B.M.S. COLLEGE OF ENGINEERING

Basavanagudi, Bengaluru- 560019

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LAB REPORT

On

Object-Oriented Java Programming

(23CS3PCOOJ)

Submitted By:

MOHAMMED SHURAIM

1BM22CS158

In partial fulfilment of

BACHELOR OF ENGINEERING

In

COMPUTER SCIENCE AND ENGINEERING

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PROGRAM 1

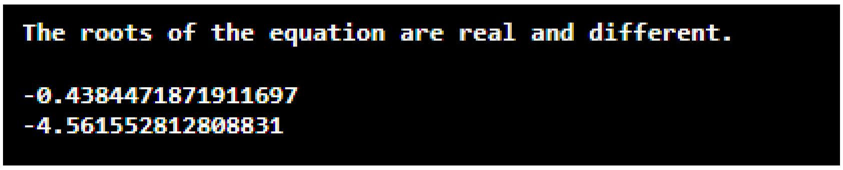
Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c= 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative,display a message stating that there are no real solutions.

```
import static java.lang.Math.*;
public class QuadraticEquation {
    static void calculateRoots(int a, int b, int c) {
        if (a == 0) {
            System.out.println("The value of a cannot be 0.");
            return;
        }
        int d = b * b - 4 * a * c;
        double sqrtval = sqrt(abs(d));
        if (d > 0) {
            System.out.println("The roots of the equation are real and different. \n");
            System.out.println((double)(-b + sqrtval) / (2 * a) + "\n"+ (double)(-b - sqrtval) / (2 *
a));
        } else if (d == 0) {
            System.out.println("The roots of the equation are real and same. \n");
            System.out.println(-(double)b / (2 * a) + "\n"+ -(double)b / (2 * a));
        } else {
            System.out.println("The roots of the equation are complex and different. \n");
            System.out.println(-(double)b / (2 * a) + " + i"+ sqrtval + "\n"+ -(double)b / (2 * a)+ " -
i" + sqrtval);
        }
    }
 public static void main(String args[]) {
        int a = 1, b = 5, c = 2;
                    calculateRoots(a, b, c); //Output 2: int a=1, b=1, c=1
                                             //Output 3: int a=1, b=-2, c=1
 }
 }
```

PROGRAM 1

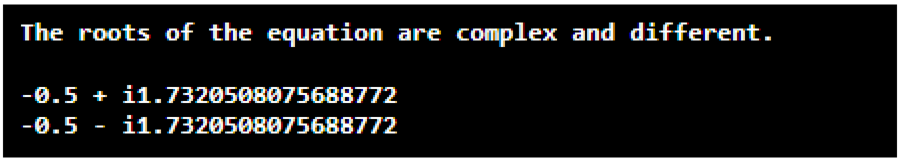
OUTPUT :

int a = 1, b = 5, c = 2



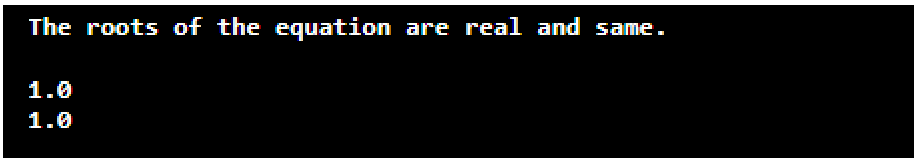
```
The roots of the equation are real and different.

-0.4384471871911697
-4.561552812808831
```

int a=1, b=1, c=1

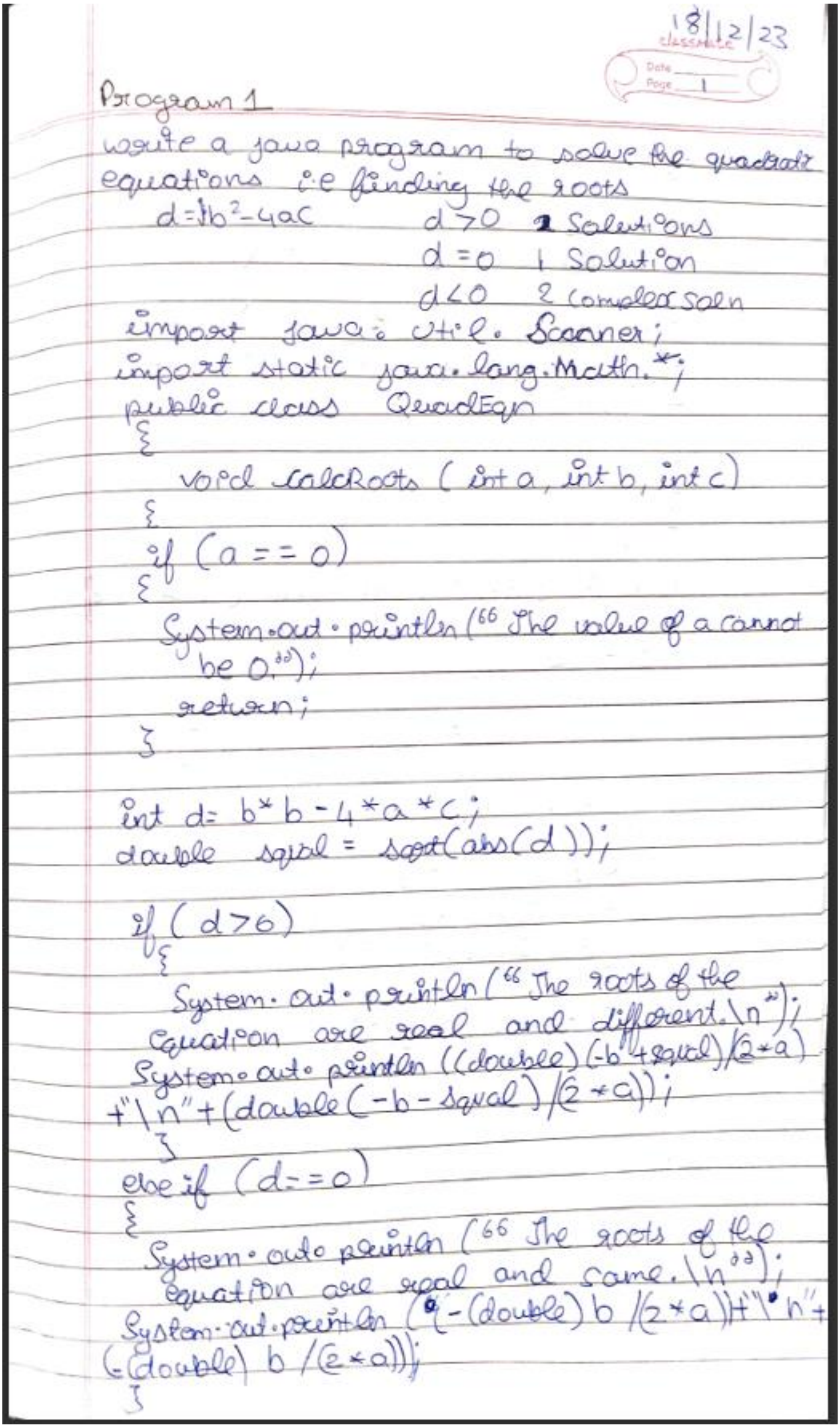


```
The roots of the equation are complex and different.

-0.5 + i1.7320508075688772
-0.5 - i1.7320508075688772
```

int a=1, b=-2, c=1



```
The roots of the equation are real and same.

1.0
1.0
```



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Program 1

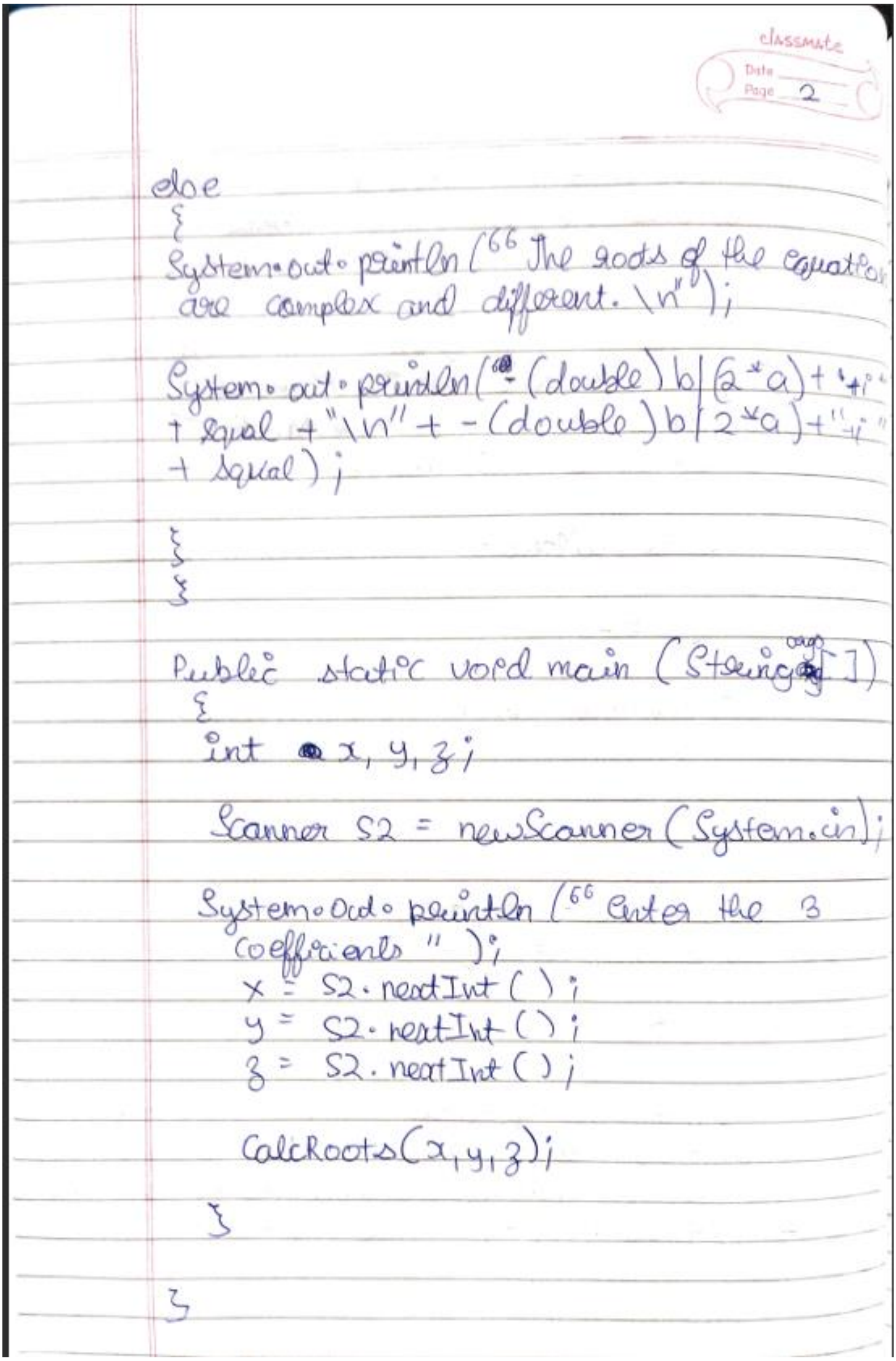
write a java program to solve the quadratic equations i.e finding the roots

d=b²-4ac   d>0 2 Solutions
            d=0 1 Solution
            d<0 2 complex soln

```
import java.util.Scanner;
import static java.lang.Math.*;
public class QuadEqn
 {
   void calcRoots ( int a, int b, int c)
 {
 if (a == 0)
 {
  System.out.println("The value of a cannot
   be 0.");
  return;
 }

int d= b*b-4*a*c;
double sqval = sqrt(abs(d));

 if ( d>0)
  {
  System.out.println("The roots of the
  equation are real and different.\n");
 System.out.println((double)(-b+sqval)/(2*a)
+"\n"+(double(-b-sqval)/(2*a));
  }
 else if (d==0)
 {
  System.out.println("The roots of the
   equation are real and same.\n");
System.out.println(-(double)b /(2*a)+"\n"+
(-(double) b /(2*a));
 }
```



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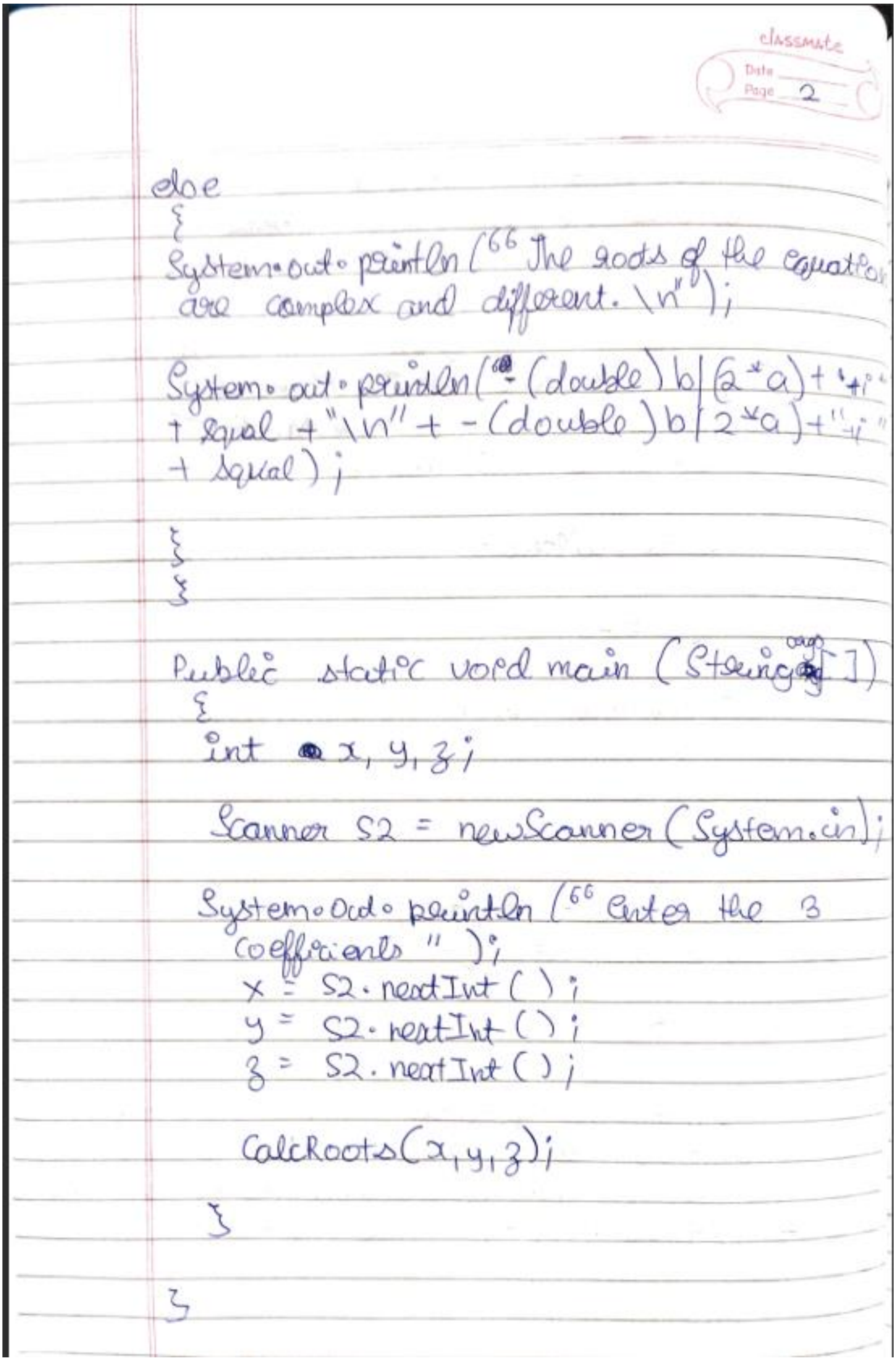
```
else
{
System.out.println("The roots of the equation
are complex and different.\n");

System.out.println(-(double)b/(2*a)+"+i"
+ sqval +"\n"+ -(double)b/(2*a)+"-i"
+ sqval);

}
}
}

Public static void main (String args[])
 {
 int x, y, z;

 Scanner S2 = newScanner(System.in);

 System.out.println("Enter the 3
  coefficients ");
   x = S2.nextInt();
   y = S2.nextInt();
   z = S2.nextInt();

   CalcRoots(x,y,z);

 }

}
```



classmate
Date
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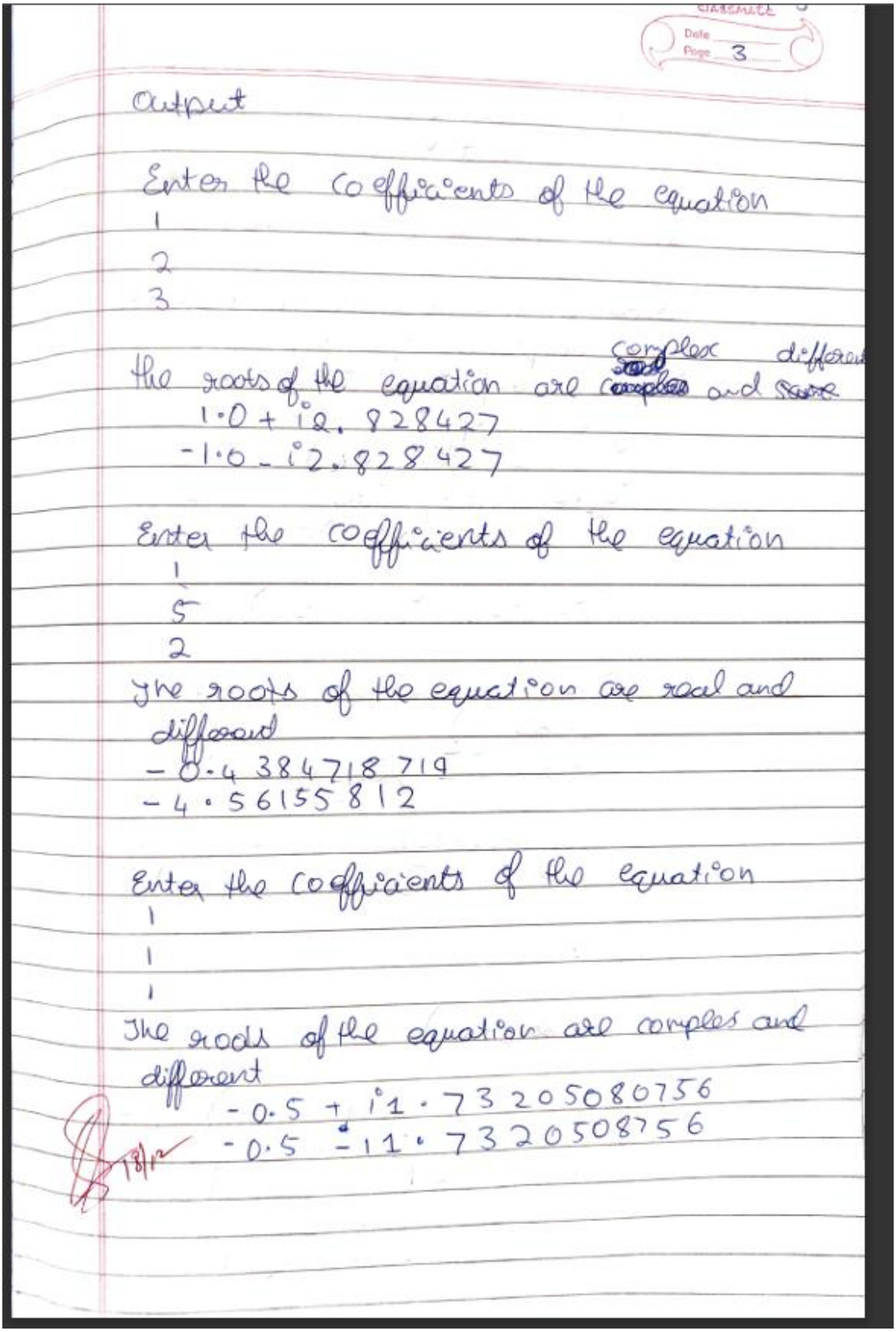
```
else
{
System.out.println(" The roots of the equation
 are complex and different.\n");

System.out.println(-(double)b/(2*a)+"+i"
+ sqval +"\n"+ -(double)b/(2*a)+"-i"
+ sqval);

}
}
}

Public static void main (String args[])
 {
 int x, y, z;

 Scanner S2 = newScanner(System.in);

 System.out.println(" Enter the 3
  coefficients ");
   x = S2.nextInt();
   y = S2.nextInt();
   z = S2.nextInt();

   CalcRoots(x,y,z);

 }

}
```



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Output

```
Enter the coefficients of the equation
1
2
3

the roots of the equation are ~~complex~~ ~~real~~ complex and ~~same~~ different
    1.0 + i2. 828427
   -1.0 - i2. 828427

Enter the coefficients of the equation
 1
 5
 2
The roots of the equation are real and
different
-0.4 384718 719
-4. 56155812

Enter the coefficients of the equation
1
1
1
The roots of the equation are complex and
different
      -0.5 + i1. 7320508756
      -0.5 - i1. 7320508756
```

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PROGRAM 2

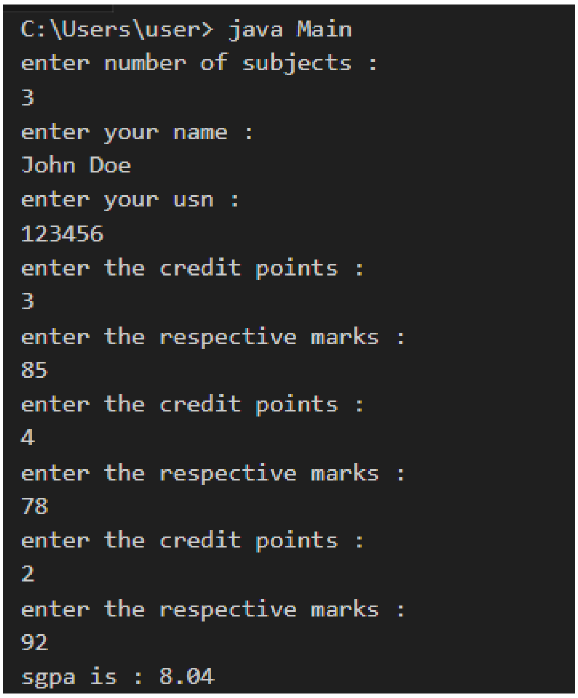
Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

```
import java.util.*;
public class Main {
        Scanner sc=new Scanner(System.in);
        public int n;
        String name,usn;
         int marks[],credit[],sum;
        float sgpa;
        public void acceptAndDisplay(){

                System.out.println("enter number of subjects : ");
                n=sc.nextInt();
                sc.nextLine();
                credit=new int[n];
                marks=new int[n];

                System.out.println("enter your name :");
                name=sc.nextLine();
                System.out.println("enter your usn : ");
                usn=sc.nextLine();
        }
        void calculate(){
                for(int i=0;i<n;i++){
                        System.out.println("enter the credit points : ");
                        credit[i]=sc.nextInt();
                        System.out.println("enter the respective marks :");
                        marks[i]=sc.nextInt();
```

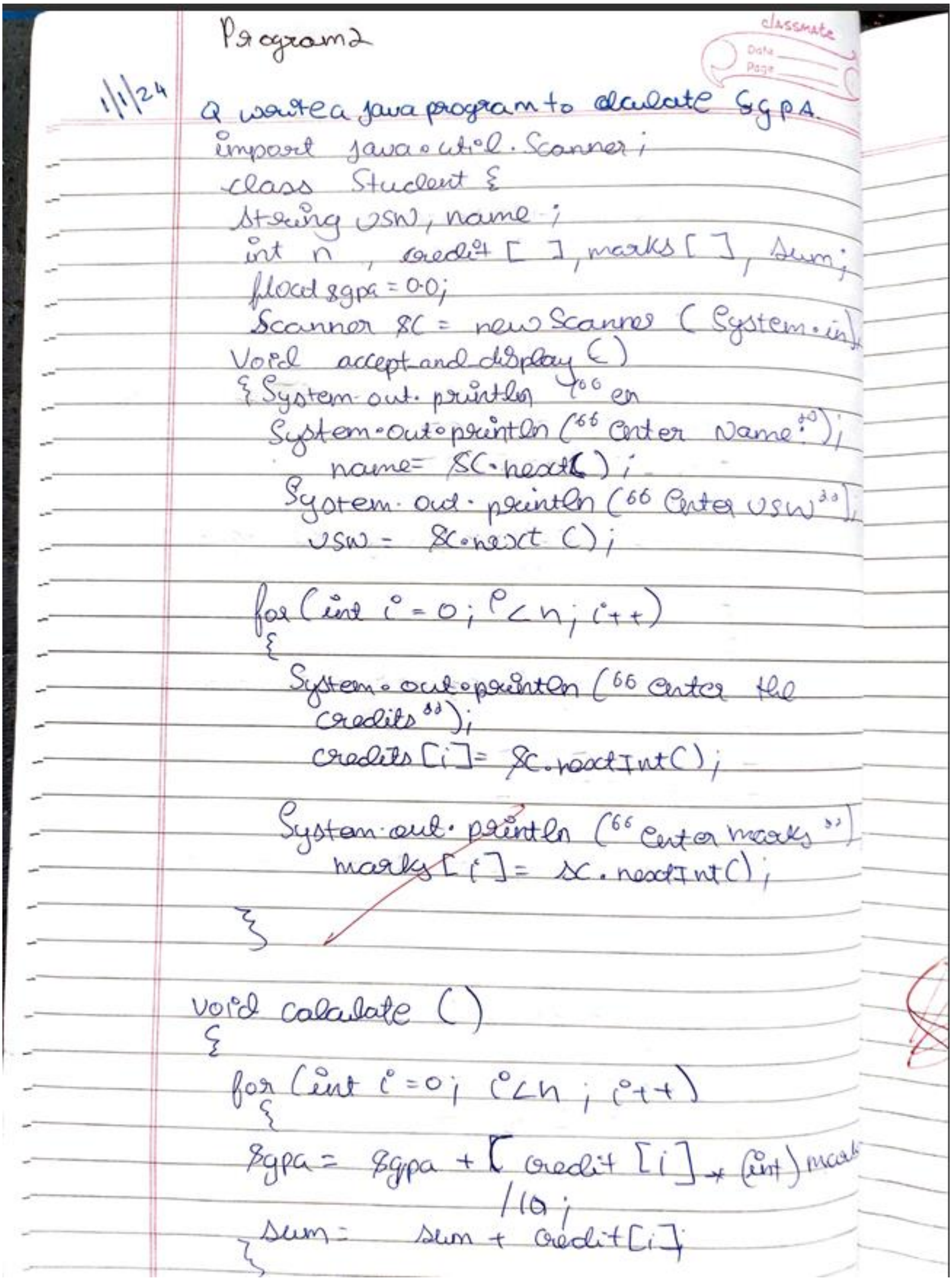
```
            sgpa+=credit[i]* marks[i]/10;
            sum +=credit[i];
        }
        sgpa=sgpa/sum;
        System.out.println("sgpa is :"+sgpa);
    }
    public static void main(String[] args){

        Main m=new Main();
        m.acceptAndDisplay();
        m.calculate();
    }
}
```

PROGRAM 2

OUTPUT :



```
C:\Users\user> java Main
enter number of subjects :
3
enter your name :
John Doe
enter your usn :
123456
enter the credit points :
3
enter the respective marks :
85
enter the credit points :
4
enter the respective marks :
78
enter the credit points :
2
enter the respective marks :
92
sgpa is : 8.04
```



Program2

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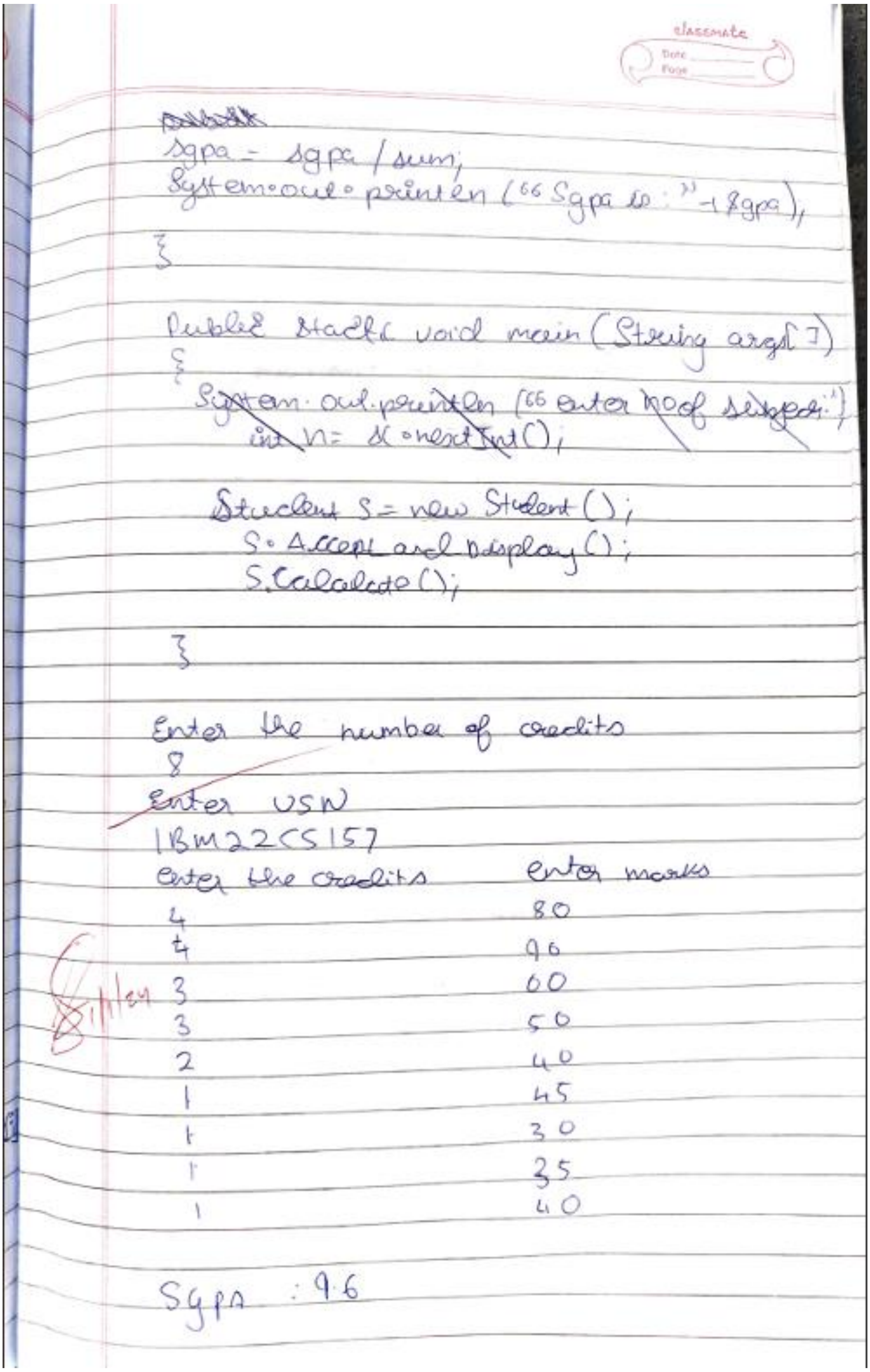
Q write a java program to calculate SGPA.

```
import java.util.Scanner;
class Student {
String usn, name ;
int n , credit [ ], marks [ ], sum;
float sgpa = 0.0;
Scanner sc = new Scanner (System.in);
Void accept and display ( )
{ System.out. println ("" en
  System.out.println ("Enter Name:");
     name= sc.next( );
   System.out.println ("Enter USN");
   usn = sc.next ( );

  for (int i = 0; i<n; i++)
  {
    System.out.println ("enter the
    credits");
    credits[i]= sc.nextInt( );

    System.out.println ("Enter marks")
      marks[i]= sc.nextInt( );

  }

void calculate ( )
{
 for (int i =0; i<n ; i++)
   {
 sgpa= sgpa + [ credit [i] * (int) mark
             /10 ;
 sum=   sum + credit[i];
 }
```



```
sgpa = sgpa / sum;
System.out.println("Sgpa is :"+sgpa);

}

Public static void main(String args[])
{
  ~~System.out.println("enter no of subject:");~~
  ~~int n= s.nextInt();~~

   Student s = new Student();
    S.Accept and Display();
    S.Calculate();

}
```

```
Enter the number of credits
8
Enter USN
1BM22CS157
enter the credits        enter marks
4                        80
4                        90
3                        60
3                        50
2                        40
1                        45
1                        30
1                        35
1                        40

Sgpa : 9.6
```

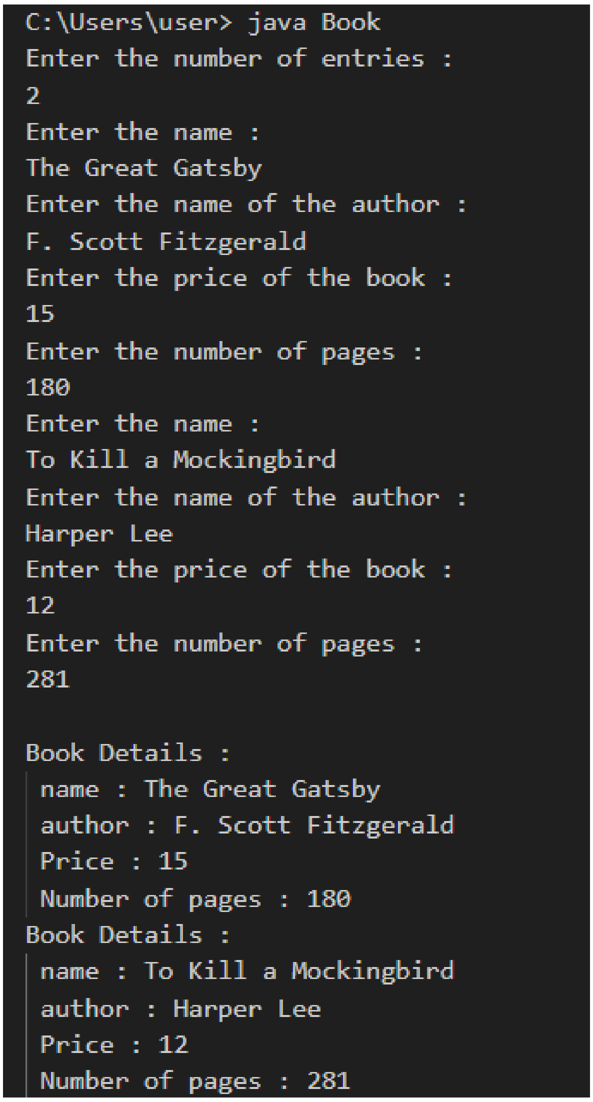
PROGRAM 3

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.

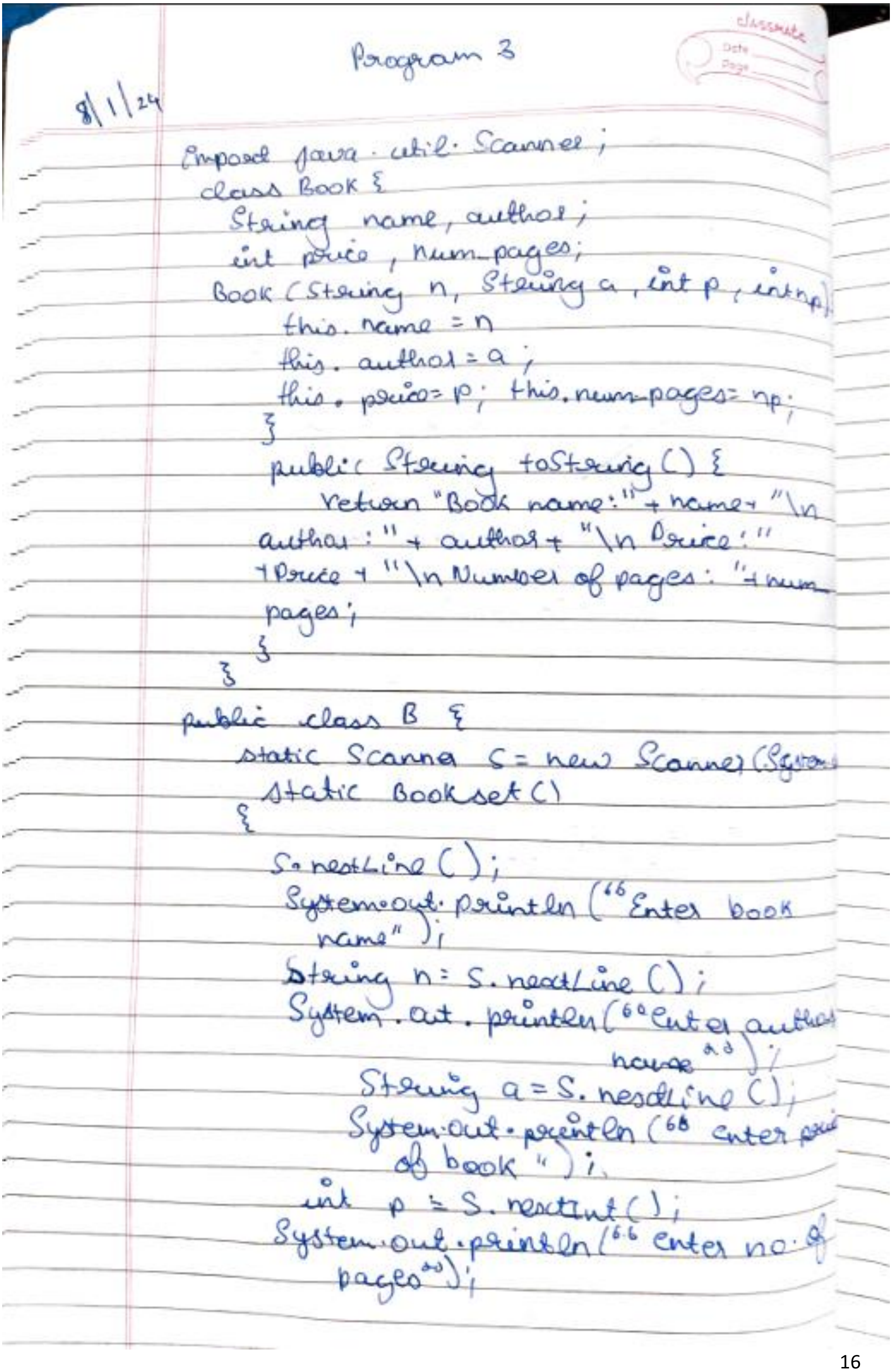
```
import java.util.Scanner;


class Book {
    Scanner s1 = new Scanner(System.in);
    String name, author;
    int price, num_pages;


    Book(String name, String author, int price, int num_pages) {
        this.name = name;
        this.author = author;
        this.price = price;
        this.num_pages = num_pages;
    }


    Book() {}


    void accept() {
        System.out.println("Enter the name : ");
        name = s1.nextLine();
        System.out.println("Enter the name of the author : ");
        author = s1.nextLine();
        System.out.println("Enter the price of the book : ");
        price = s1.nextInt();
        System.out.println("Enter the number of pages : ");
        num_pages = s1.nextInt();
    }


    public String toString() {
        return "Book Details : \n name : " + name + "\n author : " + author + "\n Price : " + price
                + "\n Number of pages : " + num_pages;
    }

    public static void main(String args[]) {
        int n;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the number of entries : ");
        n = s.nextInt();
        Book b[] = new Book[n];
        for (int i = 0; i < n; i++) {
            b[i] = new Book();
            b[i].accept();
        }
        for (int i = 0; i < n; i++) {
            System.out.println(b[i].toString());
        }
    }
}
```

PROGRAM 3

OUTPUT:



```
C:\Users\user> java Book
Enter the number of entries :
2
Enter the name :
The Great Gatsby
Enter the name of the author :
F. Scott Fitzgerald
Enter the price of the book :
15
Enter the number of pages :
180
Enter the name :
To Kill a Mockingbird
Enter the name of the author :
Harper Lee
Enter the price of the book :
12
Enter the number of pages :
281

Book Details :
  name : The Great Gatsby
  author : F. Scott Fitzgerald
  Price : 15
  Number of pages : 180
Book Details :
  name : To Kill a Mockingbird
  author : Harper Lee
  Price : 12
  Number of pages : 281
```



Program 3

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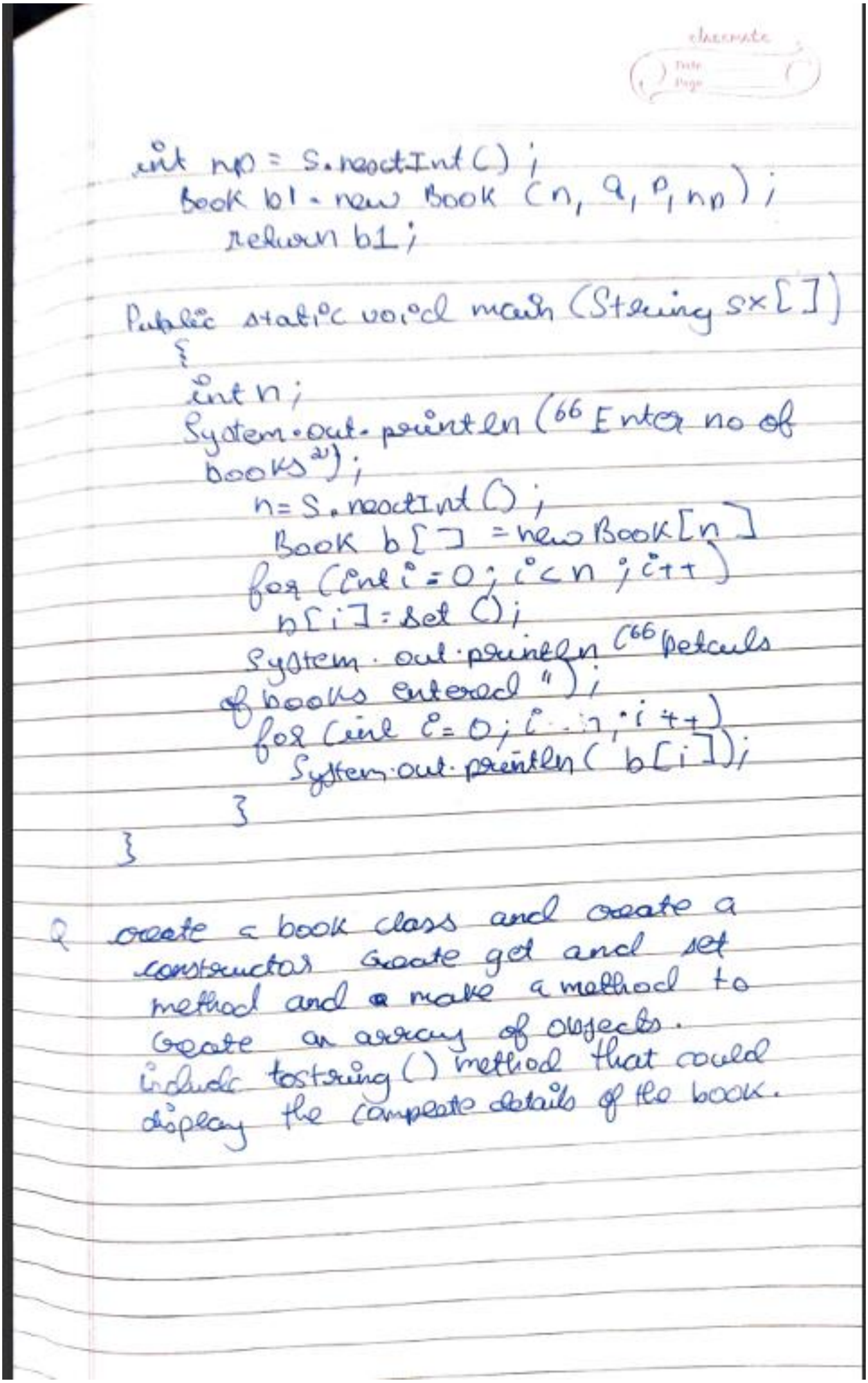
```
import java.util.Scanner;
 class Book {
  String name, author;
  int price , num_pages;
  Book (String n, String a, int p, int np){
      this. name = n
      this. author = a ;
      this. price= p; this.num_pages= np;
    }
    public String toString() {
        return "Book name:" + name+ "\n
    author:" + author+ "\n Price:"
    +Price + "\n Number of pages: "+num_
    pages;
    }
 }
public class B {
    static Scanner s= new Scanner(Syste
     static Bookset()
    {
      s.nextLine();
       System.out.println("Enter book
        name");
       String n= s.nextLine();
       System.out.println("Enter author
                          name");
           String a=s.nextLine();
          System.out.println("enter pric
            of book");
       int p = s.nextInt();
    System.out.println("enter no. of
      pages");
```



```
int np = S.nextInt();
   Book b1 = new Book (n, a, p, np);
      return b1;

Public static void main (String sx[])
  {
   int n;
   System.out.println("Enter no of
    books");
      n = S.nextInt();
       Book b[] = new Book[n]
      for (int i=0; i<n; i++)
       b[i] = set();
      System.out.println("Details
    of books entered");
      for (int i=0; i<n; i++)
         System.out.println(b[i]);
   }
}
```

Q create a book class and create a constructor create get and set method and ~~a~~ make a method to create an array of objects. include tostring() method that could display the complete details of the book.

```
Output: Enter no of books
        2
 Entel book name
 ark

Enter author name
 noah

Enter price of book
 456

Enter no. of pages
 453


Enter book name
 cakq

Enter author name
 Hilla

Enter price of book
  123

 enter no. of pages
  245
```

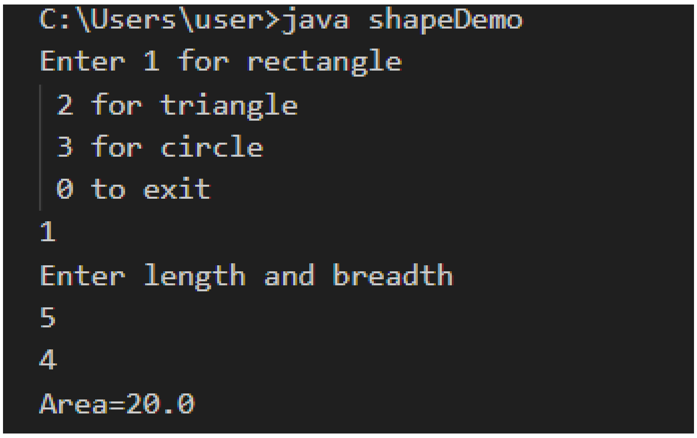
PROGRAM 4

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

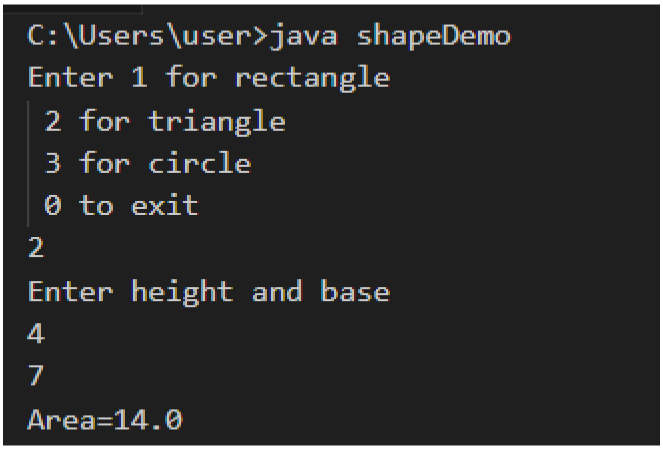
```
import java.util.*;
abstract class shape
{
double a,b;
abstract void printArea(double a, double b);
}
class rectangle extends shape
{
void printArea(double a,double b)
{
double r;
r=a*b;
System.out.println("Area="+r);
}
}
class triangle extends shape
{
void printArea(double a, double b)
{
double r;
r=(a*b)/2;
System.out.println("Area="+r);
}
}
class circle extends shape
{
void printArea(double a, double b)
{
double r;
r=(a*a)*(3.14);
System.out.println("Area="+r);
}
}
class shapeDemo
{
public static void main(String args[])
{
Scanner sc=new Scanner(System.in);
int ch=1,d=1;
rectangle rec=new rectangle();
triangle tri=new triangle();
circle c=new circle();
while(d==1)
{
System.out.println("Enter 1 for rectangle\n 2 for triangle \n 3 for circle\n 0 to exit");
ch=sc.nextInt();
switch(ch)
{
case 1:
System.out.println("Enter length and breadth");
double l=sc.nextDouble();
double b=sc.nextDouble();
rec.printArea(l,b);
break;
case 2:
System.out.println("Enter height and altitude");
double h=sc.nextDouble();
double a=sc.nextDouble();
tri.printArea(h,a);
break;
case 3:
System.out.println("Enter radius");
double r=sc.nextDouble();
c.printArea(r,3.14);
break;
case 0:
System.exit(1);
default:
System.out.println("wrong Input");
}
}
}
}
```

PROGRAM 4

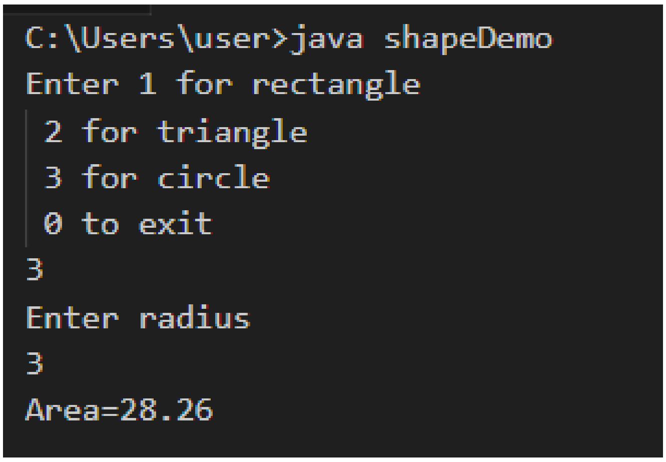
OUTPUT :



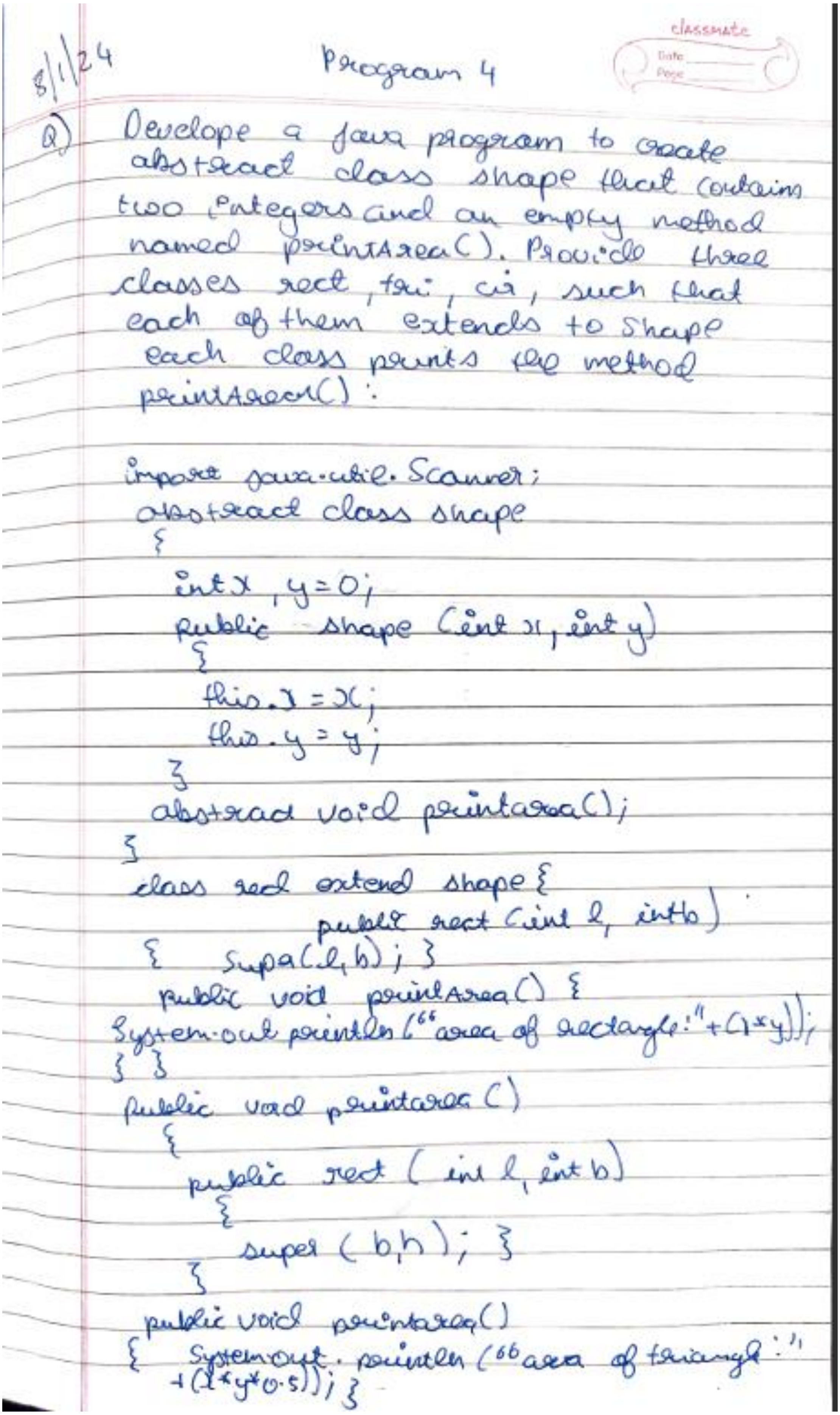
```
C:\Users\user>java shapeDemo
Enter 1 for rectangle
 2 for triangle
 3 for circle
 0 to exit
1
Enter length and breadth
5
4
Area=20.0
```



```
C:\Users\user>java shapeDemo
Enter 1 for rectangle
 2 for triangle
 3 for circle
 0 to exit
2
Enter height and base
4
7
Area=14.0
```



```
C:\Users\user>java shapeDemo
Enter 1 for rectangle
 2 for triangle
 3 for circle
 0 to exit
3
Enter radius
3
Area=28.26
```



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Program 4

Q) Develope a java program to create abstract class shape that contains two integers and an empty method named printArea(). Provide three classes rect, tri, cir, such that each of them extends to Shape each class prints the method printArea():

```
import java.util.Scanner;
abstract class shape
 {
  int x , y=0;
  public shape (int x, int y)
   {
    this.x = x;
    this.y = y;
   }
  abstract void printarea();
 }
class rect extend shape {
            public rect (int l, int b)
 {   supa(l,b); }
  public void printArea() {
System.out.println("area of rectangle:"+(x*y));
} }
public void printarea ()
  {
   public rect ( int l, int b)
     {
      super ( b,h); }
   }
 public void printarea()
{  Systemout.println("area of triangle:"
 +(x*y*0.5)); }
```

```
class cir extends shape {
    public cir ( int r)
    {
      super(r,r);
    }
  public void printarea(){
     System.out.println (" area of
     Circle:" + (3.14*x*x));
  }
class shapes
  {
   public static void main
   ( String [] args){
    rect r1 = new rect ( 20,3);
    tri t1 = new tri (5,10);
    cir c1 = new cir (4);
    r1.printarea();
    t1.printarea();
    c1.Print area();
  }
```

output

```
area of rectangle: 60
area of triangle : 25.0
area of circle : 50.24
```

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PROGRAM 5

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

a) Accept deposit from customer and update the balance.

b) Display the balance.

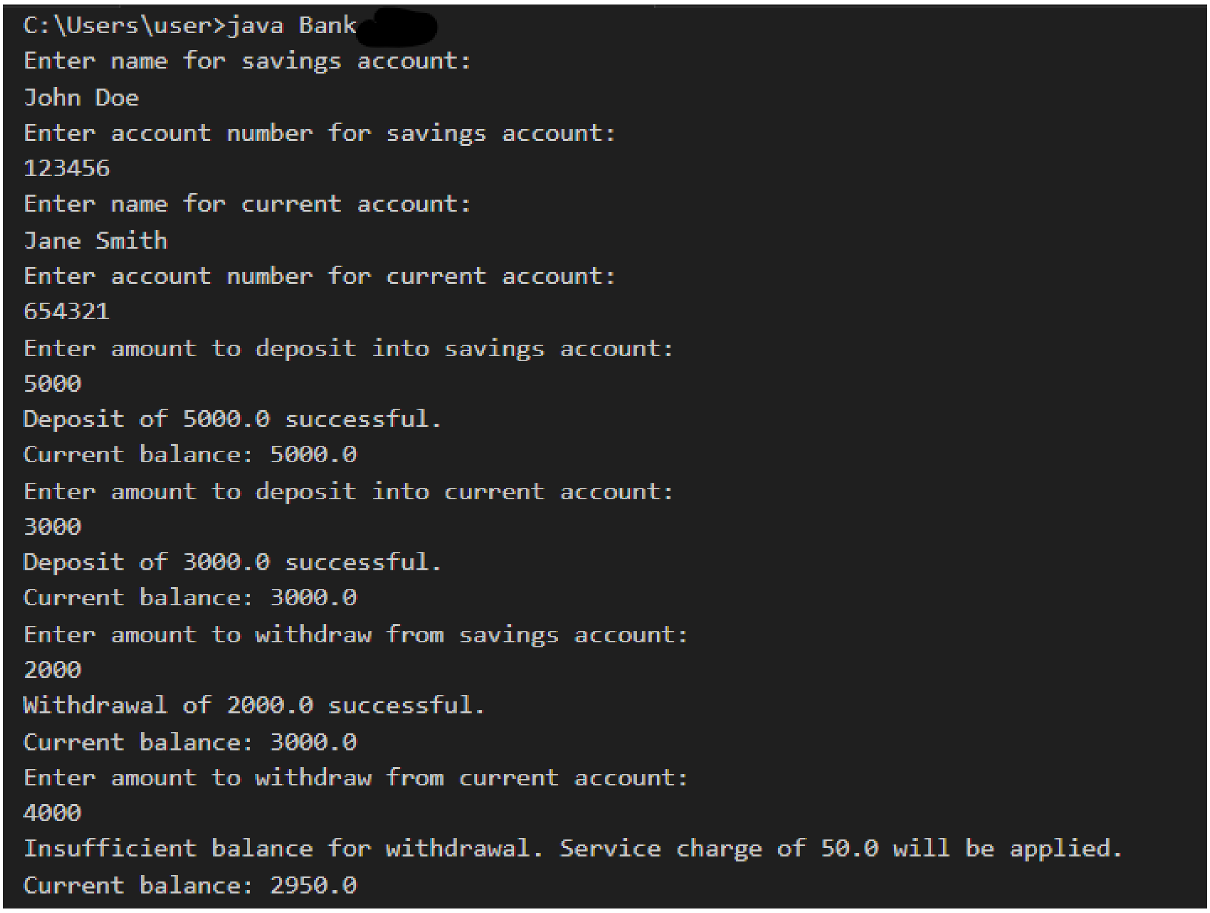
c) Compute and deposit interest

d) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.

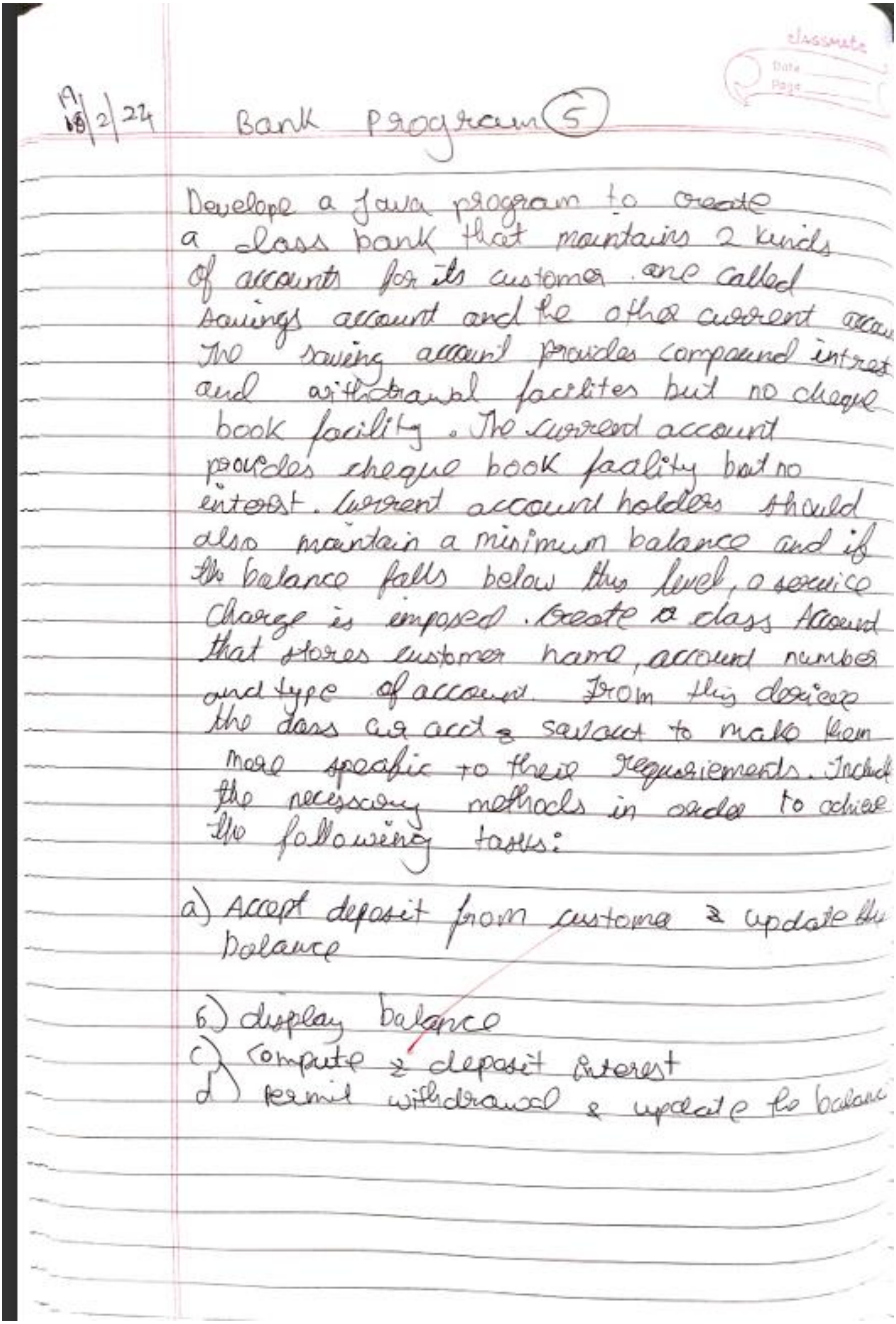
```
import java.util.Scanner;

class Account {
    String customerName;
    int accountNumber;
    String accountType;
    double balance;

    public Account(String customerName, int accountNumber, String accountType) {
        this.customerName = customerName;
        this.accountNumber = accountNumber;
        this.accountType = accountType;
        this.balance = 0;
    }

    public void deposit(double amount) {
        balance += amount;
        System.out.println("Deposit of " + amount + " successful.");
    }

    public void displayBalance() {
        System.out.println("Current balance: " + balance);
    }
}

class SavingsAccount extends Account {
    double interestRate;
    public SavingsAccount(String customerName, int accountNumber) {
        super(customerName, accountNumber, "Savings");
        this.interestRate = 0.05; // 5% interest rate
    }

    public void depositInterest() {
        double interest = balance * interestRate;
        deposit(interest); `
        System.out.println("Interest deposited: " + interest);
    }

    public void withdraw(double amount) {
        if (balance >= amount) {
            balance -= amount;
            System.out.println("Withdrawal of " + amount + " successful.");
        } else {
            System.out.println("Insufficient balance for withdrawal.");
        }
    }
}

class CurrentAccount extends Account {
    double minimumBalance;
    double serviceCharge;

    public CurrentAccount(String customerName, int accountNumber) {
        super(customerName, accountNumber, "Current");
        this.minimumBalance = 1000; // Minimum balance required
        this.serviceCharge = 50; // Service charge if balance falls below minimum
    }

    public void withdraw(double amount) {
        if (balance - amount >= minimumBalance) {
            balance -= amount;
            System.out.println("Withdrawal of " + amount + " successful.");
        } else {
            System.out.println("Insufficient balance for withdrawal. Service charge of " +
serviceCharge + " will be applied.");
            balance -= serviceCharge;
        }
    }
}

public class Bank {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter name for savings account: ");
        String savingsName = scanner.nextLine();
        System.out.println("Enter account number for savings account: ");
        int savingsNumber = scanner.nextInt();
        SavingsAccount savingsAccount = new SavingsAccount(savingsName,
savingsNumber);

        System.out.println("Enter name for current account: ");
        String currentName = scanner.nextLine(); // Consume newline
        currentName = scanner.nextLine();
        System.out.println("Enter account number for current account: ");
        int currentNumber = scanner.nextInt();
        CurrentAccount currentAccount = new CurrentAccount(currentName, currentNumber);

        System.out.println("Enter amount to deposit into savings account: ");
        double savingsDeposit = scanner.nextDouble();
        savingsAccount.deposit(savingsDeposit);
        savingsAccount.displayBalance();

        System.out.println("Enter amount to deposit into current account: ");
        double currentDeposit = scanner.nextDouble();
        currentAccount.deposit(currentDeposit);
        currentAccount.displayBalance();

        System.out.println("Enter amount to withdraw from savings account: ");
        double savingsWithdraw = scanner.nextDouble();
        savingsAccount.withdraw(savingsWithdraw);
        savingsAccount.displayBalance();

        System.out.println("Enter amount to withdraw from current account: ");
        double currentWithdraw = scanner.nextDouble();
        currentAccount.withdraw(currentWithdraw);
        currentAccount.displayBalance();
    }
}
```

PROGRAM 5

OUTPUT :



```
C:\Users\user>java Bank[redacted]
Enter name for savings account:
John Doe
Enter account number for savings account:
123456
Enter name for current account:
Jane Smith
Enter account number for current account:
654321
Enter amount to deposit into savings account:
5000
Deposit of 5000.0 successful.
Current balance: 5000.0
Enter amount to deposit into current account:
3000
Deposit of 3000.0 successful.
Current balance: 3000.0
Enter amount to withdraw from savings account:
2000
Withdrawal of 2000.0 successful.
Current balance: 3000.0
Enter amount to withdraw from current account:
4000
Insufficient balance for withdrawal. Service charge of 50.0 will be applied.
Current balance: 2950.0
```



19/18/2/24 Bank program 5

Develope a Jawa program to create a class bank that maintains 2 kinds of accounts for its customer. one called savings account and the other current accou The saving account provides compound intrest and withdrawal facilites but no cheque book facility. The current account provides cheque book faality but no interst. 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 class cur acct & savacct to make them more specific to their requirements. Includ the necessary methods in order to achive the following tasks:

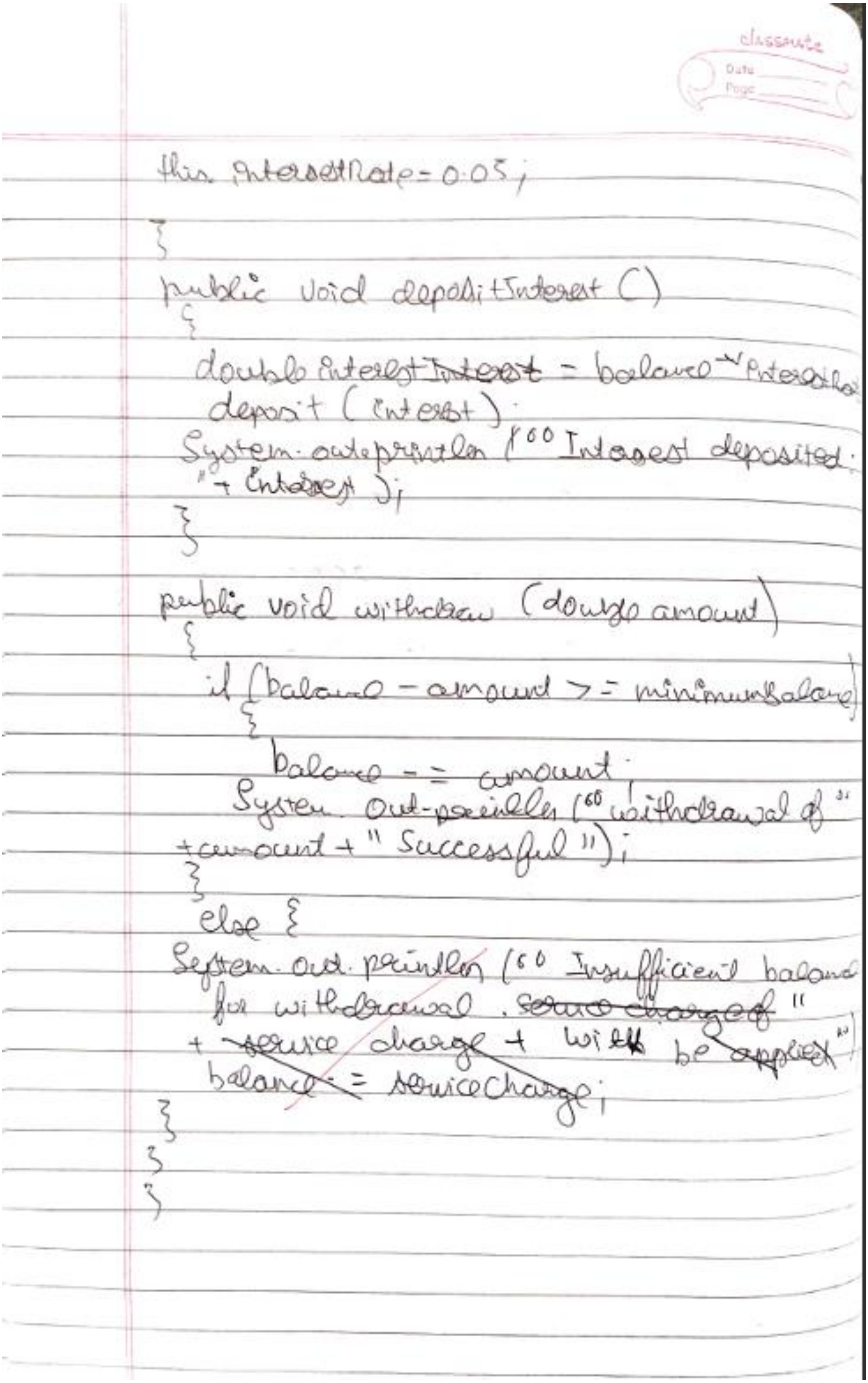
a) Accept deposit from customer & update the balance

b) display balance

c) compute & deposit interest

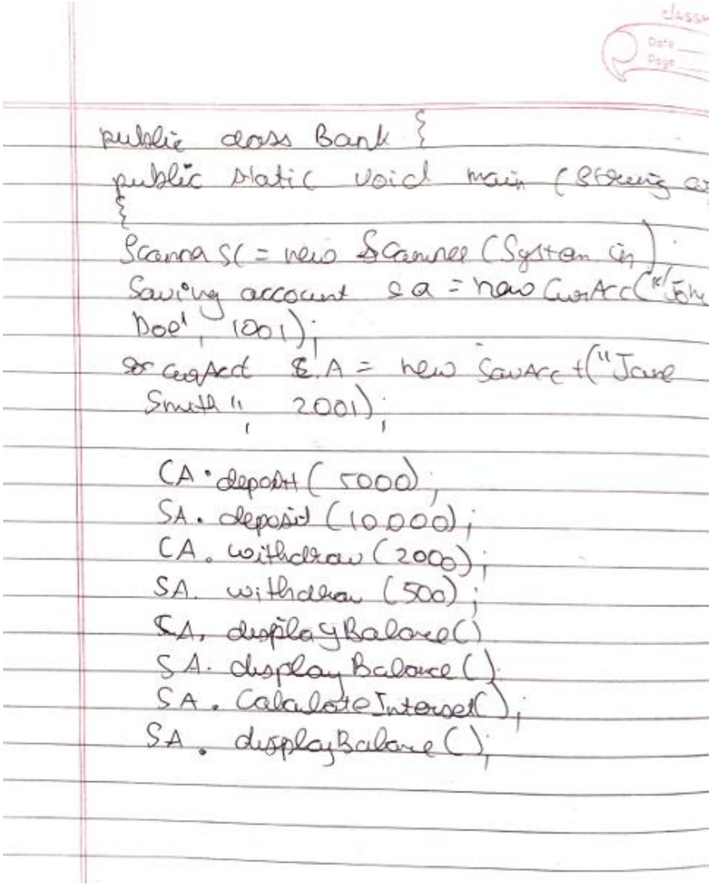
d) permit withdrawal & update the balanc

```
import java.util.Scanner;
class Account {
 String customerName;
 int accountnumber;
 String accountType;
 double balance;

public Account (String customerName
int accountNumber, String accountType)
{
this. customerName = customerName
this. accountNumber = accountNumber
this. accountType= accountType
this. balance = 0;
}

public void deposit(double amount)
{
    balance += amount;
System.out.println("Deposit of "+ account +
" Successful.");
}
public void displayBalance()
 {
 System.out.println("current balance: "+
   balance);
 }
}

class SavingAccount extends Account {
   double interestRate;
  public SavingAccount (String customerName,
int accountNumber)
{ Super (customerName, accountNumber, "Saving");
```

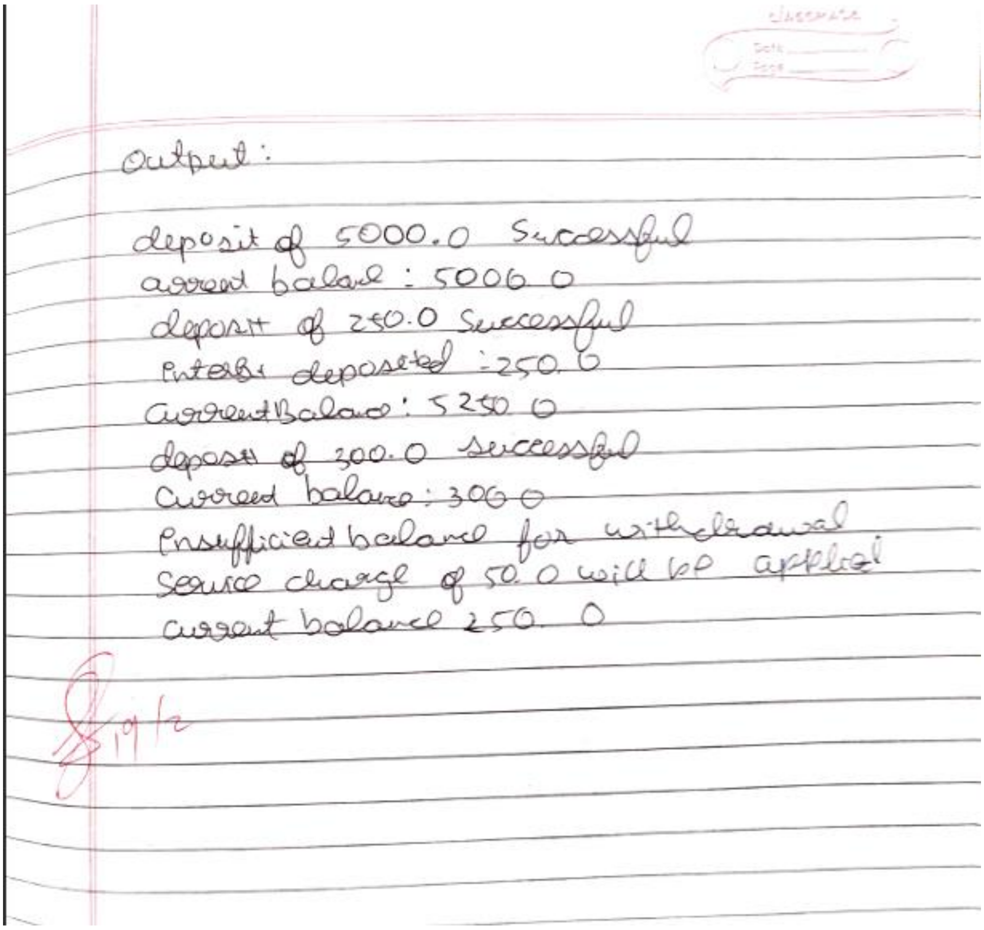


```
this. interestRate = 0.05;
}
public void depositInterest ()
 {
  double interest ~~Interest~~ = balance * interestRate
  deposit (interest);
 System.out.println ("Interest deposited: "+ interest );
 }
public void withdraw (double amount)
 {
   if (balance - amount >= minimumBalance)
    {
       balance -= amount;
     System.out.println ("withdrawal of "
 + amount + " Successful");
  }
  else {
System.out.println ("Insufficient balance
  for withdrawal. ~~service charge of~~ "
 + ~~service~~ charge + will be ~~applied~~")
 balance -= serviceCharge;
}
}
}
```

```
class CurrentAccount extends Account {
 double minimumBalance;
 double serviceCharge;

public CurrentAccount(String customerName,
int accountNumber)
{
 super (customerName, accountNumber, "current");
 this.minimumBalance =1000;
 this.serviceCharge = 50;

public void withdraw (double amount)
 {
 if (balance-amount >= minimum balance)
   {
    balance - = amount;
    System.out.println(" withdrawal
of" + amount + " successful.");
 else {
   System.out.println("Insufficient balance
   for withdrawal. Service charge of
" + serviceCharge + " will be applied.");
  balance -= serviceCharge;
 }
}
}
```



```
public class Bank {
public static void main (String ar
{
Scanner sc = new Scanner (System.in)
Saving account sa = new CurAcc("John
Doe", 1001);
sr CurAcct S.A = new SavAcct("Jane
Smith", 2001);

   CA. deposit ( 5000);
   SA. deposit (10,000);
   CA. withdraw (2000);
   SA. withdraw (500);
   SA, displayBalance()
   SA. display Balance ()
   SA. CalculateInterest();
  SA. displayBalance();
```



Output:

```
deposit of 5000.0 Successful
current balance : 5000 0
deposit of 250.0 Successful
interest deposited :250. 0
CurrentBalance: 5250 0
deposit of 300.0 successful
Current balance: 300 0
insufficient balance for withdrawal
service charge of 50. 0 will be applied
current balance 250. 0
```

19/2

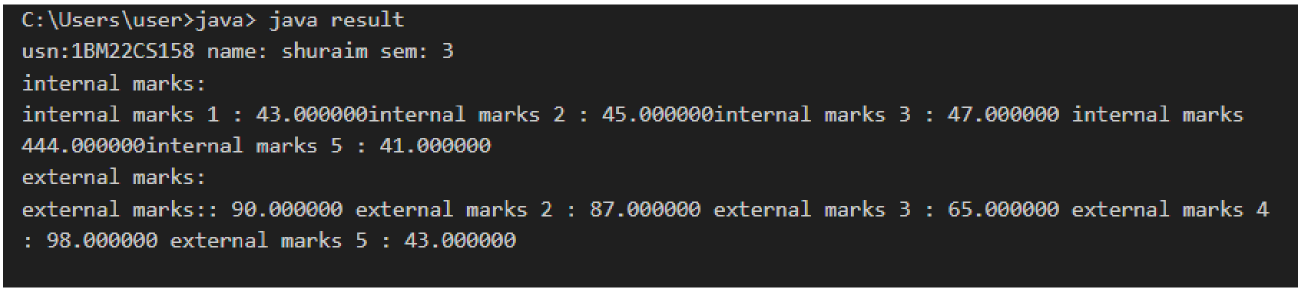
PROGRAM 6

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.

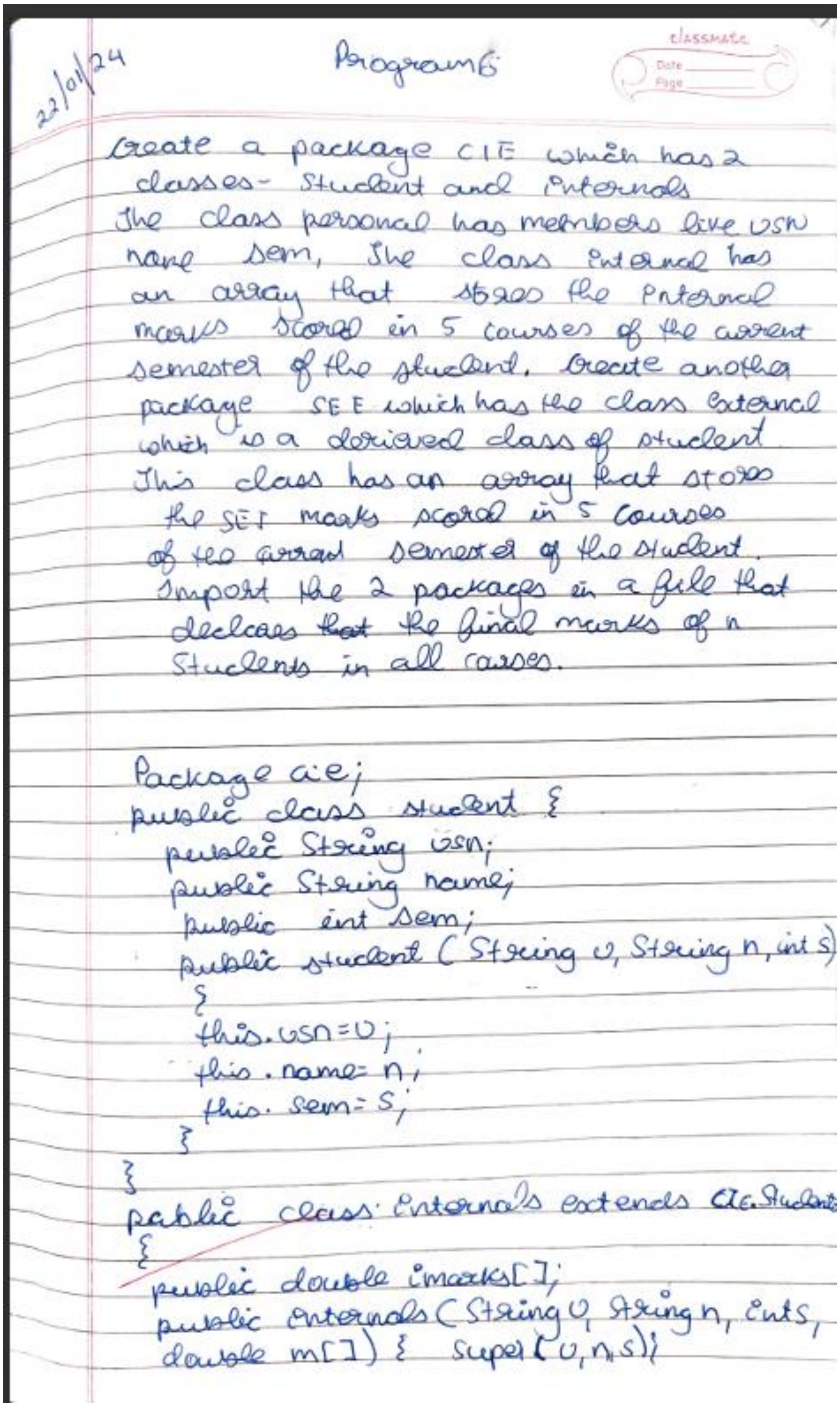
```
package CIE;


public class internals extends CIE.student{

        public double imarks[] ;

        public internals(String u, String n, int s ,double m[]) {

                super(u,n,s);

                this.imarks = m;

        }

}



package SEE;

import CIE.student;

public class externals extends CIE.student{

        public double smarks[];

        public externals (String u, String n, int s ,double m[]) {

                super(u,n,s);

                this.smarks = m;

        }

}
```

```
package result;

import CIE.student ;

import CIE.internals;

import SEE.externals;

public class test {

        public static void main(String[] args) {

                double internal[] ={43, 45, 47, 44, 41};

                double external[] = {90, 87, 65, 98, 43};

                student s1 = new student("1BM22CS166", "Mukund", 3);

                internals i1 = new internals("1BM22CS166", "Mukund", 3 ,internal);

                externals e1 = new externals("1BM22CS166", "Mukund", 3 , external);

                System.out.println("usn:" + s1.usn + " name: " + s1.name + " sem: "
+s1.sem);

                System.out.println("internal marks: ");

                for(int i = 0; i<5 ; i++) {

                        System.out.printf("internal marks %d : %f", i+1, i1.imarks[i]);

                }

                System.out.println();

                System.out.println("external marks: ");

                for(int i = 0; i<5 ; i++) {

                        System.out.printf("external marks %d : %f", i+1, e1.smarks[i]);

                }

        }

}
```

PROGRAM 6   OUTPUT :



```
C:\Users\user>java> java result
usn:1BM22CS158 name: shuraim sem: 3
internal marks:
internal marks 1 : 43.000000internal marks 2 : 45.000000internal marks 3 : 47.000000 internal marks
444.000000internal marks 5 : 41.000000
external marks:
external marks:: 90.000000 external marks 2 : 87.000000 external marks 3 : 65.000000 external marks 4
: 98.000000 external marks 5 : 43.000000
```



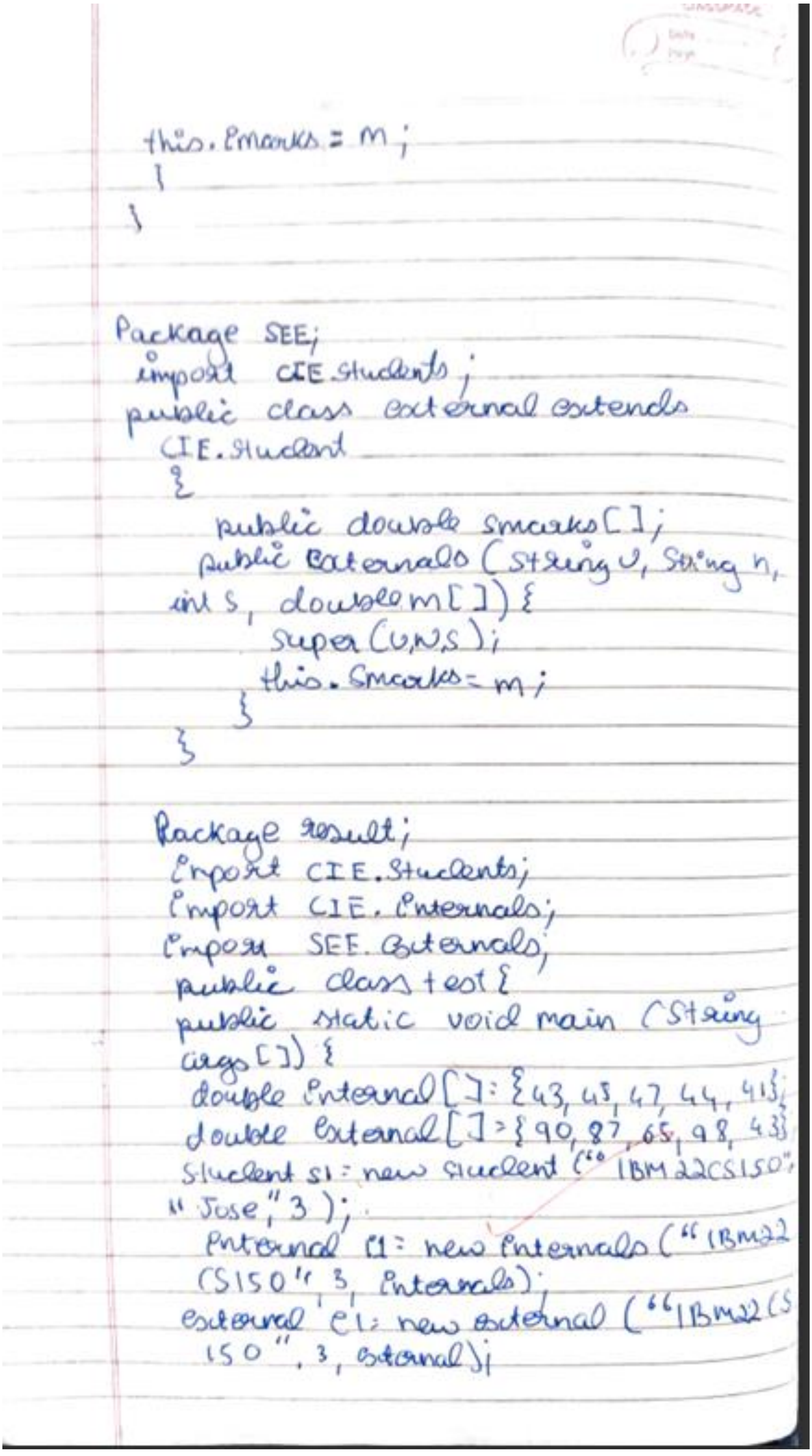
22/01/24

classmate Date Page

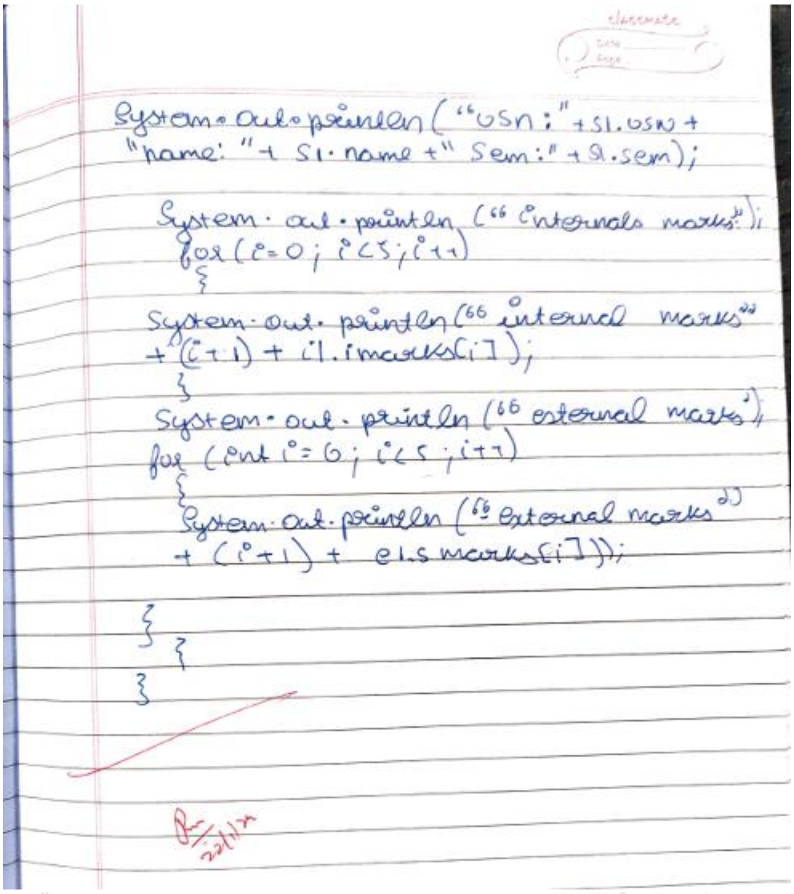
Program 6

Create a package CIE which has 2 classes- Student and Internals
The class personal has members like USN name sem, The class internal has an array that stores the internal marks scored in 5 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 5 courses of the current semester of the student. Import the 2 packages in a file that declares ~~that~~ the final marks of n Students in all cases.

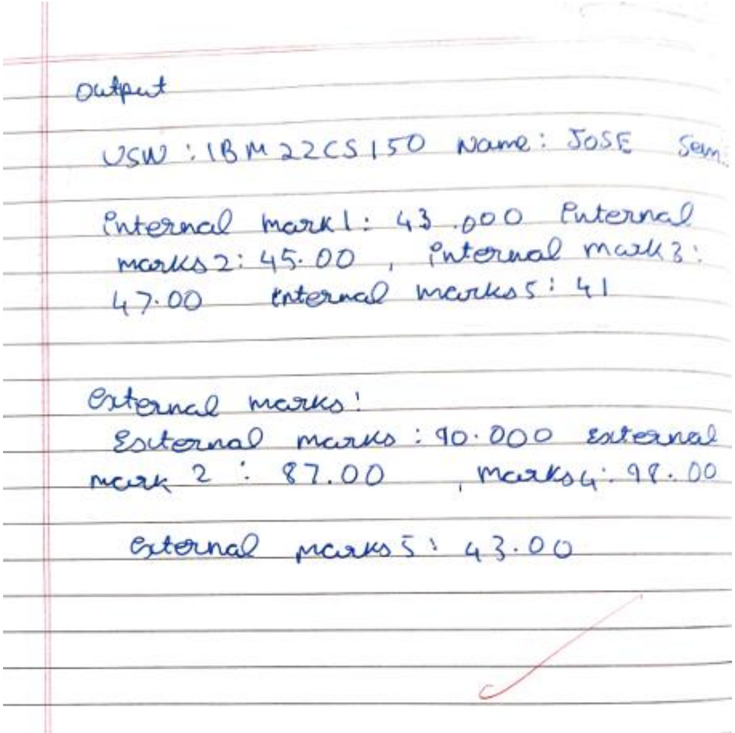
```
Package cie;
public class student {
  public String usn;
  public String name;
   public int sem;
   public student (String u, String n, int s)
    {
    this.usn=u;
    this.name=n;
     this.sem=s;
   }
}
public class internals extends cie.Students
 {
  public double imarks[];
  public internals (String u, String n, ints,
  double m[]) {  super(u,n,s);
```



```
this.imarks = m;
 }
}

Package SEE;
 import CIE.students;
public class external extends
  CIE.Student
  {
     public double smarks[];
    public Externals (String U, String n,
  int s, double m[]) {
         super(U,N,S);
        this.Smarks= m;
       }
  }

 Package result;
 Import CIE.Students;
 Import CIE.internals;
 Impora SEE.externals;
 public class test{
 public static void main (String
 args[]) {
  double internal[]= {43,45,47,44,41};
  double External[]={90,87,65,98,43};
 Student s1= new Student ("IBM22CS150",
 "Jose", 3);
   internal i1= new internals ("IBM22
  CS150", 3, internals);
 external e1= new external ("IBM22CS
  150", 3, external);
```



```
System.out.println("usn:"+s1.usn+
"name: "+ s1.name +" Sem:"+s1.sem);

  System.out.println ("internals marks:");
  for(i=0; i<5;i++)
   {
 System.out.println("internal marks"
 +(i+1) + i1.imarks[i]);
   }
 System.out.println ("external marks");
 for (int i=0; i<5 ;i++)
   {
   System.out.println ("external marks"
   + (i+1) + e1.smarks[i]));

 }
   }
 }
```



output

```
USN : 1BM22CS150 Name: JOSE  Sem:

internal mark1: 43.000 internal
 marks2: 45.00 , internal mark3:
47.00   internal marks5: 41


External marks!
 External marks : 90.000 external
mark 2 : 87.00    , marks4: 98.00

 external marks5: 43.00
```

PROGRAM 7

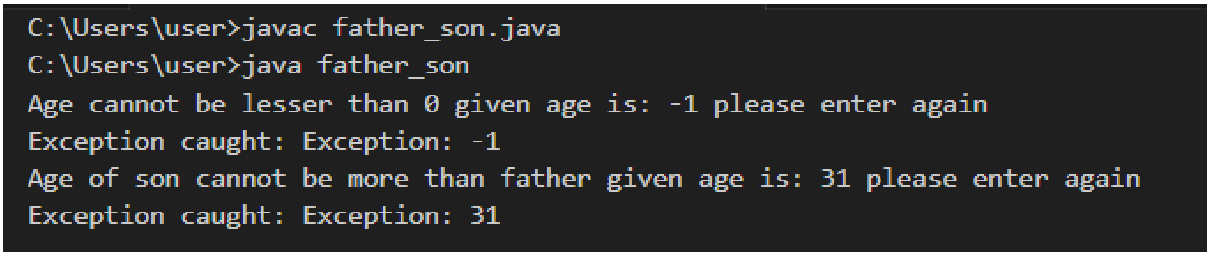
Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called “Father” and derived class called “Son” which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge( ) when the input age=father’s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

```
class MyException extends Exception {
   int detail;
         public MyException(int age, String exe) {
                  this.detail=age;
                  System.out.println(exe + " given age is: " + age + " please enter again");
         }
         public String getMessage() {
      return "Exception: " + detail;
   }
}
class Father{
         int age;
         public Father(int age) throws MyException {
                  if (age < 0) throw new MyException(age , "Age cannot be lesser than 0");
                  this.age = age ;
         }
}
class Son extends Father{
         int age;
         public Son(int fatherAge, int sonAge) throws MyException{
                  super(fatherAge);
                  this.age = sonAge;
                  if (this.age > super.age) throw new MyException(age , "Age of son cannot be more than father");
```

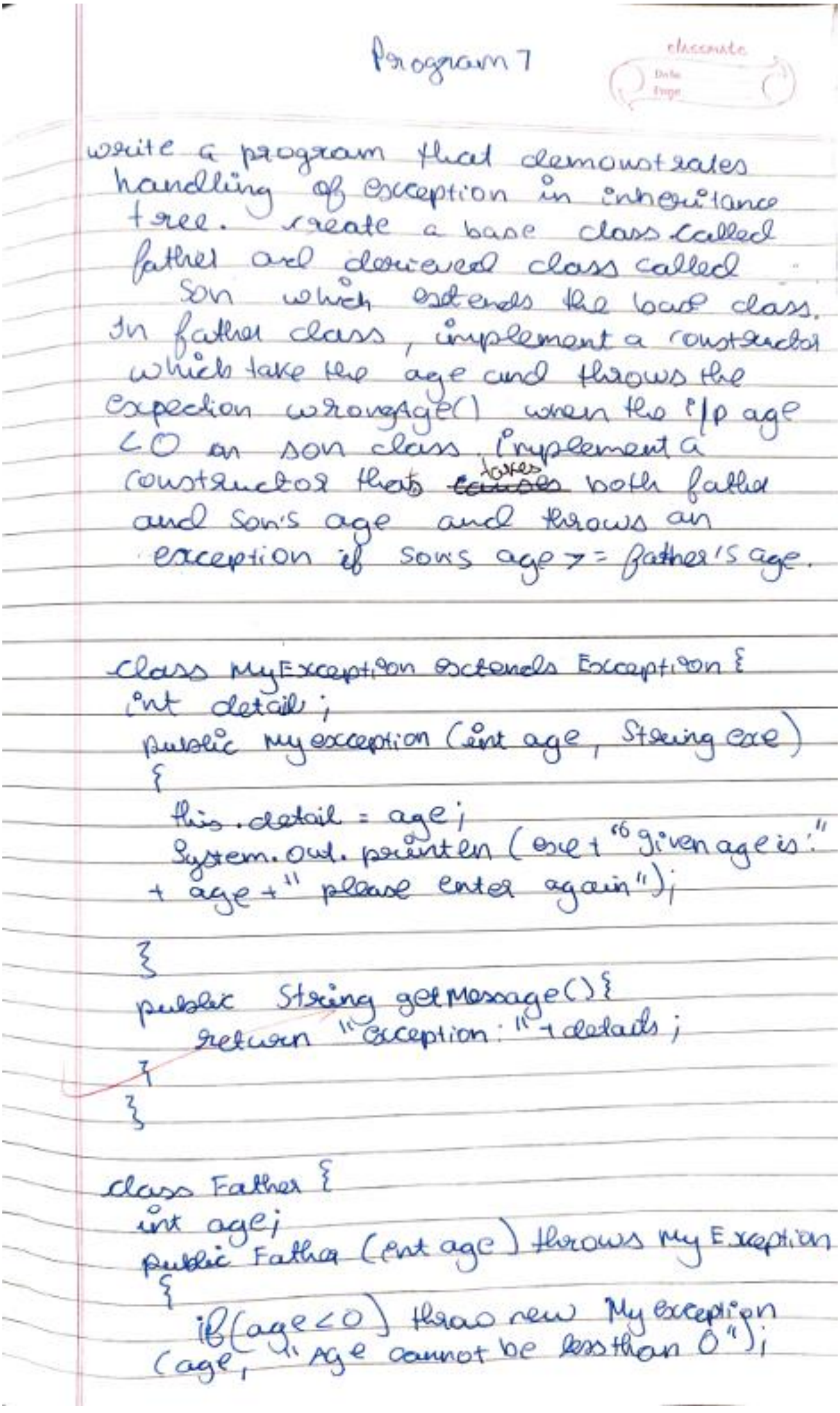
```
    }
}
public class father_son {
    public static void main(String[] args) {
        try {
            Father f1 = new Father(-1);
            Son s1 = new Son(30 , 31);
        }
        catch (MyException e) {
             System.out.println("Exception caught: " + e.getMessage());
        }
    }
}
```

PROGRAM 7

OUTPUT :



```
C:\Users\user>javac father_son.java
C:\Users\user>java father_son
Age cannot be lesser than 0 given age is: -1 please enter again
Exception caught: Exception: -1
Age of son cannot be more than father given age is: 31 please enter again
Exception caught: Exception: 31
```

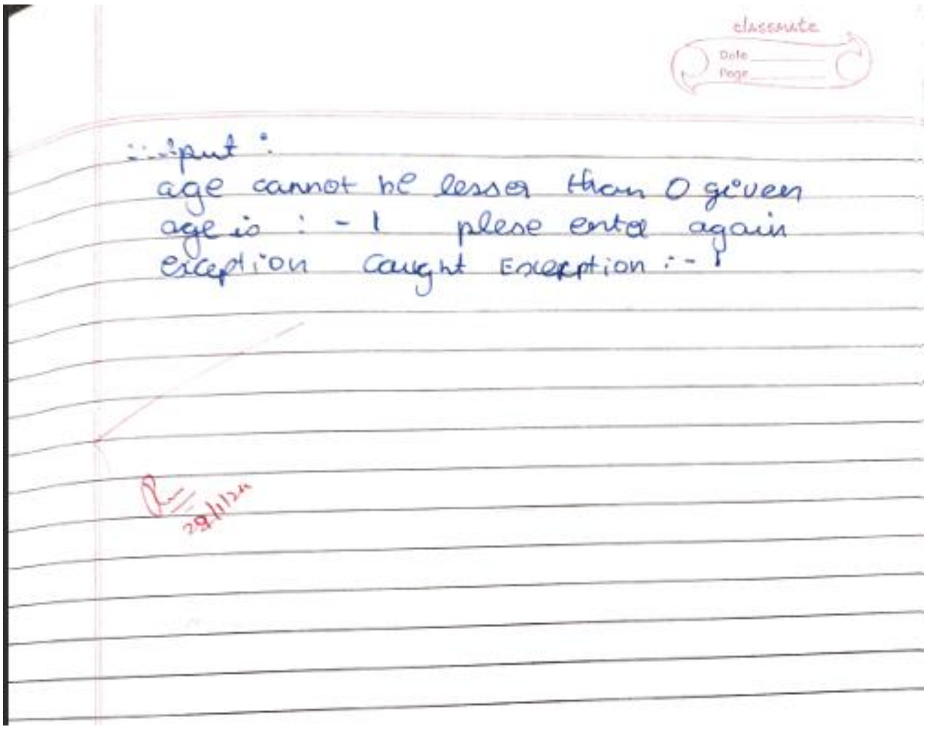


Program 7

write a program that demonstrates handling of exception 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 take the age and throws the expection wrongAge() when the i/p age <0 in son class, implement a constructor that ~~causes~~ takes both father and son's age and throws an exception if sons age >= father's age.

```
class MyException extends Exception {
int detail;
 public myexception (int age, String exe)
 {
  this.detail = age;
  System.out.printen (exe + "given age is:"
 + age + " please enter again");

 }
 public String getMessage(){
    return "exception: " + details;
 }
}

class Father {
 int age;
 public Father (int age) throws myException
 {
    if(age<0) throw new Myexception
 (age, "Age cannot be less than 0");
```

```
        this . age = age;

   }
     }

   class Son extends Father {
       int age ;
       public Son (int fatherAge, int SonAge)
       throws myException( age , "Age of
       Son cannot be more than father");
   {
  }

  public class Father_son {
     public static void main (String []
     args)
     {
  try {
       Father F1= new Father (-1);
        Son S1= new Son ( 30,31);
     }
     catch (myException e)
     {
         System.out.println ("exception
  caught " + e.getMessage());
     }
  }
 }
```



Output :

```
age cannot be lesser than 0 given
age is : -1  plese enter again
exception  caught Exception :-1
```

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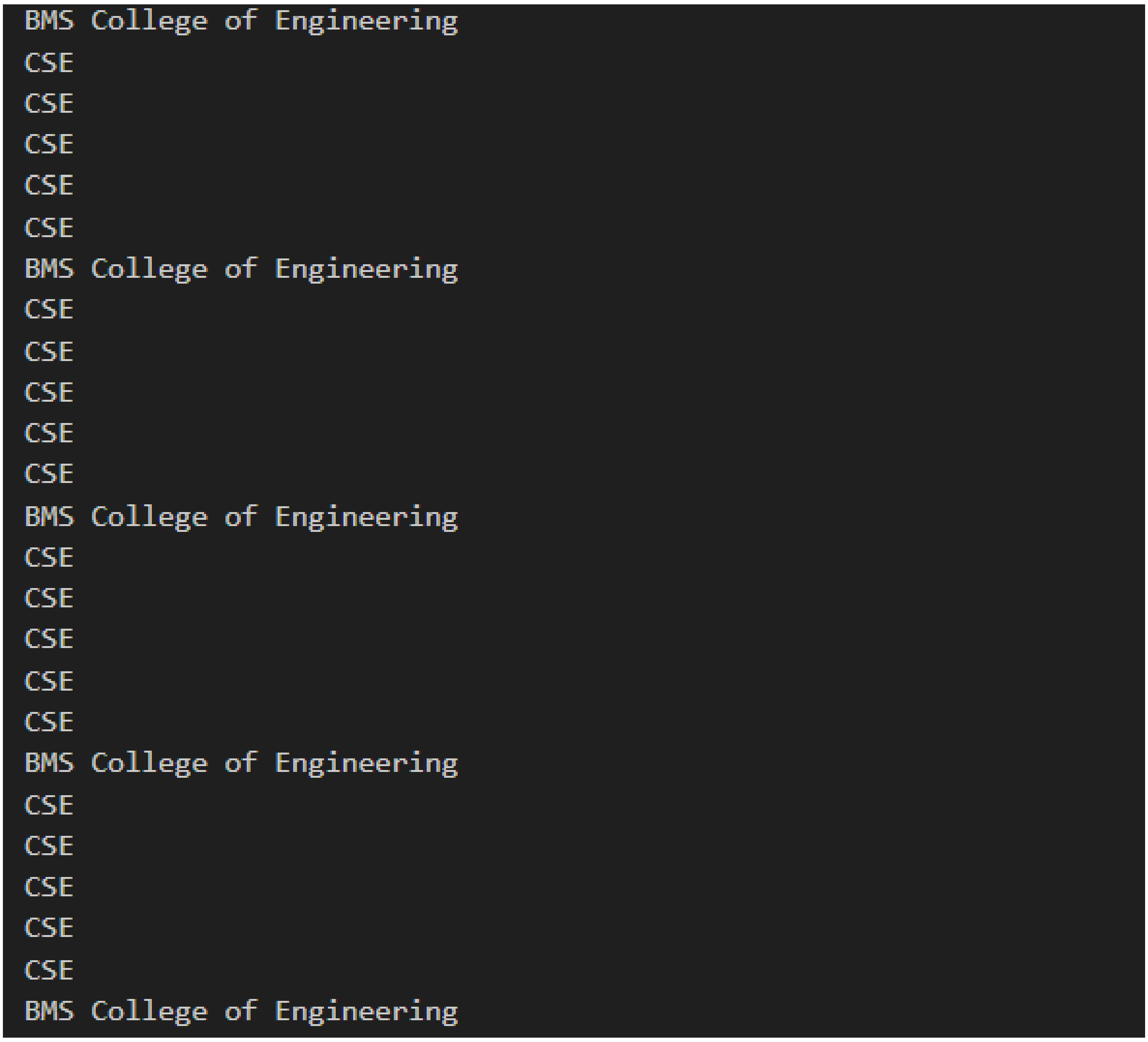
PROGRAM 8

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

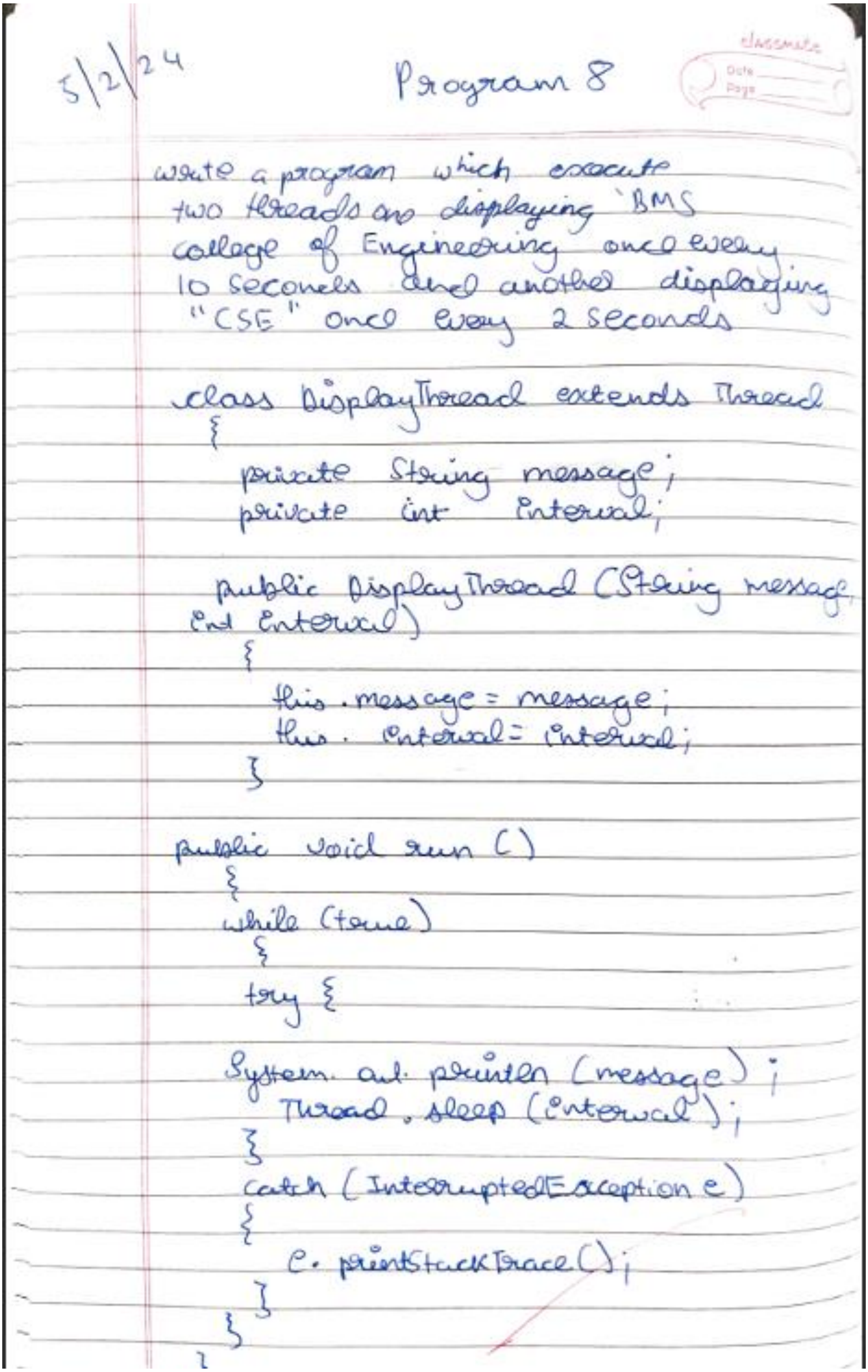
```
class DisplayThread extends Thread {
    private String message;
    private int interval;

    public DisplayThread(String message, int interval) {
        this.message = message;
        this.interval = interval;
    }

    public void run() {
        while (true) {
            try {
                System.out.println(message);
                Thread.sleep(interval);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
        }
    }
}

public class DisplayMessages {
    public static void main(String[] args) {
        Thread bmsThread = new DisplayThread("BMS College of Engineering", 10000); // 10
seconds
        Thread cseThread = new DisplayThread("CSE", 2000); // 2 seconds

        bmsThread.start();
        cseThread.start();
    }
}
```

PROGRAM 8

OUTPUT :



```
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
```



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Program 8

write a program which execute two threads one displaying `BMS college of Engineering" once every 10 seconds and another displaying "CSE" once every 2 seconds

```
class DisplayThread extends Thread
 {
   private String message;
   private int interval;

  public DisplayThread (String message,
 int interval)
   {
     this.message = message;
     this.interval = interval;
   }

public void run ()
  {
  while (true)
   {
   try {
  System.out.println (message);
    Thread.sleep (interval);
   }
   catch (InterruptedException e)
   {
     e.printStackTrace();
    }
  }
}
class DisplayMessages
{
public static void main (String [] args)
{
Thread bmsThread = new DisplayThread
("BMS College of Engineering," 10000);
Thread cseThread= new DisplayThread
(CSE', 2000"));

bmsThread.start();
CSEThread. Start();

}

}
```

Output

```
BMS College of Engineering
 CSE
CSE
CSE
CSE
CSE
```

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PROGRAM 9

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.

```
import java.awt.*;

import java.awt.event.*;


public class DivisionMain1 extends Frame implements ActionListener {

        TextField num1,num2;

        Button dResult;

        Label outResult;        String out="";          double resultNum;

        int flag=0;


        public DivisionMain1()

        {

                setLayout(new FlowLayout());


                dResult = new Button("RESULT");

                Label number1 = new Label("Number 1:",Label.RIGHT);

                Label number2 = new Label("Number 2:",Label.RIGHT);

                num1=new TextField(5);                  num2=new TextField(5);

                outResult = new Label("Result:",Label.RIGHT);


                add(number1);                   add(num1);              add(number2);
        add(num2);              add(dResult);

                add(outResult);


                num1.addActionListener(this);
```

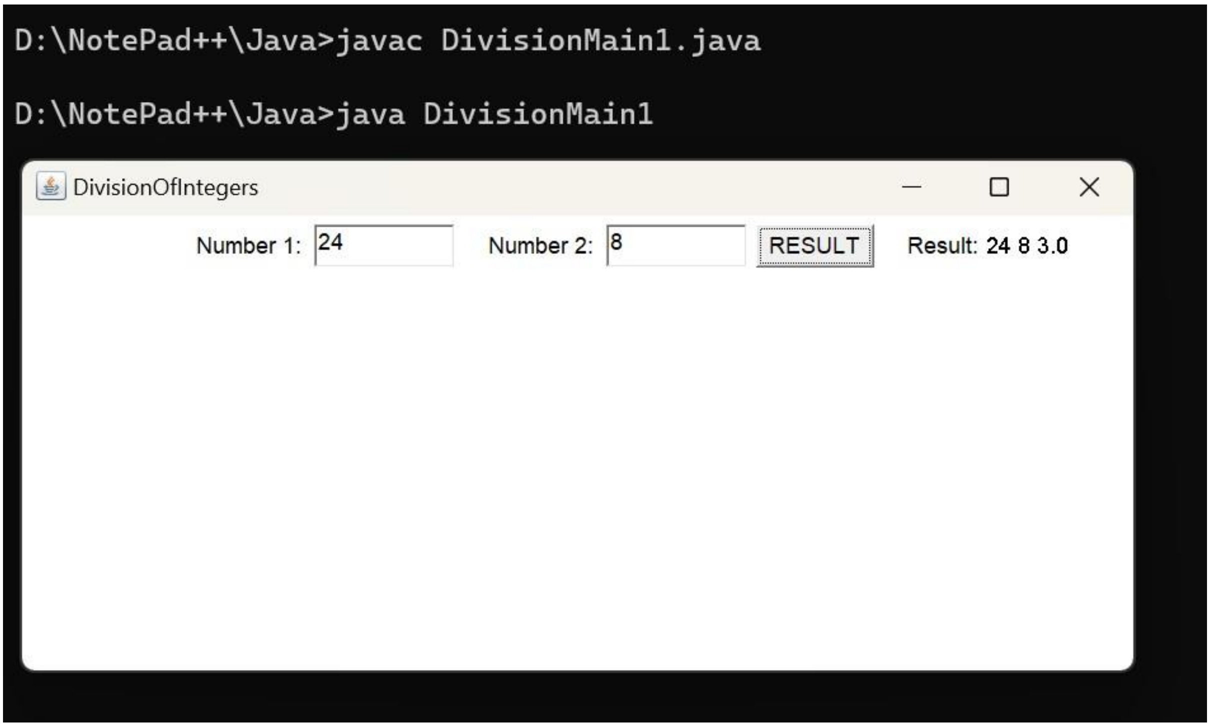
```
     num2.addActionListener(this);
     dResult.addActionListener(this);
    addWindowListener(new WindowAdapter()
    {
        public void windowClosing(WindowEvent we)
        {
            System.exit(0);
        }
    } );
}

public void actionPerformed(ActionEvent ae)
{
    int n1,n2;
    try
    {
        if (ae.getSource() == dResult)
        {
            n1=Integer.parseInt(num1.getText());
            n2=Integer.parseInt(num2.getText());

            /*if(n2==0)
                throw new ArithmeticException();*/
            out=n1+" "+n2+" ";
            resultNum=n1/n2;
            out+=String.valueOf(resultNum);
            repaint();

        }
    }
```

```
            catch(NumberFormatException e1)
            {
                    flag=1;
                    out="Number Format Exception!  "+e1;
                    repaint();
            }
            catch(ArithmeticException e2)
            {
                    flag=1;
                    out="Divide by 0 Exception!  "+e2;
                    repaint();
            }

    }

    public void paint(Graphics g)
    {
            if(flag==0)
g.drawString(out,outResult.getX()+outResult.getWidth(),outResult.getY()+outResult.
getHeight()-8);
            else
            g.drawString(out,100,200);
            flag=0;
    }

    public static void main(String[] args)
    {
            DivisionMain1 dm=new DivisionMain1();
          dm.setSize(new Dimension(800,400));
```

```
            dm.setTitle("DivisionOfIntegers");
           dm.setVisible(true);
           }
}
```

PROGRAM 9

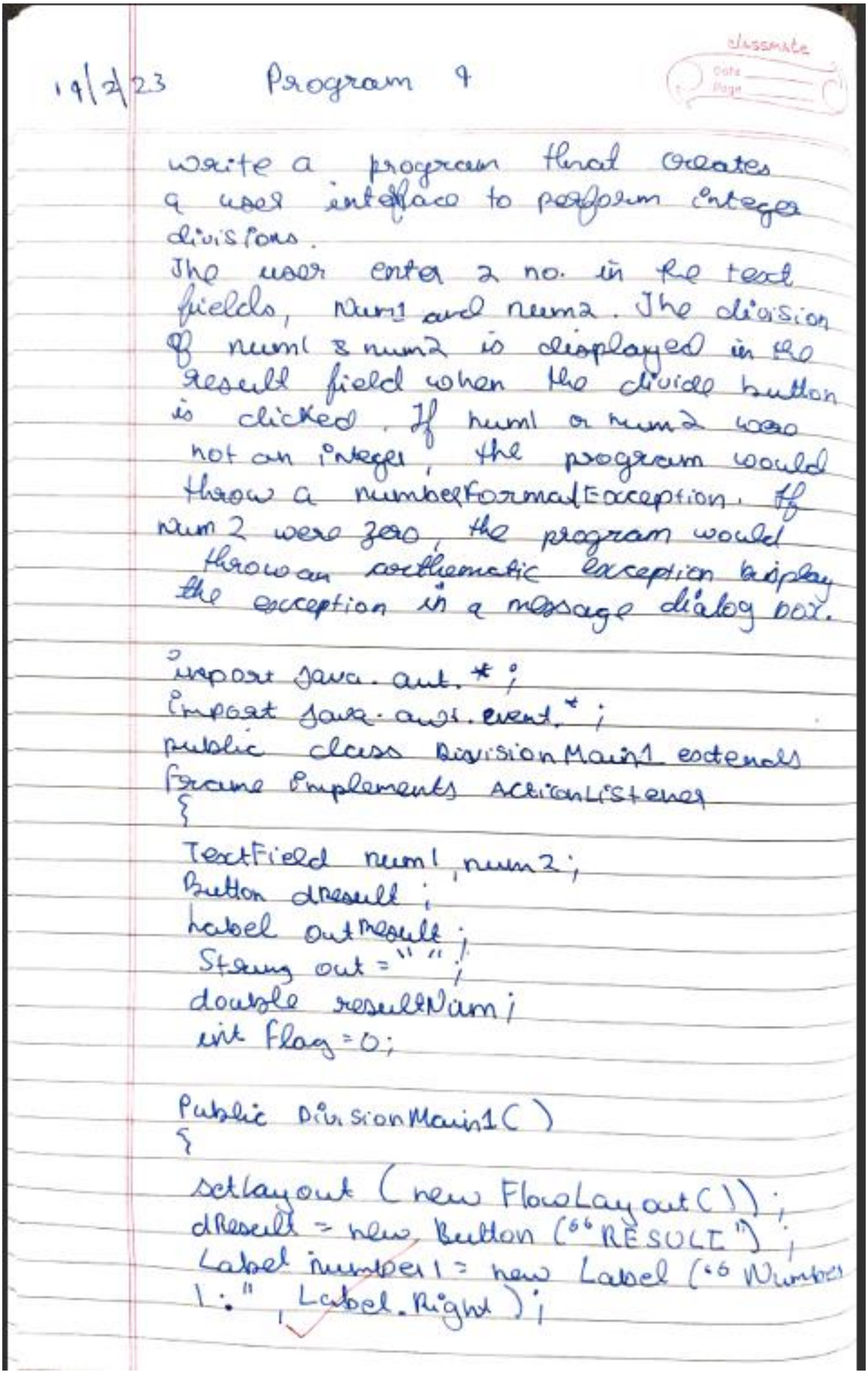
OUTPUT :



```
D:\NotePad++\Java>javac DivisionMain1.java

D:\NotePad++\Java>java DivisionMain1
```

DivisionOfIntegers

Number 1: 24   Number 2: 8   RESULT   Result: 24 8 3.0

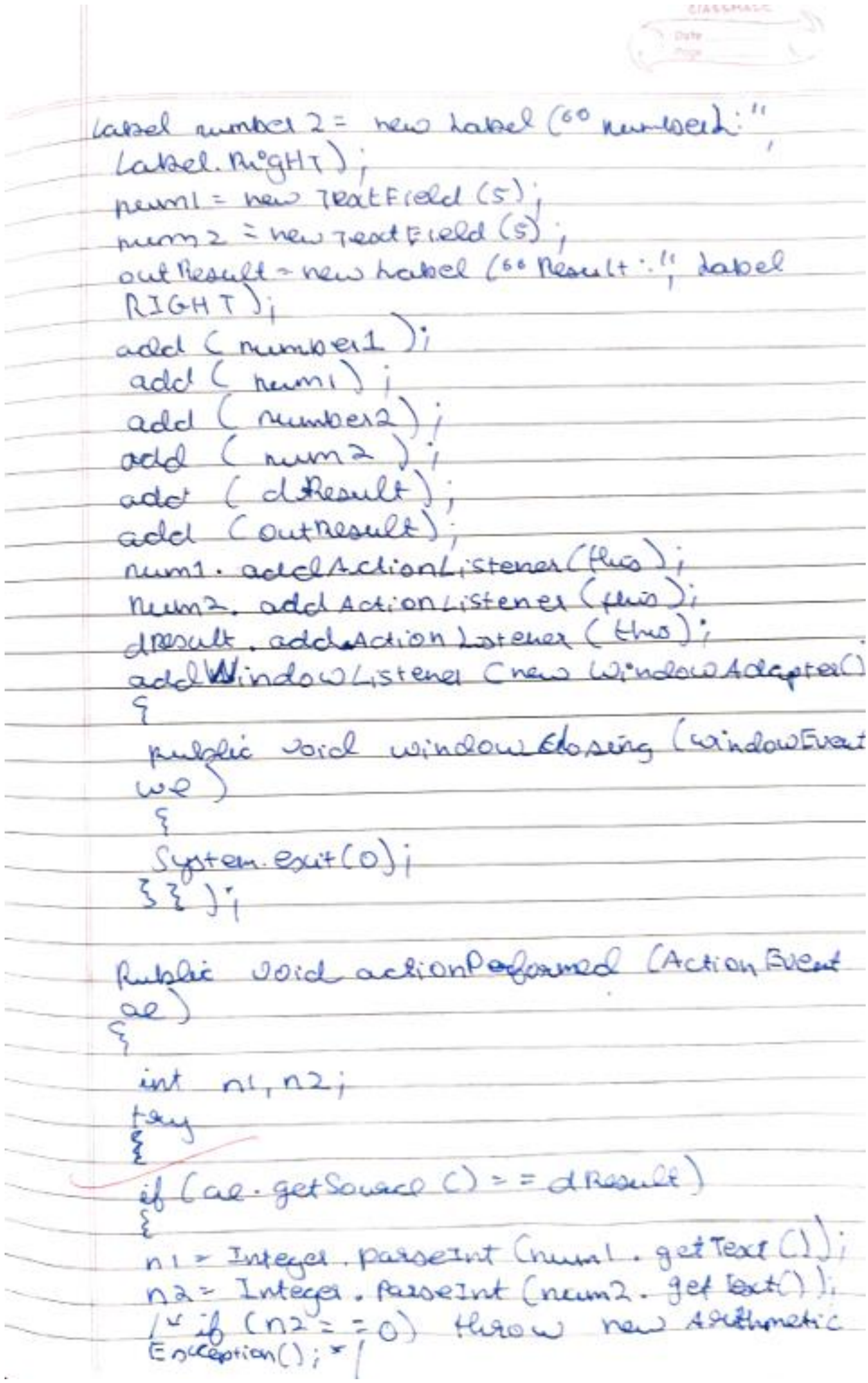


19/2/23 Program 9

write a program that creates a user interface to perform integer divisions.

The user enter 2 no. in the text fields, Num1 and num2. The division of num1 & 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 num 2 were zero, the program would throw an arithematic exception display the exception in a message dialog box.

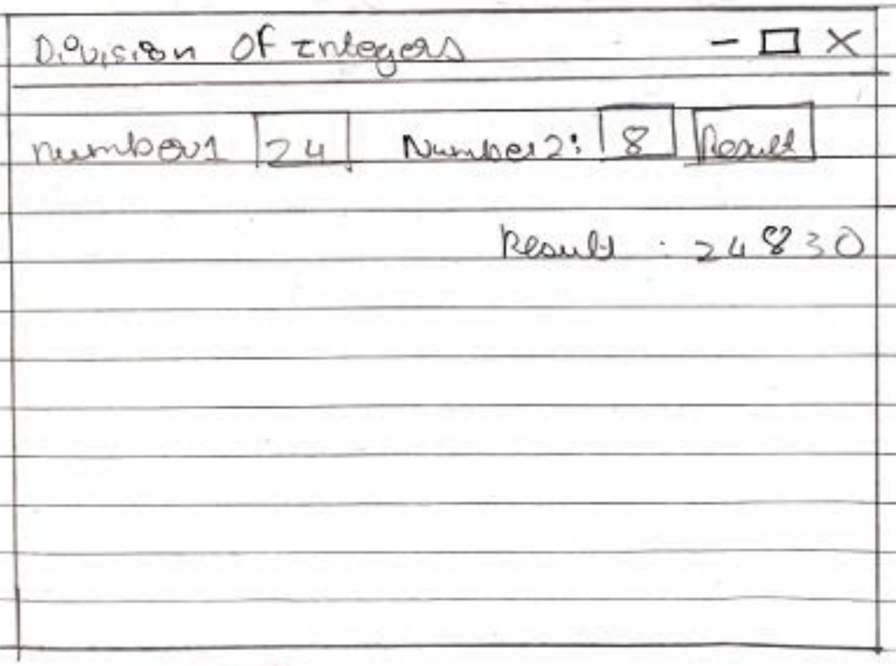
```
import java.awt.*;
import java.awt.event.*;
public class DivisionMain1 extends
Frame implements ActionListener
{
 TextField num1, num2;
 Button dResult;
 Label outResult;
 String out = "";
 double resultNum;
 int flag=0;

 Public DivisionMain1()
 {
 setLayout (new FlowLayout());
 dResult = new Button ("RESULT");
 Label number1 = new Label ("Number
 1:", Label.Right);
```



```
Label number2 = new Label ("number2:",
 Label.RIGHT);
num1 = new TextField (5);
num2 = new TextField (5);
outResult = new Label ("Result:", Label
RIGHT);
add (number1);
 add ( num1);
 add ( number2);
add ( num2 );
add ( dResult);
add (outResult);
num1. addActionListener(this);
num2. addActionListener (this);
dResult. addActionListener ( this);
addWindowListener (new WindowAdapter()
 {
  public void windowClosing (WindowEvent
 we)
  {
  System.exit(0);
 }});

Public void actionPerformed (ActionEvent
ae)
{
 int n1,n2;
 try
 {
 if (ae.getSource () = = dResult)
 {
 n1 = Integer.parseInt (num1. getText ());
 n2 = Integer. ParseInt (num2. getText());
 /* if (n2 = = 0) throw new Arithmetic
 Exception(); */
out = n1 + " " + n2 + "";
resultNum = n1 / n2;
out += String.valueOf (resultNum);
 repaint ();
  }
}
 catch ( NumberFormat Exception e1 )
 {
  Flag = 1;
out = "Number Format Exception!" + e1;
 repaint ();
}
 catch (ArithmeticException e2 )
  {
  flag = 1;
  out = "Divide by 0 Exception!" + e2;
   repaint ();
  }
}
public void paint (Graphics g)
 {
  if (flag == 0)
  g.drawString (out, outResult.getX()
+ outResult.getWidth (), outResult
.getY() + outResult.getHeight () - 8);
 else
 g.drawString (out, 100, 200);
  flag = 0;
 }
```

```
Public static void main (Sting []
args)
 {
 DivisionMain1 (); dm.SetSize (
new Demension (800, 400));
 dm. setTitle(" Division Of Integers");
  dm. setVisible(true);
 }
```

Output

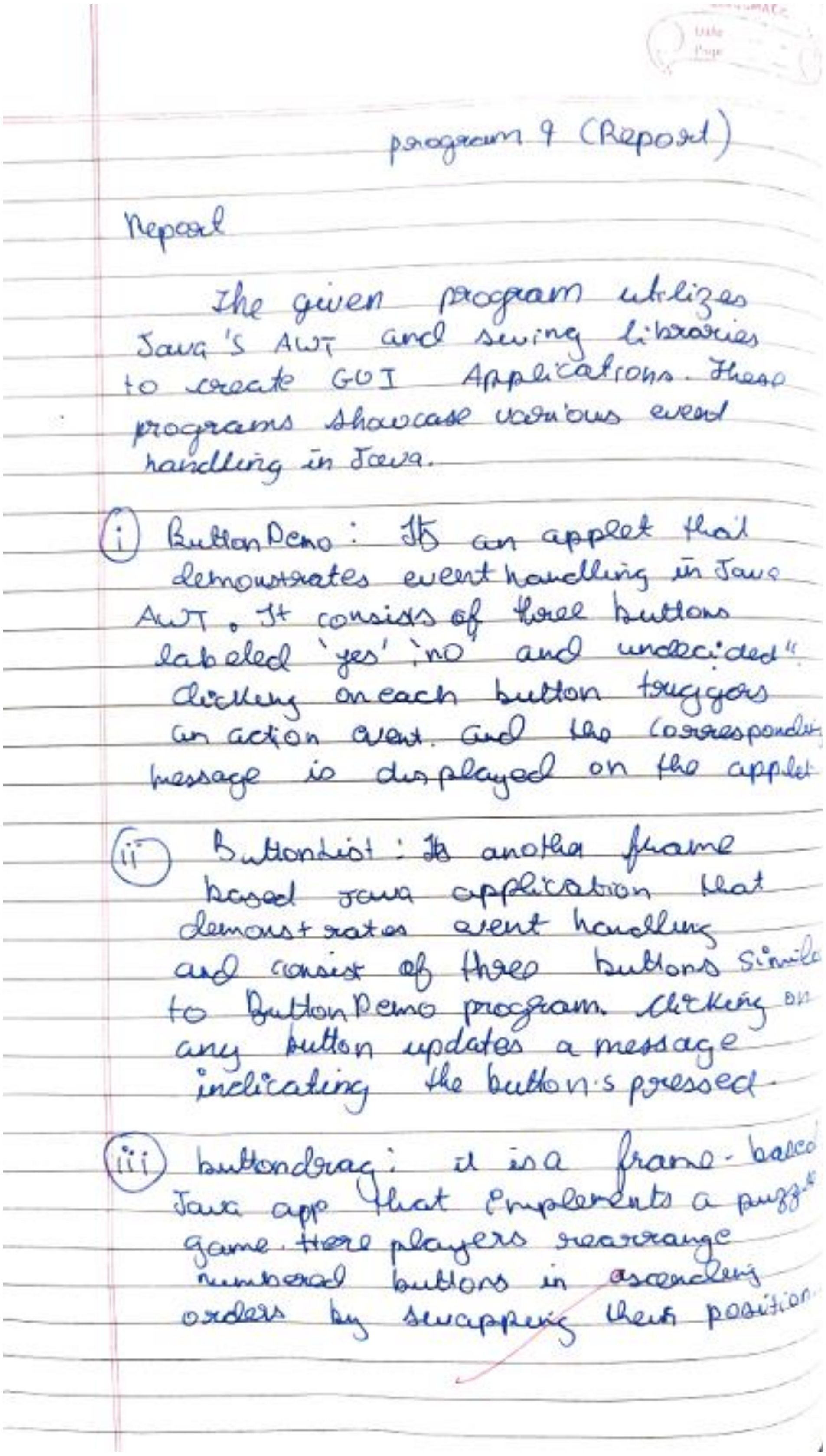


Division Of Integers — □ X

number1 24 Number2: 8 Result

Result : 24830

20/2/24



program 9 (Report)

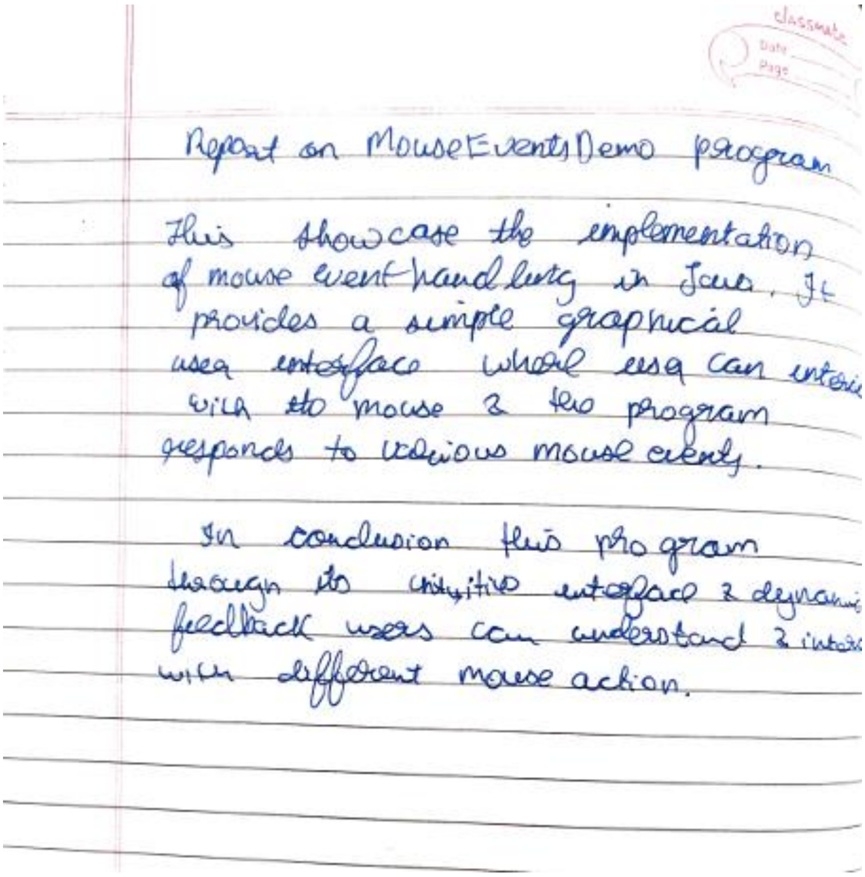
Report

The given program utilizes Java's AWT and swing libraries to create GUI Applications. These programs showcase various event handling in Java.

(i) ButtonDemo: Its an applet that demonstrates event handling in Java AWT. It consists of three buttons labeled 'yes' 'no' and undecided". Clicking on each button triggers an action event and the corresponding message is displayed on the applet

(ii) ButtonList: Its another frame based Java application that demonstrates event handling and consist of three buttons similar to ButtonDemo program. Clicking on any button updates a message indicating the button's pressed.

(iii) buttondrag: it is a frame-based Java app that implements a puzzle game. Here players rearrange numbered buttons in ascending orders by swapping their position.



classmate
Date
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Report on MouseEventsDemo program

This showcase the implementation of mouse event handling in Java. It provides a simple graphical user interface where user can interac with the mouse & the program responds to various mouse events.

In conclusion this program through its intuitive interface & dynamic feedback users can understand & interac with different mouse action.

iv DivisionMain : It is a frame-based Java app that allows users to input 2 numbers and calculate their division It includes error handling for scenarios such as division by 0 and invalid input formats.

v) DivisionMain1: Its another frame based Java app that performs divisions operation similar to DivisonMain. However it handles exceptions in a different order compared to DivisionMain.

vi TextFieldDemo: Demonstrates the usage of the text fields in Java AWT. It provides a simple GUI interfaces where user can input their name. and password. Upon pressing enter in either text file. the program repaints the window to display the entered name and password.

vii ButtonList1D: Is a frame based Java app that demonstrates event handling and dialog creation It consist of 3 button labeled "yes, 'no' and 'undecided". clicking on any button opens a analog window displaying the button label.

In conclusion the mentioned Java programs exemplify fundamental GUI developement & event handling techniques.