35){
sum=sum+(credits[i]*5);
}
else{
sum=sum+(credits[i]*0);
}
}
for(int i=0;i<5;i++){
creditssum=creditssum+credits[i];
}
sgpa=sum/(float)creditssum;
return sgpa;
}
}
class student5{
public static void main(String xx[]){
int usn;
```

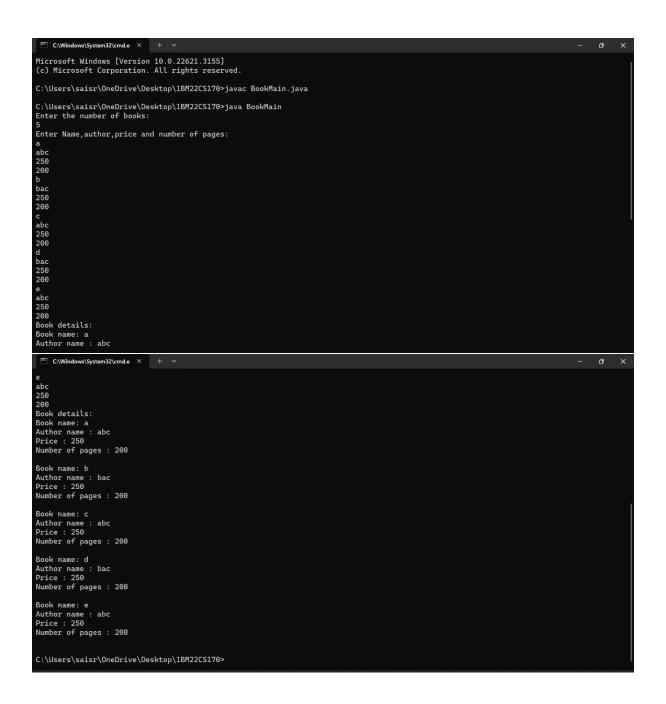
```
int credits[]=new int[5];
float marks[]=new float[5];
student6 s=new student6();
Scanner s1=new Scanner(System.in);
System.out.println("enter the usn of student");
usn=s1.nextInt();
System.out.println("enter the number of credits of subjects");
for(int i=0;i<5;i++){
credits[i]=s1.nextInt();
}
System.out.println("enter the marks of student");
for(int i=0;i<5;i++){
marks[i]=s1.nextFloat();
}
s.studdetails(usn,credits,marks);
s.printdetails();
float sgpa=s.studsgpa();
System.out.println("the sgpa of student is"+sgpa);
}
}
Output:
```

```
C:\Windows\System32\cmd.e X
 Microsoft Windows [Version 10.0.22621.3155] (c) Microsoft Corporation. All rights reserved.
 C:\Users\saisr\OneDrive\Desktop\1BM22CS170>javac student5.java
 C:\Users\saisr\OneDrive\Desktop\1BM22CS170>java student5 enter the usn of student 1\,
 enter the number of credits of subjects
4
4
3
3
2
enter the marks of student
90
80
70
60
the usn of student is1
the number of credits of subjects is
 3
2
the marks of student is
90.0
80.0
80.0
70.0
   C:\Windows\System32\cmd.e × + v
                                                                                                                                                                                                           o ×
 C:\Users\saisr\OneDrive\Desktop\1BM22CS170>java student5 enter the usn of student 1\,
 enter the number of credits of subjects
3
2
enter the marks of student
90
80
80
70
60
the usn of student is1
the number of credits of subjects is
4
the marks of student is
90.0
80.0
80.0
70.0
60.0
the sgpa of student is8.8125
 C:\Users\saisr\OneDrive\Desktop\1BM22CS170>
```

3. Create a class Book which contains four members: name, author, price, num\_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a to String() method that could display the complete details of the book. Develop a Java program to create n book objects.

```
import java.util.Scanner;
class Books {
String name, author;
int price, numPages;
Books(String name, String author, int price, int numPages) {
this.name = name;
this.author = author;
this.price = price;
this.numPages = numPages;
}
public String toString() {
return "Book name: " + this.name + "\n" +
"Author name : " + this.author + "\n" +
"Price : " + this.price + "\n" +
"Number of pages : " + this.numPages + "\n";
}
}
class BookMain {
public static void main(String[] args) {
Scanner sc = new Scanner(System.in);
int n;
String name, author;
int price, numPages;
System.out.println("Enter the number of books:");
n = sc.nextInt();
Books b[] = new Books[n];
```

```
System.out.println("Enter Name,author,price and number of pages:");
for (int i = 0; i < n; i++) {
    name = sc.next();
    author = sc.next();
    price = sc.nextInt();
    numPages = sc.nextInt();
    b[i] = new Books(name, author, price, numPages);
}
System.out.println("Book details:");
for (int i = 0; i < n; i++) {
    System.out.println(b[i].toString());
}
Output:</pre>
```



4. Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

```
abstract class shape{
protected int dimension1;
protected int dimension2;
public shape(int dimension1,int dimension2){
this.dimension1=dimension1;
this.dimension2=dimension2;
}
public abstract void printarea();
}
class rectangle extends shape{
public rectangle(int length,int width){
super(length,width);
}
public void printarea(){
double area=dimension1*dimension2;
System.out.println("area of rectangle:"+area);
}
}
class triangle extends shape{
public triangle(int base,int height){
super(base,height);
}
public void printarea(){
double area=0.5*dimension1*dimension2;
System.out.println("area of triangle:"+area);
}
```

```
}
class circle extends shape{
public circle(int radius){
super(radius,0);
}
public void printarea(){
double area=Math.PI*dimension1*dimension1;
System.out.println("area of circle:"+area);
}
}
public class rect{
public static void main(String xx[]){
rectangle r=new rectangle(2,10);
triangle t=new triangle(3,7);
circle c=new circle(5);
r.printarea();
t.printarea();
c.printarea();
}
}
Output:
```



- 5. Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Cur-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:
- a) Accept deposit from customer and update the balance.
- b) Display the balance.
- c) Compute and deposit interest
- d) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.

```
import java.util.Scanner;
class account
{
       String name;
       int accno;
       String type;
       double balance;
       account(String name,int accno,String type,double balance)
       {
               this.name=name;
               this.accno=accno;
               this.type=type;
               this.balance=balance;
       }
       void deposit(double amount)
       {
```

balance+=amount;

```
}
       void withdraw(double amount)
       {
               if((balance-amount)>=0)
               {
                       balance-=amount;
               }
               else
               {
                       System.out.println("insufficient balance,cant withdraw");
               }
       }
       void display()
       {
       System.out.println("name:"+name+"accno:"+accno+"type:"+type+"balance:"+balance);
       }
}
class savAcct extends account
{
       private static double rate=5;
       savAcct(String name,int accno,double balance)
       {
               super(name,accno,"savings",balance);
       }
       void interest()
       {
```

```
balance+=balance*(rate)/100;
               System.out.println("balance:"+balance);
       }
}
class curAcct extends account
{
       private double minBal=500;
       private double serviceCharges=50;
       curAcct(String name,int accno,double balance)
       {
               super(name,accno,"current",balance);
       }
       void checkmin()
       {
               if(balance<minBal)
               {
                       System.out.println("balance is less than min balance,service charges
                       imposed: "+serviceCharges);
                       balance-=serviceCharges;
                       System.out.println("balance is:"+balance);
               }
       }
```

```
}
class accountMain
{
        public static void main(String a[])
       {
               Scanner s=new Scanner(System.in);
               System.out.println("enter the name :");
               String name=s.next();
               System.out.println("enter the type(current/savings):");
               String type=s.next();
               System.out.println("enter the account number:");
               int accno=s.nextInt();
               System.out.println("enter the intial balance:");
               double balance=s.nextDouble();
               int ch;
               double amount1, amount2;
               account acc=new account(name,accno,type,balance);
               savAcct sa=new savAcct(name,accno,balance);
               curAcct ca=new curAcct(name,accno,balance);
               while(true)
               {
                       if(acc.type.equals("savings"))
                       {
                               System.out.println("\nMenu\n1.deposit 2.withdraw 3.compute
                               interest 4.display");
                               System.out.println("enter the choice:");
                               ch=s.nextInt();
                               switch(ch)
                               {
                                       case 1:System.out.println("enter the amount:");
```

```
amount1=s.nextInt();
                        sa.deposit(amount1);
                        break;
                case 2:System.out.println("enter the amount:");
                        amount2=s.nextInt();
                        sa.withdraw(amount2);
                        break;
                case 3:sa.interest();
                        break;
                case 4:sa.display();
                        break;
                case 5:System.exit(0);
                default:System.out.println("invalid input");
                        break;
       }
}
else
{
        System.out.println("\nMenu\n1.deposit 2.withdraw 3.display");
        System.out.println("enter the choice:");
        ch=s.nextInt();
        switch(ch)
        {
                case 1:System.out.println("enter the amount:");
                        amount1=s.nextInt();
                        ca.deposit(amount1);
                        break;
                case 2:System.out.println("enter the amount:");
                        amount2=s.nextInt();
                        ca.withdraw(amount2);
                        ca.checkmin();
```

```
C:\Windows\System32\cmd.e ×
Microsoft Windows [Version 10.0.22621.3155]
(c) Microsoft Corporation. All rights reserved.
C:\Users\saisr\OneDrive\Desktop\1BM22CS170>javac accountMain.java
C:\Users\saisr\OneDrive\Desktop\1BM22CS170>java accountMain
enter the name :
abcd
enter the type(current/savings):
savings
enter the account number:
170
enter the intial balance:
1000
Menu
1.deposit 2.withdraw 3.compute interest 4.display enter the choice:
enter the amount:
Menu
1.deposit 2.withdraw 3.compute interest 4.display
enter the choice:
3
balance:945.0
1.deposit 2.withdraw 3.compute interest 4.display enter the choice:
  C:\Windows\System32\cmd.e × + v
 enter the type(current/savings):
savings
enter the account number:
170
enter the intial balance:
1000
Menu
1.deposit 2.withdraw 3.compute interest 4.display
enter the choice:
2
enter the amount:
1.deposit 2.withdraw 3.compute interest 4.display enter the choice:
3
balance:945.0
Menu
1.deposit 2.withdraw 3.compute interest 4.display
enter the choice:
4
name:abcdaccno:170type:savingsbalance:945.0
Menu
1.deposit 2.withdraw 3.compute interest 4.display
enter the choice:
C:\Users\saisr\OneDrive\Desktop\1BM22CS170>
```

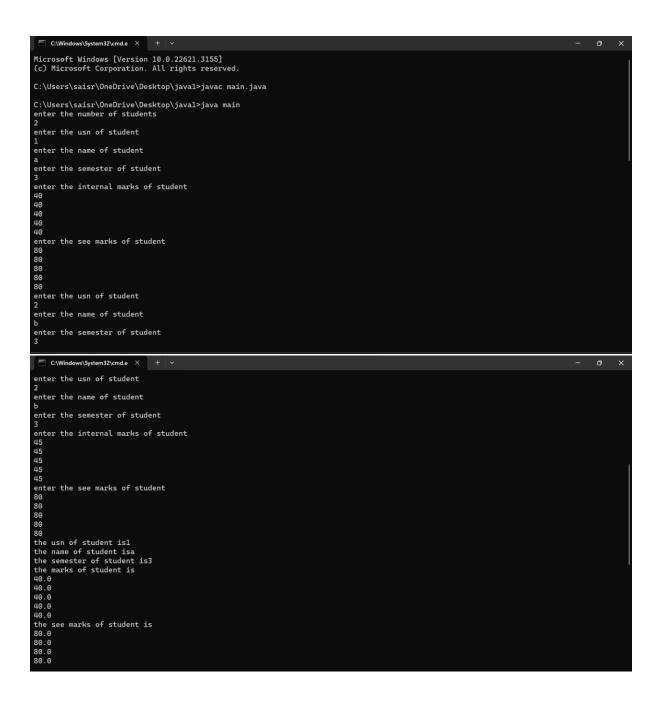
6.CreateapackageCIEwhichhastwoclasses-StudentandInternals.TheclassStudent has members like usn ,name, sem .The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.

```
package cie;
import java.util.Scanner;
public class student{
String usn;
String name;
int semester;
public void studdetails(){
Scanner s1=new Scanner(System.in);
System.out.println("enter the usn of student");
usn=s1.next();
System.out.println("enter the name of student");
name=s1.next();
System.out.println("enter the semester of student");
semester=s1.nextInt();
}
public void printdetails(){
System.out.println("the usn of student is"+usn);
System.out.println("the name of student is"+name);
System.out.println("the semester of student is"+semester);
}
}
package cie;
import java.util.Scanner;
```

```
public class internals extends student{
public float studmarks[]=new float[5];
public void studmarks(){
Scanner s1=new Scanner(System.in);
System.out.println("enter the internal marks of student");
for(int i=0;i<5;i++){
studmarks[i]=s1.nextFloat();
}
}
public void printmarks(){
System.out.println("the marks of student is");
for(int i=0;i<5;i++){
System.out.println(studmarks[i]);
}
}
}
package see;
import java.util.Scanner;
import cie.student;
public class external extends student{
public float seemarks[]=new float[5];
public void seemarks(){
Scanner s2=new Scanner(System.in);
System.out.println("enter the see marks of student");
for(int i=0;i<5;i++){
seemarks[i]=s2.nextFloat();
}
}
public void printseemarks(){
System.out.println("the see marks of student is");
```

```
for(int i=0;i<5;i++){
System.out.println(seemarks[i]);
}
}
}
import java.util.Scanner;
import cie.student;
import cie.internals;
import see.external;
class main{
public static void main(String xx[]){
int n;
Scanner s3=new Scanner(System.in);
System.out.println("enter the number of students");
n=s3.nextInt();
internals internalmarks[]=new internals[n];
external externalmarks[]=new external[n];
for(int i=0;i<n;i++){
internalmarks[i]=new internals();
externalmarks[i]=new external();
internalmarks[i].studdetails();
internalmarks[i].studmarks();
externalmarks[i].seemarks();
}
float finalmarks[][]=new float[n][5];
for(int i=0;i<n;i++){
for(int j=0; j<5; j++){
finalmarks[i][j]=internalmarks[i].studmarks[j]+((externalmarks[i].seemarks[j])/2);
}
}
```

```
for(int i=0;i<n;i++){
  internalmarks[i].printdetails();
  internalmarks[i].printmarks();
  externalmarks[i].printseemarks();
}
for(int i=0;i<n;i++){
  System.out.println("the final marks of "+i+" student is");
  for(int j=0;j<5;j++){
   System.out.println(finalmarks[i][j]);
  }
}
Output:</pre>
```



```
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C:\Windows\System32\cmd.e × + v
                                                                            o x
C:\Users\saisr\OneDrive\Desktop\java1>
```

7.Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge() when the input age=father's age.

```
class wrongage extends Exception{
public wrongage(String Message){
super(Message);
}
}
class father{
private int age;
public father(int age) throws wrongage{
if(age<0){
throw new wrongage("age cannot be negative");
}
this.age=age;
}
public int getage(){
return age;
}
}
class son extends father{
private int sonage;
public son(int fatherage,int sonage) throws wrongage{
super(fatherage);
if(sonage>=fatherage){
throw new wrongage("son's age cannot be greater than or equal to father's age");
}
this.sonage=sonage;
}
```

```
public int getsonage(){
return sonage;
}
}
public class exceptioninheritance{
public static void main(String xx[]){
try{
son son1=new son(40,20);
System.out.println("father's age:"+son1.getage());
System.out.println("son's age:"+son1.getsonage());
son invalidson=new son(30,35);
System.out.println("this line will not be reached");
}
catch(wrongage e){
System.out.println("exception:"+e.getMessage());
}
}
}
```

## Output:

```
Microsoft Windows [Version 10.0.22621.3155]
(c) Microsoft Corporation. All rights reserved.

C:\Users\saisr\OneDrive\Desktop\lBM22CS170>javac exceptioninheritance.java

C:\Users\saisr\OneDrive\Desktop\lBM22CS170>javac exceptioninheritance
father's age:\( \text{40} \)

son's age:\( \text{20} \)

exception:\( \text{50} \)

exception:\( \text{50} \)

C:\Users\saisr\OneDrive\Desktop\lBM22CS170>

C:\Users\saisr\OneDrive\Desktop\lBM22CS170>
```

8.write a program which creates two threads, one thread displaying "BMS College of Engineering" once every ten seconds and another displaying "CSE" once every two seconds.

```
class DisplayMessageThread extends Thread {
  private final String message;
  private final long interval; // in milliseconds
  DisplayMessageThread(String message, long interval) {
    this.message = message;
    this.interval = interval;
  }
  public void run() {
    try {
      while (true) {
        System.out.println(message);
        Thread.sleep(interval);
      }
    } catch (InterruptedException e) {
      System.out.println(Thread.currentThread().getName() + " interrupted.");
    }
  }
public class TwoThreadDemo {
  public static void main(String[] args) {
    DisplayMessageThread thread1 = new DisplayMessageThread("BMS College of Engineering",
10000); // 10 seconds
    DisplayMessageThread thread2 = new DisplayMessageThread("CSE", 2000); // 2 seconds
    thread1.setName("Thread 1");
    thread2.setName("Thread 2");
```

```
thread1.start();

try {
    // Let the threads run for a while
    Thread.sleep(30000); // Let the program run for 30 seconds
} catch (InterruptedException e) {
    System.out.println("Main thread interrupted.");
}

// Interrupt both threads to stop them
    thread1.interrupt();
    thread2.interrupt();

System.out.println("Main thread exiting.");
}
```

## Output:

9.write a program thar creates a user interface to perform integer divisions. the user enters two numbers in the text fields, Num1 and Num2. the division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberformatException. If Num2 were zero, the program would throw an Arithmetic Exception display the exception in a message dialog box.

```
import java.awt.*;
import java.awt.event.*;
public class DivisionMain1 extends Frame implements ActionListener
{
       TextField num1,num2;
       Button dResult;
       Label outResult;
       String out="";
       double resultNum;
       int flag=0;
       public DivisionMain1()
       {
               setLayout(new FlowLayout());
               dResult = new Button("RESULT");
               Label number1 = new Label("Number 1:",Label.RIGHT);
               Label number2 = new Label("Number 2:",Label.RIGHT);
               num1=new TextField(5);
               num2=new TextField(5);
               outResult = new Label("Result:",Label.RIGHT);
               add(number1);
               add(num1);
               add(number2);
```

```
add(num2);
       add(dResult);
       add(outResult);
       num1.addActionListener(this);
       num2.addActionListener(this);
       dResult.addActionListener(this);
       addWindowListener(new WindowAdapter()
       {
               public void windowClosing(WindowEvent we)
               {
                       System.exit(0);
               }
       });
}
public void actionPerformed(ActionEvent ae)
{
       int n1,n2;
       try
       {
               if (ae.getSource() == dResult)
               {
                       n1=Integer.parseInt(num1.getText());
                       n2=Integer.parseInt(num2.getText());
                       /*if(n2==0)
                              throw new ArithmeticException();*/
                       out=n1+" "+n2;
                       resultNum=n1/n2;
                       out+=String.valueOf(resultNum);
```

```
}
               }
               catch(NumberFormatException e1)
               {
                       flag=1;
                       out="Number Format Exception! "+e1;
                        repaint();
               }
               catch(ArithmeticException e2)
               {
                       flag=1;
                       out="Divide by 0 Exception! "+e2;
                       repaint();
               }
       }
       public void paint(Graphics g)
       {
               if(flag==0)
       g.drawString(out,outResult.getX()+outResult.getWidth(),outResult.getY()+outResult.getHeig\\
ht()-8);
               else
               g.drawString(out,100,200);
               flag=0;
       }
       public static void main(String[] args)
       {
```

repaint();

```
DivisionMain1 dm=new DivisionMain1();
dm.setSize(new Dimension(800,400));
dm.setTitle("DivionOfIntegers");
dm.setVisible(true);
}

Output:
```



Divide by 0 Exception! java.lang.ArithmeticException: / by zero

Number Format Exception! java.lang.NumberFormatException: For input string: "a"

```
develop a javo pragram that prints all real solutions to the quadrotic
equation an +bu+c=0. read in a,b,c and use the quadratic formulo if
the dixtiminant bi-uac is negative, display a message stating that there
one no real solutions.
 chass main import Java-util-sconner
 class first?
       public static void main (string xx[]) }
             int anotydinysty
             int a, b, c)d;
             float my 72;
             system out println ("enter the coeffecients of quadratic
                                            equation");
            scanner ss = new scanner(system.in);
             a = si next Int();
             b = SJ- next Int(7;
             c = S2-next Int(); Thereary is down that site
             if(a == 0) $
                 system-out-primin (" involid coeff
                system out println ( " coeffectents ove involve");
            ene fit manage - F - min went to be and out out
                do b*b- (4tatc) a dog to dog the off off
                if (d>0) f
                  system-out-println (" it has real and distinct root");
                  41 = (-d+89
                  1) - (-b + sqrt(d))/(2*a);
                  72 - (-b- sqnt(d))/(4.50);
                  system out println (" the room ove" +vi+" and "+vi);
```

system.out. primen ("it has real and equal roots)

y eve if (d == 0) {

73 = (-6)/(9 = 0);

49/3 BB

```
System out printin (" the rook are + + + + "and + +1);
         the state of the settlement of the settlement was
                                                                        int credibl
    else 5
                                                                         int credit
                                                                         float man
         System-out-println ("there are no real solutions");
                                                                         hel Sum -
                                                                         Void stud
                                                                             this.
   4
                                                                             tho
  4
                                                                             this.
                                   S. Frye, D. Judit by
                                                                            this
                                         JEZO WID BE
 output ,
                                           Carlot today
                                                                       Void printde
 enter the coefficient of quadratic equation
                                                                           System
                                                                           System
                                                                           System
it has real and equal roob
                                                                           for (in =
the roots are -1 and -1
                                     1 Clin Prod . C. . co
                                     CHATTARING THE
enter the coefficient of quadratic equation
                                                                           System
                                                                          for (int )
                    tran illume ") control to matter
it has real and distinct rout
the room are -0.267949192434728 and -3-732050807568777
enter the coefficient of quadratic equation
                                                                      float studig
                                                                            for (int
demont printer " H has well and dither was "); y
it has no real roots
a develop a Java program to create a class student with members uso, name, an
array credit and an array month include methods to accept and display
details and a method to calculate sypa of a student.
import Java-uhl-scanner
class student f
 -int- uso some some son to be being - har one one
 int credit - new (1
```

```
int credititi- new int[s];
                    float marks[] = new int[s];
                      not Sura=0; float sum=0; Float sum=0;
                     Void studdetails (int usn, String name[], int credib[], float marks[]) {
                          this usn = wn; 11 to dileta | 1000 mis.
                          tho. name = name;
                          that credit : credit;
                          this manks = marks;
                     Void printdetails () f

System-out-println (" the use of student is "+use);
 100 1
                          System.out. println ("the name of student is "+ name);
                          System-out-println ("the credit of subjects are");
                                                 o medicar of
                          for (in = 0; ics; i++) {
                               System-out-println (credib[i]);
                                     Credition: Creditions condition
                          System-out println ("the marks of student dre");
                                                            = 0165 tell
                          for (int i=0;ics;i++){
                               System-out-printin (marks [i]);
                          4
                        float studigpal) {
+268877
                             for (int i=0; i<5; i++) { port more has the state
                                  f(op= < [i] trom) 7:
                                       Sum = Sum + (credits[i] *10); 101
                                  else if (monks[i]) = 80) {
                                         Sum = Sum + (credib(i)* 9);
members un, name, an
accept and display
                                   else if (monts (i) >= 70) {
                                        Sum : Sum + (credib(i) *8);
                                          galant and restrict enter the true
                                   else if (martuli) >= 60) f
                                        Sum: Sumt (credio (0 + 7))
```

A STATE OF THE STA

```
else if [manti[1]> = 50) {
                                                   sum = sum + (credibli) *6);
                                         else if (monks [i]>=35) {
                                                   Sum = Sum + (credib(i) *5);
                                        elve &
                                                   som = sum + (redin(i) + 0);
                                                                                                                                                                                                                                      for (
                                        elsef
                                                                                                                                                                                                                                       3
                                                    Sum = Sum + (credibli) + 0);
                                                                                                                                                                                                                                       8
                                                  I have to now out " fallates to make the
                       principle 2 month to say aft ) although a month of
                                                                                                                                                                                                                                       SI
                        introventes and a distribution of the state 
                                                                                                                                                                                                                                       SP
                        int creditssum=0,
                       for (int i=0; ks; i++) frame day women by?
                                                                                                                                                                                                                                       Sys
                                        creditssum = creditssum + credits[1];
                                "Spiritus to bounds ("the number of shadens one "to
                       Plant sgpa=
                                                                                                                                                                                                          3
                      float sgpa = Sum /(float) creditsom ; harmonic
                                                                                                                                                                                                 out
                      Felum sgpa;
                                                                                                                                                                                                 output +
                                                                                                                                                                                                 enter the usn of st
                                                                                                                                                                                                 A Stranger
class students }
                                                                                                                                                                                                enter the name of s
            public static void main (String xx[]) {
                                                                                                                                                                                               enter the credit of s
                          int usn;
                         Shing name;
                         int credits []: new mits;
                          int credibly = new int[s];
                                                                                                                                                                                              enter the marks of s
                         float monks[]: new float[f];
Float sapa;
Student S = new student())
                                                                                                                                                                                               80
                                                                                                                                                                                               80
                         Scanner S1 = new Scanner (System in);
                                                                                                                                                                                               70
                        System out println ("enter the Usn
                       System out println (" enter the Usn of student");
                                                                                                                                                                                               the un of
                                                                                                                                                                                               the usn of sludent
                        Usn = SI · next Int();
                                                                                                                                                                                               the name of Student
                        System out println ("enter the name of Student");
                                                                                                                                                                                               the credit of subject
```

```
name = SI-next ();

System-out - println (" enter the credit of subject ");
                              for(int) = 0; i(5; i++) {
                                    crediblij: $1. next Int();
                               4
                               System-out-println ("enter the marks of Shudent"),
                              for (int 1 = 0; ics; i++) f
                                     marks (i): s1. nextfloat();
                               3
                               S. Studdetails (win, name, credit, marks);
                                SEPYT
                                s printdetails ();
                                SS Pa > Studypal Vi
                                Sgpa = S. Studigpa();
                                System out println (" the sgra or student is " + sypa);
                           4
                       4
                    OUT
                    output +
                    647
                    enter the usn of student
                    The specimen to any tool com-
                    enter the name of student
                    enter the credit of subjects
 N 1134
                     4
                    4
                     3
                     enter the marks of student
                     90
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                      the un of
                      the usn of sludent is 1
; (" Ens
                      the name of student is a
; ("has
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and the second

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  4
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 the marks of student are word and sold harmany the months
  90.0
  80.0
  80-0
  70-0
  60 · D
create a class book which contains four members o name, author, price, numbers
include a constructor to set the values for the members - include methods to set
and get the details of the objects include a toshing() method that could dipply
the complete details of the book develop a Java program to create n book
import Java will Scanners
class pookf
   Shing bookname;
   Shing authorname;
   float price;
   int num-pages;
  void book ( string bookname, String authorname, Float price, int num_pages) }
     this bookname = bookname;
                                                                           4
     this authorname = authorname;
      this price = price;
                                                                          Outputt
      this num-pages = num-pages;
  public String tostring() f
     return bookname + " " + authorname + "
                                             "+ price +" "+ num-pages;
                                                                          abe
                                                                          arz
cless
                                                                          200
class books?
  Public Static void main (Shing XX[]) }
      String bookname;
                                                                         box
      String authorname)
                                                                          enter the
```

float price int num-po int n; Stanner 31 Scanner SI System-out n = S1-next book b[] = for (int i = 0 b[i] = ne System-or bookname System-or authomam System ou Price = S1. System-out num\_pages b(i) book (t b[i] book(b For (int i = o sien System out pr enter number of bool entry the 1 booknar enter the authorname ener the pice enter number of pages enter the 2 bookname enter the authoriame Price

```
float price;
                                                                            int num-pages;
                                                                             int n;
                                                                             Stanner St. new Scanner (System in);
                                                                            Scanner ss = new Scanner (System-in);
                                                                             System-out-println ("enter number of books");
                                                                             n = S1-nextInt();
                                                                             book b[] = new book[n];
                                                                             for (int i=0; icn; i++) }
                                                                                        b[i]: new book();
                                                                                        System-out-println ("enter the "+ (i+1)+" bootname");
                                                                                        bookname = SJ-next();
                                                                                       System-out-println ("enter the author name");
                                                                                      authorname = $1-next();
thor, Pirce, num-pages.
                                                                                      System-out-println ("enter the price");
 methods to set
  that could display
                                                                                       price = S1-nextfloat();
create n book
                                                                                     System-out-printin (" enter the number of pages ");
                                                                                     num_pages = S1 nextInt();
                                                                                     b(i) book (bookname,
                                                                                     blid-book (bookname, authorname, price, nom-pages);
                                                                        For (int i=0; icn) i++) {
                                                                                  System out println(b[i]);
it num_pages) 1:
                                                             y
                                                            outputr
                                                             enter number of boots
                                                              entry the 1 bookname
                                                              enter the authorname
   "+ num-pages;
                                                              ener the pice
                                                                                                            posted has needed and two closes student and letters
                                                              entr number of pages to all all answers and all commerced and areas
                                                                                                                                             the following the factorial property of the first and the first and the factorial an
                                                               enter the 2 bookname
                                                               enter the authomame
```

023 520 enter number of pages enter the 3 bookname C enter the authorname abe enter the price 920 enter the number of pages 200 enter the 4 bookname 9 enter the authorname hac enter the price 250 ener the humber of pages 200 enter the 5 bookname e entry the authorname ahe enter the price 250 enter the number of pages 200 0-200 250-0 abc 0 250 0 200 bac 200 250.0 abc 250-0 200 d bac 200 package cie; abc 250-0 public class internals ext \* Create a package cie which has two classes. Student and internals. the class ster' Student has members like usn, name and sem. the class internals has an array Floa PUblic that stores the internal marks stored in A scored in five courses of the current Semester of the student-create another package see which has the class external which is derived class of student this class has an array that shores the see see marks scored in five courses of the current semester of the student-import the two + Packag Package in a file that declares the Final marks of a students

in all five courses + import java-util-S package cie; package cie; public class public class stude Public String wn; public string name; int Semester; public void stu Scanner st System-out 067 SJ-USn = S1-ne System-out name = st-n System out 1 Semester Semester = Si 14 public void printd System-out pr SHI System-out Pri System out pri import Java util S import Java util Scanner

Studmarts[] St.; new Scam Void Studm

System-out-p

for (in) i= 0;

FOT

```
in all five courses-
                                                                      S-Clumping.
                    import Java-util-Sconner;
                                                         Doctor to I Distributed
                      package cie;
                      package cie;
                      public class
                      public class student {
                      public String usn;
                                                                           Calciminating king states
                      public string name;
                           public Void Studdetails()
                           int semester;
                                Scanner st = new Scanner (Systemin);
                                System out println ("enter the usn of student");
                                                       attenuous) kinag too motu.
                                 USn = SI-next();
                                System-out-println ("enter the name of student");
                                 name = SI next();
                                 System-out-println ("enter the semester of student");
                                 Semester = SI-next2nt();
                                                                                  ranges the cost may no
                            13
                            public void printdetails(){
                                 System-out-println ("the usn of Student is"+usn);
                                 System out Println(" the name of student is "+name);
                                 System out printin ("the semester of Student is "+ semester);
                                                     delica con patella ( entre de del mode
                        import Java util S
                         import Java util Scanner;
                         package cie;
                         public class internals extends students
                               Floor
                                float studmarts[]: new new float [s];
scanner sz: new scanner (syclem-in);
public void studmarks()
internals . the class
internals has an array
                                      System out println ("enter the internal marks of Student");
nues of the current
has the class external
that stoves the see see
                                       for (in) i= 0; PCS (j++) } hand and addition
 the student import
```

```
in all five courses-
                                                                      S-Clumping.
                    import Java-util-Sconner;
                                                         Doctor to I Distributed
                      package cie;
                      package cie;
                      public class
                      public class student {
                      public String usn;
                                                                           Calciminating king states
                      public string name;
                           public Void Studdetails()
                           int semester;
                                Scanner st = new Scanner (Systemin);
                                System out println ("enter the usn of student");
                                                       attenuous) kinag too motu.
                                 USn = SI-next();
                                System-out-println ("enter the name of student");
                                 name = SI next();
                                 System-out-println ("enter the semester of student");
                                 Semester = SI-next2nt();
                                                                                  ranges the cost may no
                            13
                            public void printdetails(){
                                 System-out-println ("the usn of Student is"+usn);
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internals . the class
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                                      System out println ("enter the internal marks of Student");
nues of the current
has the class external
that stoves the see see
                                       for (in) i= 0; PCS (j++) } hand and addition
 the student import
```

```
Studmonts[i] - 81
                     Shudmarks[i]: st:nextfloat();
                                                                                                     forli
      public
      Public void print
      Public void printmaky () }
           System out println ( the marks of of student is ");
                                                                                      Н
                                                                                      import Java-util-Sca
                                        Samuel II . 1820 Summer College
           for (int i=0; ics; i++)
                                                                                      import cie-student
                                        to 100 s.h. mile "stanicy log army?
                                                                                      import cie-internals
                                                                                     import see external
                   System out println(studmonts[i]);
                                                                                     class mar
                          of traducts to some and roles") almost two arming
                                                                                     class mainf
                                                                                          public Static v
                                                                                                 ini
                                                                                                 int n;
                                                                                                 Scanner
import Java-u
                                                                                                System c
import Juva-util-Scanner;
                                                                                                 n = sy.n
import cie-student;
                                                                                                internals
class external extends student ( + 11 through to me at the many through the
                                                                                                external
     public float Seemants[] = new float[s];
                                                                                                for (int i=
          public void seemarks () The transfer of the seemarks ()
                                                                                                      itt.
                                                                                                     ifi.
               Scanner 53 - new Scanner (Systemin);
                                                                                                     eti.
              System out println ("enter the see marks of of Student");
                                                                                                     efij
               for (int i=0; ics; i++)}
                                                                                                    e(i)
                     Seemants[i]: Sa nextribute
                                                                                          Float Finalments
                                                   is abortion stompton tasts
                                                                                         float finalmarks
                                                                                        for(in
                                                                                         for (int i=0) icn; i
                                                                                             for (int j=0;
                                                                                                   final
    void printseemental) {
                                                                                                   Angla
             System out printin ("the see morks of student is ");
```

```
for(int i=0; i(5; i++){
                                                                                                                          System-out-Printin (seemarks[i]);
                                                              НАПРЫ
                                                              import Java-util-Scanner;
                                                                                                                                                                                                                                                    I MAY BEAUTIFULE
                                                               import cie-Students
                                                               import cie-internals;
                                                                import see external;
                                                                 class mar
                                                                 class main
  0 1
                                                                                  public static void main(String xx[]){
                                                                                                            int I brown to the second to the self affining the orthing
                                                                                                            Scanner Sy: new Scanner (Systemin);
                                                                                                            System-out-println ("enter the number of students");
                                                                                                            n= Sy-nextInt();
internals (internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internals(internal
     boy string
                                                                                                              for(int i=0; i<n; i++) } }
    malu.
                                                                                                                                   r[i]-studdetails(); internalmarto(1)- new internals();
                                                                                                                                  i [i] Studmorts(); external marks(i); new external(); internal marks(i); studdetails();
                                                                                                                                                                                                internal marks [i] - stud marks ();
                                                                                                                                                                                                external marks [i] seemarks();
                                                                                                                                  efij seeme
i ("tnabu
                                                                                                                                  e(i) seemarks();
                                                                                                 Float Finalmarks[][] =
                                                                                                 float finalmarks[][] = new float[n][s];
                                                                                                for(in
                               14.18
                                                                                                  for (int i=0) ien; i++)}
                                                                                                                  for (int j=0; i(S; j++)}}
                                                                                                                                                                                                                                                                  external markal ()
                                                                                                                                                                                               internalmariu(i)
                                                                                                                                         Analmaits[i][i] = if ] - Studmarks[i] + ((E) - Seemarks[i])/2);
```

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40
                                  4
                                                                                                                                                                                                                                           40
                                                                                                          Ultrawall share two miles.
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        for(inti-o)
                                                                                                                                                                                                                                        80
       for (int i= 0; icn) i++) {
    internal marks | internal 
                                                                                                                                                                                                                                         80
                                                                                                                                                                                                                                       80
                                                                                                                                                                                                                                       08
                           internalmorts() printmarks()

ifit printmarks();

externalmorks();

etil printseemarks();
                                                                                                                                                                                                                                       enter the usn of shu
                                                                                                                                                                                                                                    enter the name of s
                                                                                                                                                                                                                                    enter the semester of
       for (int i - 0
                                                                                                                                                                                                                                   enter the international
                                                                                                                                                                                                                                 enter the internal n
     for(int i=0; icn; i++){
                                                                                                                                                                                                                                  45
                                                                                                             1(1) xx (piri2) alone biou attalk sitting
                                                                                                                                                                                                                                  45
                       State
                                                                                                                                                                                                                                  45
                       System-out-println ("the final marks of " + i + " Student is " );
                                                                                                                                                                                                                                  45
                                                                                                                                                                                                                                 45
                                                                                                                                                                                                                                  enter the see marts of
                       for (int j=0; j<5; j++) } { (miner g i) common, war = p i common.
                                                                                                                                                                                                                                 800000
                                                                                              educer adt rains Delining too makes
                                      System out println(
                                                                                                                                              of Mathematical In
                                                                                                                                                                                                                                Usn of Student is 1
                                     System out printin (finalmosts [i][i]);
                                                                                                                                                                                                                                the name of stident is
                                                                                                                                                                                                                               the semester of studen
                                                                                                      [ neto external [n]
                                                                                                                                                                                                                               the marks of student is
                                                                                                                                  1(++1 (asi (0 = 1 for )ro)
                                                                                                                                                                                                                             4000
                                                                                                                           (Chalatabhada (1)
                                                                                                                                                                                                                              the see marks of student
    3
                                                                                                                                                                                                                               80.0
                                                                                                                                                10523-175
                                                                                                                                                                                                                               86.0
   output >
                                                                                                                                ( ) Exemply ( )
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   enter the number of students
                                                                                                                                                                                                                               80-0
                                                                                                                                                                                                                             the usn of student is 2
  epoler the using a startegat
                                                                                                                                                                                                                             the name of student is b
                                                                                                                                                                                                                            the semester of student is
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  enter the win of student
                                                                                                                                                          Electronic Local
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enter the semester of student
                                                                                                                                    the last to Last to !
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enter the internal marts of student
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                                                                                                                                        77 40 4/6 14
40
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40
                                                                                                                                                          30-0, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 31-1, 3
                                                  40
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                                                 enter the see marks of student
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                                                    enter the usn of student
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                               Tai
                                                                                                                                                                                                    82-0
                                                    enter the name of student
                                                                                                                                                                                                    88-0
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                           facquer.
                                                    enter the semester of student
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            THE DICTION
                                                    enter the internalmarts of student
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                                                     enter the internal marks of student
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        NO WE HAVE
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              THE PLANE
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E lauk
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                                                                  the see marks of student is
                                                                   80.0
```

A STATE OF THE STA

```
" write a program that dem demonstrates handling of exceptions in inheritence tree
create a base class called father on father and derived class son which on
the base class- in in father class implement impliment a constructor whi which la
the age and throws the exception or wrongage() when the input input que
in son son class impliment a constructor constructor that cases both father and
Son's age and throws an exception exception if son's son's age is > - father's age
delass compaga
                            Exception exceptioninheritancedemos
- class mondage
                                                                                               this si
· class wrongage extends exception
           wrongage (String m
                                                                                           public in
     void wrongage (string message)
                                                                                          public Int
                 Stypo
                 Super (message);
                                                                                          . vetur
 3
 class father {
                                                                                    public class exce
      private int age;
      public father (int age) throws wrongage [ }
                                                                                           puthi
                                                                                           public Stati
           if (age <0) }
                                                                                                  try
                  throw new wrongage ("age cannot be negative");
          this age = age;
    13
                                                                                                  Sor
      public int getuge() # {
                                                                                                  SH
            return age;
                                                                                                  Sys
                                                                                              catch(u
  class son
  class son extends father {
      private int Samo sonage;
      public son (int fatherage, int sonage) throws wrongage f
             Super (Fatherage);
```

```
vitence tree
e which extensi
                                                                                                                                             if (sonage >=
whi which take
                                                                                                                                           if (sonage > = fatherage) f
input input agero
th father and
                                                                                                                                                                       throw new wrongage ("son's age cannot be greater than or
   - father's age
                                                                                                                                                                                         equal to father's age ");
                                                                                                                                     age count is grafty from an equal to the
                                                                                                                                        this sonage = sonage;
                                                                                                                       public interior comes note for lessons, bonness and a special and so an
                                                                                                                                                                     year off in logs has a class twent tails with delatte, game age
                                                                                                               public int getsonoge() | make the property of the property of the property of the public interest of the public in
                                                                                                            vetum sonage; I would be a little reported talk a tot meday
                                                                                                The organist court which graded have the last of decourts continued that graded consider places
                                                                                           Made exposure with the effective or with the mass delited which a fell experted men we do nearly and having an arrange of the exposure with the content will have provided in the exposure with the content will have provided in the experience with the content will have provided in the experience with the content will have provided in the experience with the content will have provided in the experience with the content of the experience will be content of the experience with the content of the experience will be content on the experience will be c
                                                                                                public class exceptioninheritance demo {
                                                                                                                              public Static void main(shing xx[]){
                                                                                                                                                            try
                                                                                                                                                                        Son Son = new son(40,20);
                                                                                                                                                                       System out println ("father's age: " + son getage());
                                                                                                                                                                       System out printin ("Son's age : "+ son gersonage());
                                                                                                                                                                       Son invalidson = new son(30,35);
                                                                                                                                                                     Syste
                                                                                                                                                                     System out println ("this line will not be reache reached");
                                                                                                                                                                                                                                                                                                                The Thomas is the
                                                                                                                                                         catch (wrongage e) f
                                                                                                                                                                                                                                                                      e-getmessage()
                                                                                                                                                                                          Swiem
                                                                                                                                                                                          System out printin ("exception : " + e getme e getmestaget ));
                                                                                                                                                                                                                                                                                                        I do along may - but
```

```
output +
 father's age: 40
 Son's age: 20
 exception: gars Sort a
 exception son's age cannot be greater than ov equal equal to father's age.
 if (-getmessage() is not used t
 exception: wrongage: son's age cannot be greater than or equal to Father's age a
                                                                                      Pet
1. Create two packages - one named personal and other named named Professional the
 personal package has a class person with details - name, age, address, emailed the
                                                                                      package professio
 includes methods to accept and display data data from the user the professional
                                                                                      import Java-util-S
 package has a class manager which is a subclass of person with details - id deptid;
                                                                                      import personal pe
 qualification, salary. This includes methods to accept and display data from the user-in
 Import these two packages in a file which cree creates n objects of the manager class
                                                                                      public class man
 print the names of the managers who are above so years of age and who earn above
                                                                                                int id:
 20000
                                                                                                int dept
- package personal;
                                                                                               String
 import Java-util-Scanner,;
                                                                                               double &
 public class person } }
                                                                                               double si
                                                                                              public vi
         String name;
                                                                                                  Scan
         int age;
                                                                                                  59
        string address;
                                                                                                  Syster
        string emailed;
                                                                                                 1d = 52
        public void person
                                    nen Casta? Selfrant les montes
                                                                                                 System
        public void periondetails()
                                                                                                deptid
             Scanner w = new Jeanner (System-in);
                                                                                                deptid =
             System out println ("enter the name of person");
                                                                                                System !
             name = si-next();
                                                                                               qualifica
            System out println ("enter the age of person");
                                                                                               System-c
             age = SI-nextInt()1
                                                                                               System a
            System-out-println ("enter the address of person");
                                                                                              Salary = S
            address=sinext();
            Sustan
                                                                                         public void p
           System-out println("enter the emailed of person");
                                                                                                System.
            emailed = S1-next();
                                                                                                System
                                                                                                System.
    public void printdetails() }
                                                                                                System-
```

```
item2[1] . itemdetails(2,"b", 250,2,2)11
                                                                                               Supe
         itemz[1] sell();
                                                                                        public vold
     catch (reorder e) $
                                                                                            double
                                                                                           System o
          System out println ("exception: "+ e-getMessage()) 1;
                                                                                           system .
                                                 Crobian month Calles bias
                                                                                    4
                                                                                   class circle exte
                                        Caval values > 1- values 114
output v
                                                                                           10
         will extend now against torresp spiriters?"] consider now except
                                                                                           Public
exception: quantity cannot be less than rea veorder level. level.
Shape +
                                                                                        public voic
abstract class shape {
                                                                                             double
       protect
                                                                                             8
                                                                                             System
       protected int dimensions;
       protecte
                                   F(CJAK gross) store blue offers.
       protected int dimensions;
      public shape (int dimension), int dimensione) {
                                                                                    public class yes
            this dimension = dimension;
                                                                                         public stat
            this dimensions = dimensions,
                                                                                               recta
                                                          Solve prices
     public abstract void printAreal);
                                                                                              R
                                                                                               HIGH
                                                                                              Circle
class rectangle extends shape f
                                                                                              circle
                                                                                              Y- Prin
        public vectangle (int length, int width)
                                                                                              1 - prin
         Super (length, width);
                                                                                             erpili
        public void printArea () {
        int area = dimension * dimensions,
                                                                                Output +
         system out printin ( area of rectangle " + area)
                                                                                orea or rectangle;
                               illation of a line bearing to land
                                                                                area of triangle:
                                                                               area of circle +
                                               Transiture Laterest
class triangle extends shape f
                                                                               Ovea of circle: 78
        public hiangle (int base, int height) f
```

```
time pine
                              Super (base, heigh);
                        public void printurea ()}
                            double area = 0.5 " dimension) " dimensions;
                            System-out println ("
                            System-ou - Println (" area of Hangine: "+area);
           3
 Pille His
                     clas circle extends shape f
 (P)) 1
                            public circle (int radius)
                                  Super (radiu, 0);
    11
                           public void printagea () {
idinap
                                double area = Math. PT + dimension 1 dimension 1;
                                System-out-println ("area of circle : "+area);
     dass items!
public stuffs w
                        public class vect {
                             public static void main (string xXI) {
                                   rectangle ro new rectangle (2,10);
                                   to trangle + > new mangle (3,7)
ing adducts
                                   etrele c = new
timovp tol
                                   circle c = new circle (2))
ishman this
                                   r- printarea ();
 · meti
                                   i-printareal);
18511 H511
                                   esprintareas);
                        3
                        Output +
                        orea of rectangle : 20
                        area of triangle: 10.5
eg) har
Leasure
                        area of circle +
                        avea of circle : 71 53113
```

```
Outpul +
  Now thread : Thread [#11, one, 5, main]
                                                                                                 4 catch
  New thread:
  new thread: Thread [#21, one, 5, main]
                                                                                               3
  new thread: Thread [# 22, two, 5, main]
 new thread: Thread [#23, three, 5, main]
 three:5
                                                                                      publ
 one:5
                                                                                      public classhoothyon
 two: 4
1 three: 4
                                                                                      public class huother
1 one: 4
                                                                                         public static
 two: 3
 one 3
                                                                                               displayme
 three: 3
 three: 2
                                                                                             displaymess
 one:2
 two: 2
                                                                                             threads-sett
 GARP
                                                                                            thread : set
 one: 1
                                                                                            thread 1. sta
 three: 1
 two: 1
                                                                                            threadz-sta
 three exiting
                                                                                            tryf
 two exiting
 one exiting
                                                                                               Thread 5
 main thread is aco
                                                                                          3 Catch (Inter
 main thread is aware
 main thread exiting
                                                                                                 System
 class displaymessagethread extends the
                                                                                         thread interru
 class displaymessage thread extends Thread f
                                                                                        threadz-interrup
         private final String message;
                                                                                        System out print
         private final long interval;
         display message thread (shing message, long interval).
                                                                                    3
              this messo
              this message : message;
              this interval = interval;
                                                                                   output:
                                                                                   20ms college of engin
        public void run()
                                      kernell atmost ballaced for other
                                                                                   cse
             tryf
                                                                                   CSE
                                      equilin amos amenjalines As
                                                                                   CSE
                while (true) {
                    System. out println(message);
                    Thread-sleep(interval);
                                                                                   BMJ college of engineer
```

```
y catch (Interrupted exception e) {
                   System-out println (Thread currentifread ) getwome()+"intercept
   3
-publ
<del>public class/woth/read</del>
public class huothreaddemo f
    public static void main (string argues) f
          displaymessagethread thread1 = new displaymessagethread ("bms college
                                                     of engineering ", 10000);
         displaymessagethread threadz = new displaymessagethread ("CSE", 2000);
         threads-setName("thread 1");
        thread 2 set Nume (" thread 2");
        thread 1. start();
         thread 2- start();
        tryf
            Thread sleep (30000);
        3 catch (Interrupted Exception e) - {
               System-out-println ("main thread interrupted");
       threadl interrupt())
       threadz-interrupt();
       System-out-println( main thread exiting ") 100;
    output +
    doms college of engineering
    CSE
    CS€
CS€
    BMJ college of engineering
```

CSE CSE CSE this name CSE this accino bms college of engineering CRE this-type this balance CSE CSE CSE void deposit ( main thread exiting void deposit I do thread 2 interrupted thread 1 interrupted balance + = a void withdraw (c if ((balance develop a Java program to create a class bank that maintains two kinds of arising 1 for for 11's cost customen, one called savings account and the other current balance account the savings account provides compound interest and withdrawlifeolities but no cheque book facility the current account provides cheque book facility elset but no interest . current account holders should also maintain a minimum System-o balance and if the balance falls below this level, a service charge is imposed create a class account that stores customer name, account number and type of account from this derive the classes cor-acct and sav-acct to more them' move specific to their requirement include the necessary methods in order void display() to acheive the following tasks: (a) accept deposit from customer and update to the balance. System out print (b) display (b) display the balance (1) compute and deposit interest (d) permit withdraws and update the balance check for the minimum balance impose penalty if necessary and update the balance class savacet exten class sovacet exten import Java util-Scanner; private static doub class account savacci (Slving name string name; super (name, as int accno; string type 1 vold interest() double balance) account (Shing name, int accno, Shing type, double bolance) balance + : balance

```
this name - name;
                              this accno - accno;
                              this-type = type;
                              this balance = balance)
                          void deposit t
                           void deposit (double amount)
                             balance += amounts;
                           Void withdraw (double amoun+)
                                if ((balance - amount) 7=0)
is two Kinds of account
                                   balance - = amount;
and the other current
nd withdrawl facilities
                                    System-out-println("insufficient balance, cant withdraw");
                                elset
cheque book facility
itain a minimum
rice charge is imposed
 number and type of
it to make them.
                           void display()
                             System out printin ("name: "+ name +" accno: " + accno+" type: "+type
any methods in order
                                                 + " balance: " + balance);
ance.
 liquittai lisself
 the Minimum balance,
                          class sovacct extends account
Tallines are named
                          class savacet extends account
                             private static double rate = 5)
                             sovacci (Shing name, int accno, double balance)
                                Super(name, accno, "Savings", balance),
                             void interest()
                               balance += balance * (Yate)/100;
dance)
```

```
System-out println ("balance: " + balance)
                                                                                           Systen
                                                                                           Slying
                                                                                          Syst
                                                                                          System
 class (or
                                                                                          int acc
i class curact extends account
                                                                                         system
                                                                                         Hadoob-
   private double minbal : 5001
                                                                                         doubte
                                                                                         double b
                                                                                         int chy
   private double service ha
   private double servicecharges - 50;
                                                                                        double o
   curact+(shing name, int accno, double balance)
                                                                                        account a
                                                                                        Sovacct si
                                                                                        curact c
       super (name, accno, "corrent", balance);
                                                                                        White (tro
                                                                                       while ( hu
                                                                                         if (all.
  void checkmin()
                                                                                            system
     if (balance < minbal)
                                                                                           System
        System-out println ("balance is less than min balance, service
                            charges imposed: "+ servicecharges);
                                                                                           ch
                                                                                           ch:
        balance - - servicecharges;
        System-out-println ("balance is:" + balance);
                                                                                             Cast
                                                                                             COM
class accountmann
class accountmain
   public static void main (shing xx());
                                                                                           case
       Scanner s = new Scanner (system in);
       System-out printing enter the name : ");
       shing name = s-next();
                                                                                         Case 3
```

```
System-out-printing enter the type (conem |savings):");
                                string type - s next()
                                System out printin ("enter the account number.");
                                int accno : s. next2n+())
                                System-out printin (" enter the initial bolance: ");
                                double but
                                double balance = 5-next-Double(1)
                                int chy
                                double c
                               account acc = new account ( name, accno, type, balance);
                                double amountly amounts;
                               Sovacet sa = new savacet (name, accno, balance),
                               curacet ca : new curacet (name, accno, bolance);
                                while (hve)
                                white the
                                 if (acc-type, equals (" savings")).
                                    System-out - printlal" Inmenu \n 1- deposit 2 with traw 2- withdraw
                                    System-oul println ("enter the choice: ");
balance, service
                                     ch = s nextInt );
remitecharges);
                                     Switch (ch)
                                      case 1: System-out-printing
                                       case 1 = System-out-privatin (" enter the amount!"))
                                               amount = s nextInt();
                                               sardeps,
                                               SA Acporti
                                               Sa deposit (amount 1)
                                                breat-
                                      Case 2 : System-out-println (" enter the amount :");
                                                amounts : s nextInt();
                                                Sa. withdraw (amounts);
                                                break)
                                     case 3 sa intrest (-);
```

```
case 3 : Sa interest(),
                  break;
         Case 4: sa-display();
                                                                   default .
        Case 5 : Sys
        case s: System exit(0);
       default : System out prints !
       default: System out printin ("invalid in put");
                                                           3
                                                           output :
                                                           enter the name : 5
else
                                                          outputr
 System out-printin ("Inmenuln 1-deposit 2-withdraw 3-display"),
                                                           enter the name : at
                                                           enki the type lour
                                                           savings
 System-out-println (" enler the choice : ");
                                                          enter the account no
 ch = SnextInt();
                                                          Enter the initial ba
 Ster
                                                          1000
 Switch (ch)
                                                          menu
                                                          1. deposit 2 witha
      Case 1: System out println (" enter the choice : ");
                                                          enter the choice
      case 1: System-out-println ("enter the amount:");
                                                          enter the amount
              amount = snext Int();
             ca deposit (amount);
                                                          1- deposit 2 withdraw
              break;
                                                          enter the choice = 3
                                                          balance: 240-0
     case 2: System out println ("enter the amount:");
                                                          menu
                                                          1- deposit 2 withdro
              amount 2 = S- nextInt()
                                                          1 deposit 2 withdr
              ca-withdraw (amount 2);
                                                         enter the choice :
              ca-checkmin(),
                                                         4
                                                         name: abid
             breaky
                                                         accno: 170
    case 3: (a-display();
                                                         type: savings
             break;
                                                         bolance : 940-0
   case 4: System-exit(0);
                                                         menu
```

```
HE!
                             default : System out-printin (" invalid input");
                                       toxeet >
                                       breat?
                             4
ipul");
                      3
                      output ,
                      enter the name : 5
                      output r
                      enter the name : about
                      enki the type (corrent | Lavings)
aw 3 display "),
                      savings
                      enter the account number:
                      Enter the initial balance :
                       1000
                      1. deposit 2. withdraw 3 compute interest 4 duplay
                       enter the choice
ice : ")
                       enter the amount : 100
mount 1");
                       1 deposit 2 withdraw 3 compute interest 4-display
                       enter the choice : 3
                       balance: 240 o
                       1 deposit 2 withdraw 3 compute interest . 4 display
amount: ");
                       menu
                       enter the Choice:
                       name: abid
                        accho: 170
                        ype : savings
                        balance : 940-0
                        menu
```

```
1 deposit 2 withdraw 3 compute interest 4 display
 enter the choice, 5
                                                                                                    Text Field De
mport
                                                                                                    TEXTREMOS
import Java awt. *;
                                                                                                    Owin Setsia
import Java-awt-event. *;
                                                                                                    awin setTit
Public class TextfieldOemo extends frame implements Achonlistener
                                                                                                    awin - selvi
   Textfield name, pass;
                                                                                                    awin setvis
    Public Textfield Demo()}
         Settayout
         Setlayout (new flowlayout());
                                                                                           class MywindowAd
         Label namep = new label ("Name: ", Label PIGHT);
                                                                                                  public void u
                                                                                                          Syste
         Label passp = new Label ("Password:", label RIGHT);
         Men
         hophe? new
                                                                                  OUTPUTY
         name = new Textfield(12);
                                                                                                          pass
                                                                                  name abc
         pass = new Textfield (8);
                                                                                  name : obc
         pass set Echochar ('?');
                                                                                  select text in name: bc
         addf
                                                                                  password: aaa
         add (namep);
         add(name);
         add ( passp);
                                                                                  import Java-awt *;
                                                                                  import java-awt event . *;
         add(r
         add(pass);
                                                                                 Public class DivisionMain1 exte
         name add Action Listener (this);
         pass add Action Listeney (this);
                                                                                        Textfield numl, numz;
         addwindowlistener(new MywindowAdapter());
        add Windowlistener (new MyWindow Adapter ());
                                                                                        Button deesult;
         public void actionPerformed(ActionEvent ae) [
                                                                                        Label outresult;
                                                                                        String out = " ";
                 repain();
                                                                                        deep
                                                                                       double resultNum;
         public void paint (Graphics g)
                                                                                        int flag : Or
                                                                                        public DivisionMaint()
               9 drawShing("Nome: " + name-getText(), 100,200);
                                                                                        public DivisionMaini()
               g. drawshing ("selected text in name: " + name = getselected [ext())
                              100,220);
                                                                                            Setlayout(new Flowla
              9 drawshing ("Password: " + pass getText(), 100, 240);
                                                                                           dresult =
                                                                                           the
                                                                                           dresult : new Button
      public static void main (string xx17)
                                                                                            Kakel numbert = MEL
```

```
Text field Demo
                                  Text (ield Demo awin = new Text Field Demot);
                                  awin setsize (new Dimension (700, 700));
                                  awin setTitle ("Tf_ label demo");
                                  awin - selvisible
                                  awin setvisible (tyve);
                          class MywindowAdapter extends WindowAdapter f
                                 public void windowclosing (Window Event we) {
                                         System exit(0);
                   OUTPUTT
                                        password: [227]
                   nome: [a[bc]]
                    name: abc
                   select text in name: bc
                   password: aaa
                   import Java-awt . *;
                   import Java-awt-event. *;
                    Public class DivisionMain1 extends frame implements Actionlistener
                         Textfield numl, numz;
                          Button deesult;
                          Label outresult;
                          String out = " ";
                          double result Num;
                          int flag = Or
                          public DivisionMaint()
                           public DivisionMain()
· gerselected Text(),
                              Setlayout(new Flowlayout());
                               dresott =
240);
                               dresult : new Button (" RESULT");
                               Kaker number = new tabelt
```

```
label number1 = new label ("number 1:" label RIGHT);
 label numberz = new label (" number z:", label-RIGHT);
                                                                                Catch (Number
 num1 = new Textfield(s);
 numz - new Text
                                                                                    flag=1;
  num : new Textfield(s);
                                                                                   OUT = " 1
 Outresult = new Label ("result:", Label-RIGHT);
add(number1);
                                                                                   repaint
 add (numi);
                                                                                catch (Arithme
 add (numberz);
 add(numz);
                                                                                    flag=1;
 add (d Pesult);
                                                                                    det
                                                                                    out : "
 add(outresult);
                                                                                    repaint
 num1 add Action Listener (this);
 numz add Action Listener (this);
dResult. add Action Listener (this);
add Windowlistener (new WindowAdapter ()
                                                                           public void paint (
                    public void window Closing (Window Event we)
                                                                              if(flag==0)
                                                                                9 drawshing
                        System exit(0);
                  3);
                                                                              else
public void actionPerformed (ActionEvent ae)
                                                                              else
                                                                                9-drawshing
     int ni, nz;
     try
                                                                                flag=0;
       if (ae. getSource() = = d Result)
                                                                              politic stati
       19
                                                                              public static vo
          ni Ir
          n1- Integer - parseInt (num) - getText());
          nz = Integer · PorseInt (numz · getText());
                                                                                 DivisionMair
          out = n1 + " " +n2;
                                                                                 dm · setsize
         resoltNum = n1/n2;
                                                                                 dm setTitle
         out + Shing value of (
                                                                                 dm-se
         out += Shing value of (result Num);
                                                                                 dm setvisible
         repaint();
```

```
(CT+
                                                                                                             carch (Numberformat Exception e1)
HT);
                                                                                                                  OSSESSION LINES & Frederick
                                                                                                                           out = " number format exception! " tel " .....
                                                                                                                           repaint(); of the state of the 
                                                                                                              catch (Arithmetic Exception e2)
                                                                                                                      " Flag = 17 neithe 23 toronterament good over torontera toront retirem
                                                                                                                                out = " divide by o exception! " +ez;
                                                                                                                                repaint();
                                                                                                   public void paint (Graphics 9)
ow Event we)
                                                                                                                if(flag==0)
 [ | ale ] seman
                                                                                                                        g. drawshing(out, outResult, getx() + outResult, getwidth (), outResult, getx()
                                                                                                                                                                        + outresult. getHeight()-8)1;
  select test to no
                                                                                                                  else
                                                                                                                   else
                                                                                                                           g.drawstring(out, 100, 200);
                                                                                                                              flag = 0;
                                                                                                                     poblic stati
                                                                                                                      public static void main (string xx[])
                                                                                                                                      DivisionMain1 dm = new OivisionMain1();
                                                                                                                                      dm - Setsize ( new Dimension (800, 400));
                                                                                                                                      dm SetTitle ("Division Of Integers");
                                                                                                                                       dm-setVisible(true);
```

```
Output +
                                          result: 4 2 2.0
                         number 2 1
  Number 1: 4
                                                                                        add(numz);
                        number 2 : 0 [Yesult] result :
                                                                                        add (dresult
                                                                                        add (Ourkey
                                                                                       add (outlesu
 divide by o Exception! Javo long. Animmetic Exception: / by zero
                                                                                       numi- add Act
                        number 2 : a result result
 number 1:4
                                                                                       numz odd Ac
                                                                                       dresult add A
 number format exception! Java-lang-Numberformat Exception: for input string: "o"
                                                                                       addwindowlis
                                                                                      public void o
import Java-awt. *;
import Tava aut event . *;
                                                                                           double r
public class DivisionMain extends frame implements ActionListener
                                                                                           my
      Texfield numi, numz;
                                                                                            if (at
      Button dresult;
     Label outresult;
      String out = "";
     double result Num;
     int flag = 0;
                                                                                               nz
     public Division Main()
                                                                                               ves
         setlayout (new flawlayout());
         dresult = new Button(" RESULT");
                                                                                               Yel
         Label number = new Label ("Number 1:" tabel- RIGHT);
         label numbers = new label ("Numbers!", label-RIGHT);
                                                                                      catch (Arithmeti
         num1 = new Textfield (s);
         numz = new Textfield (5);
                                                                                         Flag=1;
        outresult > new label ("Result: ", label RIGHT);
                                                                                         out : " Din
        add (number ).
                                                                                         repaint()
        add(numi);
        add (number 1);
```

# Report +

AWT "Abstract window Toolkit"

The AWT is a package in Java which provides classes to create and manage graphical user interfaces (GVIs)

The AwT includes various components, event handlers layout managers and other utilities.

### Components +

## 1) Frame +

- A frame is a window with title and border.

> used as a main window in which other components are added Syntax +

class Integer Division extends frame

## Dialog ,

" it takes some form of input from the user

») Used to display model dialog to intact with wer

- used to confirm actions, prompt the user and display messages

## 3 Textfield+

-) it is a single line text displayed

- Used for guiding the User to accept input

### 9 label +

- display area for short text

- display static text

\* prompts the user to enter textlinpus

" Eg+ Num1:

### O Button :

-) triggers the actions when clicked

- used for performing specific actions

- used for submitting forms, confirming retr.,

# 6 checkBOX :

= component which can be cheeked or unchecked

-, used to enable or disable

=) used in form with multiple choices

## Event handling,

# O Event

- event are generated

-) used for handling user

event are processed component

## Event listener +

" object that receives

or this is for the implem

=> event listener's are r particular types of ever

## (3) Action Event

= event that indicates t

=) used for handling usi

action generated when checkbox etc.,

## a Action listener .

» it receives action event

-) it responds to the user

### 1 Window Event -

- event indicating chang

» handles window relate etc.,

### 6 Window listener -

o) it receives window events

" used to implement metho

### Layout Management .

### 1) flow layout ,

" Arranges components in a

wed for arranging row

=) Used for creating forms el

Event handling , agon manager that minder the container into a regions contracts @ Even create and O Event - event are generated by user actions -) used for handling user input such as mome clicis, key press or window nanagers and =, event are processed by event listeners attached to the relevant component actionable for amonging component in confider Event listener . " object that receives and handles events

" this is for the implementation of event driven behaviour in Gust's event listener) are registered with specific components to litten for re added porticular types of event 3 Action Event » event that indicates that a component-defined action occured ») used for handling user actions =) action generated when user clicks on ear component like button, checkbox etc., play messages a Action listener. » it receives action event -) it responds to the user action 1 WindowEvent -- event indicating change to the state of a window » handles window related event such as window opening, clossing, respiring 6 Window Listener a) it receives window events or used to implement methods to handle window-related events Layout Management , 1) flow layout, " Arranges components in a centered flow one after another -) used for arranging row or column with equal spacing between them. =) Used for treating forms etc.,

2 Border-Layout, Layout manager that divides the container into 5 regions: north, south, east, west and center - used for arranging components at the edge edges and center of the container Layout manager . responsible for arranging component in container - control size and position of components I write the same to rediction required set not of the en duscreptions affirmed with straight are compared to dates to 1996 white Emotio martie barriote managina a talk totalibre talk has wester bandling user actions edim generated when uses eliths on car component like button Warton listener the received actions even a wellse may salt et danger it " - tarriadain ? · best indication change to the state of a weather manas prindagamago wehale to duri duova batelar wehale sellari change ketelor audicias elkadel et chanton hepartipo el kin enstant with the well product of the agree of the and condidigited logs that make wher endpoint of the