Department of Computer Science and Engineering

B.M.S COLLEGE OF ENGINEERING

(Autonomous College Affiliated to Visvesvaraya Technological University, Belgaum)

Bull Temple Road, Basavanagudi, Bangalore-560019

Sep-2020 to Jan-2021

3rd Semester OOJ LAB Report

In

"Object Oriented Java Programming"

[19CS3PCOOJ]

BY

NAME	USN
AMBEKAR MONISH	1BM18CS012

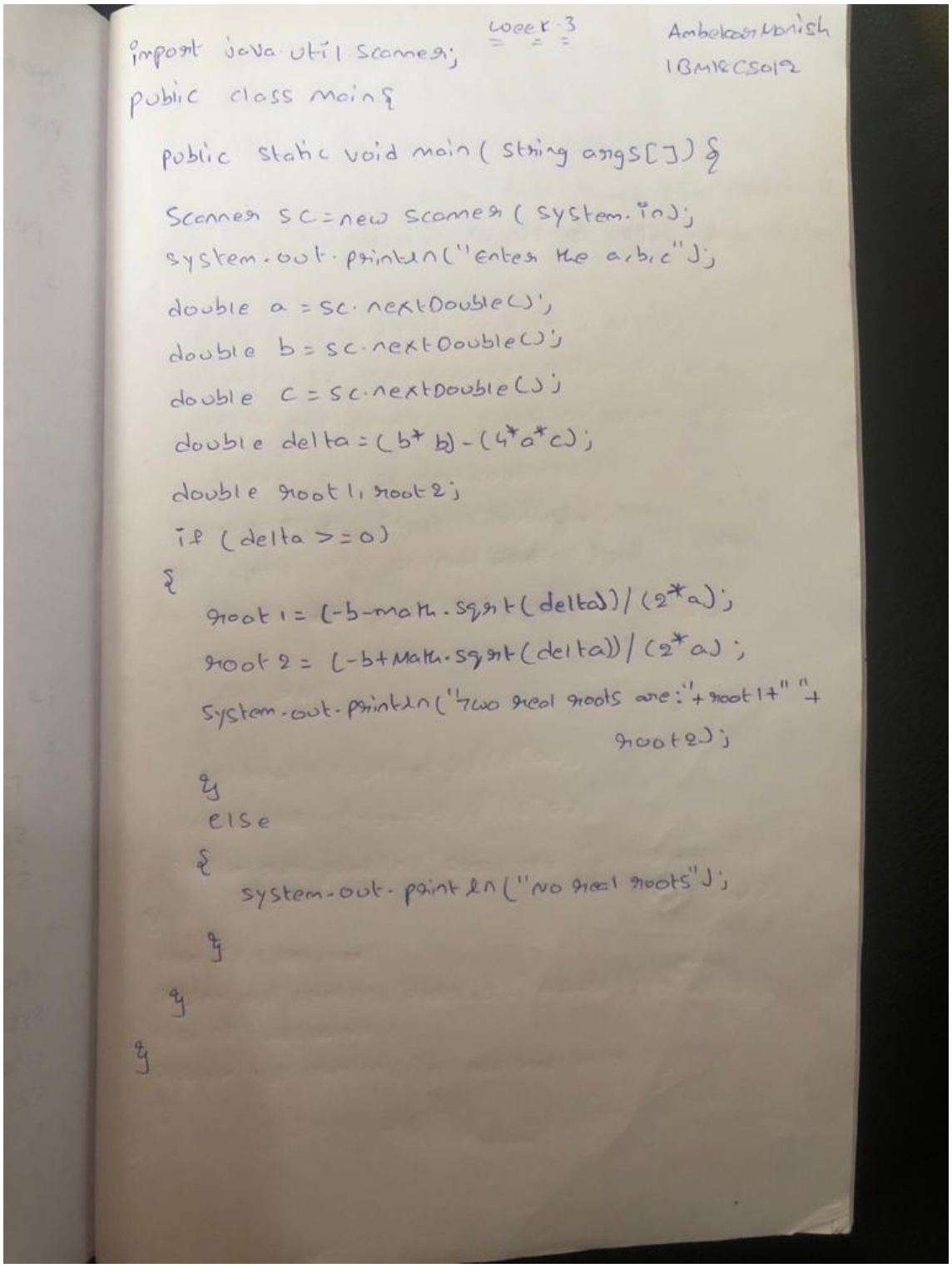
Name of the course instructor:

Dr. Nandhini Vineeth

Lab Program 1:

Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate b^2-4ac is negative, display a message stating that there are no real solutions

Writeup:



```
Week-3                                  Ambekar Manish
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import java.util.Scanner;
public class main{
  public static void main(String args[]){
  Scanner sc=new Scanner(System.in);
  System.out.println("enter the a,b,c");
  double a=sc.nextDouble();
  double b=sc.nextDouble();
  double c=sc.nextDouble();
  double delta=(b*b)-(4*a*c);
  double root1,root2;
  if(delta>=0)
  {
    root1=(-b-Math.sqrt(delta))/(2*a);
    root2=(-b+Math.sqrt(delta))/(2*a);
    System.out.println("Two real roots are:"+root1+" "+
                                        root2);
    }
    else
    {
      System.out.println("No real roots");
    }
  }
}
```
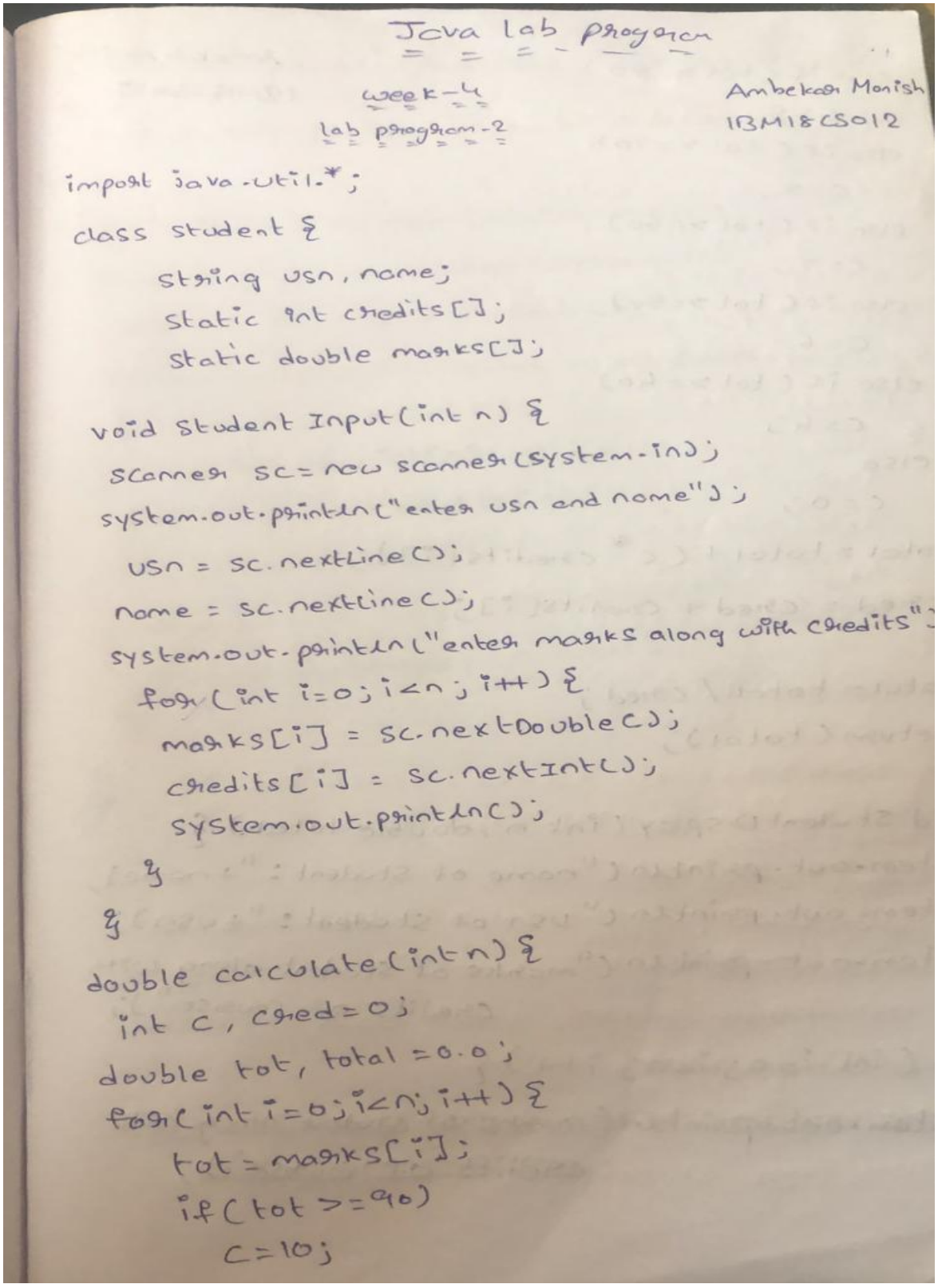

Output

```
D:\Java\jdk1.8.0_261\bin\prog>javac quadeqn.java

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decresing power of x:

1
1
1
a=1.0 b=1.0 c=1.0
Roots are imaginary

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decresing power of x:

1
-2
1
a=1.0 b=-2.0 c=1.0
Roots are real and equal

r= 1.0

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decresing power of x:

1
-3.2
2.56
a=1.0 b=-3.2 c=2.56
Roots are real and unequal

r1= 1.6000000210734244 r2=1.5999999789265757

D:\Java\jdk1.8.0_261\bin\prog>
```

Lab 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.

Writeup:



Java lab program

week-4

lab program-2

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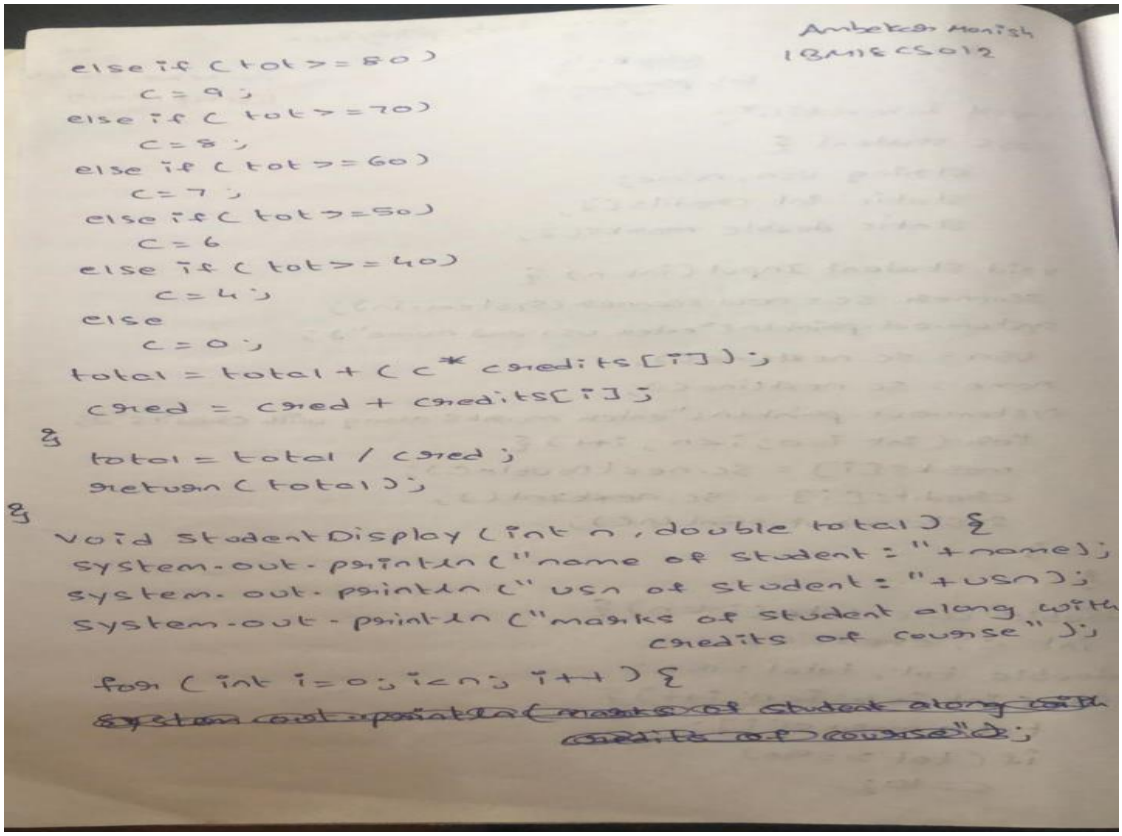
```
import java.util.*;
class student {
    string usn, name;
    static int credits[];
    static double marks[];

void student Input(int n) {
 Scanner sc= new Scanner(System.in);
System.out.println("enter usn and name");
  usn = sc.nextLine();
 name = sc.nextline();
 system.out.println("enter marks along with credits"
  for(int i=0;i<n;i++) {
   marks[i] = sc.nextDouble();
   credits[i] = sc.nextInt();
   system.out.println();
  }
}
double calculate(int n) {
 int c, cred=0;
double tot, total =0.0;
for(int i=0;i<n;i++) {
    tot = marks[i];
    if(tot >=90)
      c=10;
```



```
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else if (tot >= 80)
    c = 9;
else if (tot >= 70)
    c = 8;
else if (tot >= 60)
    c = 7;
else if (tot >= 50)
    c = 6
else if (tot >= 40)
    c = 4;
else
    c = 0;
total = total + (c * credits[i]);
cred = cred + credits[i];
}
total = total / cred;
return (total);
}
void studentDisplay (int n, double total) {
system.out.println("name of student : "+name);
system.out.println(" usn of student : "+usn);
system.out.println("marks of student along with
                    credits of course");
for (int i=0; i<n; i++) {
system.out.println(marks of student along with
                    credits of course");
```
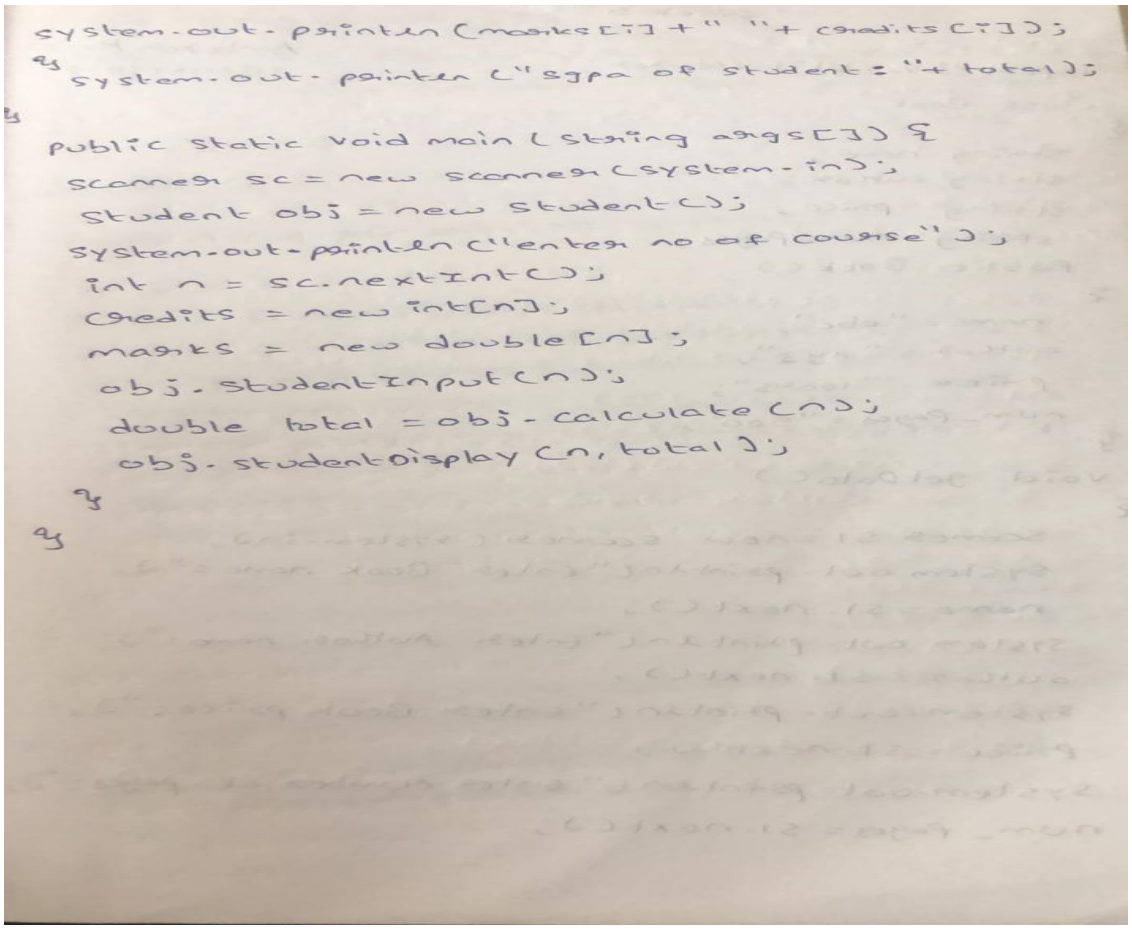
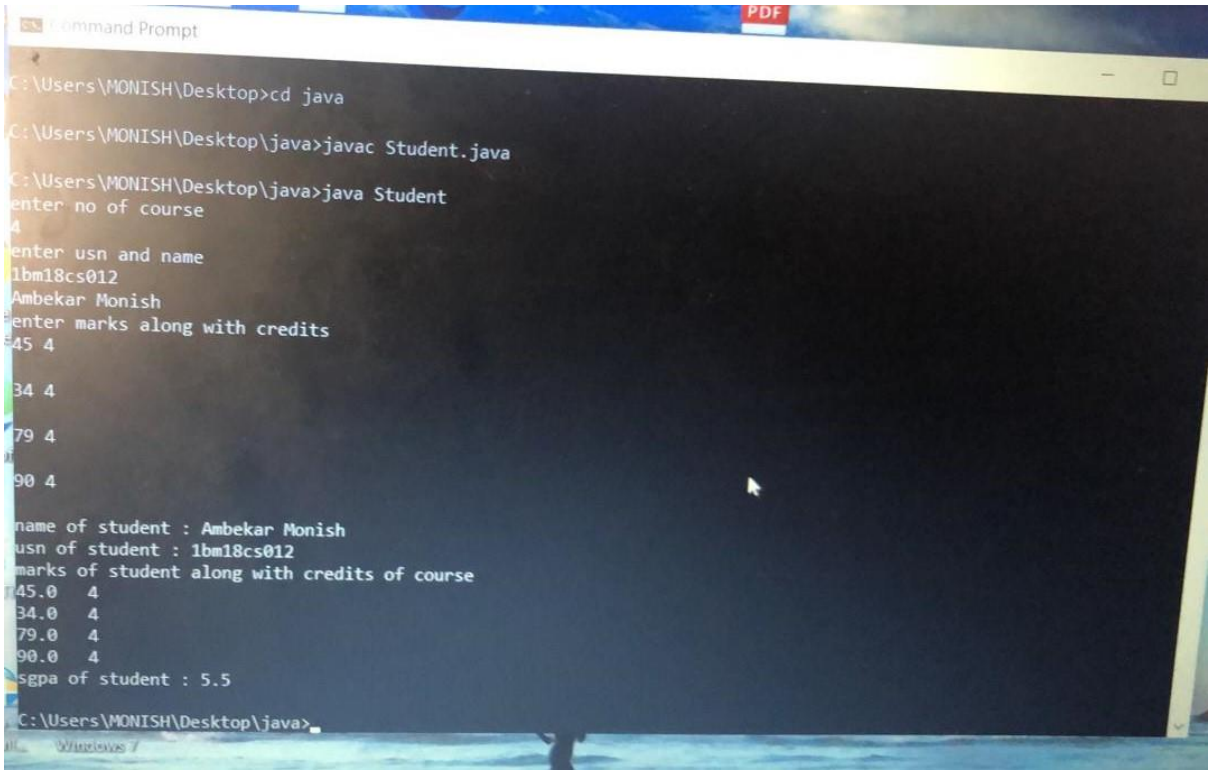



```
system.out.println(marks[i] + " " + credits[i]);
}
system.out.println("sgpa of student : "+ total);
}
public static void main (String args[]) {
Scanner sc = new Scanner(System.in);
Student obj = new Student();
System.out.println("enter no of course");
int n = sc.nextInt();
credits = new int[n];
marks = new double[n];
obj.studentInput(n);
double total = obj.calculate(n);
obj.studentDisplay(n, total);
}
}
```

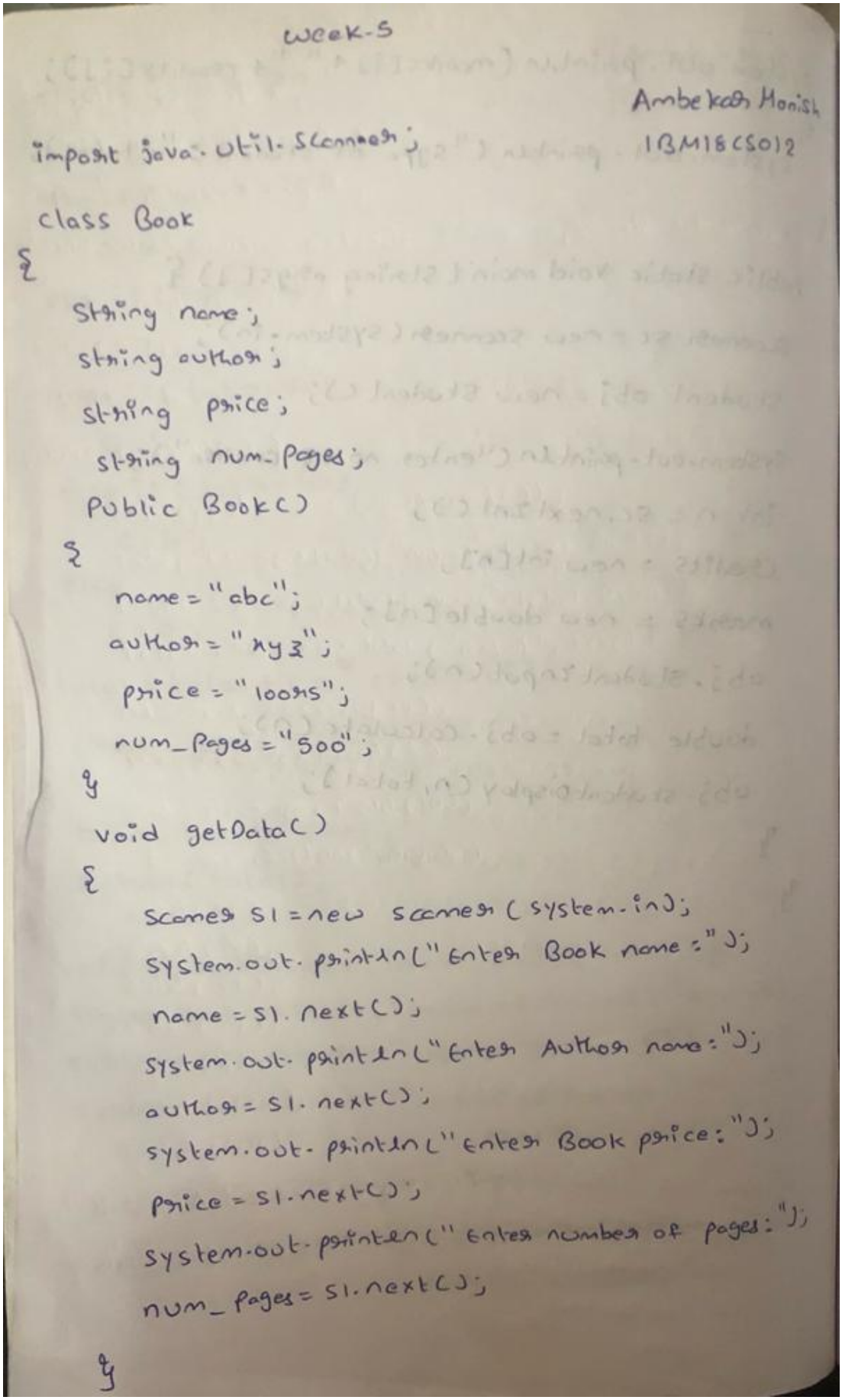
Output:



Lab 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.

Writeup:-



week-5

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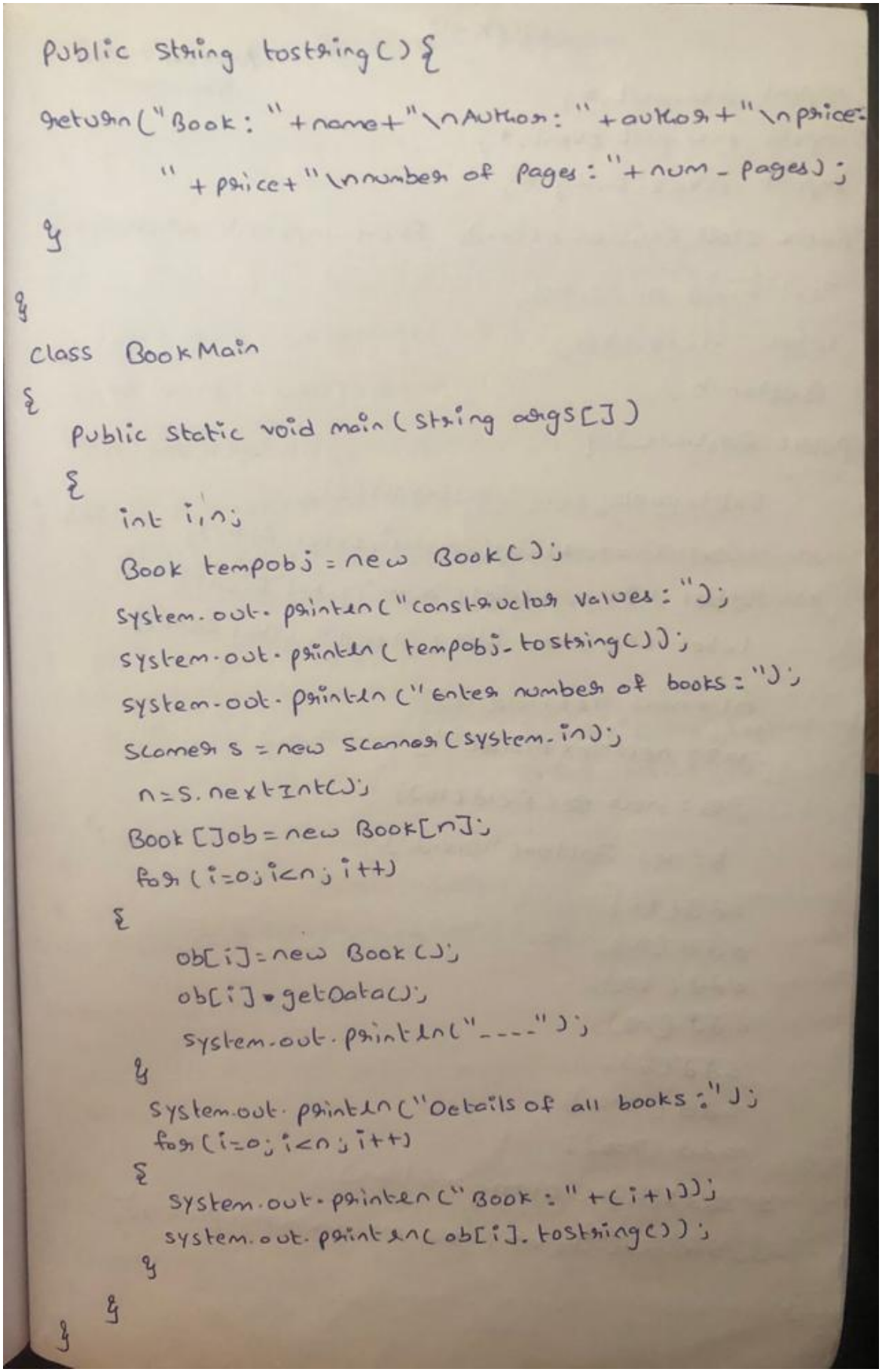
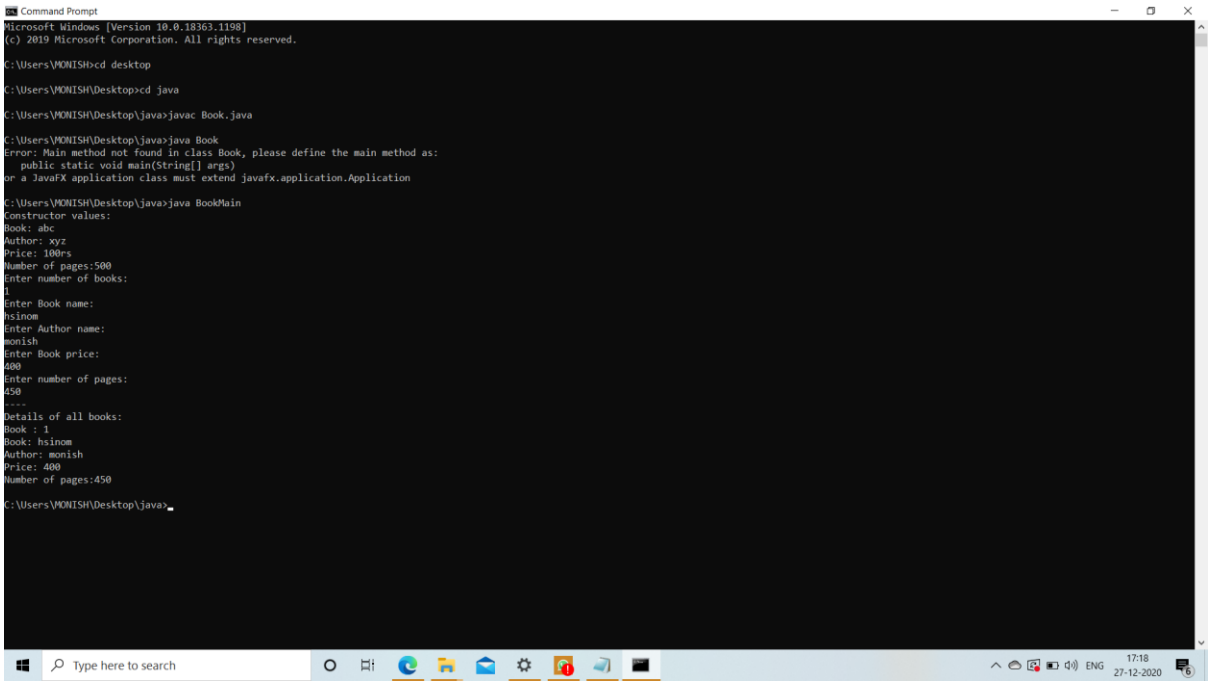
```
import java.util.Scanner;

class Book
{
    String name;
    string author;
    string price;
     string num_pages;
    Public Book()
    {
       name = "abc";
       author = "xyz";
       price = "1000rs";
       num_Pages = "500";
    }
     void getData()
     {
         Scanner s1 = new scanner (system.in);
         System.out.println("Enter Book name :");
         name = s1.next();
         System.out.println("Enter Author name:");
         author = s1.next();
         system.out.println("Enter Book price:");
         price = s1.next();
         system.out.println("Enter number of pages:");
         num_pages = s1.next();
     }
```



```
Public String toString(){
return("Book: "+name+"\nAuthor: "+author+"\nprice:
        "+price+"\nnumber of pages: "+num_pages);
}
}
class BookMain
{
   Public static void main(String args[])
   {
      int i,n;
      Book tempobj = new Book();
      System.out.println("constructor values: ");
      system.out.println(tempobj.toString());
      system.out.println("Enter number of books: ");
      Scanner s = new Scanner(system.in);
       n=s.nextInt();
      Book []ob=new Book[n];
       for(i=0;i<n;i++)
      {
          ob[i]=new Book();
          ob[i].getData();
          system.out.println("----");
       }
        System.out.println("Details of all books:");
        for(i=0;i<n;i++)
       {
          system.out.println("Book: "+(i+1));
          system.out.println(ob[i].toString());
       }
   }
}
```

Output:



Lab 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.

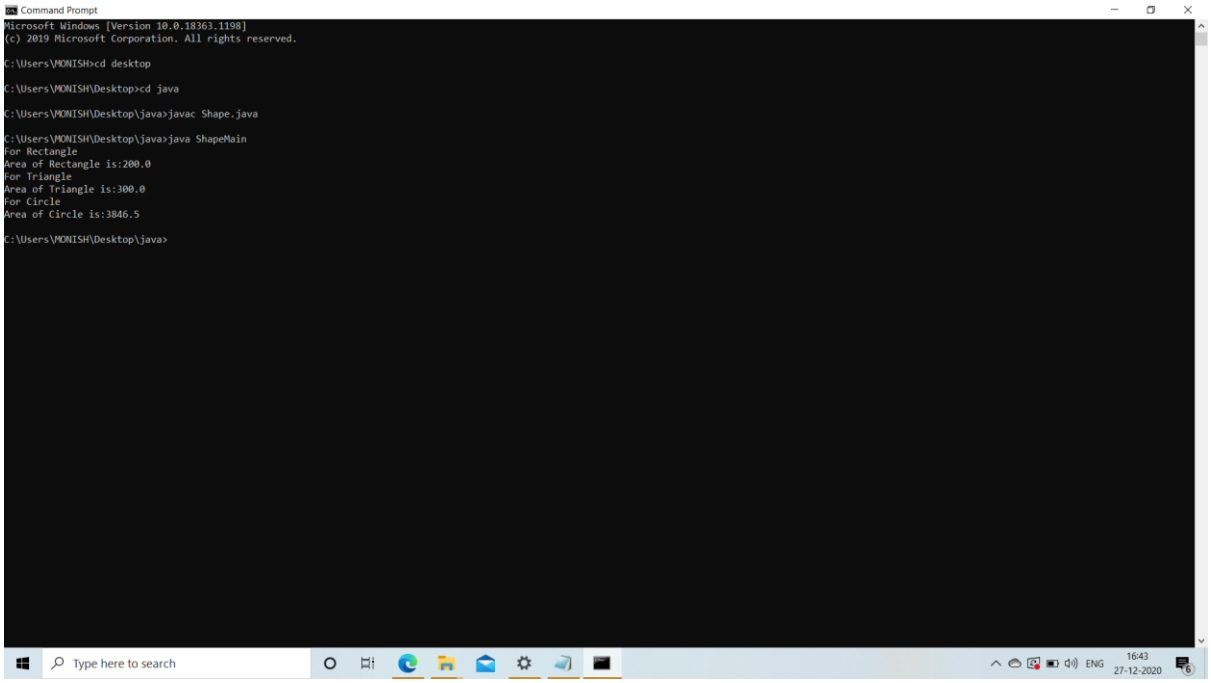
Writeup:

SHAPE:-

```
import java.util.Scanner;
abstract class shape {
   int int1,int2;
   abstract double printArea();
}
Class Rectangle extends shape {
    Rectangle(int a, int b) {
       int 1 = a;
       int 2 = b;
    }
   double printArea() {
       System.out.println(" For Rectangle");
       return int1 * int2;
    }
}
class Triangle extends shape {
        Triangle(int a, int b) {
           int 1=a;
           int 2=b;
        }
        double printArea() {
          System.out.println(" For Triangle");
          return (int1*int2)/2;
        }
    }
```

```
class circle extends shape {
    circle ( int a) {
     int l = a;
    }
    double printArea () {
      System.out.println ("For circle");
      return 3.14 * int l * int l;
    }
}
Class ShapeMain {
     Public static void main ( String args []) {
      Rectangle r = new rectangle ( 10, 20);
      Triangle t = new Triangle ( 20, 30);
       circle  c = new circle ( 35);
    System.out.println ("Area of Rectangle is :" + r. printArea ());
    System.out.println ("Area of triangle is:" + t. printArea ());
    System.out.println (" Area of circle is : " + c. printArea ());
    }
}
```

Output:



Lab 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 Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks: • Accept deposit from customer and update the balance. • Display the balance. • Compute and deposit interest • Permit withdrawal and update the balance • Check for the minimum balance, impose penalty if necessary and update the balance

Writeup:

week-8

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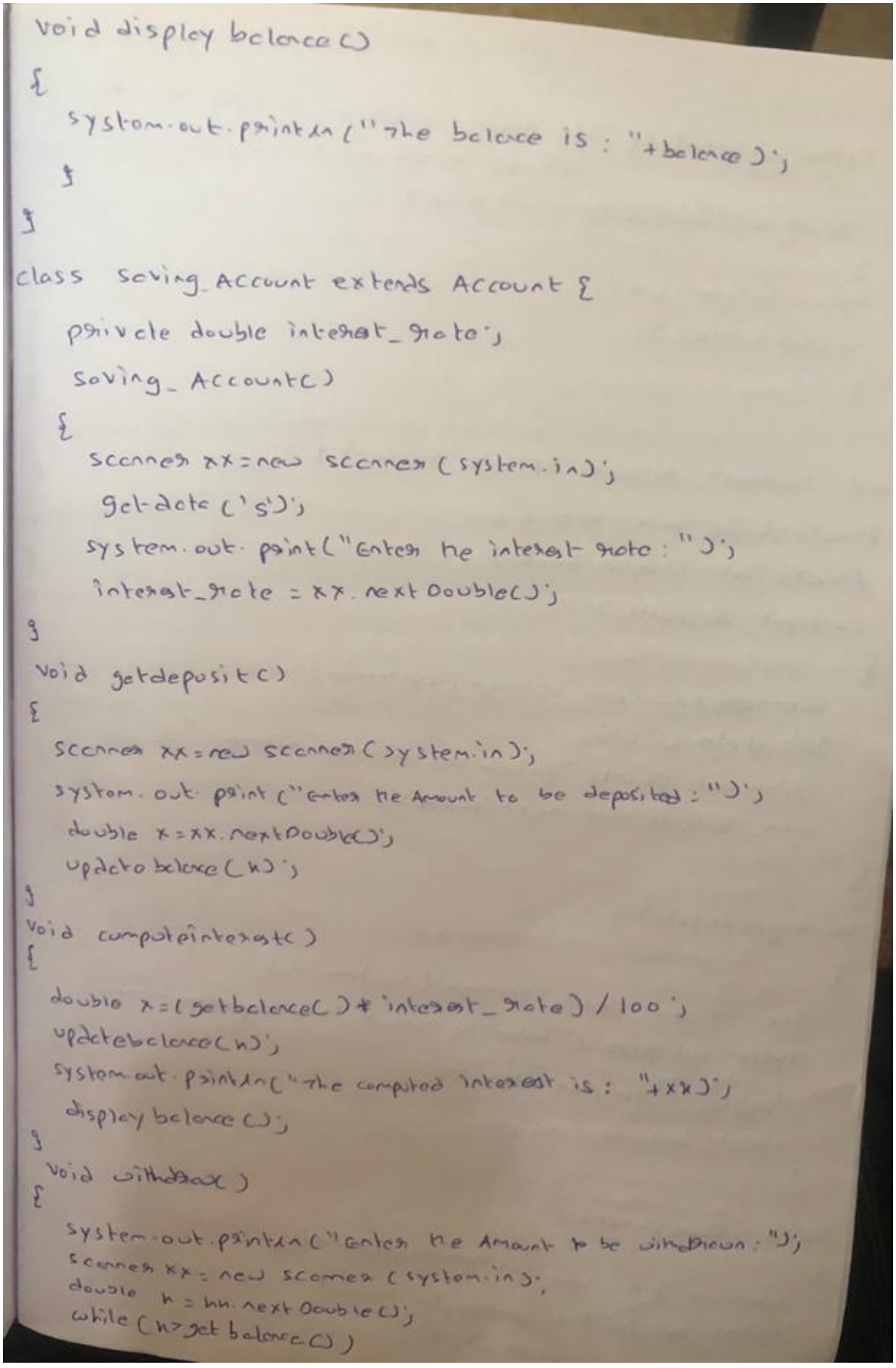
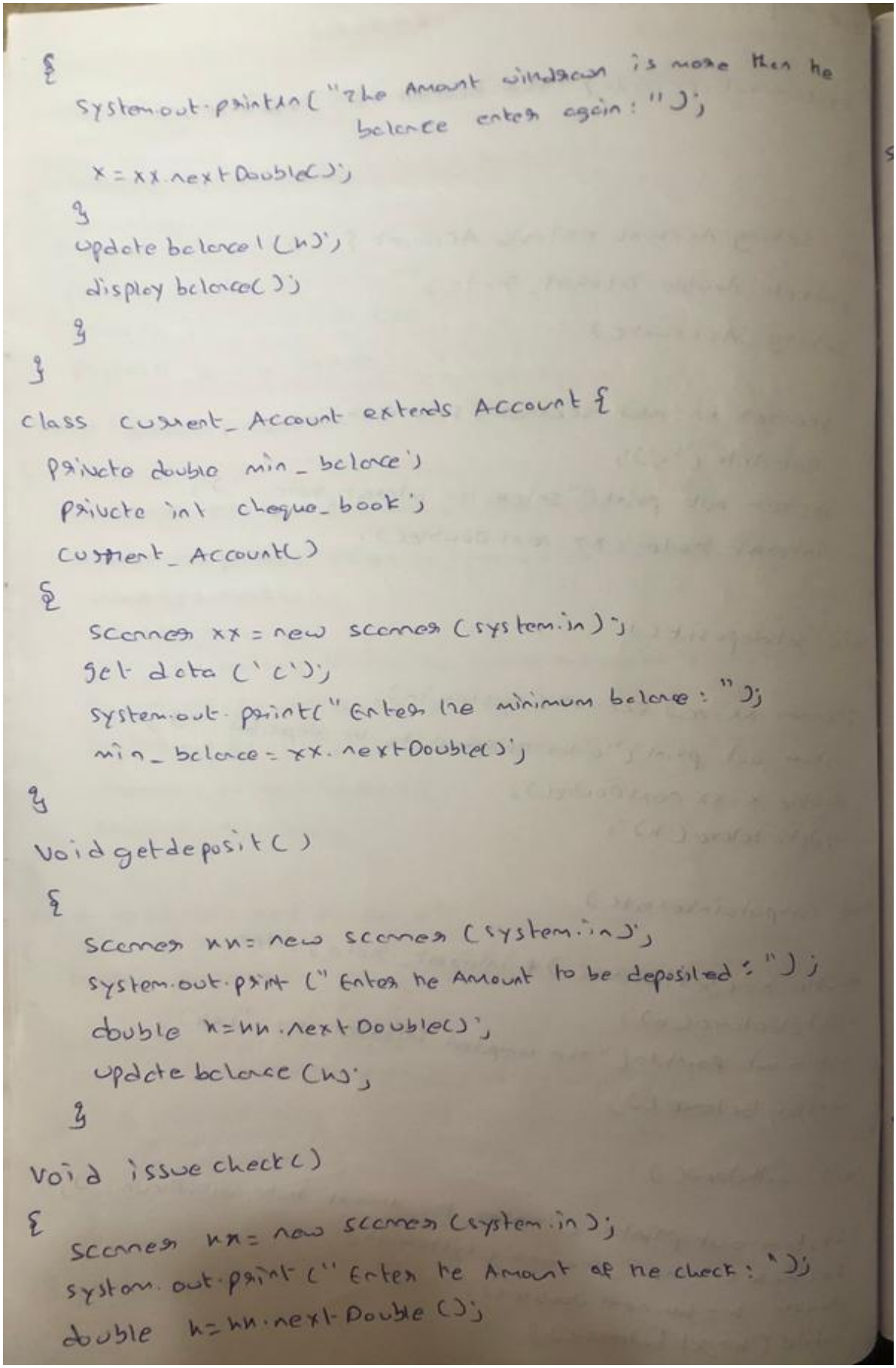
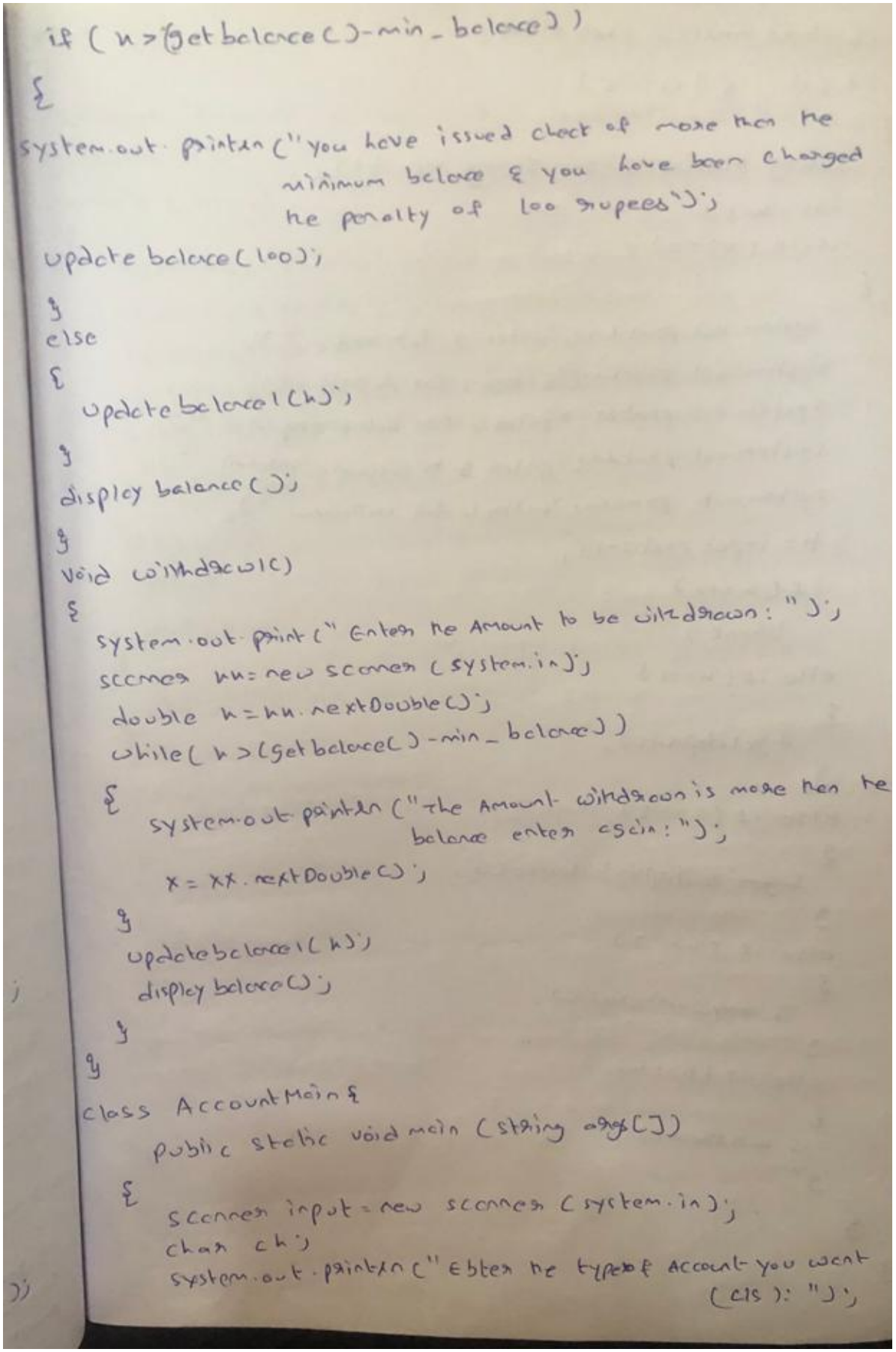
```
import java.util.Scanner;

class Account
{
  private string name;
   private double account_no;
   private char account_type;
   private double balance;

 void getdata(char ch)
{
    Scanner xx = new Scanner(System.in);
    System.out.print("Enter the name of the customer: ");
     name = xx.next();
     xx.nextline();
     System.out.print("Enter the Account Number of the customer: ");
     Account_no = xx.nextDouble();
     System.out.print("Enter the balance of the customer: ");
      balance = xx.nextDouble();
      Account_type = ch;
}
void updatebalance(double x)
{
   balance = balance+x;
}
void updatebalance1(double x)
{
   balance = balance - x;
}
double getbalance()
{
   return balance;
}
```



```
void display balance()
{
   system.out.println("the balance is : "+balance);
   }
}

class saving_Account extends Account {
   private double interest_rate;
   saving_Account()
   {
     scanner xx=new scanner(system.in);
      get-date('s');
     system.out.print("Enter the interest rate : ");
     interest_rate = xx.nextDouble();
}
 void getdeposit()
{
  scanner xx=new scanner(system.in);
  system.out.print("Enter the Amount to be deposited : ");
   double x=xx.nextDouble();
   updateBalance(x);
}
void computeinterest()
{
  double x=(getbalance() * interest_rate) / 100;
  updatebalance(x);
  system.out.println("the computed interest is : "+xx);
   display balance();
}
 void withdraw()
{
   system.out.println("Enter the Amount to be withdrawn : ");
   scanner xx = new scanner(system.in);
   double x = xx.nextDouble();
   while(x>getbalance())
```



```
{
    System.out.println("The Amount withdrawn is more than the
                        balance enter again: ");
     x = xx.nextDouble();
   }
   update balance1(x);
    display balance();
   }
}
class current_Account extends Account {
 private double min_balance;
  private int cheque_book;
  current_Account()
 {
    Scanner xx = new Scanner(System.in);
    get data('c');
    System.out.print("Enter the minimum balance: ");
    min_balance = xx.nextDouble();
}
Void getdeposit()
 {
    Scanner xx= new Scanner(System.in);
    System.out.print("Enter the Amount to be deposited: ");
    double x=xx.nextDouble();
    update balance(x);
   }
Void issue check()
{
   Scanner xx= new Scanner(System.in);
   System.out.print("Enter the Amount of the check: ");
   double x=xx.next.Double();
```

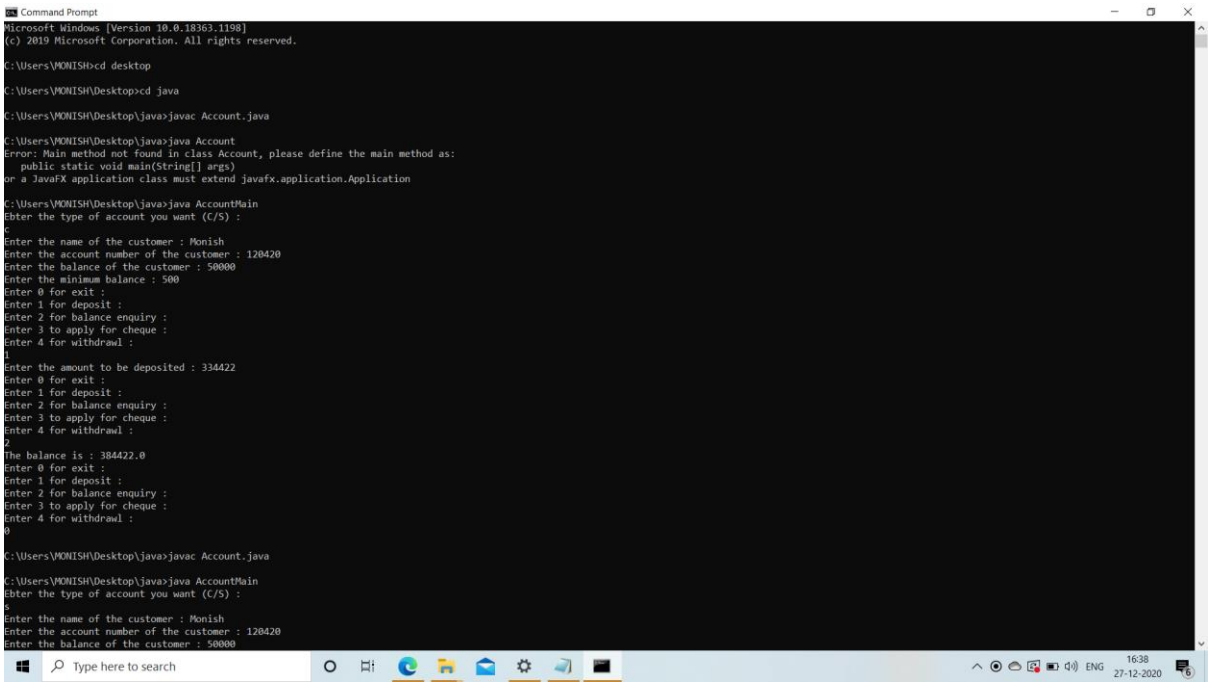


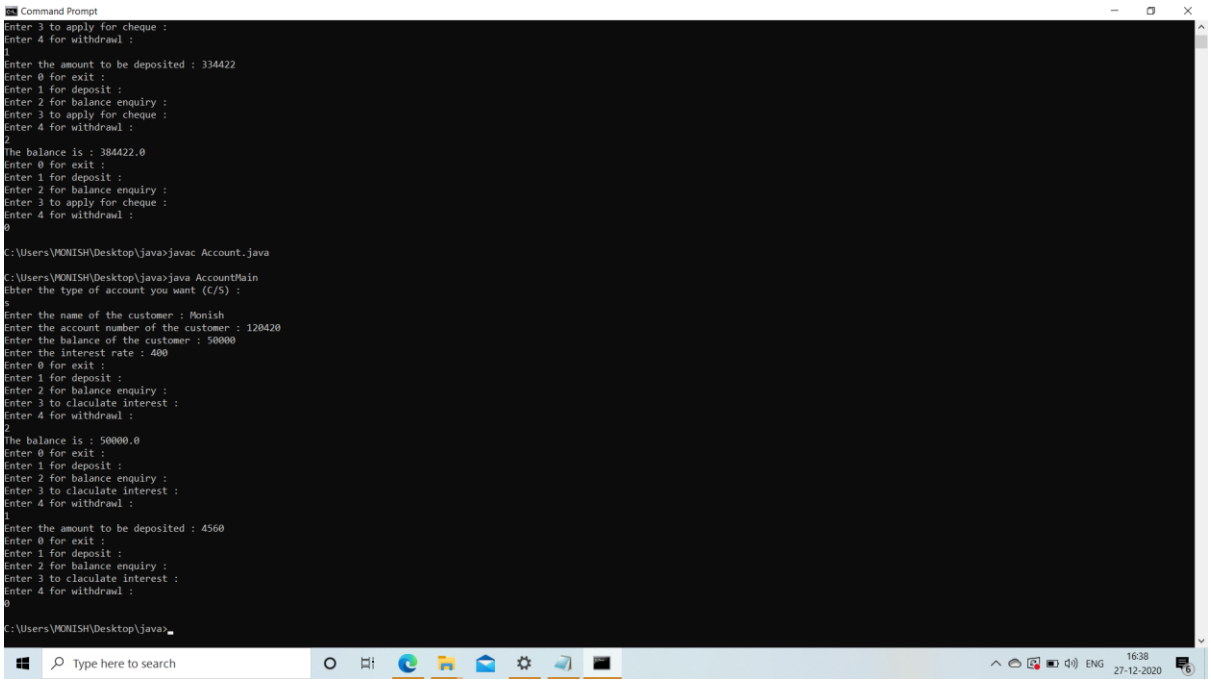
```
if ( x>(getbalance()-min_balance))
{
system.out.println("you have issued check of more than the
                    minimum balance & you have been charged
                    the penalty of 100 rupees");
update balance(100);
}
else
{
  updatebalance1(x);
}
display balance();
}
void withdraw1()
{
  system.out.print(" Enter the Amount to be withdrawn: ");
  scanner xx=new scanner (system.in);
  double x=xx.nextDouble();
  while( x>(getbalance()-min_balance))
  {
    system.out.println("the Amount withdrawn is more than the
                        balance enter cscin:");
     x=xx.nextDouble();
  }
  updatebalance1(x);
  display balance();
  }
}
class AccountMain{
   public static void main (string args[])
   {
     scanner input=new scanner (system.in);
     char ch;
     system.out.println("Enter the type of Account you want
                                          (CIS): ");
```

```
ch=input.next().charAt(0);
if (ch=='s'||ch=='S')
{
   Saving_Account S=new Saving_Account();
   int n=1;
   while(n!=0)
   {
      System.out.println("Enter 0 for exit: ");
      System.out.println("Enter 1 for deposit: ");
      System.out.println("Enter 2 for balance enquiry: ");
      System.out.println("Enter 3 to calculate interest: ");
      System.out.println("Enter 4 for withdrawal: ");
      n=input.nextInt();
      if(n==0)
         break;
      else if(n==1)
      {
         S.getdeposit();
      }
      else if(n==2)
      {
         ~~S.get~~ S.displaybalance();
      }
      else if(n==3)
      {
         S.computeinterest();
      }
      else if(n==4)
      {
         S.withdrawal();
      }
   }
}
```

```
else
{
  cosnent_Account s = new cosnent_Account();
   int k=1;
  while (k!=0)
  {
      system.out.println("Enter 0 for exit : ");
      system.out.println("Enter 1 for deposit: ");
      system.out.println("Enter 2 for balance enquiry : ");
      system.out.println("Enter 3 to apply for cheque: ");
      system.out.println("Enter 4 for withdrawal: ");

      k=inpt.nextInt();

     if(k==0)
     break;
    else if(k==1)
    {
       s.getdeposit();
    }
    else if(k==2)
    {
       s.displaybalance();
    }
    else if(k==3)
    {
       s.issuecheque();
     }
    else if(k==4)
    {  s.withdraw();
      }
    }
  }
}
```

Output:



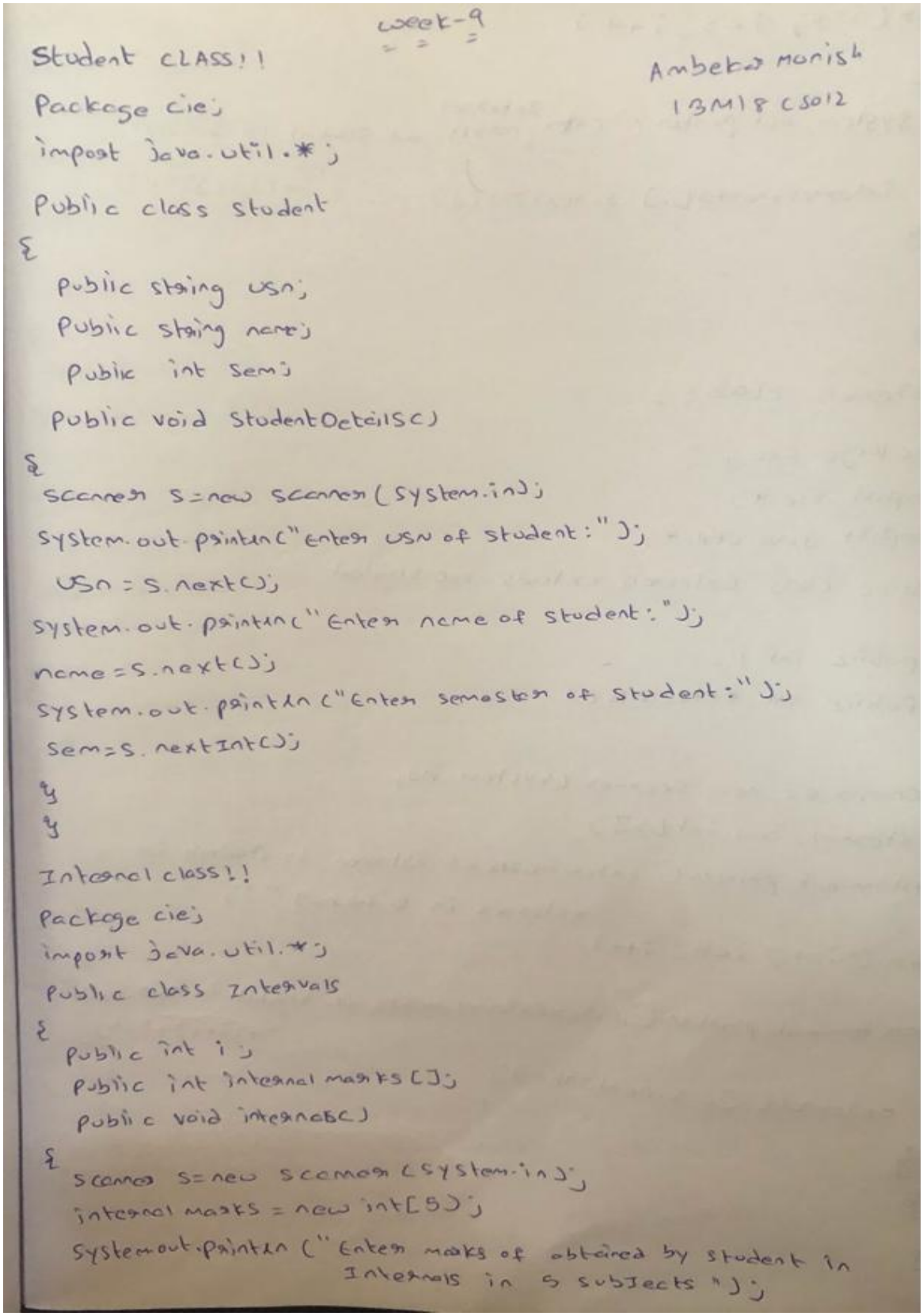


Lab Program 6:

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.

Writeup:



week-9

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1BM18CS012

Student CLASS!!

```
Package cie;
import java.util.*;
Public class student
{
  Public string usn;
  Public string name;
   Public  int sem;
  Public void StudentDetails()
{
 Scanner s=new Scanner(System.in);
 System.out.println("Enter USN of student:");
  usn = s.next();
System.out.println("Enter name of student:");
name=s.next();
System.out.println("Enter semester of student:");
 sem=s.nextInt();
}
}
```

Internal class!!

```
Package cie;
import java.util.*;
Public class Intervals
{
  Public int i;
   Public int internal marks[];
   Public void internals()
{
  Scanner s=new Scanner(System.in);
  internal marks = new int[5];
  System.out.println("Enter marks of obtained by student in
                      Internals in 5 subjects");
```

```
for(i=0; i<5; i++)
{
 System.out.println("Enter Internal marks of student in subject
                                        "+(i+1)+":");
  internalmarks[i]=s.nextInt();
}
}
}
```

Externals class!!

```
Package see;
import cie.*;
import java.util.*;
Public class Externals extends cie-student
{
  public int i;
  Public int externals()
{
Scanner s= new Scanner(System.in);
external= new int[5];
System.out.println("Enter marks of obtained by students in
                        externals in 5 subjects");
for(i=0; i<5; i++)
{
System.out.println("Enter External marks of Student in subjects
                                        "+(i+1)+":");
  external[i]= s.nextInt();
}
}
}
```

Driver class!!

```
import cie.*;
 import see.*;
import java.util.*;

class FinalMarks
{
  public static void main (String [] args)
{
 int total[];
Scanner S=new Scanner (System.in);
 total = new int[5];
System.out.println("Enter the number of students:");
int n=S.nextInt();
cie.Student s[]=new.cie.student[n];
cie.Internals c[]= new cie.Internals [n];
see.Externals e[]= new See.Externals[n];
System.out.println("Enter Details of students");
 for (int i=0; i<n;i++)
{
  s[i]
  c[i]
  e[i]
  s[i]
  c[i]
  e[i]
}
  For(int i=0;i<n;i++)
  {
    for(int j=0;j<5;j++)
    {
      total[j]=c[i].internalmarks[j]+e[i].externals[j]/2;
    }
    System.out.println("total marks of student"+(i+1)+" in each
                                                subject are:");
     For(int j=0;j<5;j++)
     System.out.println(" total marks in subject "+(j+1)+" for student
                                                "+(i+1)"is" total
                                                [i][j];
}}}
```

Output:

```
Enter External Marks of Student in subject 3 :
23
Enter External Marks of Student in subject 4 :
24
Enter External Marks of Student in subject 5 :
44
Enter USN of Student:
23425
Enter Name of Student:
raj
Enter Semester of Student:
2
Enter Marks of obtained by Student in Internals in 5 subjects
Enter Internal Marks of Student in subject 1 :
34
Enter Internal Marks of Student in subject 2 :
50
Enter Internal Marks of Student in subject 3 :
23
Enter Internal Marks of Student in subject 4 :
34
Enter Internal Marks of Student in subject 5 :
44
Enter Marks of obtained by Students in Externals in 5 subjects
Enter External Marks of Student in subject 1 :
67
Enter External Marks of Student in subject 2 :
88
Enter External Marks of Student in subject 3 :
98
Enter External Marks of Student in subject 4 :
78
Enter External Marks of Student in subject 5 :
67
Total marks for student1in each subject are:

Total marks in subject1for student1is:
62
Total marks in subject2for student1is:
50
Total marks in subject3for student1is:
33
Total marks in subject4for student1is:
56
Total marks in subject5for student1is:
72
Total marks for student2in each subject are:

Total marks in subject1for student2is:
67
Total marks in subject2for student2is:
94
Total marks in subject3for student2is:
72
Total marks in subject4for student2is:
73
Total marks in subject5for student2is:
```

Lab Program 7:

Write a program to demonstrate generics with multiple object parameters.

Writeup:

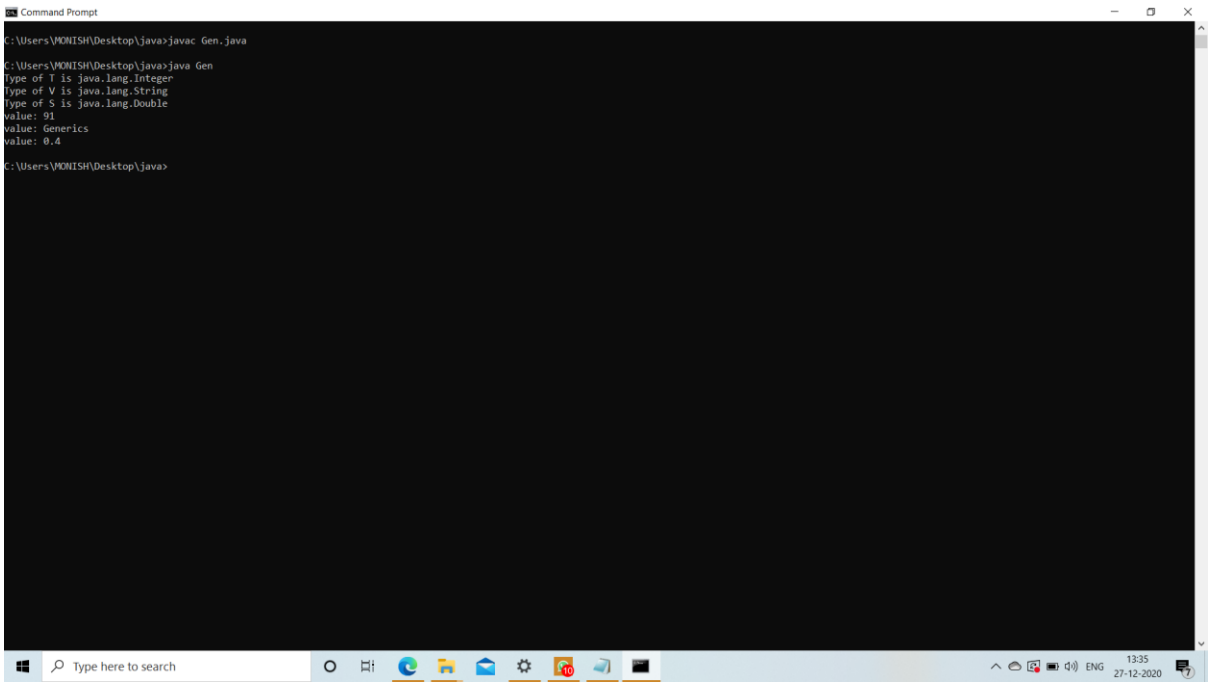
GENERICS :

1BM18CS0

```
import java.util.*;
class ThreeGen<T, V, S>
{
 T ob1;
 V ob2;
 S ob3;
ThreeGen(T o1, V o2, S o3)
{
ob1 = o1;
ob2 = o2;
ob3 = o3;
}
void showTypes()
{
System.out.println("Type of T is" + ob1.getClass().getName());
System.out.println("Type of V is" + ob2.getClass().getName());
System.out.println("Type of S is" + ob3.getClass().getName());
}
T getob1()
{
return ob1;
}
V getob2()
{
return ob2;
}
S getob3()
{
return ob3;
}
}
```

```
class Gen
{
public static void main (String args[])
{
ThreeGen <Integer, String, Double> tgobj = new ThreeGen<
        Integer, String, Double>(91, "Generics", 0.4);
tgobj.showTypes();
int v = tgobj.getob1();
System.out.println("value: " +v);
String str = tgobj.getob2();
System.out.println("value: "+ str);
double s = tg obj.getob3();
System.out.println("value: "+s);
}
}
```

Output:



Lab Program 8:

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 Wrong Age( ) when the input age=father’s age.

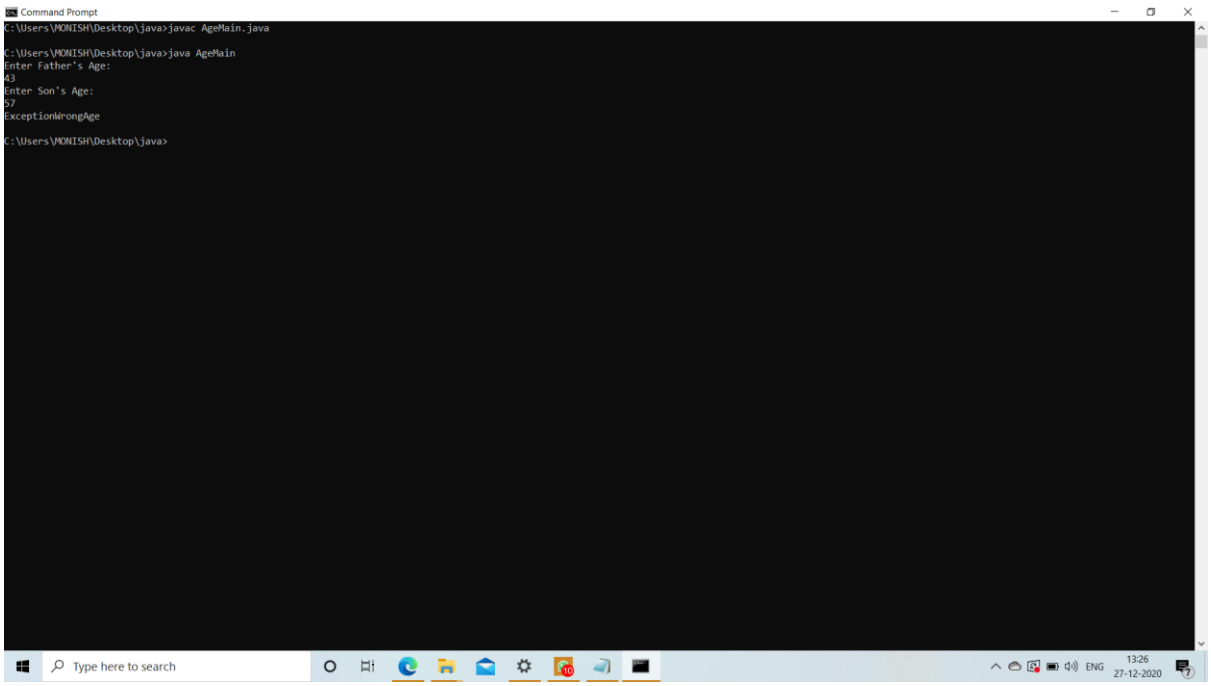
Writeup:

Exception:

```
import java.util.*;
class wrongAge extends Exception
{
int F,S;
wrongAge(int Fatherage,int sonage)
{
F= Fatherage;
S = Sonage;
}
}
class Father
{
int Fatherage;
int Sonage;
Father(int F,int s) throws wrongAge
{
if (f==s)
throw new wrongAge(FatherAge,sonage);
else
{
this.fatherage = f;
this.sonage=s;
}
}
}
class son extends Father
{
son(int f,int s) throws wrongAge
{
```

```
super(f,s);
if(s>=f)
throw new wrongAge(fatherage, sonage);
system.out.println("valid Age");
}
void display()
{
 System.out.println("father's Age:"+Fatherage);
 System.out.println(" son's Ase :"+sonage);
}
}
class Agemain
{
public static void main(string[] args)
{
int f,s;
scanner S=new scanner(system.in);
system.out.println("Enter Father's Age:");
 f=S.nextInt();
system.out.println("Enter son's Ase");
 s=S.nextInt();
 try
{
 son s1=new son(F,S);
  s1.display();
}
catch(wrongAge e)
{ system.out.println("Exception"+e);
}
}
}
```

Output:



Lab 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.

Writeup:

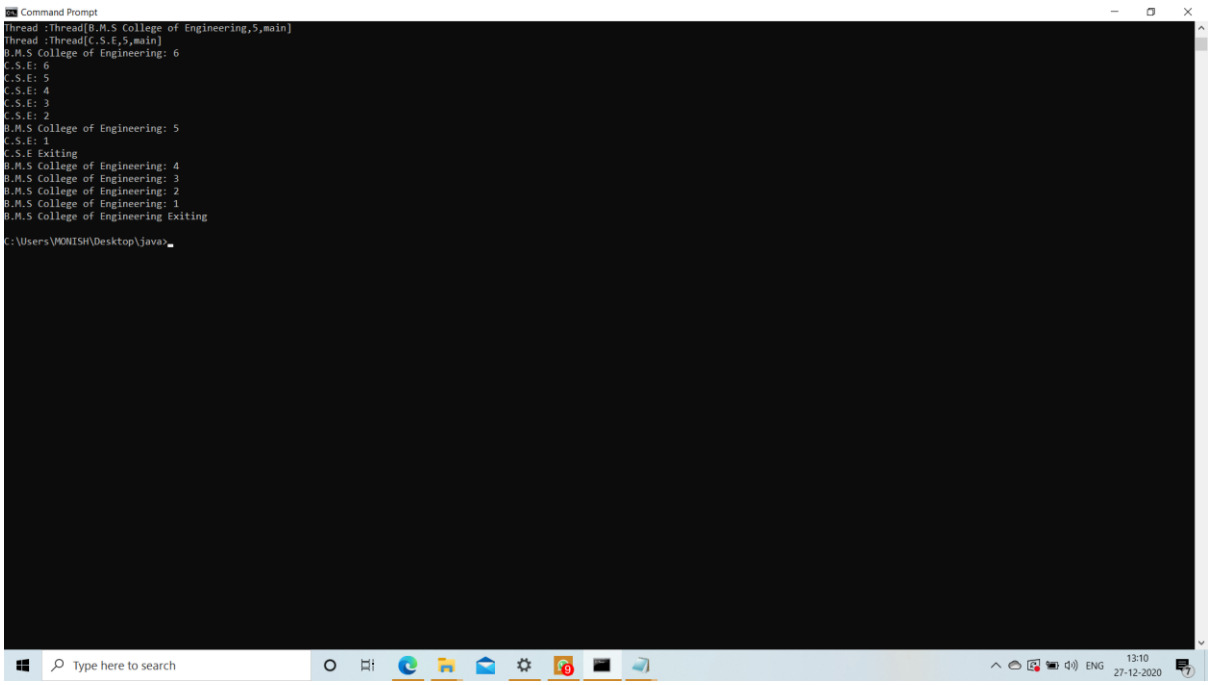
Week-11

Ambeter Manish
1BM18CS012

```
import java.util.*;
class ThreadM implements Runnable
{
String name;
int number;
Thread t;
ThreadM (String tn, int n)
{
name = tn;
number = n;
t = new Thread (this, name);
System.out.println("Thread : "+t);
t.start();
}
public void run()
{
try {
if (number==1)
{
for(int i=6;i>0;i--){
System.out.println(name+" : "+i);
Thread.sleep(10000);
}
}
if(number==2)
{
for(int i=6; i>0; i--){
System.out.println(name+": "+i);
Thread.sleep(2000);
}}
}
```

```
catch ( InterruptedException e)
{
system.out.println (name+" Interrupted");
}
system.out.println(name+" Exciting");
}}
class ThreadMain
{
Public static void main(string[] args)
{
new ThreadM("B.M.S college of Engineering", 1);
new ThreadM("C.S.E",2);
}}
```

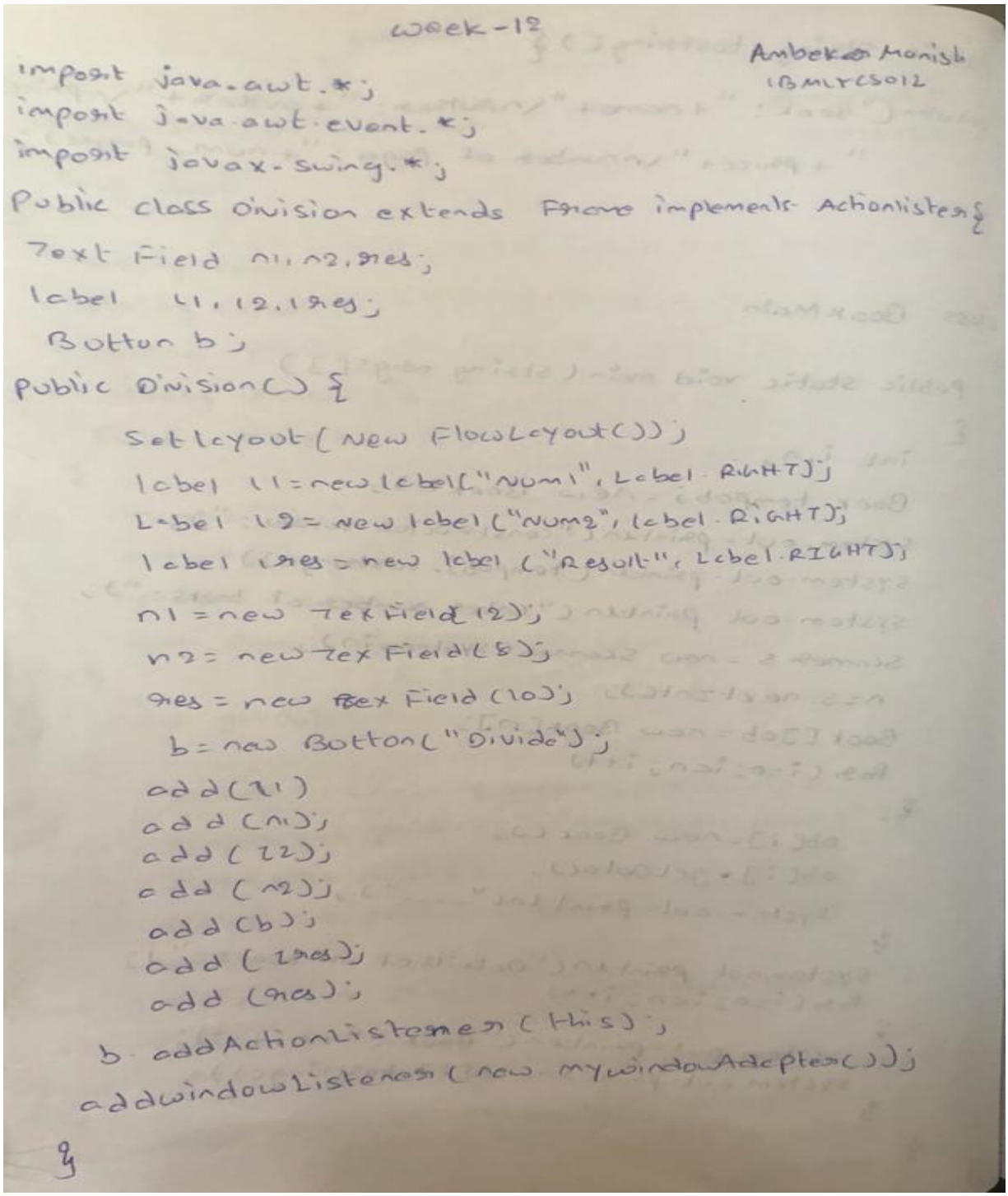
Output:



Lab Program 10:

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.

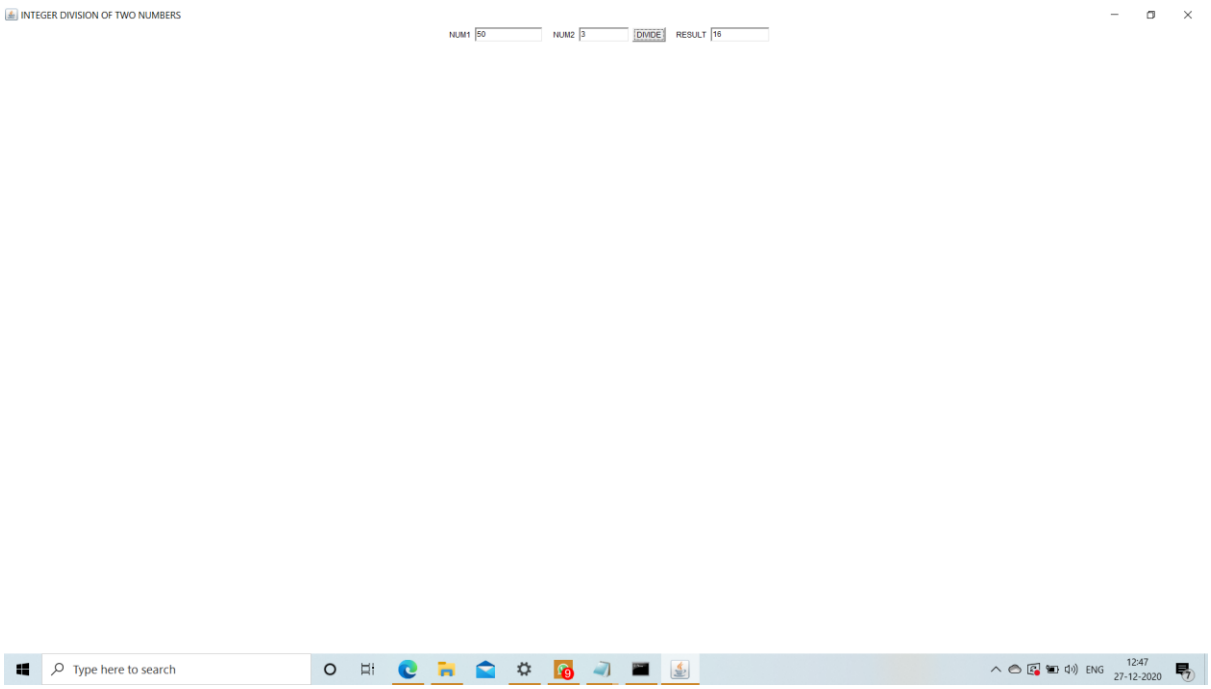
Writeup:



```
week-12                                   Ambeka Monish
                                          1BM17CS012
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
Public class Division extends Frame implements ActionListener{
 Text Field n1, n2, res;
 label l1, l2, lres;
  Button b;
Public Division() {
      SetLayout( New FlowLayout());
      label l1=new label("Num1", Label.RIGHT);
      Label l2= New label ("Num2", label.RIGHT);
      label lres = new label ("Result", Label.RIGHT);
      n1 = new TextField(12);
      n2= new TextField(5);
      res = new TextField(10);
       b= new Button("Divide");
      add(l1)
      add(n1);
      add(l2);
      add(n2);
      add(b);
      add(lres);
      add(res);
   b.addActionListener(this);
  addwindowListener( new MywindowAdapter());
}
```

```
Public void actionPerformed (ActionEvent ae)
{
  if(ae.getSource() == b)
  {
    try {
    int num1 = Integer.parseInt(n1.getText());
    int num2 = Integer.parseInt(n2.getText());
    int num3= num1/num2;
   res.setText(String.valueOf(num3));
} catch( NumberFormatException ne ) {
      JoptionPane.showMessageDialog( this, ne, "ERROR", JoptionPane.ERROR_MESSAGE);
}
catch(ArithmeticException a) {
    JoptionPane.showMessageDialog( this, a, "ERROR", JoptionPane.ERROR_MESSAGE);
    }
  }
}
Public static void main(String args[])
{
 Division i = new Division();
 i.setSize(new Dimension(400,400));
 i.setTitle("Integer Division of Two NUMBERS");
 i.setVisible(true);
}
class MyWindowAdapter extends WindowAdapter {
 Public void windowClosing(WindowEvent we)
{
  System.exit(0);
  }
}
}
```

Output:


INTEGER DIVISION OF TWO NUMBERS
NUM1 50
NUM2 3
DIVIDE
RESULT 16
Type here to search
ENG
12:47
27-12-2020