PROGRAM: 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 discriminate b2-4ac is negative, display a message stating that there are no real solutions.

INPUT AND OUTPUT->

```
File Edit Format View Help
                                                                                   Quad.java:4: error: invalid method declaration; return type required public Static void main(String xx[]):
import java.util.Scanner;
class Quad
                                                                                   G:\|lrer=\mscecse\Desktop\18M22C$15#>javac Quad.java
Quad.java:4: error: cannot find symbol
public static void main(string xxkl);
public static void main(String args[])
                                                                                    symbol: class string
location: class Quad
kuad.jawa:4: error: nissing method body, or declare abstract
mblic static void main(string xx[]);
double r1,r2;
Scanner s1=new Scanner(System.in);
System.out.println("Enter coeff of a:");
                                                                                    C:\Users\becss\Desktop\18M22C8150>javac Qoad.java
Quad.java14: oren: nixing method hady, or declare abstract
public static void main(String args[1)]
double a=s1.nextDouble();
System.out.println("Enter coeff of b:");
double b=s1.nextDouble();
                                                                                    error
System.out.println("Enter coeff of c:");
                                                                                    C:\Users\bmccecse\Desktop\18M22CS150>javac Quad.java
double c=s1.nextDouble();
                                                                                   C:\Users\bmscecse\Desktop\18M22CS150\java Quad
Enter coeff of a:
double disc=(b*b)-(4*a*c);
if(disc == 0)
                                                                                     nter coeff of hi
                                                                                     ster coeff of c:
r1=r2=(-b/(2*a));
                                                                                   l
Real solution
Root 1 :-0.5
Root 2 :1.0
System.out.println("Real and equal roots");
System.out.println("Root 1:" + r1 + "Root 2:" +r2);
                                                                                   C:\Users\bmscecse\Desktup\1BM22CS150}javac Quad
error: Class names, 'Quad', are only accepted if annotation processing is e
itly requested
I error
else if (disc >0)
                                                                                    :\Users\bnscecse\Desktop\1BM22CS150)javac Quad.java
                                                                                   Gt\Users\hnscecse\Desktop\18M22CS158)java Quad
Enter coeff of a:
r1 = (-b + Math.sqrt(disc))/(2*a);
                                                                                     ater coeff of h:
r2 = (b + Math.sqrt(disc))/ (2*a);
System.out.println("Real solution");
                                                                                     ster coeff of c:
System.out.println("Root 1 :" + r1);
System.out.println("Root 2 :" + r2);
                                                                                    !\Users\bmscesse\Desktop\18M22C$150}
!\Users\bmscesse\Desktop\18M22C$150}javac Quad.java
                                                                                   C:\Usera\bnccccse\Desktop\18M22C5i50>java Qaad
Enter coeff of a:
else
                                                                                     ater coeff of h:
                                                                                     ster coeff of o:
System.out.println("No real roots");
                                                                                    leal and equal roots
loot 1:-1.8Root 2:-1.8
                                                                                           rs\hmscesse\Desktop\18M22CS15@5
```

```
PROGRAMI: QUADRATIC EQUATIONS.
  emport gava util. Scannes:
  class quad
  public static void main (string axigs 1)
  double 11, 12;
  scanner s1 = new- scanner ( bystem in );
  system.out.printen ("fine coeff of a:");
  double a = SI. next-Double ();
 system. out println ("three coeff of 6:");
 double b = s1. next Double ();
 System. out-println (" inter coeff of c: ");
 double (= SI. next bouble ();
 double desc = (6x6) - (4x0x0);
 14 (disceo)
  System. Out. printin ("No real rook");
 else if (disc > 0)
 YI = (-b+ Math. sqr+ (disc)) / (2+a).
  12 = (b+ Math. sqr + (disc)) 1(2+a);
 system. out. printlne " Real sound" ":
 system. Out. printen ("ROOF 1: "+ YI)
 dystem. Out. println ("ROOF2:"+ 82):
```

	SAME PROPER STRANGAUM STRANGE STRANGE
	else
	1
	Y1= Y2= (- b1(2×0));
	System.out.printhn("real and equal");
	System our printer
	" Poot 2" " + Y2);
	Y
	4 can be a second and a second
	3
	output
0	NO RIAL ROOFS
	NO RIAL 10.86602540 200+1:-05+10.86602540 Root 2:-05 T10.86602540
@ @	futer coeff of a:
	2
	there weff of b:
	3
	Finter coeff of c:
	1
	Real solution
	Root 1: -0.6
	ROOT 2: 1.0
	The same of the sa
	Have been been been been been been been be

3	Enter coeff of a
	1 3 months
	from coeff of lo:
	2 SAMEN PATHS
	enter coeff log 100 mg
	(; r) surpress that
-	Real and equal Roots
9.00	Root 1: -1:0 Root 2:=1:0
	CANCOP SURED &
	is usn = usn;
: [82	hes creating new top (numeral -
18	ints marks and the [want of s
A.	123
18	12/23

PROGRAM 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.

INPUT->

```
import java.util.Scanner;
class Student {
   private String usn;
   private String name;
   private int[] credits;
   private double[] marks;
    public Student(String usn, String name, int numSubjects) {
       this.usn = usn;
       this.name = name;
       credits = new int[numSubjects];
       marks = new int[numSubjects];
    public void acceptDetails() {
       Scanner s1 = new Scanner(System.in);
       System.out.print("Enter USN: ");
       usn = s1.nextLine();
       System.out.print("Enter Name: ");
       name = s1.nextLine();
       System.out.println("Enter details for each subject:");
        for (int i = 0; i < credits.length; i++)
            System.out.print("Enter credits for subject " + (i + 1) + ": ");
           credits[i] = s1.nextInt();
            System.out.print("Enter marks for subject " + (i + 1) + ": ");
           marks[i] = s1.nextInt();
       }
    }
```

```
public void displayDetails() {
    System.out.println("USN: " + usn);
    System.out.println("Name: " + name);
    for (int i = 0; i < credits.length; i++) {</pre>
        System.out.println("Subject " + (i + 1) + ":");
        System.out.println(" Credits: " + credits[i]);
        System.out.println(" Marks: " + marks[i]);
}
public double calculateSGPA() {
    double totalCredits = 0;
    double weightedSum = 0;
    for (int i = 0; i < credits.length; i++) {</pre>
        totalCredits += credits[i];
        weightedSum += calculateGradePoints(marks[i]) * credits[i];
    return weightedSum
   return totalCredits;
}
private double calculateGradePoints(double marks) {
    if (marks >= 90) {
        return 10.0;
    } else if (marks >= 80) {
        return 9.0;
    } else if (marks >= 70) {
        return 8.0;
    } else if (marks >= 60) {
       return 7.0;
```

```
return 7.0;
        } else if (marks >= 50) {
            return 6.0;
        } else if (marks >= 40) {
            return 5.0;
        } else {
            return 0.0;
    }
}
public class Main {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the number of subjects: ");
        int numSubjects = scanner.nextInt();
        Student student = new Student("", "", numSubjects);
        student.acceptDetails();
        student.displayDetails();
double sgpa = student.calculateSGPA();
        System.out.println("\nSGPA: " + sgpa);
    }
```

OUTPUT->

```
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P2>javac Stud.java
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P2>java Stud
Enter the number of subjects: 2
Enter USN: 123a
Enter Name: abc
Enter details for each subject:
Enter credits for subject 1: 10
Enter marks for subject 1: 20
Enter credits for subject 2: 30
Enter marks for subject 2: 20
Student Details:
USN: 123a
Name: abc
Subject-wise Details:
Subject 1:
  Credits: 10
  Marks: 20.0
Subject 2:
  Credits: 30
  Marks: 20.0
SGPA: 0.0
```

OBSERVATION->

0	Q Date Page C
01124	PROGRAM 2: STUDENT
	Emport java. util scannes;
	class student (
	private string usn:
	private string name;
	private ent 19 (rediti)
	private int marus (1)
	public student c strong una strong name,
	Int numof sub) {
	inse wen = usn;
	thes. credits = new ent (numof sub);
	this more = new got [numof sub]
	4
	40.7.
	public void acceptant & IL
	scanner si= new scanner (systemin);
	system out. print ("fines USN: ");
	int credits t
	credite usn = seanner. next Lina ();
	System. out. print (" Enter name");
	name = scander nexueles
	for (int 1= 0; ic creditt. length; 1++
	{
	system. out. println(" Enter credits");

ent creater (1) = newscanner netterinte); ent masystem out prenten (" Enter marker") int march [17 = Scanners 1. next2 ht 6): THE I CHONES SEED IN public void deployes system. out. println (" USN: " + USN); system. out printen (" Name: " + name); for lint i=0; se executs. length; i++) System. out printing a subject of d creal'ts: " lod warke: " d", i+ 1; eredit [i], marksfil); yeros charemi is sus 4 public double calculate-SGPACIÉ Put total = 0; double sum = 0-0; tor (Int 1=0; 1 credits, lingth; i++) & total+= crediti [17: sum + = calc GP (marus si7 * credity (17 = 3 10 parts return sum; remira to ral;

prévate double caleGPCTE of the of market >= 90) (return, 10.0; elle 1+ (marus >= 80) & return A.O. THE REPORT OF THE PROPERTY OF THE PARTY OF clust cmarus = 40) 6 teturn 8.0; and and the else of (masks) = 60) { return 7:0; · (Program 113 minors else (1 (marks) = 30) & return 6.0; taken to the cal of are total else (to the tot the veturn 0.0: T. HIPAU. 21 DO Y 4:10 man Land cum + - calcap coma Keep class stud & public static void main (string orgs [7) FERNYN FORES:

student student = new student 128 " *John Doe", 3); Student acceptant () : student displayes; system. out printent usapa: "w soudent. calculate SGPA ()): public beek lining name. Yes author, double price, not numed OUTPUT : LABOR - LABOR - LIM Enter USN 41120 - 10 1811 2111 Enter Name: abc Forter detally for each subject: enter credits for subject 1: 10 Fire marks for subject 1:90 fite credits for subject 2: 9 7 (MHA 21: 85 31100 315 8 3! 76 soudent peralli: 1 USN: 112 wasen stars Name: abc subject-wise details: sub1 - credits - 10 sub2 - credits - 9 sub3 - credits - 8

PROGRAM: 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.

INPUT->

```
import java.util.Scanner;
class Book {
   private String name;
   private String author;
   private double price;
   private int numPages:
   public Book(String name, String author, double price, int numPages) {
       this.name = name;
       this.author = author;
       this.price = price;
       this.numPages = numPages;
   public void setDetails(String name, String author, double price, int numPages) {
       this.name = name;
       this.author = author;
       this.price = price;
       this.numPages = numPages;
   public String getName() {
       return name;
   public String getAuthor() {
       return author;
   public double getPrice() {
       return price;
```

```
public int getNumPages() {
        return numPages;
    @Override
    public String toString() {
        return "Book Details:\n" +
"Name: " + name + "\n" +
"Author: " + author + "\n" +
"Price: $" + price + "\n" +
                "Number of Pages: " + numPages;
    }
public class BookTest {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of books: ");
        int n = scanner.nextInt();
        Book[] books = new Book[n];
        for (int i = 0; i < n; i++) {
             scanner.nextLine(); // Consume the newline character left by previous nextInt()
             System.out.println("\nEnter details for Book " + (i + 1) + ":");
             System.out.print("Name: ");
             String name = scanner.nextLine();
             System.out.print("Author: ");
             String author = scanner.nextLine();
             System.out.print("Price: $");
             double price = scanner.nextDouble();
```

```
books[i] = new Book(name, author, price, numPages);
}

System.out.println("\nDetails of the Books:");
for (int i = 0; i < n; i++) {
    System.out.println("\nBook " + (i + 1) + ":\n" + books[i]);
}
}</pre>
```

OUTPUT->

```
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P3>set path="C:\Program Files\Java\jdk-21\bin"
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P3>javac BookTest.java
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P3>java BookTest
Enter the number of books: 3
Enter details for Book 1:
Name: a
Author: A
Price: $12
Number of Pages: 44
Enter details for Book 2:
Name: b
Author: B
Price: $24
Number of Pages: 234
Enter details for Book 3:
Name: c
Author: C
Price: $22
Number of Pages: 134
Details of the Books:
Book 1:
Book Details:
Name: a
Author: A
Price: $12.0
Number of Pages: 44
```

Book 2:

Book Details:

Name: b Author: B Price: \$24.0

Number of Pages: 234

Book 3:

Book Details:

Name: c Author: C Price: \$22.0

Number of Pages: 134

OBSERVATION->

PROGRAM & : BOOK 01 124 emport favo util scannes; class Book & Ant Ant. prevate streng name; private strong authors private string double price; private int num; public BOOK (swing name, string author, double price, ent num) [rhis name = name; ruginos this aumor = author; this, price = price, 1 3400 thesinums numing 41 to state for subject of public void set pet (siring name, string author, double price, int num , & this name two author this price to so the sour mes num NAME OF COME

public string get Det () { teturn " Name: "+ name + "In author" + author + "In price: \$ + price + " In Number of pages. " + numpages; alleria rames strong proper THE STEPS . COLD . MICHAEL PRINCE . P. CO. C. public string to streng() (return get Det () 3: 1000 Annount of a street memore THE WAR OUR DEPARTS THE STREET TO ANTHON OF SOME THE ANT public clay book Test & public staric void main (string args[7) scanner si= new scanner (system. en); system. out printen c'Enter me number of books : "); The n = sc. next 2nt(); BOOK (76 = new BOOK (n2) for (Int 1=0; 1 cn; 1++) { system. out prenting of Enter the number 0+ 600K1 :11) ent n = sc. next Int ()) BOOK [76 = NEW BOOK [N7 ;

for (int 1=0; ich; 1++) [1 Sycrem. out printen (" forter the detales for book "+ (1+1)+ ":"); System. out. printen (" Nome: "); string name sc. next(); system. out . printin("Aumor:"); aring aumor = scinert(); sudba System. out. printh (u price: \$ 1) double price = sc. nextoouble; system. out prenten ("Number of Pager"); end num = sc. nex+In+ (); bill = new Book Chame, author or price, num); or street study System.our-prenten ("In peraile of A MILLOORS MID! ATTAIN THE THE for cint 1=0; 1 < n! 1++) = 1 system out printing in books " +(1+1) + 11: 1n+ 6 517); Sycamore out product to the contract on ? 100 to 1720 28 2 01 to 1

OUTPUT: 1 2990 , LOS TIMBLE enter number of books: 2 fine details of book 1: Name: abc Author: aa a and and some state ereces from to anomando das Number of pager 9 enter setails of book 2: Name: give Author typy blov boreds suduo Price: \$ 94 Number of pages: 30 petale of books; was toss DOOKSIN MONE LINE IN 12 NOOD Name : (abos alpau) sque NAWTHOI: aaa Price >1900mming blov syduce Number of pages: 9 books 21: DOIN FRANCE THO MY 21 Name: que : (0000 + Author: 444 Piice: 87 Number of page: 30

PROGRAM: 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.

INPUT->

```
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() {
        int 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[] args) {
       Rectangle rectangle = new Rectangle(5, 8);
       Triangle triangle = new Triangle(4, 6);
       Circle circle = new Circle(3);

      rectangle.printArea();
       triangle.printArea();
       circle.printArea();
   }
}
```

OUTPUT->

```
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P4>set path="C:\Prog
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P4>javac Rect.java
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P4>java Rect
Area of Rectangle: 40
Area of Triangle: 12.0
Area of Circle: 28.274333882308138
C:\Users\HP\OneDrive\Desktop\Java Programs\LAB PGMS\P4>
```

OBSERVATION->

PROGRAMA: ABSTRACT SHAPE abstract class snape & protected ent dimension! proxited for dimension?; NOMELON public snape cine demonsion 1, int dimensions ¿ this dimension = dimension); this dimension 2 = dimension2; that detailed of book at - SURE , BURGE public abstract void print Areal); P. S. E : 13 19 Y Number of pages so class rect extends inaper public Rect Cint length, int width) { super (length, width); L'AMMINON OUR public void Pisntareac) { ent area = dimension 1 # dimension2 system.out. printm(" Area of Rectangu" + area); NYY : TOALLA 3 PIL : 53 Marker of page , 20

class Triangle extends snape f & 5 public Triangle (ent ball 4nt height) & super (base, height); (CP 4) 1008 WER - 1022 . 1019 public void Area prentarea () { double area = 0.5 + demension 1 + almenison 2: System. out pigntle ("Area of Triangu:" + area); () something . Upneter TILL DIE + BECCO 4 class circle extends snape & public circle (rnt radius) (3 super(radius, 0); public void print Area () (double area = Math. PI + dimension 1 * dimeneson 1 : 18 to soil system.out. println (" Area of circle:" + area); 4

Public class rect d public static vord main (string orgs[7) super (base, helger); b Rect. Rect = new Rect (B, a); Triangle triangle new mangu (2,6) Write drile = new drile (10); ollmenston 2: rect print Area (2) tus more triangu. printareal 35 (som + Unde print Area () class chile eviende snope 4 public chile interaction Output (0, willow) ways Area of Rectangle: 72 mond Area of Treangle: 6. 0 Area of cercle: 214. 6159265 SHIPPINGER DIVINION CO ANEO MA · (saca).

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.

INPUT->

```
import java.util.Scanner;
// Account class to store customer information
class Account {
  String customerName;
  int accountNumber;
  String accountType;
  double balance;
  // Constructor
 Account(String name, int accNo, String accType, double bal) {
    customerName = name;
    accountNumber = accNo;
    accountType = accType;
    balance = bal;
  }
 // Method to accept deposit
  void deposit(double amount) {
    balance += amount;
    System.out.println("Deposit successful. Updated balance: " + balance);
 // Method to display balance
  void displayBalance() {
    System.out.println("Current Balance: " + balance);
 }
}
// Current Account class
class CurAcct extends Account {
  double minBalance = 1000; // Minimum balance for current account
  double serviceCharge = 50; // Service charge if balance falls below minimum
  // Constructor
  CurAcct(String name, int accNo, String accType, double bal) {
    super(name, accNo, accType, bal);
  }
```

```
// Method to withdraw
  void withdraw(double amount) {
    if (balance - amount >= minBalance) {
      balance - amount:
      System.out.println("Withdrawal successful. Updated balance: " + balance);
    } else {
      System.out.println("Insufficient balance. Service charge of $\sigma$" + serviceCharge + " will be applied.");
      balance -= serviceCharge;
      System.out.println("Updated balance after service charge: " + balance);
 }
}
// Savings Account class
class SavAcct extends Account [
  double interestRate = 0.05; // Interest rate for savings account
  SavAcct(String name, int accNo, String accType, double bal) {
    super(name, accNo, accType, bal);
  // Method to deposit interest
  void depositInterest() {
    double interest = balance * interestRate;
    balance += interest:
    System.out.println("Interest deposited. Updated balance: " + balance);
  // Method to withdraw
  void withdraw(double amount) {
    if (balance - amount >= 0) {
      balance -= amount;
      System.out.println("Withdrawal successful. Updated balance: " + balance);
      System.out.println("Insufficient balance.");
 }
```

```
public class Bank {
  public static void main(String[] args) {
    Scanner scanner = new Scanner(System.in);
    // Creating a savings account
    SavAcct savingsAccount = new SavAcct("John Doe", 1001, "Savings", 5000);
    // Creating a current account
    CurAcct currentAccount = new CurAcct("Jane Smith", 2001, "Current", 2000);
    // Menu
    int choice;
    do {
      System.out.println("\n1. Deposit");
      System.out.println("2. Withdraw");
      System.out.println("3. Display Balance");
      System.out.println("4. Deposit Interest (Savings Account Only)");
      System.out.println("5. Exit");
      System.out.print("Enter your choice: ");
      choice = scanner.nextInt();
      switch (choice) {
        case 1:
          System.out.print("Enter amount to deposit: ");
           double depositAmount = scanner.nextDouble();
           System.out.print("Select account (1. Savings / 2. Current): ");
          int accountType = scanner.nextInt();
          if (accountType == 1)
             savingsAccount.deposit(depositAmount);
          else if (accountType == 2)
             currentAccount.deposit(depositAmount);
          break:
        case 2:
          System.out.print("Enter amount to withdraw: ");
          double withdrawAmount = scanner.nextDouble();
          System.out.print("Select account (1. Savings / 2. Current): ");
          int accountTypeWithdraw = scanner.nextInt();
          if (accountTypeWithdraw == 1)
             savingsAccount.withdraw(withdrawAmount);
          else if (accountTypeWithdraw == 2)
             currentAccount.withdraw(withdrawAmount);
```

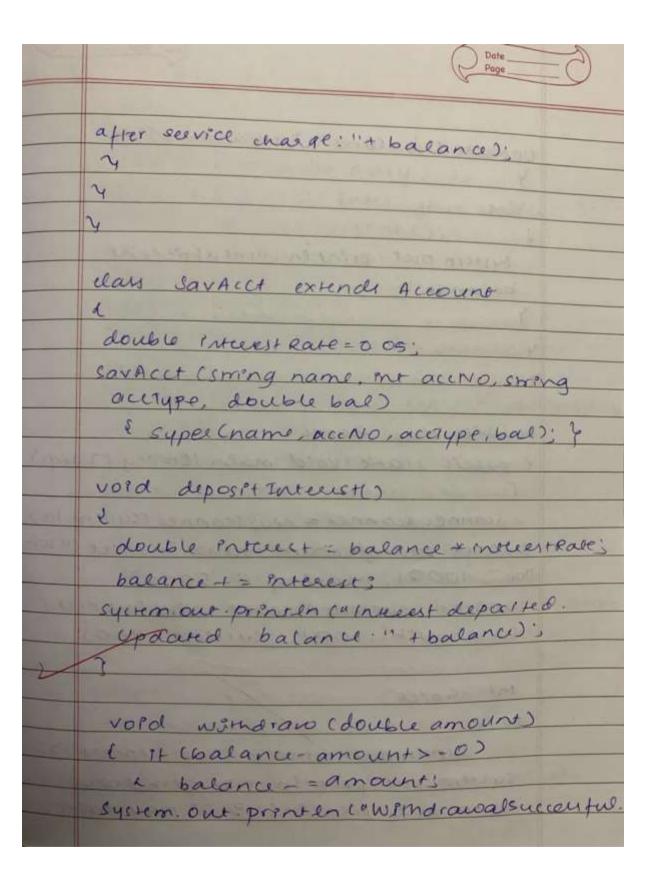
```
break;
          case 3:
            System.out.print("Select account (1. Savings / 2. Current): ");
            int accountTypeDisplay = scanner.nextInt();
            if (accountTypeDisplay == 1)
              savingsAccount.displayBalance();
            else if (accountTypeDisplay == 2)
              currentAccount.displayBalance();
            break;
          case 4:
            System.out.print("Select account (1. Savings): ");
            int accountTypeInterest = scanner.nextInt();
            if (accountTypeInterest == 1)
              savingsAccount.depositInterest();
            else
              System.out.println("Invalid option.");
            break;
          case 5:
            System.out.println("Exiting...");
            break;
          default:
            System.out.println("Invalid option. Please try again.");
     } while (choice != 5);
     scanner.close();
  }
OUTPUT->
```

```
C:\Users\oracle\Desktop\New folder (3)>java Bank
1. Deposit
2. Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
S. EXIC
Enter your choice: 1
Enter amount to deposit: 12000
Select account (1. Savings / 2. Current): 1
Deposit successful. Updated balance: 17000.0
1. Deposit
2. Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
      Deposit
Withdraw
Enter your choice: 1
Enter amount to deposit: 23008
Select account (1. Savings / 2. Current): 2
Deposit successful. Updated balance: 25008.0
1. Deposit
2. Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
Enter your choice: 2
Enter amount to withdraw: 2000
Select account (1. Savings / 2. Current): 2
Withdrawal successful. Updated balance: 23008.0
       Deposit
      Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
S. EXIC
Enter your choice: 2
Enter amount to withdraw: 1200
Select account (1. Savings / 2. Current): 1
Withdrawal successful. Updated balance: 15800.0
       Deposit
      Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
Enter your choice: 3
Select account (1. Savings / 2. Current): 1
Current Balance: 15800.0
1. Deposit
2. Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
Enter your choice: 3
Select account (1. Savings / 2. Current): 2
Current Balance: 23008.0
1. Deposit
2. Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
Enter your choice: 4
Select account (1. Savings): 1
Interest deposited. Updated balance: 16590.0
1. Deposit
2. Withdraw
3. Display Balance
4. Deposit Interest (Savings Account Only)
5. Exit
Enter your choice: 5
Exiting...
```

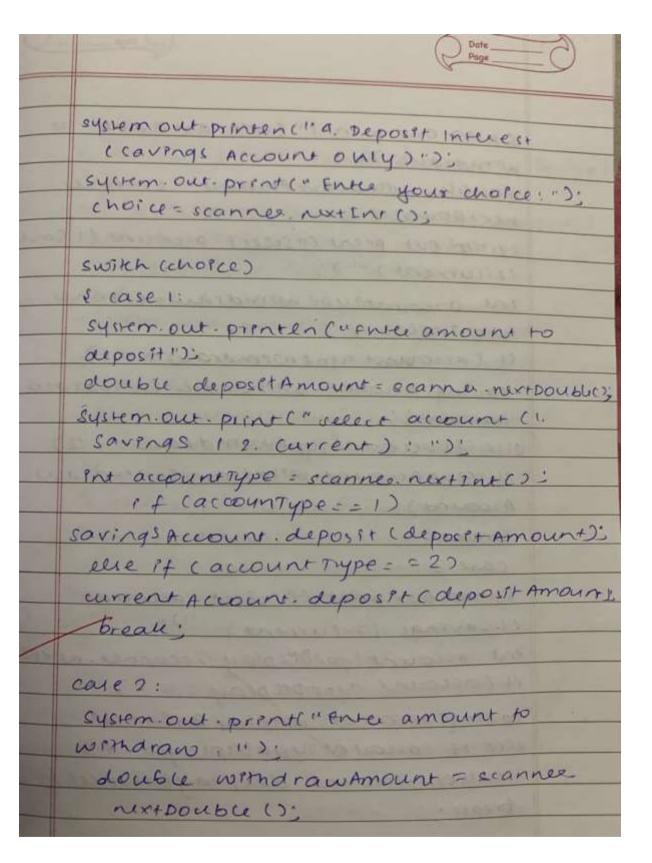
OBSERVATION->

	Classmate Dote
100	Page
1 02/24	PROGRAM 13: BANK
	Emport Java. utll. scanners
	ceas Account C
	string custome Name;
	int account Namb ca:
	string account Type:
	double balance;
	Tolland the Same and the Same a
	Account (string name: Int accino - string occiype,
	double bal)
1	La souther air so amon becare
	customer Name = name;
	account Number - accNo:
	account Type = acc Type;
	balance = bal:
	3 CHANGE S- BROKESHE I
	Same many of the party of the same of the
Comple	void diposit (double amount)
	J
	balance + = amount:
	system. out println cadeposit successful.
	updated balance: "+ balance):
	2.
	4
	void desployBalance()(
	system our printle (acurrent balance: "+
	y balance);

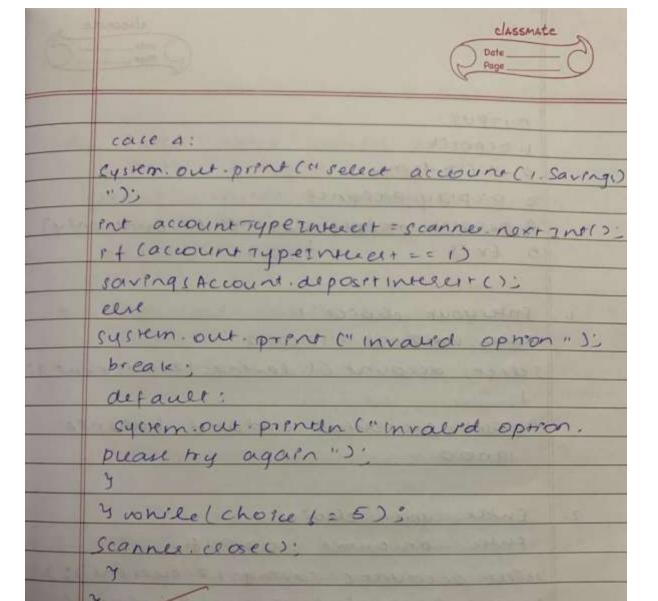
```
class currect extends Account
double minBalance = 1000;
double resvice charge = 50:
currect Covering name. Port accide,
string acc Type, double bal)
super (name, accNo, acctype, bal);
void withdraw (double amount)
of (balance - amount > = min Balance)
& ## balance - = amount;
system. out-printen cowerndrowal
successful updated balance: "+ balana)
else
System. out printen ("Insufficient
bacance. surice/charge of s "+
service change + "will be appured: ")
balance -= service charge's
system.out.printen ("Updated boulance
```



	updated balane: " 1 balance);
	3
	else
	2
	system out printer concutticient
	balanco");
1 1	V so care to the same and and the
_	Y SERVICE SERV
- 60	Chard and hoth careford
3	public class Bank
	& public static void main (string [7 asq)
	C service of the serv
	scanner scanner = new scanner (system.in)
Na S	Savacet paringAccount = new Savacet (" sor
	Doe", 10001, "savings", 5000)
100	curacit current Account = new curacit
	"Jane couth" 2001, "current" 2005
	int choice:
	do 2
	syctem.out-prenten ("In 1. Deposet ")
	system. out. prentin (" 2. werndraw")
10.7	system out prenten (13 Display Baland



systemour prent (" Ever amount to windraw") double windraw Amount = ccanne ner+pouble(); system. out print cuselect account (1. save 12. current): "3's 1237045 ent accountinge windraw = ccanne next 2nx(); st (account type normara w = = 1) savings Account, windraw (windraw Amount); else if (account typewendraw = = 2) current Accound-windraw cuindraw Account): break; case 3: system. out. print ("select account (1. savinge 12. current): "): ent account Type Dexplay = sconnee. next IN ex coccount type Disploy == 1) savings Account, display Balanco (); elce of laceountype Dreplay == 1) current-Account desplayBalance() break :



- 1	Page 6
	DUTPUT:
	1. Deposit
Police!	2. Withdraw
	3. Dieplay Balance
E Taxas	4. Deposit inkeest courings Account only
	5. Exit.
	TEMPERATURE DE LA LANGUE DE LA LES LA
	Manager and the last of the la
1.	Enter amount: 12000
	select account (1. savings 12. current
_	select account (1. saving
-	Deposit succentul. Updated balance
	17000
	The same of the sa
2.	Enter your choice:1
	the amount: 28008
	select account (1. savings 12. current);2
	Deposit succentul updated balance
	25008
	Project
3	Enter your choice:2
	select the amount: 2006
	select account (1. savengs 12. current):2
	windrawal successful updated
	balance 23008 updated
	1

All of	classmate
(0)	Date
V	KALAM MONIZANIO AL MANAGON MANAGON
1	The state of the s
4.	Enter your chorce:2
	enter amount: 1200
1	select account of savings 1, current):1.
	worndrawal juccessful updated
	balance 15800
	Tisterical neonal basement to the print
5.	
	select account (1. savings 12. curent):1
	current Balance: 15800
6.	Enter your choice: 3
	Select acrownt (1. savengs 1 2. current):2
	current Balance: 23008
	actiques i toutave. United 30 c
7.	Enser your chose: 4
W 1	Leliet accoun (1. savings):1
	Interest deposited: Updated balance:
P 15 1	16590.
	Challet Back
9-	she your moice: 5
	exiting
	The same of the sa
6	7/2/234
	19/21

PROGRAM: 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 cases both father and son's age and throws an exception if son's age is >=father's age.

INPUT->

```
import java.util.Scanner;
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 < 0) {</pre>
            throw new WrongAge("Son's age cannot be negative.");
        }
        if (sonAge >= fatherAge) {
            throw new WrongAge("Son's age should be less than Father's age.");
        }
        this.sonAge = sonAge;
    }
    public int getSonAge() {
        return sonAge;
}
```

```
public class Inheritance {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        try {
            System.out.print("Enter father's age: ");
            int fatherAge = scanner.nextInt();
            Father father = new Father(fatherAge);
            System.out.print("Enter son's age: ");
            int sonAge = scanner.nextInt();
            Son son = new Son(fatherAge, sonAge);
            System.out.println("Father's age: " + father.getAge());
            System.out.println("Son's age: " + son.getSonAge());
        } catch (WrongAge e) {
            System.out.println("Exception caught: " + e.getMessage());
        } catch (Exception e) {
            System.out.println("Invalid input. Please enter valid ages.");
        } finally {
            scanner.close();
        }
    }
}
```

OUTPUT->

```
C:\Users\bmscecse\Desktop\1BM22CS150\z\set path="C:\Program Files\Java\jdk1.8.0_201\bin"

C:\Users\bmscecse\Desktop\1BM22CS150\z\javac Inherit.java

C:\Users\bmscecse\Desktop\1BM22CS150\z\javac Inherit.java

C:\Users\bmscecse\Desktop\1BM22CS150\z\java Inherit

Enter father's age: 23

Enter son's age: 2

C:\Users\bmscecse\Desktop\1BM22CS150\z\
C:\Users\bmscecse\Desktop\1BM22CS150\z\
C:\Users\bmscecse\Desktop\1BM22CS150\z\
java Inherit

Enter father's age: 2

Enter son's age: 34

Exception caught: Son's age should be less than Father's age.

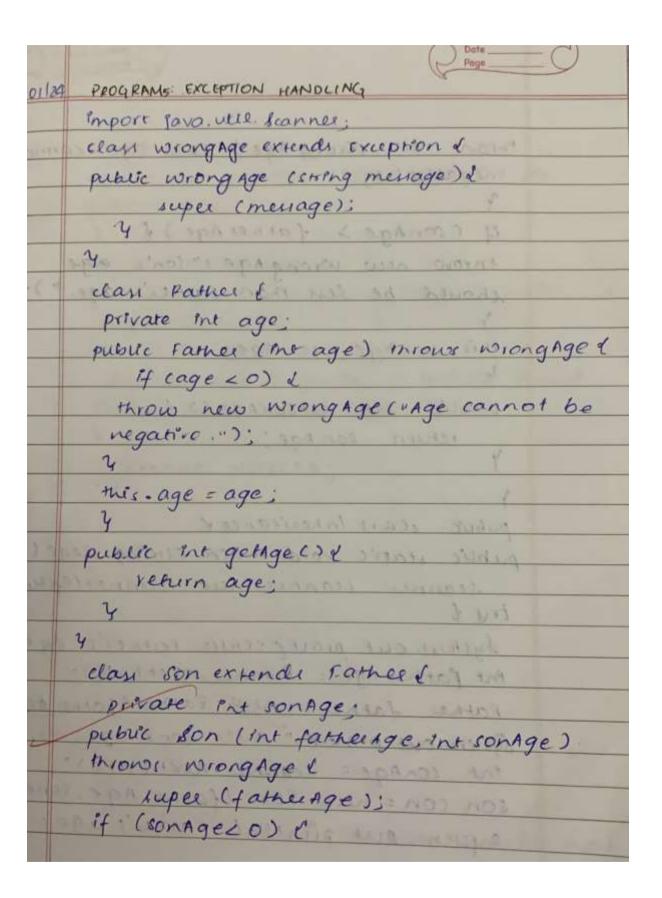
C:\Users\bmscecse\Desktop\1BM22CS150\z\java Inherit

Enter father's age: 23

Enter son's age: -9

Exception caught: Son's age cannot be negative.

C:\Users\bmscecse\Desktop\1BM22CS150\z\z\
Description caught: Son's age cannot be negative.
```



```
throw new wrong Age ( " con's age cannot
 regative").
 if (sonage) = father Age) {
 throw new wrong age i son's age
 should be less man fameis age ");
 this. son Age & son Age;
public int getsonAge () (
   return son Age;
public class Inheritance of
public static void main csrring agg(17)
 scanner scanner : new scanner (Sychmin
toy &
System. out print ("Enter Father's age:")
ent father age = scanne next Inter;
 Father father = new Father (father Age);
System. out prent ( " ruter some age: ")]
Int sonage = scanner. next Ent();
son son = new son (father Age, sonage)
system out printent "father's age: "+
```

```
father get Age (1);
 system out printin 1 son's age : + son
 getcon Age());
 carch ( wrong Age e) {
system. out prenten (" Exception caught: "+
 e.get Mestage ()): }
catch (Exception e) &
 system. out printen (" motid hopet
Puase enter valid orgen ");
 3 finally &
  scanner close (2;
output >
Enter fameri age 29
cathe sone age: 4
Famel's age: 29
cone age : 4
enter partier age: 5
Exception caught son age should no
```

	be less than parners age
3.	Fatheri age 1 23
	soni age: -8 - (() 3PA 100 +3
	Exception caught: sone age
	cannot be negative
334	HELD CITY OF FREED OF EXILEPTION COLL
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PROGRAM 6: 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.

INPUT-> CIE.STUDENT

```
package CIE;
public class Student {
    public String usn;
    public String name;
    public int sem;
    public Student() {
        this("", "", 0);
    public Student(String usn, String name, int sem) {
        this.usn = usn;
        this.name = name;
        this.sem = sem;
    }
    public void setUsn(String usn) {
        this.usn = usn;
    public void setName(String name) {
        this.name = name;
    public void setSem(int sem) {
        this.sem = sem;
    public String getUsn() {
        return usn;
    public String getName() {
        return name;
    public int getSem() {
        return sem;
    }
}
```

CIE.INTERNALS

```
package CIE;
public class Internals{
    private int[] internalMarks = new int[5];

public Internals() {
    }

public void setInternalMarks(int[] internalMarks) {
        this.internalMarks = internalMarks;
    }

public int[] getInternalMarks() {
        return internalMarks;
    }
}
```

SEE.EXTERNALS

```
riie cuit roimat view meip
package SEE;
import CIE.Student;
public class External extends Student {
    public int[] seeMarks = new int[5];
    public External() {
        this("", "", 0, new int[5]);
    }
    public External(String usn, String name, int sem, int[] seeMarks) {
        super(usn, name, sem);
        this.seeMarks = seeMarks;
    }
    public void setSeeMarks(int[] seeMarks) {
        this.seeMarks = seeMarks;
    public int[] getSeeMarks() {
        return seeMarks;
    }
}
```

FINAL MARKS

```
import CIE.Student:
import CIE. Internals;
import SEE.External;
import java.util.Scanner;
public class FinalMarks {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of students: ");
        int n = scanner.nextInt();
        Student[] students = new Student[n];
        Internals[] internals = new Internals[n];
        External[] externals = new External[n];
        for (int i = 0; i < n; i++) {
            students[i] = new Student();
            System.out.print("Enter USN for student " + (i + 1) + ": ");
            students[i].setUsn(scanner.next());
            System.out.print("Enter name for student " + (i + 1) + ": ");
            students[i].setName(scanner.next());
            System.out.print("Enter semester for student " + (i + 1) + ": ");
            students[i].setSem(scanner.nextInt());
            internals[i] = new Internals();
            internals[i].setInternalMarks(inputMarksWithValidation("internal", i, scanner, 0, 50));
            externals[i] = new External(students[i].getUsn(), students[i].getName(), students[i].getSem(), new int[5]);
            externals[i].setSeeMarks(inputMarksWithValidation("external", i, scanner, 0, 100));
            int[] finalMarks = new int[5];
            for (int j = 0; j < 5; j++) {
                finalMarks[j] = internals[i].getInternalMarks()[j] + externals[i].getSeeMarks()[j] / 2;
            }
            System.out.println("Student " + (i + 1) + " Final Marks: " +
                    finalMarks[0] + ", " + finalMarks[1] + ", " + finalMarks[2] + ", " +
                    finalMarks[3] + ", " + finalMarks[4]);
        }
                     finalMarks[0] + ", " + finalMarks[1] + ", " + finalMarks[2] + ", " + finalMarks[3] + ", " + finalMarks[4]);
         }
         scanner.close();
     private static int[] inputMarksWithValidation(String type, int studentIndex, Scanner scanner, int min, int max) {
         int[] marks = new int[5];
         System.out.println("Enter " + type + " marks for student " + (studentIndex + 1) + ": ");
         for (int i = 0; i < 5; i++) {
             int mark;
             do {
                System.out.print("Subject " + (i + 1) + ": ");
                 mark = scanner.nextInt();
                if (mark < 0 || mark > max) {
                     System.out.println("Invalid input. " + type + " marks should be between 0 and " + max + ". Please try again.");
             } while (mark < 0 || mark > max);
             marks[i] = mark;
         return marks;
```

OUTPUT->

```
C:\Users\bmscecse\Desktop\Project\java FinalMarks
Enter the number of students: 1
Enter USN for student 1: 1234
Enter name for student 1: A
Enter semester for student 1: 1
Enter internal marks for student 1:
Subject 1: 23
Subject 2: 33
Subject 3: 23
Subject 3: 23
Subject 5: 12
Enter external marks for student 1:
Subject 5: 12
Enter external marks for student 1:
Subject 2: 45
Subject 3: 55
Subject 4: 34
Subject 5: 23
Student 1 Final Marks: 40, 55, 50, 51, 23
C:\Users\bmscecse\Desktop\Project>
```

	Dute_Page
124	PROGRAM 6: PACKAGES
	The second secon
	II FILE: CIE
	package CIE;
	public class sudent &
	public Atring un;
	public string name;
	public ent sem:
	public student () (
	this (" ", " ", 0);
	· ·
	public student (string usn. string name,
13	int sem) i
	this usn = uni
	this name = name;
	this sem = sem;
-	1 3 Marie Control Marie Barre State of Control
	public void let us n csirring un) &
10	mes-usn: 2
	public void set Name (string name) s
	pre. nome = name; }
	public void set som (int sem) &
	this sem = sem; 3
	Public string get usn () {
	return usn;
	3

public strong get Name () ¿ return name. public int get sem () } return (em ! MFILE: CIE package CIE; public class Inturals 4 private int [7 Internal Macky = new int (5); public internals () } public void setInternal Macks line [7 interal Marks) & thu. Proximal Macks = internal Macin; public put [7 get internal marke(); return internal markets;

Poge 11 FILE I SEE backage SEE; Proport CIE. Student: public class External extends student of public ent [7 see Marker = new int [67; public External () { this (" ", " ", 0, new int [57): public External (strong up, string name, Put sem. PUT 3 see Macker) super (un, name, sem); this. siemanne = su Marke: 3 public void set SEE Marks (INT 17 See Marks) this. seemanly = servancy public ent [7 get see marin () { return seemach,

```
II FILE : PROJECT
 Emport CIE. student?
 import ett. internali;
 Proport set. external;
 import gava. util. Acanne;
 public class final marker of
  public static void main (Storing [] algs)
  Scanner scanner = new scanner (System to
 System. out print 1" futu no. of soudeness
    Int n = scanner. nextInt();
 students? indent : new student (n?)
 Internal () internal: new Internals (n7:
 External [] external= new External [n].
 for (int 120; rcn; 1++) &
 students [17 = new student ();
 System out print " Enter USN for suden
+ (1+1)+"1");
students [i] - set vin ( scanner next ());
system. out print l'étutes name of stud's
 + (7+1)+":");
students 1:7. set Name (scanner next(1)
system. out. print (" price sem of soud"
(+1)+ 11,11)
students (i) set sem escanner, next
```



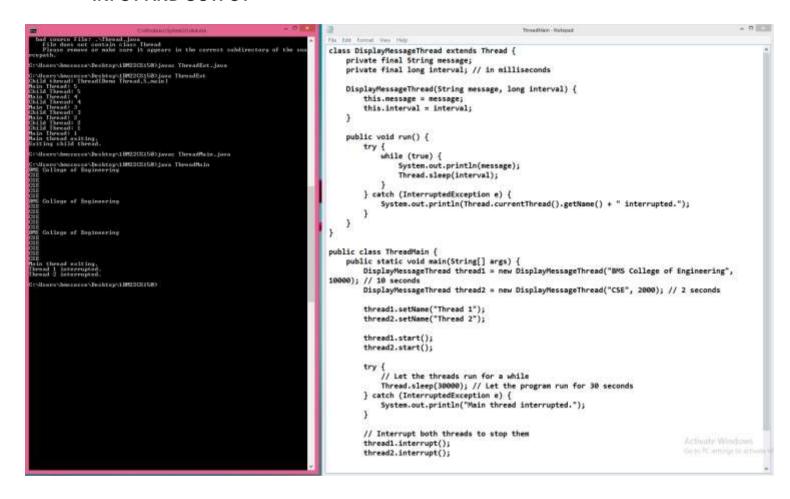
internals [i7 = new Internals &): Internals Fi) set internal marks Cinput marker with validation " internal", i, sconner 10,50)11 external (i) = new fxternals (studenty 5:7. getven (), students 1:7. get Name, studentssil get eem (2, new intos)); externals Fin. Set secretar my Computmarium ith validation 10 exicens!", is scenne, o, (00)); 1 nt 17 A'nalmary = new Int (57) for lint ; = 0; 165; 1++)d tinalmaem [] 7 = Internal (i) get internal marks () []) + errenaly 517. get seeman (1) Ca7/214 system. Out. printen ("Student"+ (1+1) -"Final Marks: "+ final Marks (07+ ", 1' - final Macks (1)+ ", 11, + final Marles (2) + "," + tinal marke 137+ + finalmaeu (4)), samme close ()

private static Intra input macus nom Validation certing type int students scanne , canner, ent men, ent max) y Put Amaeus = new Put (57; system out princen (" finder" + type +" maers for shedent " + (student index +) for lint 1=0; 125; 1++) in- mack; do d 5.0. P ("Subject " + (1+1) + ": "). maele = peanner. next 2nt ()] if (mark & o 11 mark > mark) & System out pintln (" mvalid 12 put" + type + " makes knowled be blun 0" + max + " place try again "). y while (make co) makes mack); maen (i) = maek; return maely;

7	
	Output->
	Forter the number: 1
	ENTER USN for students 1: 1234
	Ente name for sudent 1: A
	onte semesee for student 1:1
	Subject 1: 23
	Subject 2: 33
	subject 3: 23
	Subject 7:34
	Subject 5:12
	Enter expernal many for sudent 1:
	Subject 1:34
	Subject 2:45
	Subject 3:55
	Subject a: 34
	subject 5:23
	Student 1 Final Navu: 40,55, 50,51,23

PROGRAM 9: 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.

INPUT AND OUTPUT ->



OBSERVATION->

0510212	4 PPD(sphills
	THREAD
1 184 11	class Display Mexage Thread extends Thread &
	final string menage;
	private final long meeral:
	03010 0100
	Displaymenage Thread (stringmenage)
	long interval)
	The state of the s
	this message = message;
	thes. interval = enterval :
	Y the state of the
	The state of the s
	public void run ()
	E bolton based since
	try & Name and Asset Belling
	where (true)
	{
	system.out.println (menage);
	Thread. slup (interal);
	3
	Y
	carch (muuped Exception e)
	1/
	System. Out. println(mread. current mod
	getName()+ "Interrupted")
-	
	3

4 public class thread main & public static voidmain (string aggs[1) DisplaymenageThread threads = new Display Menag eThread ("BMS college of Engineering 20000); Display Menagemread thread 2: new Displaymenagemead (" CSE", 2000); thread 1. Let Nome ("thread 1"); thread 2. set Name 1" Thread 2"); thread 1. stock (); thread? starter; try & Thread sleep (3000); tatch (interrupted exception e) System. out println1" Main Thread inkulupted Thread 1. Phterupt (); thread 2. interuptes;

-	Page C	
	- D	
i	system. out. pigntlnc" main Thread exiting	3
	4	1
	our	1
	OUTPUT -> Gratery broads wash studied	1
	(BRISCE MAINE) MEMBER STUDIE STUDIES	1
	CSE	1
	Orginalization beautinguesticion	1
14	Display mandy almonder and columnias	
	CSE	
	Display well age micad micad 2 12323	
	BMSCE TE TO " 180 " TEAD THE BOUND BUSINES	
	thread s services (more of 132)	
	thread 2 set Nome - thread 2 323	
	THREAD IN ALBERT 323	
-	thread? stackers 323	
1	CSE RYNT	236
1	Man mread exiting	
1	Thread 1 * newwapted 5	
	Thread 2 sherrupted.	
	- Croverpre	
1		
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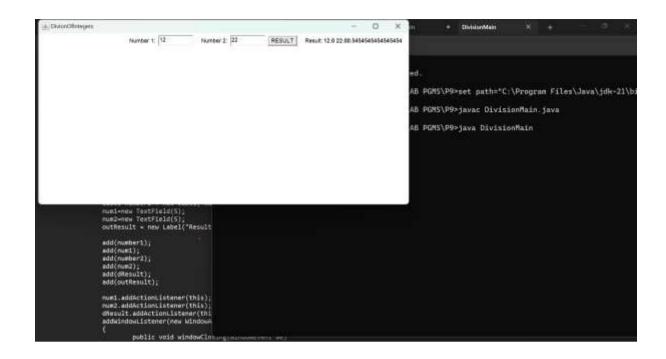
Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

INPUT->

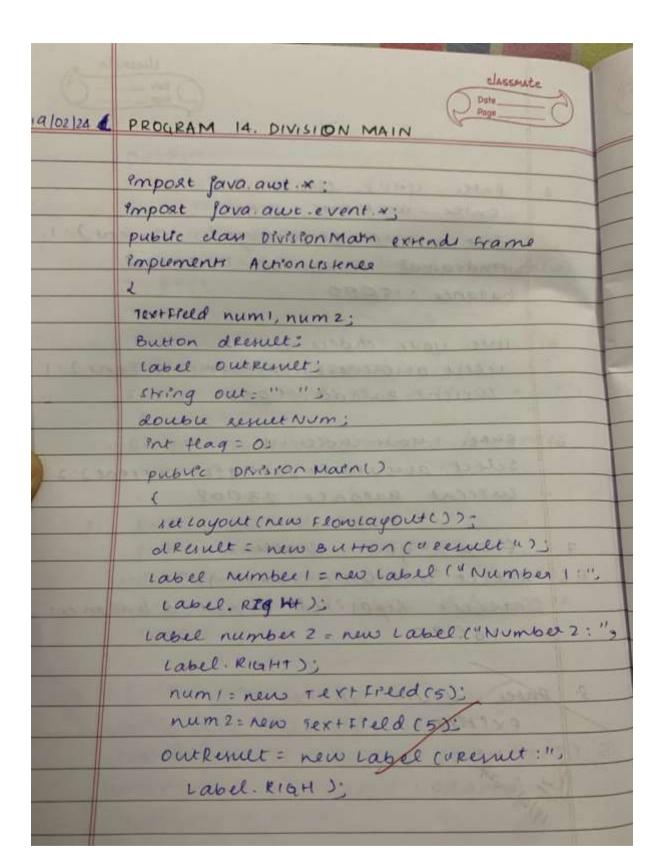
```
import java.awt.*;
import java.awt.event.*;
public class DivisionMain extends Frame implements ActionListener
        TextField num1,num2;
        Button dResult;
        Label outResult;
        String out="";
        double resultNum;
        int flag=0;
        public DivisionMain()
                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)
             double n1,n2;
             try
              {
                       if (ae.getSource() == dResult)
                        {
                                 n1=Double.parseDouble(num1.getText());
                                 n2=Double.parseDouble(num2.getText());
                                  /*if(n2==0)
                                           throw new ArithmeticException();*/
                                 out=n1+" "+n2;
                                  resultNum=n1/n2;
                                 out+=String.valueOf(resultNum);
                                 repaint();
                        }
              catch(ArithmeticException e2)
              {
                       flag=1;
                        out="Divide by 0 Exception! "+e2;
                       repaint();
              catch(NumberFormatException e1)
                       flag=1;
                       out="Number Format Exception! "+e1;
                        repaint();
              }
public void paint(Graphics g)
      g.drawString(out,outResult.getX()+outResult.getWidth(),outResult.getY()+outResult.getHeight()-8);
else
      g.drawString(out,100,200);
flag=0;
public static void main(String[] args)
      DivisionMain dm=new DivisionMain();
dm.setSize(new Dimension(800,400));
dm.setTitle("DivionOfIntegers");
dm.setVisible(true);
```

OUTPUT->



OBSERVATION->



add (number 1); add (numl): add (number 2); add (num 2): add (dresult): add (out Result): numi add Action Listener (Hus); nume add actioncistence (this): dryult. add Action Listence (this); addwindow where (new windowAdapter() & public void windowclosing c windowsent we) Cardo and distribution Syltem exit(0): a the same of the same public void action performed caction event aes public void eaint (Graphics 4) > double n1, n2; as diamographic the sample of d'if (ae get source () = = dresult) CUPRICALITY OUR COMPACION 3 n1 = Double parce Double (nums, getTer+())

