B.M.S COLLEGE OF ENGINEERING BENGALURU

Autonomous Institute, Affiliated to VTU



AAT

22CS3PCOOJ

LAB OBSERVATION

Submitted in partial fulfillment of the requirements for LAB COMPONENT

Bachelor of Engineering in Computer Science and Engineering

Submitted by:

MOHITH JAIN 1BM22CS162

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1. Develop a Java program that prints all real solutions to the quadratic equation $ax_2+bx+c=0$. Read in a, b, c and use the quadratic formula. If the discriminant b_2 -4ac is negative, display a message stating that there are no real solutions.

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0.	Develop a java program that prints all real solutions
properties.	to the quadratic equation ax 2 + bx+ c=0.
, 0	Read in a, b, c and use the graduatic formula.
	Handle ye make cast (-d) I (200)
	import java. util. Scanner:
	class roots of sales and the s
	8
	public static rold noin (String xx[])
	System.out. println (" Mowth Jain- 18M22cs162");
	double x1, x2;
	Scanner SI = new Scanner (System.in)
	System. out-printin l'tuter rooffinients of equation")
	double a= St. next Doubla();
	double b= SI. next Double (1)
-	double e= S1. mont Doublel); 1000 2000 2000 2000 2000 2000 2000 200
	i) (d == 0)
	System. out. printly ("Roots are real and equal");
	x1 = x2 = -b/(2*a);
	System. Dut. Orintly ("K1 = "+x1)200 21009
1	System. out. printly ("R2="+r2); 0==19
	2 Contract of the ST 10 - 1 - ST 10 - 1 - ST 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10
	else if (d>o)
	white as I remaind at read
	System. out. printer ("Roots are read and distinct");
	11= (-b+Moth sqxt (d)) / (2"a);
	Y2 = (-b- Math. Sqyt (d))/(2 * a);
	System out mintin ("RI="+81);
	System. out. println (" R2= "+ 22);
	- 5

	pate 18 12 23 Page 02	
	else	1
	our the study bath warpard evel a deleval.	1
	System out printly ("Roots are distinct & magine	24
10	double 2 = = b (2+a) = 2 d = 2 d = 2	3
	doubly 4= math. sart (-d) / (2 a);	
	Sustemport printle KI = + x + + 1 1911	1
	System. out. printly ("R2="+x+"+i"+y);	1
	30	J
	3 (Free parts) when him should be with	
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-	120 System out policity (" no work John 18M22001)	
	Output:	
	(a) make 2 may 2 may 2 man 2	
1	Month Jain-181922 es 162	
	Enter the coefficients of equation	
4	d What tree to a shoot	
	Roots are real and equal	
	R1 = -1.0 () () () () = b > (deab	
	R2= -1-0 (0==b) [1]	
		10
O.	Enter the coefficients of equation	
	Roots are real and distinct a ton marious	
	RI = -0.5 (cr + " - cl ") with cry . byc	
	1 3	
	Three the sofficions of	
1.	Enter the coefficients of agration	
	Roots are distinct and imaginary	
		1
	R2=-0.75-10,6614378777661477	
	TFH13011	

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                            × + ~
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
PS C:\Users\bmsce\Desktop\1BM22CS162> javac roots.java
PS C:\Users\bmsce\Desktop\1BM22CS162> java roots
Mohith Jain - 1BM22CS162
Enter cooefecients of equation
Roots are real and equal
R1=-1.0
R2=-1.0
PS C:\Users\bmsce\Desktop\1BM22CS162> java roots
Mohith Jain - 1BM22CS162
Enter cooefecients of equation
Roots are real and distinct
R1=-0.5
R2=-1.0
PS C:\Users\bmsce\Desktop\1BM22CS162> java roots
Mohith Jain - 1BM22CS162
Enter cooefecients of equation
Roots are distinct and imaginary
R1=-0.75+i0.6614378277661477
R2=-0.75-i0.6614378277661477
PS C:\Users\bmsce\Desktop\1BM22CS162>
```

```
Example

    Calculator
    Fibon

                                Prime
File Edit View
import java.util.Scanner;
class roots
public static void main (String xx[])
 System.out.println("Mohith Jain - 18M22C5162");
double r1,r2;
Scanner s1=new Scanner(System.in);
System.out.println("Enter cooefecients of equation");
double a= s1.nextDouble();
double b- s1.nextDouble();
double c= s1.nextDouble();
double d=(b*b)-(4*a*c);
if(d--0)
System.out.println("Roots are real and equal");
r1=r2=-b/(2*a);
System.out.println("R1=" +r1);
System.out.println("R2=" +r2);
System.out.println("Roots are real and distinct");
System.out.println("Roots are in r1=(-b+Math.sqrt(d))/(2*a); r2=(-b-Math.sqrt(d))/(2*a); System.out.println("R1=" +r1); System.out.println("R2=" +r2);
else
 System.out.println("Roots are distinct and imaginary");
double x=-b/(2*a);
double y=Math.sqrt(-d)/(2*a);
System.out.println("R1=" + x +"+i" +y);
System.out.println("R2=" + x +"-i" +y);
```

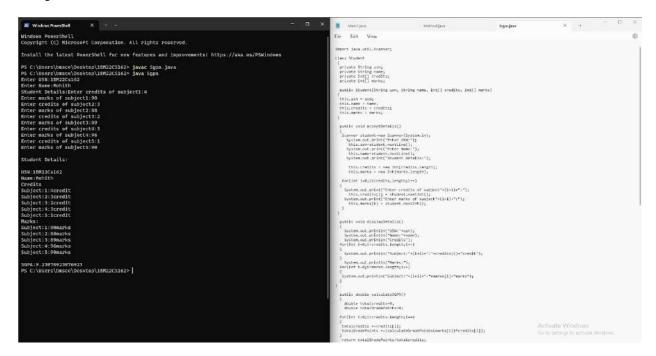
2. Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

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② .	Develop a jana program to execute a class student with monibers use, name, an orray credits & an array marks. Include methods to accept &
	of a student.
1 1	import java-util. Scanner:
	private string usn;
	private string name; private int 17 erectits;
	private Ind [] morks;
The state of	public sweet (String usu, String now, INET executes, int [] normal // Constructor
	tus. usn = usn;
6 - 04	tuis, nome = nome; tuis, credits = credits;
	this, morks = marks;
	Public void accept Details () Scanner Stonenthew Scanner (System in):
- Y	System. out print ("Enter USN:")
	S. O. P ("Enter name: ")
1000	this - a come = seconder - next Line ()
	this credits = new int [credits.length]; ? this marks = new int [harks.length]

Page 7

for (int = 0, is credits longth; it + (int) for (int = 0, is credits longth; it + (int) fais condits fit = scanner, part find (). fais condits fit = scanner, part find (). So P (Fully norms for subject " + (int) + two mores fit = scanner, hext fait (); fully nord display Details () So Plu (" usn): " + usn): So Plu (" usn): " + vsn): So Plu (" (rectits:"): for (int i = 0; is creates long th; it+) \$ So Plu (" Mores:"): for (int i = 0; is creates longth; it+) \$ Soph (" mores subject " + (int) + " + credits Soph (" Mores:"): for (int i = 0; is more longth; it+) \$ soph (" mores subject " + (int) + " + mores) \$ doubt total creates soph () \$ doubt total creates soph; it+) \$ doubt total creates soph; it+) \$	3 (17) (ret) ts	private mt calculate Fracte Points (int norths) If (marks >=90)? Return 10; 3 else if (marks >=80)? Return 9; Return 8; Relse if (marks >=60)? Return 7; Relse if (marks >=50)? Return 6; Return 7; Re
g double total (seath = 9) double total (seath of sea;	norts [i]	int ET marks = new int [nonsubjects];

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Main1.java
                                                    Method.java
                                                                                                Sgpa.java
                                                                                                                                                                              (3)
File Edit View
   public double calculateSGPA()
    double totalcredits=0;
double totalGradePoints=0;
   for(int i=0;i < credits.length;i++)
  {
  totalcredits +=credits[i];
  totalGradePoints +=(calculateGradePoints(marks[i])*credits[i]);
    return totalGradePoints/totalcredits;
  private int calculateGradePoints(int marks)
  if(marks>90)
        return 10;
  else if(marks>-80)
  else if(marks>=70)
        return 8;
  else if(marks>=60)
       return 7;
  else if(marks>=50)
       return 6;
  else if(marks>=40)
        return 5;
  else
        return 0;
 public class Sgpa{
  public static void main(String []args)
{
  int Subjects=5;
int[] credits= new int[Subjects];
int[] marks= new int[Subjects];
Student student=new Student("1BM22CS162","John",credits,marks);

Student.acceptDetails();

System.out.println("Student Details:\n");

student.displayDetails();

double spa-student.calculateSGPA();

System.out.println("\nSGPA:"+sgpa);
                                                                                                                       Go to Settings to activate Windows.
```

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 toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

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	Classon's Onto 8 1/24
	Develop a jave program to create a clay Book
	which contains four numbers: no me, author. price, num pages. Enclude & constructor to set the
	the state of the s
	tostring () method that could display the
	complete dutails of the book & execute in Book objects
	Import java. util. Scauner;
	class Book
	1
	private String name;
	private String author
	private double price;
4 20 0	private ent mini Pages;
	public void set Nome (String nome)
	1 this, nome = nome;
	9.
	public void set Arthor (String author)
	1 & the author = author; I
	public void sexporce (double price)
-	9 this. price = price;
: (, i ,	
	public void setNumbages (int numbages)
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	tws. nom Pages = nom Pages;
	Rock [] bake - was Rock [] .
	The state of the s
	public String gardame ()
	Yetven name;
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public string getherhord in granical	for (int i=0; icn; i++)
Yetorn author	System out printing Fater certain of Book"+ (i+1) + "!"); St. perthine();
- posito coose j	System out printly they book nome: /;
2	Styling name = St. northine(); System.out. printh (" Buter stuther name:");
public ent gornomfagne	String author = S1. neuthine (): System out printly (" Enter price "): double prize = S1. neutbouble ():
yearn nowfagts:	System our printly (" Futor number of pages:"); ind numbages = St. next first ();
public string to String ()	books [i] = new Book (name, author, price, numbages),
"In Author: "+ author + " In Price: "+ price + "In Number of Pages: "+ numbages;	for (ind 1=0; i < n; i++)
"In Number of Pages:" + numbages;	System out private ("In Details of Book"+ (i+1) +
3 Public class BookTest	Sec. St. close();
public starie voice man (String [Jangs)	3
Scouner SI = new Scouner (Systemin);	Output: Fater the Details for Book!
System out println ("fater number if Books:")	Enter Book Name: Coole with Tava Enter outhor pique: S.N Book
Book [] books = new Book [h];	Enter price: 180 Enter number of facys: 562 Enter the Octobs for Book 2
	Enter Book Now: ngSQL Enter author name: L. Nanothe
	Enter price: 950 Enter number of Rages: 1452

Details of Book 1:

Book Details

Name: Coole with Jana
Author: S.N. Bose

Potre: 780.0

Normber of Pagy: 662

Book Details

Name: Myshe

Author: 1 Novathe

Price: 1950.0

Normber of Pagy: 1462

```
indows PowerShell
opyright (C) Microsoft Corporation. All rights reserved.
                                                                                                                                                                        File Edit View
                                                                                                                                                                       import java.util.Scanner;
 nstall the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
                                                                                                                                                                       class Book
PS C:\Users\bmsce\Desktop\18M22CS162> javac BookTest.java
PS C:\Users\bmsce\Desktop\18M22CS162> java BookTest
Enter number of Books:
                                                                                                                                                                         private String name;
private String author;
private double price;
private int numPages;
Inter the Details for Bookl:
inter Book Mame:
Gode mith Java
inter Author name:
i.M Bose
inter price:
                                                                                                                                                                        public Book(String name,String author,double price,int numPages)
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nter number of pages:
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this_name-name;
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oter Book Name:
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                                                                                                                                                                            return numPages:
                                                                                                                                                                           olic String toString()
                                                                                                                                                                             return"Book Details:\mMar
                                                                                                                                                                                                              :"+name+"\nAuthor:"+author+"\nPrice:"+price+"\nNumber of Pages:"+numPages;
                                                                                                                                                                        public class BookTest
                                                                                                                                                                            nublic static anid main(String) large)
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```

```
public class BookTest
   public static void main(String[]args)
Scanner scanner=new Scanner(System.in);
     System.out.println("Enter number of Books:");
          int n=scanner.nextInt();
 Book[] books=new Book[n];
for(int i=0;i<n;i++)
   \label{eq:system.out.println} System.out.println("Enter the Details for Book"+(i+1)+":");
      scanner.nextLine();
   System.out.println("Enter Book Name:");
       String name=scanner.nextLine();
   System.out.println("Enter Author name:");
       String author=scanner.nextLine();
   System.out.println("Enter price:");
       double price=scanner.nextDouble();
   System.out.println("Enter number of pages:");
       int numPages=scanner.nextInt();
books[i]=new Book(name,author,price,numPages);
    for(int i=0;i<n;i++)
  {
    System.out.println("\nDetails of Book"+(i+1)+":"+books[i]);
   scanner.close();
                                                                                            Activate Windows
}
}
```

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 print Area() that prints the area of the given shape.

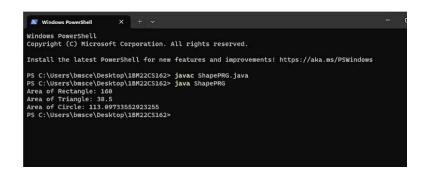
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Develop a java program to treat an abstract	2 signer (longth, wroth);
class named Shape that sourcing two insegers and	
an empty method rained prostArea ().	2 Daid printfrea ()
Kenide three classes named Restaught, Triangles	Mariting Apolished
Civile evel that each one of the clause extends	ind area = tength + width;
the class shape. Each on of the classes	System bote private ("Arrord Ratanger"+orca);
Lawreing the method printfree () that fring the	2 Orand-salog alvan
ona of the grow shape.	
Original Patent the Interior for heart	class Text and as 20
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And the wall order years	Public Trigual (but to oth his styl
The part of the pa	Public Triangle (ind length, ind moth) E suffer (length, moth);
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	public startic voted main (String [] arops)
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	Rectangle sectangle = new Retangle (8,20);
- 5 00	Rectangle sectangle = new Relangle (8,20);
	Tricugle tricugle = now Tricugle (7,11); trangle print trea ();
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BookTest.java

    ShapePRG.java

       Sqpa.java
                                                                                                                                                                                 (3)
File
      Edit View
abstract class Shape {
   public int length;
   public int width;
     public Shape(int length, int width) {
          this.length = length;
this.width = width;
     abstract void printArea();
}
class Rectangle extends Shape {
     public Rectangle(int length, int width) {
          super(length, width);
     void printArea() {
   int area = length * width;
   System.out.println("Area of Rectangle: " + area);
3
class Triangle extends Shape {
     public Triangle(int length, int width) {
    super(length, width);
     }
     void printArea() {
   double area = 0.5 * length * width;
   System.out.println("Area of Triangle: " + area);
1
class Circle extends Shape {
   public Circle(int radius) {
          super(radius, 0);
     void printArea() {
   double area = Math.PI * length * length;
   System.out.println("Area of Circle: " + area);
1
public class ShapePRG {
   public static void main(String[] args) {
           Rectangle rectangle = new Rectangle(8, 20);
          rectangle.printArea();
         Triangle triangle = new Triangle(7, 11);
triangle.printArea();
           Circle circle = new Circle(6);
           circle.printArea();
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- 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.

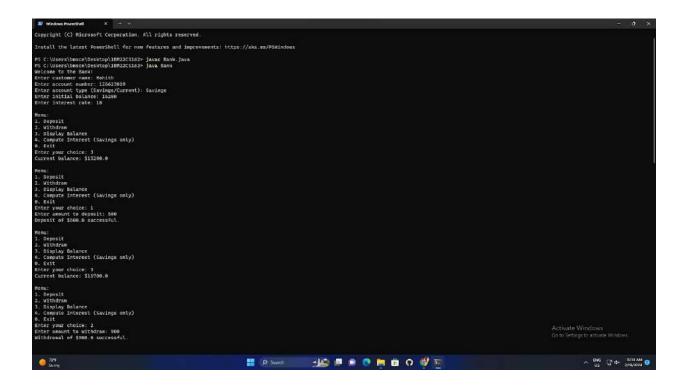
2	classmate com 19/2/23
	Develop a jane program to expelle a class bank that mountains two kinds of account for the customers, one called sorings account and the other current account the sorings account provides compound inserted and withoursease foculties but no chique book facility. The current account provides chaque book facility but no instruct current account helder than had also anditain a minimum barance & if the balance falls below that level
	Create a clair Account that stores instance rome account the closer type of account from this derivative correct & Soveret to make them more specific to their requirements. Enchouse the necessary methods in order to achieve the following tasks: a) Accept depend to be customer & update balance b) Display the balance c) Conquet & deposit methods
	import jave. util Scours;
	stars fletour ? String to stoner Name: 9nt account Number; String account Type:
	State of the state
	Public Account (String austenandome, jut accounts more String accountlype, clouble Batance) ? This customername = austenandome:
- 1	this account you have account Type;

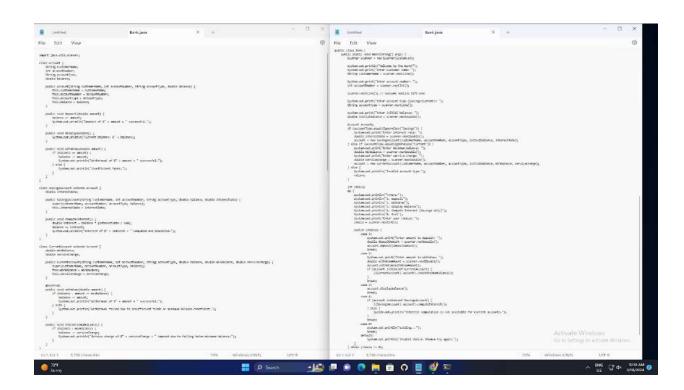
	\$ 200	chespate Page Page One One One One One One One One One One
Hoe	public world deposit (double amount)	
	public void deposit (double amount)	Public word compare ful or see (13
		public world compute interest ()? double interest = balance (interest Rato 100); balance + interest;
	Sussement println ("Deposit of \$" + amount 1" Suscernful.");	balance += interest;
	System but printing Deposit 9 4 1 combine	5.0. P(" Justine is t" , c "
-	Society VI. Ji	of printiples of composed &
-	The second secon	5.0. P(" Enterest of \$" + Enterest 1" compared & objectived ");
		1
Mark .	public vaid display Bolonce() } Systamore price ("Corrord Bolonce: \$ + balance):	S and this
211	Systamore frieth ("Corrent Bolonce: \$ + balance)	
(C)	17 0 many many many many many many many many	class Comentaccount extends Account ?
	total total and	double nu Balance;
	Public void withdraw (double amound) ?	double somice thorog;
	1 (balance >= amount)	Frank tools water
	1 balance - = amount;	public current Account (String custonorName, But
100	Car u ('hours - 1 h"	account number, String accountly po mouth
	Systemory printly ("Withdrawal of \$" + amount + Successful."): 3 else	Balanco, double min Balance, double service Change)
	2 . Occupation	
	5 0119	Super (Eusting nound action of Normbor, sommer types Balance):
		Balaure Si
	System out printer ("lunfaired balone "I"	this win balance = minbalance;
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	The state of the s	bolance - 2 amount; " amount + " succent, 1").
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	bolance);	2 / 2
	thes, subarystate = Superatlates	3 . Cold at the manner of the decretation with
	I the same and the	the distance of the format of the state of t
		executive manifered bases have been for
	CARLO CONTRACTOR OF THE PARTY O	

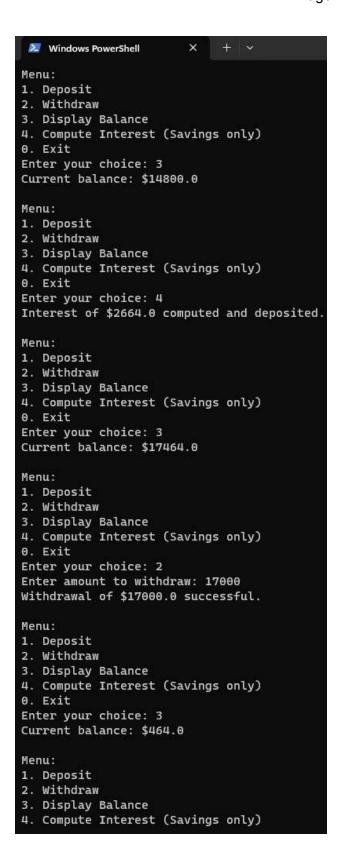
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poblic verid check Manhana Colome () 3.	else y (accountly pe equals deproved ("Cornere")) \$ 0.0 (" Byter winismen bateurs.");
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Public class bank & Public static raid mate (Statig [] angs)	else 3 Soll "Emoire account Bype" to return;
Sequent Scarner steer scanor (yourne).	Sud Attended to a state of the
S.O.P(" moleone to the Rove"); S.O.P(" Futer conto my rouse:") String contonorsame = Scanny, northin (2)	do 3 50.P(" nMFHU"); 50.P(" 1. Deposit"); 50.P(" 2. N. HINDYOW");
S.o. P("Ender account Number:") 14 account Number = Scours, red fort (): Scanner, host him ();	50.P(" 5. Onglay Bolonde"); 50.P(" b. Congrae Intrat (Corongrany)"); 50.P(" D. Exit");
String account yes = somer was how ();	S. O. P. (" Enser your choice ") Choice 2 scanner, host for ():
South of which belows = scown with the (); Account occount;	case 1: 50.P(" Enter emoved to deposit:"); devolve depositioned = securer new Dorble();
if (account hype-equals ignore Case ("Savings")) S.O. P ("Factor prolong Rate:");	account deferre (deposithmound);
account = now Souther strate = Scanner next Buble(); account = now Souther Account (Customerrows, account visitor, accountly pe, Printed Bolance, Internet Ratu); 3	

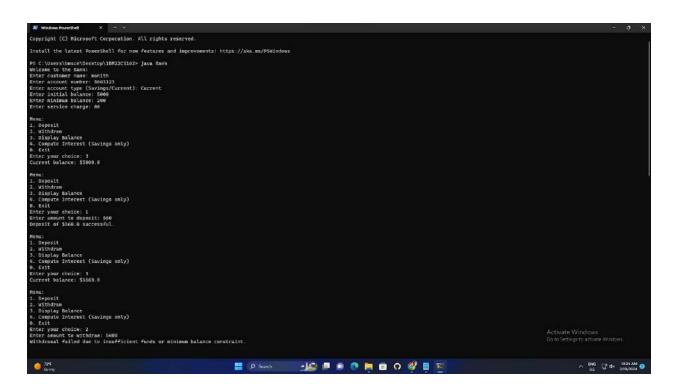
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	Q But a	tlasimate
		Data Data
Maria	case 2: S.O.P("finer amount to withour aw.").	
	double withdrauffmount = scouner modernix():	autput! Harris towers with
	acrount . withour (withdraw Amount)	For Savings account
47.4	The state of the s	Welcome to Bonk 444 4 months
	4 (Decions empared Convert Account) ?	Futer Customer Nouse: Mowth
325	(Icomy pecons) account): check phianulobo()	Enter account Winter: 12245678
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	brok; and to make with the down to	Exter instrail Ratowe : 15200
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	and the second	\$11 March 101 101 101 101 101 101 101 101 101 10
	come 3: account of play & a lawer 1):	MENU:
	brook)	" Defait " withdraw S. Byp buy halony W. Compose interes (savongs only) O. Fort.
	case H! if (account impace of Samuelarcourt)	H. Complete inter on (savones only) O Fam
	case 4: if (acount intere of Surveylarcore) 2. ((savingstecount) account).	the first and from the first second of
	a serious and seri	Files your chaire: 1
	elsel	Fusin amount to depart : 500
	Sore (" human congriction had and other for	Defore of \$500.0 successful.
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	proor, the state of the state o	Enter your chee's: 3
	Dwork's Company of the Company of th	Coment to lane: \$ 15700 0
	can o: s.o. P(fring);	N. On M. P. Constell August
	Drog k)	Entar your charice: 2
- 54	defautt : 500 p (" Swots ruis. ").	Ente consecut to william 1 900
	brods.	withdraw of \$900.0 successful
		withdraw of \$900.0 energy
	3 www (choice 1=0);	First your chiefer 13
	scarres close ();	Correct balance: \$1450 6.0
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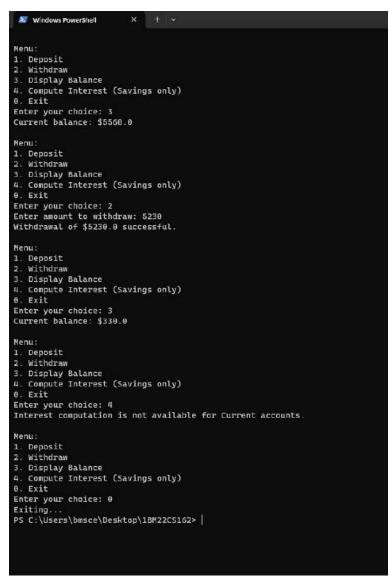
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	O STATE OF THE STA
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	1. De parit 2 withopraw 5. Rolance
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	Enter your charge: 1 Enter amount to deposit: 500 Deposit of 3 600 successful.
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1	broto amount to wathdraw: 5230
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	Entre your choice: 3 Corrand Balance. \$350.0 Entre your choice: 4 Entre your choice:
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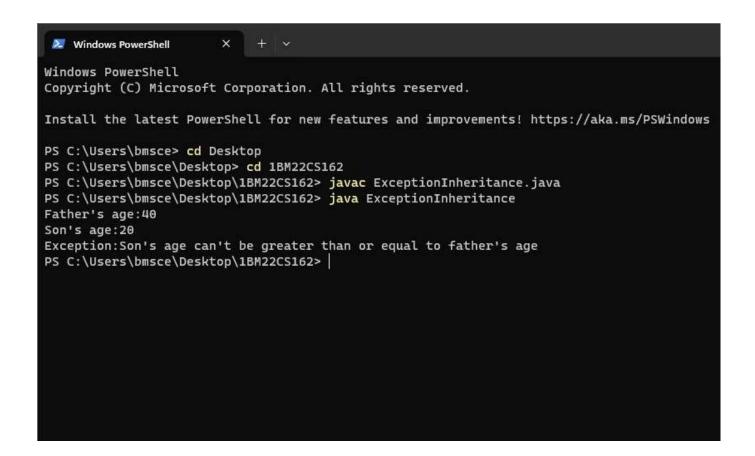
6. Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge() when the input age<0. In Son class, implement a constructor that checks both father and son's age and throws an exception if son's age is >=father's age.

	Classmate Date 22/1/11 Pege
6. N	exceptions in inheritance tree. Crease a base
"S	on" which extends the base class called
a	y and throws the exception with take the
a	constructor that cases both perting
Lece	y and throws an exception if some age is
Cic	ess WrongAge extends Exception
2	wrongtige (String message)
	Super (message);
3	
cl	Bose class father ass father
	Drivate but age;
pub	Lic Father (int age) throws wrongertige
7	i) (ag <0)
	1
	throw new Wrong Age ("Age con't be nighting");
(/3	this age = age;
publi	e int gettige()?
	3 chish age,
3.	

Date_Page_	Classmate Dote
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	So. P (" 70.11 1)
Low Cook No Father	Son impations on : how son (30,35); Frequent's. S.O. P (" This line will will be reached").
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as all but souther a state	courch (wrongstge e)
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poblit Son (110 day, 110 series)	1
Wrong Hay!	3
Super (agi): solurs If (souther >= agy)	
Super (agi)	
11/11/11/11/11	Ov-put:
(Southly >= lary)	
	father's age: no
throw new Wrongstay I Sovis agy can be	Souls age: 20
greats thou or equal to father's age ");	forthin's age: 40 Son's age: 70 Exception: Son's age con't be operate thou or equal to forther's age.
	equal to father's any.
this son Age; contage;	
3	
Il born close for loss	
public int got southly () ? xeturn southly; 3	The state of the s
xetusu sontay;	Constituted invited
3	Court pass nv 202
and the factor to a second water of the	the most seem with a Co Copy of your
poblic class Exception Inherstance &	204244
g public static void nain (String 17 angs)	+ Cxx - x + 1103
8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
try	
- 3	
SON SONE NEW SON / LOO 1.	
Son son: new Son (Horro);	
So.p("fatha's age: " + son. oxtge());	
S. o. P (" Son's age: " + son gus surley!)	

```
BookTastjavs • ShapePRGjav • Bookrunjava studentrunjava Exceptionini X +
■ Sgpa,java
File Edit View
class WrongAge extends Exception{
 WrongAge(String message)
  super(message);
 }
class Father{
 private int age;
public Father(int age)throws WrongAge
  if(age<0)
   throw new WrongAge("Age can't be negative");
 this.age=age;
public int getAge()
  return age;
class Son extends Father
  private int sonAge;
  public Son(int age,int sonAge)throws WrongAge
  super(age);
```

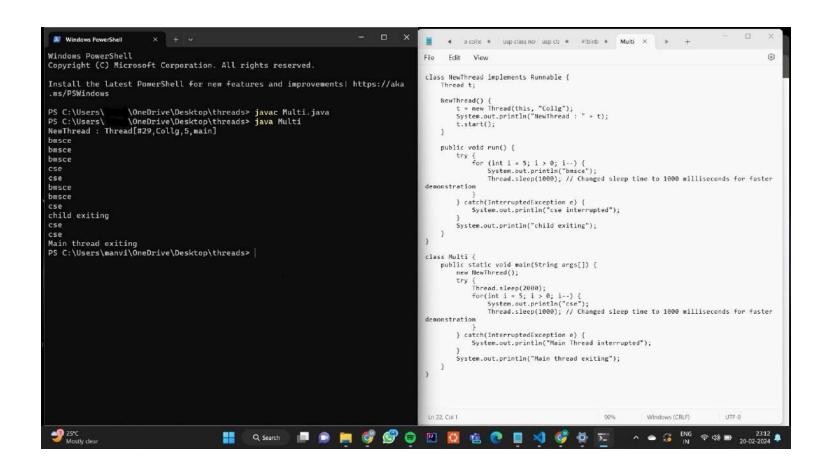
```
if(sonAge>=age)
 throw new WrongAge("Son's age can't be greater than or equal to
father's age");
this.sonAge=sonAge;
public int getsonAge()
return sonAge;
public class ExceptionInheritance{
public static void main(String[]args)
try
 Son son=new Son(40,20);
System.out.println("Father's age:"+son.getAge());
System.out.println("Son's age:"+son.getsonAge());
Son invalidson = new Son(30,35);
System.out.println("This line will not be reached");
catch(WrongAge e)
 {
   System.out.printl Exception: "+ e.getMessage());
}
                                                  Go to Settings to activate Windows.
```



7..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.

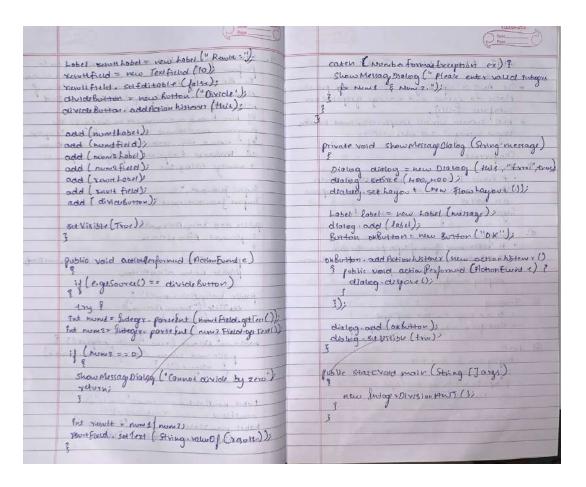
		Lab Program
		Too I so on the sound
	_	thread displaying "BMs oplings of Engineering" "CSE" Once every two seconds.
	-	are green to some do college of thopicering"
	_	"CSE" once puery two seconds.
_	_	and seconds.
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_	-	? Thread to
_	-	New Thread ()
_	-	E Charles para la company
_	-	t = new Thread (es = "
_	_	t = new Thread (this, "conegeNonie");
_	-	System.out. printin ("Name:"+t);
	-	t. stort():
		3
	4	public void son (1)
		try 1
		for (int n = 2; n>0; n)
		for (int n = 2; n>0; n)
	1	Sustance Dut - Divinte (" CCE").
	1	System. out. printin ("CSE"); Thrusia sleep (2000); 3
_	+	1 (15000) /
_	+	
	1	S cooled purposed
		catch (Interrupted traception ie)
		9
	1	System out printle ("Child Thread growings ed");
	-	2 September 1 Straight Carrier Straight and Ji
	-	More celled a production of the to second
		}
	2	
	/	
	C	lass Collegeron
	9	
		Parie statie vord maly (String SS[])
		white static void main (string sst)
	4	
		new New Thread ();
		1,000

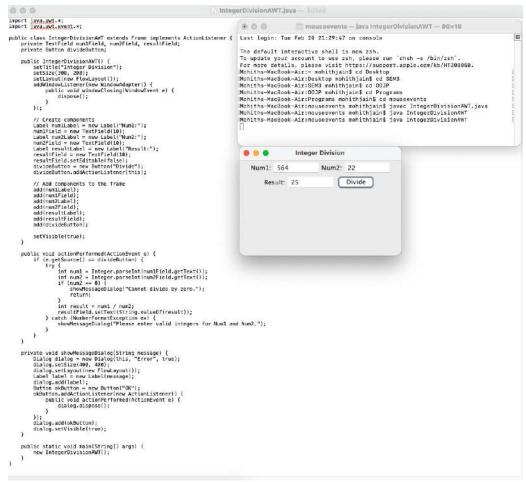
11	Date Page
-	System.out. printly (" College & Department"): System.out. printly (" Pointing below"):
1	System out printly (Pointing below !
	System. out. printer (" BMS College of Engineering")
	Invend, Steep (COOC)
	State Country College College See 12
	carch (Enterrupted Exception He)
	System out printer ("Mary Thread Enterrupi)
	2 3 pr
	3 (- N : O < N : C = N Di) rol .
	Output:
	Supreme out party ("CE"):
	College & Department
	Printing below
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	CSC
D. C.	SE la based both 13") all in 7 seconds
- 81	MS college of Enghuering in 10 seconds
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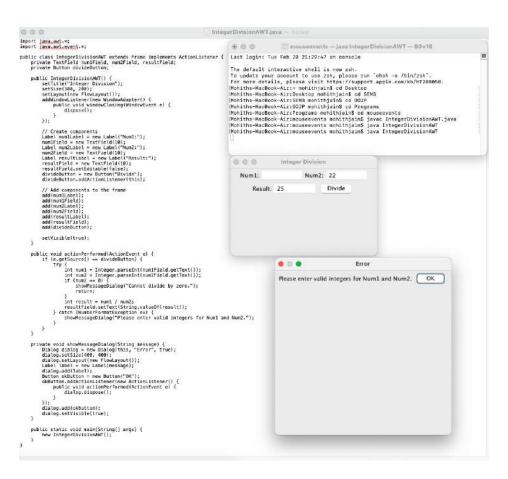


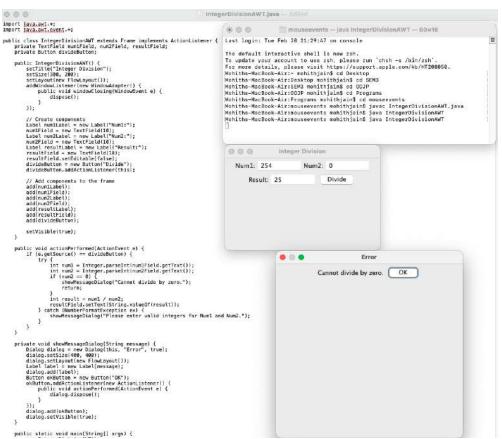
8.Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

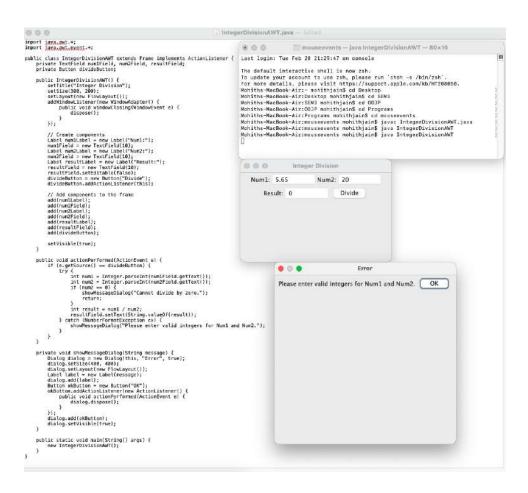
Classmate Prope
9. Write a program that creates a user interface to
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None & None & le displayed in the Result freid
El Numb or Nums were not an interest
program would throw a Nomber-Found to
of new a were zero, the progress would throw
program would throw a Noneber-Format Exception. The program would throw an Arithmetic Exception Driplay the exception in a menage dialog box.
a runage dialog box.
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Purport java. awt. event. " (has 4 times) has
Public class Integralivision-And extends frome Pruplements Action histories
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private Textifield noundfield, mon 2 field, resultfield;
Muate Button divide Button;
Poblic Integer Division AUTC) ?
set Title ("Endeger Division");
setsize (300, 200)
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addhindowhistener (new Window Adapter () }
public votal helman Clasing (hindres Frience)
Ourpose ()/ S
31; was to wood of policy regular constant
Label numblobel = new hobel ("Nom1:");
numifield = new Toxefield (10);
habel none 2 habel = new habel (" Nume: ");
mune Field = new Text field (10);

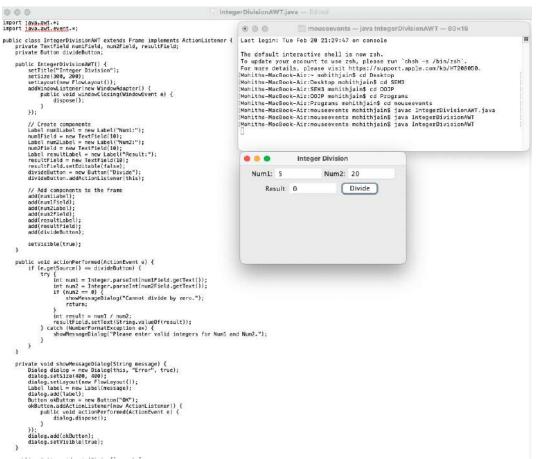










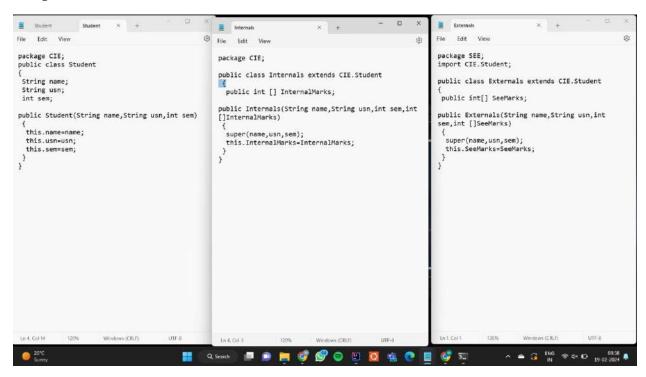


9.Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External 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.

	SEE - Externally (Strains) classing classing Date 22/1/24 Page
5.	Create a package CIE which has two classes - student
	and interhals. The class Student has members like use,
	nome, sem. The day internals has an orray that
	stoxes the internal marks scored in the course of the
	corrent semester of the Student. Create another
	package SEE which has the class External which is a
	derived class of student. This class has an orray
	that stores the SEE marks scored in fine courses of
	The corrent semester of the student.
	final works of a swelints in a fine courses.
	final worms of a stroums in a fine courses.
	CIE. java
	package CIE;
	public class student & stit and
	String name;
,	String usn; all all won side
- 48	ind sen; her server
	Public studens (String name, String usn, ind sem)
	? this name = name;
of m	-1 1/18 - 10xxx - 4/2 - 1
	?
	this semi semi
	Class Enternals extends student &
	A LINE AND THE STATE OF THE STA
-	public Enternals (String none, String usn, but sow,
	ent [] Interna Marks)
	I Salled teducal sedemans (71) to
	super (nome, usn, sew);
	this Internal March = Enternal marks;
	<u>}</u>

Dob Pegs	Pote Prop
SEE java	for (int i=0; i<5; i++) ?
and and an army has been all the same has	System out privates ("factor details of spector
Pockage SEE!	4 (1+1)+":")>
import CIE. Student;	S.O. P ("Name!");
Class Externals extends CIE. Swallont &	nome [i] = sinex+(): 1"
had FT Spenior X4:	5.0.P (" USN ")
THE RESERVE THE PARTY OF THE PA	Usn [1] = S1. next ();
public Externals (String down, String ush,	5.0.p (" Sens :");
ind some, and [] Seemones)	Sem [1] = SI-MX+ Int():
The property of the party of th	1 2 1 1 1 1 2 2
Super (none, win, sen);	S.O. P("Enter internal morks for 5 courses:");
this. Seemarks - Seemarks;	The first the second of the se
3 00 10	5.0.P("COURSE" + (j+1)+ ":")1
1 Company Bayer	50.p("course"+ (j+1)+":"); [Nernalmonks[i][j] = SI-nextInt();
to the second se	
New file	5.0. P(" finter See marks for 5 rourses:")
	for (int j=0; j<5; j++) { Sop("courte" + (j+1) +":");
public class finalments ?	Sope Course + (ft) +
s public Static vaid main (String Florgs)	Seemarks [i] [j] = 51. hext hall;
Sconner SI = New Sconner (System in)	7
THE TOT BY WENT BOUTH BY	
Sighten out principle (" Fater no of surrents")	Array to store final Morks
ind n= s1-nextitut();	and [][] final Marks = new Jut [n][5];
	for (inti-oficn; 14+) }
String[] name - new String [m];	Internals It: new Internals (name 6), usuli),
String [] usn = now string [n]	Sen GJ, Puternalmerks GJ);
int [] sem: nego int[n];	1 69 69
A STATE OF THE PARTY OF THE PAR	fatornais El = new treamors (more [i], usn [i],
"not [][] Internalmonks = now int [n][s];	souli], Spemorks [i]);
ind [][] Sernorks: new Ent [n] [s];	
	for line jo ; j<5 jjn)
	1 676.7 TO 2 100.1 67 4
	framouns [][j] = M. Internal Marks [] + El. See marns [];
	TI. See MELLY (1)

1	Date
The same of	S.O.P(" Final mosks for "+n+" Students in
	360.53
	for (in j=0; j<5; j+1); for (in j=0; j<5; j+1)
	S.o. Pl fluornorks [i] [j] + "!");
	3 A MANUARY IN 1985
11.0	S.ο.ρ();
	\$1.clos(c);
	Fire and array as to told his had all of order of the 3



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FinalMarks
File
      Edit
            View
import CIE.Student;
import CIE.Internals;
import SEE.Externals;
import java.util.Scanner;
public class FinalMarks {
    public static void main(String[] args) {
        Scanner s1 = new Scanner(System.in);
        System.out.println("\nEnter the number of students");
        int n = s1.nextInt();
        String[] name = new String[n];
        String[] usn = new String[n];
        int[] sem = new int[n];
        int[][] InternalMarks = new int[n][5];
        int[][] SeeMarks = new int[n][5];
        for (int i = 0; i < n; i++) {
            System.out.println("Enter details of Student" + (i + 1) + ":");
            System.out.println("\nName:");
            name[i] = s1.next();
            System.out.println("\nUSN:");
            usn[i] = s1.next();
            System.out.println("\nSem:");
            sem[i] = s1.nextInt();
            System.out.println("Enter internal marks for 5 courses:");
            for (int j = 0; j < 5; j++) {
                System.out.println("\ncourse" + (j + 1) + ":");
                InternalMarks[i][j] = s1.nextInt();
            }
            System.out.println("Enter See marks for 5 courses:");
            for (int j = 0; j < 5; j++) {
                System.out.println("\nCourse" + (j + 1) + ":");
                SeeMarks[i][j] = s1.nextInt();
        }
```

```
System.out.println("Enter See marks for 5 courses:");
             for (int j = 0; j < 5; j++) {
    System.out.println("\nCourse" + (j + 1) + ":");
    SeeMarks[i][j] = s1.nextInt();</pre>
        }
         int[][] FinalMarks = new int[n][5];
         for (int i = 0; i < n; i++) {
             Internals I1 = new Internals(name[i], usn[i], sem[i], InternalMarks[i]);
             Externals E1 = new Externals(name[i], usn[i], sem[i], SeeMarks[i]);
                 int sum=0;
             for (int j = 0; j < 5; j++) {
                  FinalMarks[i][j] = I1.InternalMarks[i] + E1.SeeMarks[j];
             System.out.println("\n\nFinal Marks for " + n + " Student in 5 courses:");
             for (int k = 0; k < n; k++) {
                 System.out.println(name[k] + ":");
                 for (int j = 0; j < 5; j++) {
                      sum += FinalMarks[i][j];
                 System.out.println(sum);
             }
        s1.close();
   }
}
```



```
pkg — -bash — 80×6
Course5:
92
Enter details of Student2:
John
USN:
1bm22cs140
Sem:
Enter internal marks for 5 courses:
Course1:
49
Course2:
45
Course3:
Course4:
Course5:
Enter See marks for 5 courses:
Course1:
89
Course2:
91
Course3:
90
Course4:
Course5:
95
Final Marks for 2 Student in 5 courses:
Mohith:
708
John:
1416
Final Marks for 2 Student in 5 courses:
Mohith:
687
John:
1374
Mohiths-MacBook-Air:pkg mohithjain$ ▮
```

10.Abstract Window Toolkit -AWT programs report

Classic
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Toolkit
ANT Abstract Window Toolkit
Java which pro
The ANT is a package in Java which promo classes to create and manage graphical very
Outland and ICultural
ANT Enclosed various components, wont hours
layout managers and other utilities
(specific vale specific and specific
Components.
Traine: possess parties
· A Frame is a numbour north title & border
. Used as a main window hi while other components
one added.
Syntan : doss Enterger Diversion extends Frame
Dialog: Notes and Northware Markey
some form of July Dom, The islen.
prompt the leser &
display newages. ()
1 Textfield:
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· Et is a single-line tout displayed.
· Used for guraing the view to accept jugot. (B. Label
@ Label water water to a golding
· Displey area for short text.
the state beset.
· prompts the vier to enter text layes.
eg: Novil = Contin teset l'appet.
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	.) It triggers the action when diewd
) Used for ferforming specific cretion
	-) Used for subhating form, roughning etc
6.	
(6),	Check Box and the second of the charter of the char
	·) Component which can be checked or unchecked. ·) Used to enoble or oblisable
	·) Ond in the form with nextiple choices.
	Event Handling
	who of Souther averages of bill &
(A).	Event: Ather make warmer
	·) Events are generated by user actions
) Used for handling vser Enpot, such as
	mouse-clicks, key press or window events.
	·) Event one precured by event listeners offoched
3.A/O	to the relevant components.
	yestawo wife
2 .	Front history:
	.) Objects that sectours & handles ereents.
	.) Phrs is for the nuplementation of creent ormen
	behaviour du Gibs.
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