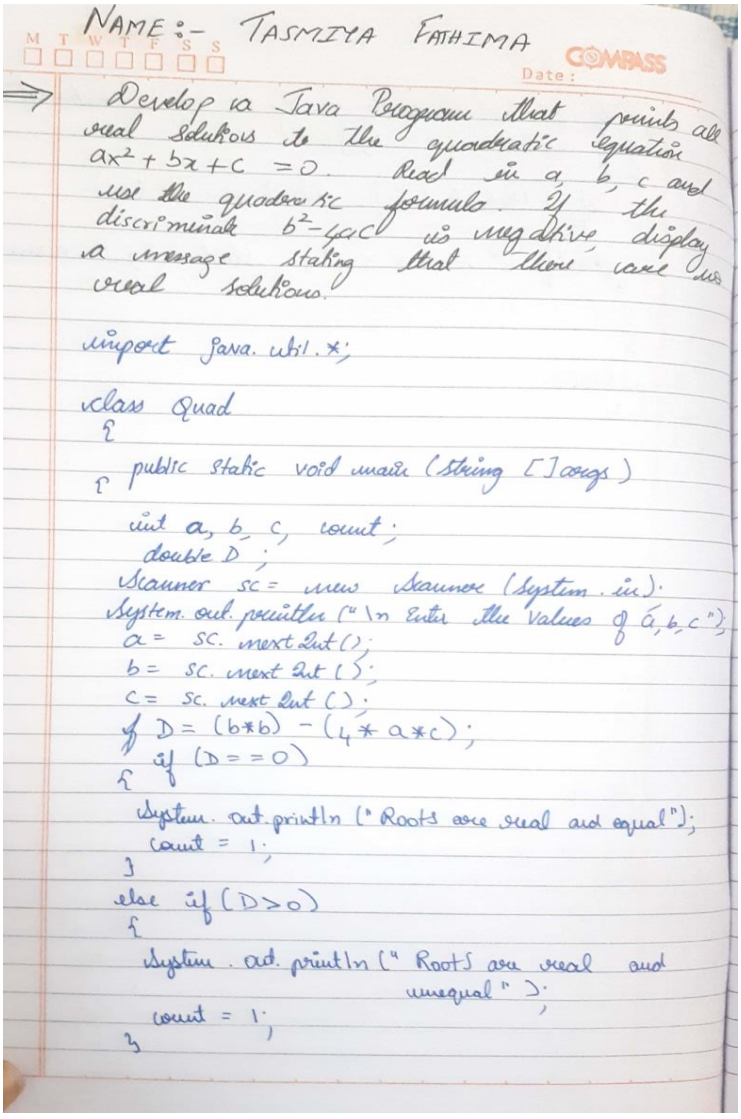
Lab Program: 1

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 java.util.*;

WRITE UP :-

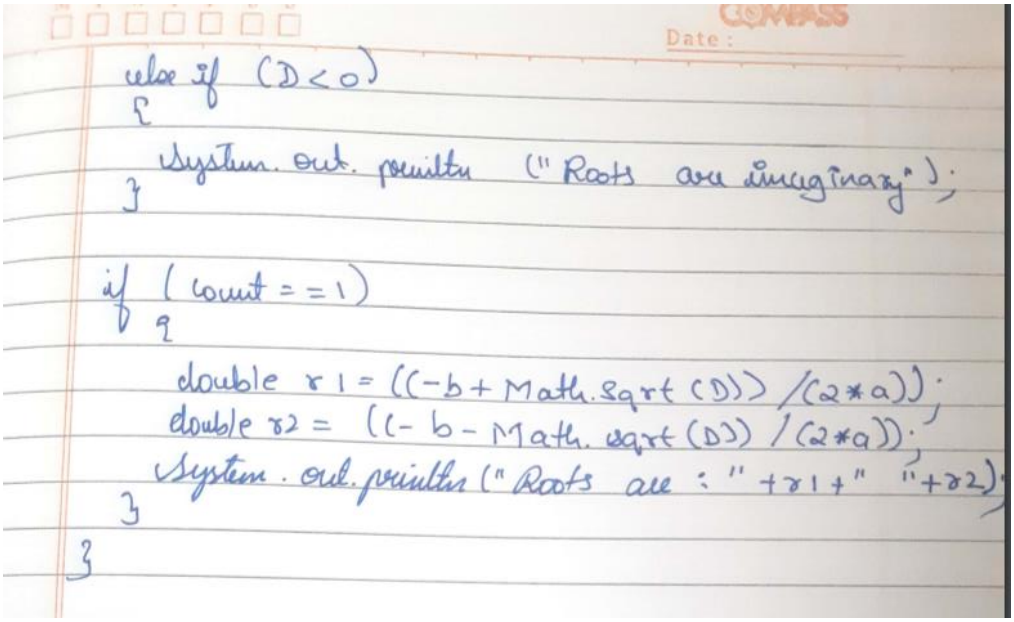


NAME :- TASMIYA FATHIMA

Date :

⇒ 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.

```
import java.util.*;
class Quad
{
public static void main (String [] args)
  int a, b, c, count;
   double D;
Scanner sc = new Scanner (System.in);
System.out.println("\n Enter the values of a,b,c");
 a = sc.nextInt();
 b = sc.nextInt();
 c = sc.nextInt();
 D = (b*b) - (4*a*c);
   if (D==0)
{
 System.out.println("Roots are real and equal");
  count = 1;
}
else if (D>0)
{
 System.out.println(" Roots are real and
                    unequal");
  count = 1;
}
```

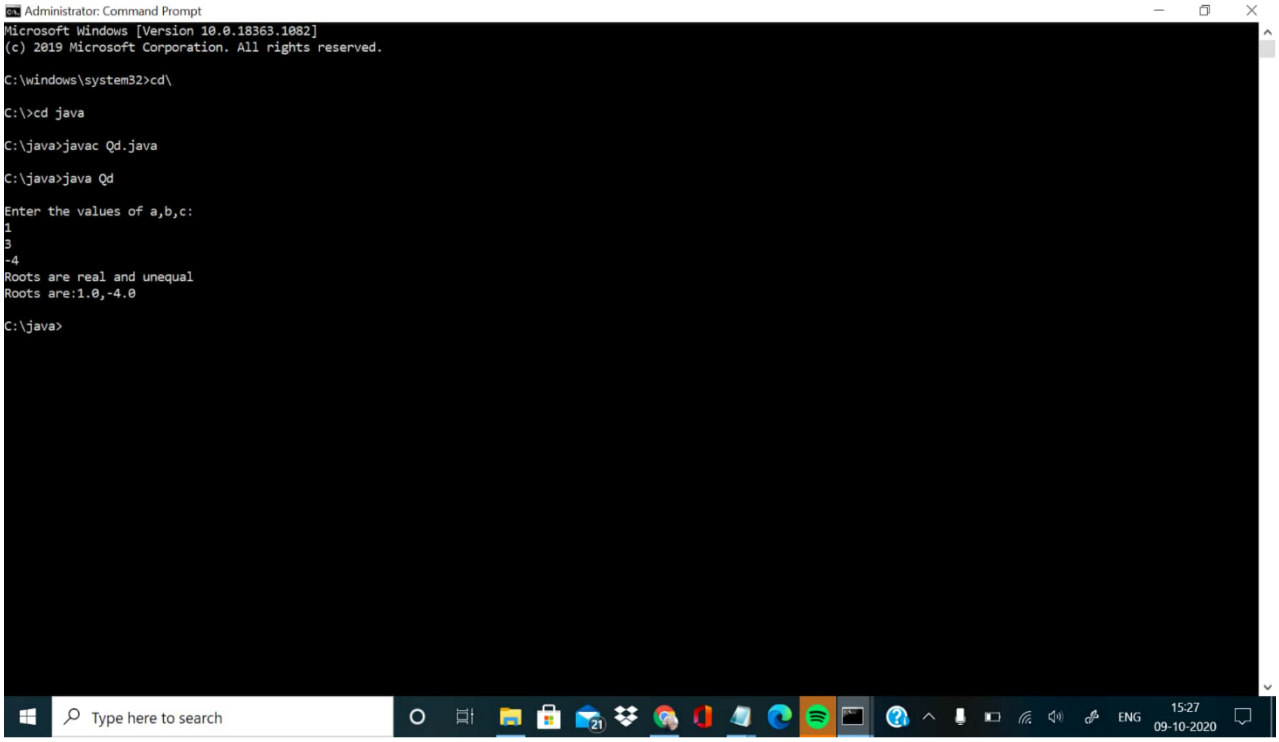


PROGRAM:-

```
class Qd
{
  public static void main(String[] args)
{
  int a,b,c,f=0;
  double D;
  Scanner sc=new Scanner(System.in);
  System.out.println("\nEnter the values of a,b,c:");
  a=sc.nextInt();
  b=sc.nextInt();
  c=sc.nextInt();
  D=(b*b)-(4*a*c);
  if(D==0)
 {
  System.out.println("Roots are real and equal");
 f=1;
```

```
 }
 else if(D>0)
 {
  System.out.println("Roots are real and unequal");
  f=1;
 }
 else if(D<0)
 {
  System.out.println("Roots are imaginary");
 }
if(f==1)
{
  double r1=((-b+Math.sqrt(D))/(2*a));
  double r2=((-b-Math.sqrt(D))/(2*a));
  System.out.println("Roots are:"+r1+","+r2);
}
}
}
```

OUTPUT:-



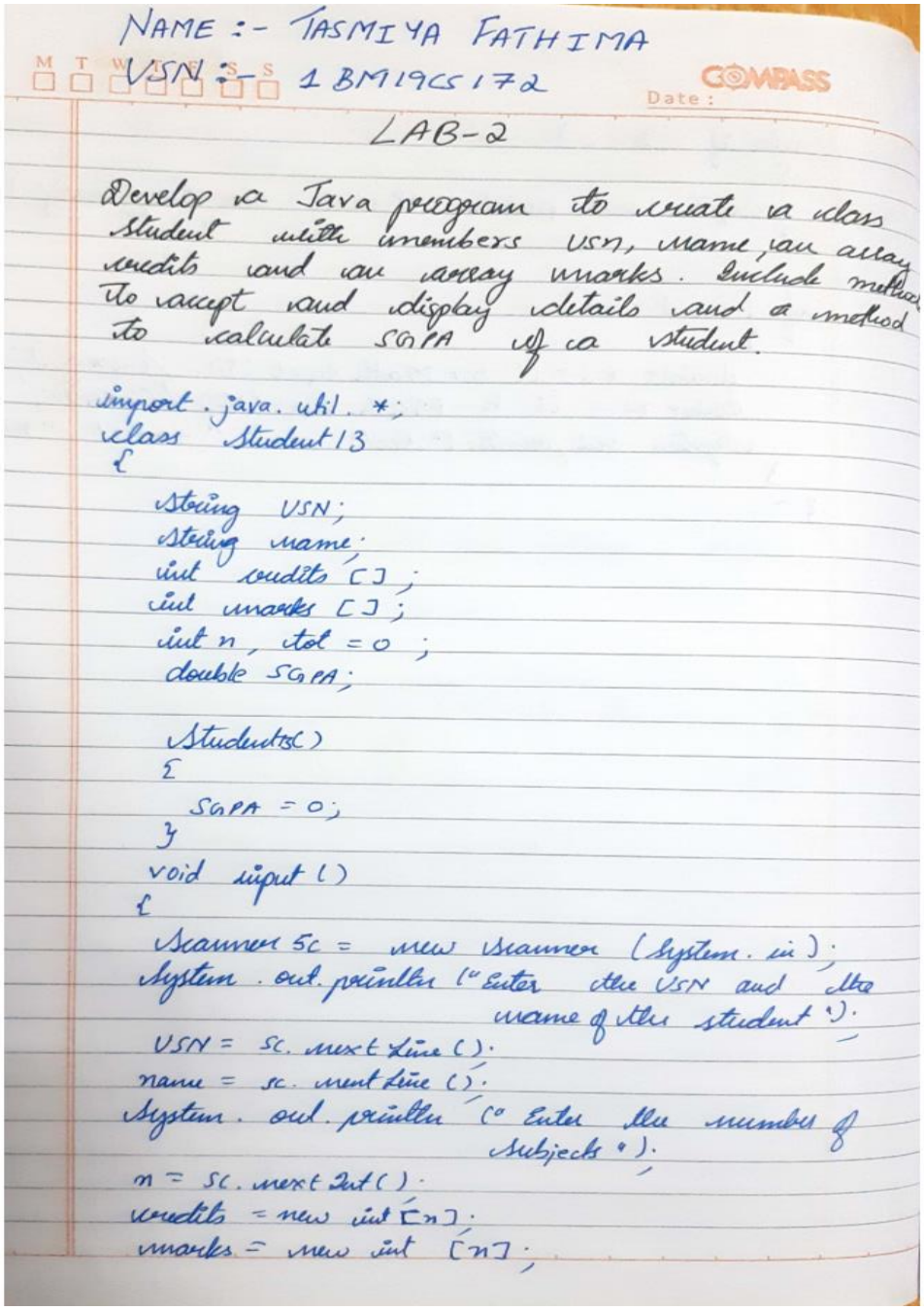
Lab Program 2:

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.

WRITE UP:-



NAME :- TASMIYA FATHIMA
USN :- 1BM19CS172

LAB-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.*;
class Student13
{
    String USN;
    String name;
    int credits[];
    int marks[];
    int n, tot = 0;
    double SGPA;

    Student13()
    {
      SGPA = 0;
    }
    void input()
    {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the USN and the
                        name of the student");
    USN = sc.nextLine();
    name = sc.nextLine();
    System.out.println("Enter the number of
                        subjects");
    n = sc.nextInt();
    credits = new int[n];
    marks = new int[n];
```

```
for(int i=0; i<n; i++)
{
System.out.println("Enter the credits for subject"
                    + (i+1));
credits[i] = sc.nextInt();
  tot = tot + credits[i];
}

for (int i=0; i<n; i++)
{
System.out.println("Enter the marks of the
student for subject:" + (i+1));
marks[i] = sc.nextInt();
}
}

Void grade_points()
  {
    int i;
    for(i=0; i<n; i++)
  {
    if (marks[i] >=90 && marks[i] < 100)
    marks[i] = 10;

else if (marks[i] >= 80 && marks[i] < 90)
     marks[i] = 9;

else if (marks[i] >= 70 && marks[i] < 80)
     marks[i] = 8;

else if (marks[i] >= 60 && marks[i] < 70)
     marks[i] = 7;
```

```
else if( marks[i] >=50 && marks[i] <60)
        marks[i] = 6;

else if (marks [i] >=60 && marks [i] <=80)
        marks [i]= 4;

else if (marks [i] < 40)
    marks [i] = 0;
  }
 }
}

void calculate_SGPA()
{
  int i;
  for (i=0; i<n; i++)
  {
     SGPA = SGPA + ( credits [i] * marks[i]);
  }
     SGPA = SGPA / tot;
}

 void display_details ()
 {
     System.out.println (" The student with
      USN : " + USN + ", Name : " + name + ", SGPA:
       + SGPA);
 }

public static void main (String [] args)
  {
     Student13 obj = new Student ();
```

```
Obj.input();
Obj.grade_points();
Obj.calculate_SGPA();
Obj.display_details();
}
}
```

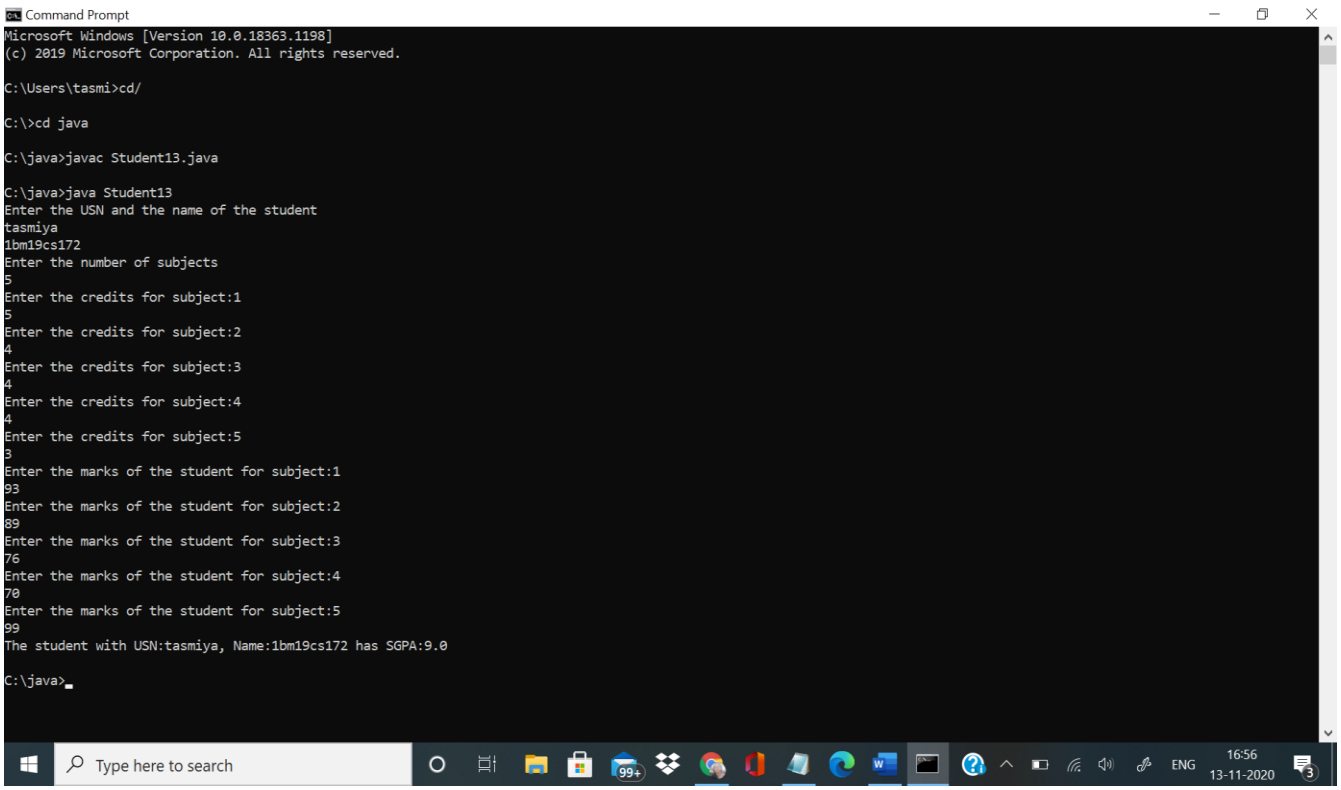
```
import java.util.*;
class Student13
{
 String USN;
 String name;
 int credits[];
 int marks[];
 int n,tot=0;
 double SGPA;

Student13()
{
 SGPA=0;
}
void input()
{
 Scanner sc=new Scanner(System.in);
 System.out.println("Enter the USN and the name of the student");
 USN=sc.nextLine();
 name=sc.nextLine();
 System.out.println("Enter the number of subjects");
 n=sc.nextInt();
 credits=new int[n];
 marks =new int[n];
 for(int i=0;i<n;i++)
```

```
{
 System.out.println("Enter the credits for subject:"+(i+1));
 credits[i]=sc.nextInt();
 tot=tot+credits[i];
}
for(int i=0;i<n;i++)
{
 System.out.println("Enter the marks of the student for
subject:"+(i+1));
 marks[i]=sc.nextInt();
}
}
void grade_points()
{
    int i;
    for(i=0;i<n;i++)
    {
        if(marks[i]>=90 && marks[i]<100)
        {
            marks[i]=10;
        }
        else if(marks[i]>=80 && marks[i]<90)
        {
            marks[i]=9;
        }
```

```
        else if(marks[i]>=70 && marks[i]<80)
        {
           marks[i]=8;
        }
        else if(marks[i]>=60 && marks[i]<70)
        {
           marks[i]=7;
        }
        else if(marks[i]>=50 && marks[i]<60)
        {
           marks[i]=6;
        }
        else if(marks[i]>=40 && marks[i]<50)
        {
           marks[i]=4;
        }
        else if(marks[i]<40)
        {
           marks[i]=0;
        }
    }
}
void calculate_SGPA()
{
 int i;
```

```
 for(i=0;i<n;i++)
 {
  SGPA=SGPA+(credits[i]*marks[i]);
 }
  SGPA=SGPA/tot;
}
void display_details()
{
   System.out.println("The student with USN:"+USN+",
Name:"+name+" has SGPA:"+SGPA);
}
public static void main(String[] args)
{

 Student13 obj=new Student13();
 obj.input();
 obj.grade_points();
 obj.calculate_SGPA();
 obj.display_details();
}
}
```

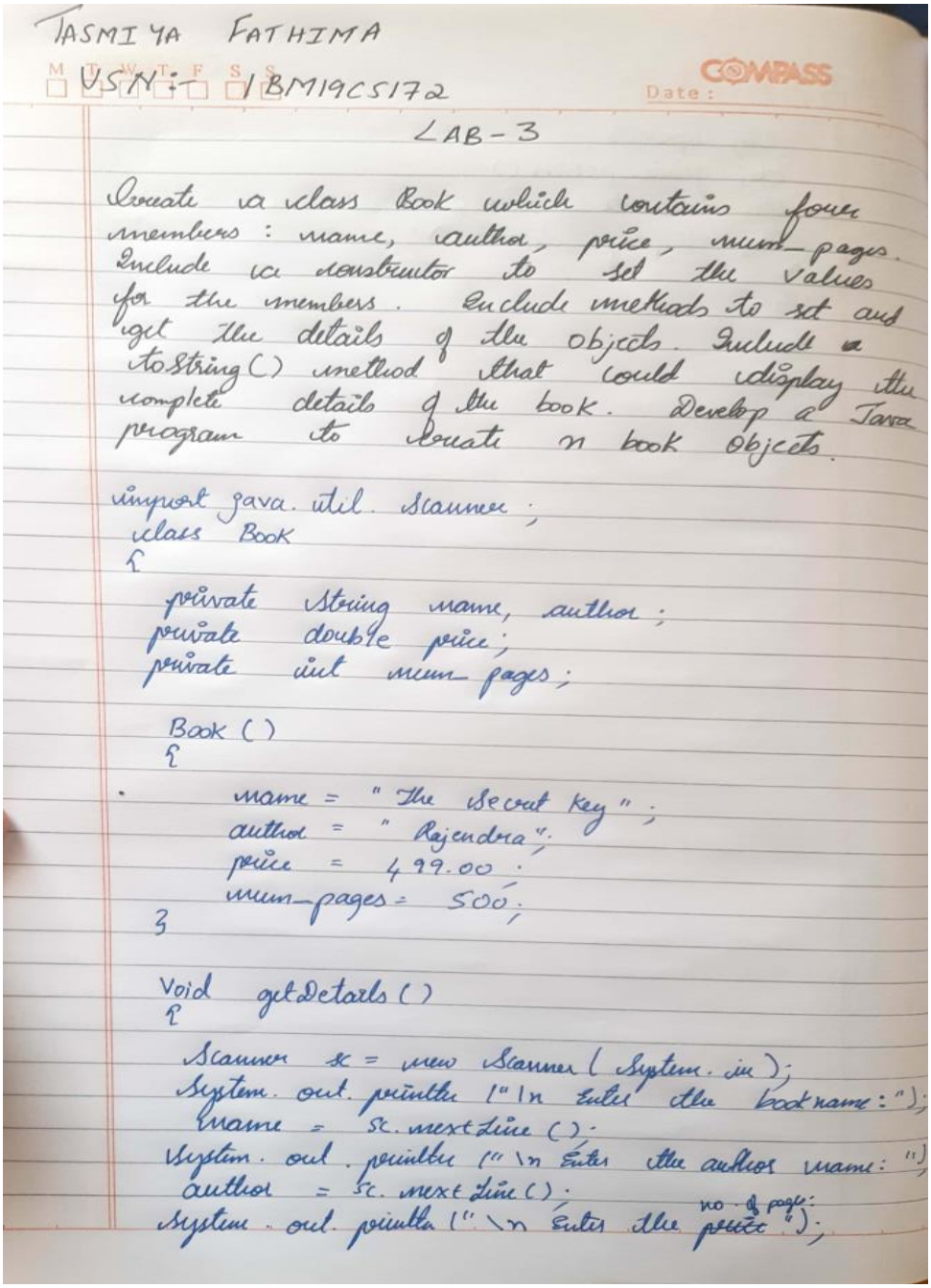
OUTPUT:-



LAB PROGRAM -3

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.

Write Up:-



TASMIYA FATHIMA

USN:- 1BM19CS172

Date:

LAB-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
{
    private String name, author;
    private double price;
    private int num_pages;

    Book()
    {
        name = "The Secret Key";
        author = "Rajendra";
        price = 499.00;
        num_pages = 500;
    }

    Void getDetails()
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("\n Enter the book name:");
        name = sc.nextLine();
        System.out.println("\n Enter the author name:");
        author = sc.nextLine();
        System.out.println("\n Enter the price no. of page:");
```

```
num_pages = sc.nextLine();
System.out.println("Enter the price :");
price = sc.nextDouble();
}

public String toString()
{
  String temp = "Book name : "+name+"\n Author name : " + author + "\n No. of pages : " + num_pages+
"\n Price : " + price + "\n";

  return (temp);
}
}

class Book_details
{
  public static void main(String args[])
  {
    int i, n;
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the number of book :");
    n = sc.nextInt();
  Book [] obj = new Book[n];
  for(i=0; i<n; i++)
  {
      obj[i] = new Book();
  }
  System.out.println("\t\t *** Ente Book Details
                    ***");
  for(i=0; i<n; i++)
  {
      System.out.println("\n Book " + (i+1) + " ; ");
      obj[i].getDetails();
  }
```

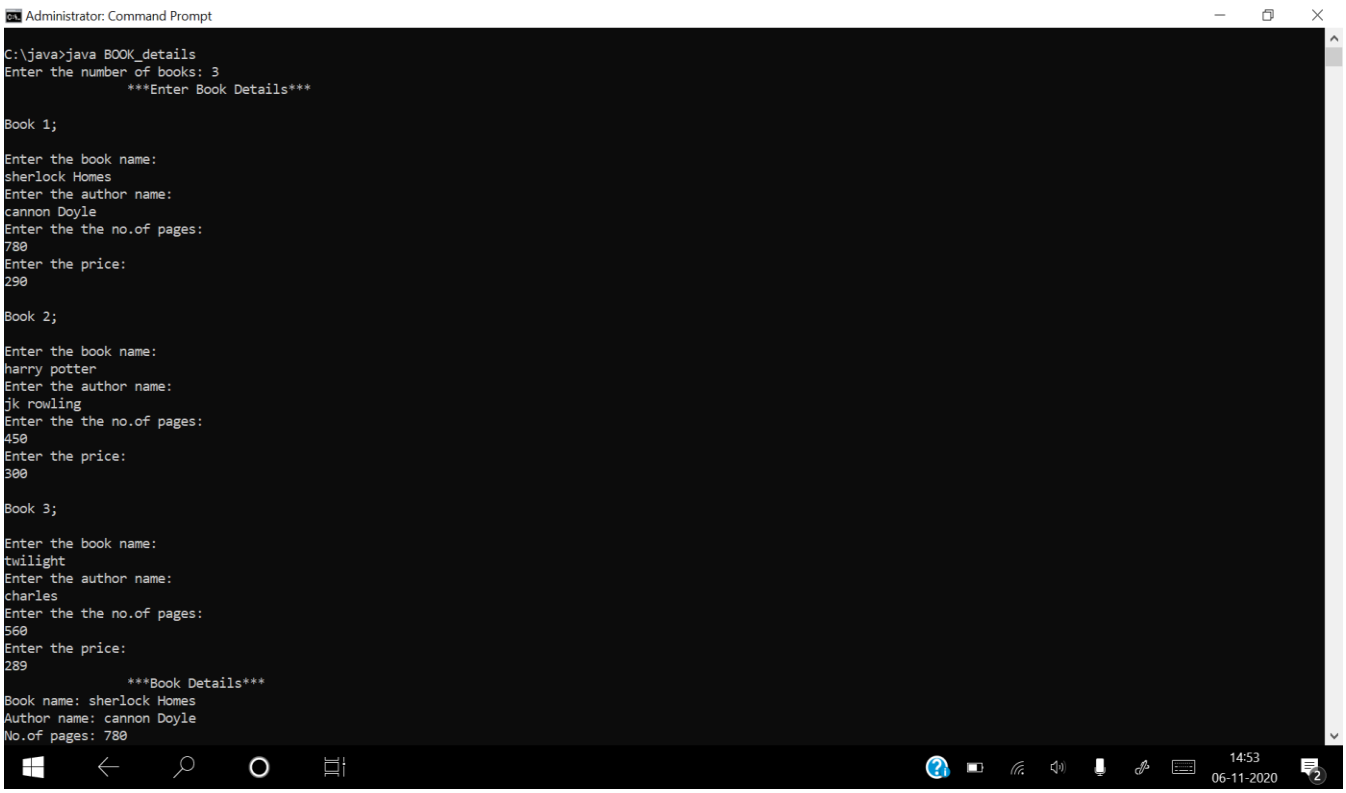
```
for(i=0; i<n; i++)
{
  System.out.println(obj[i]);
}
}
}
```

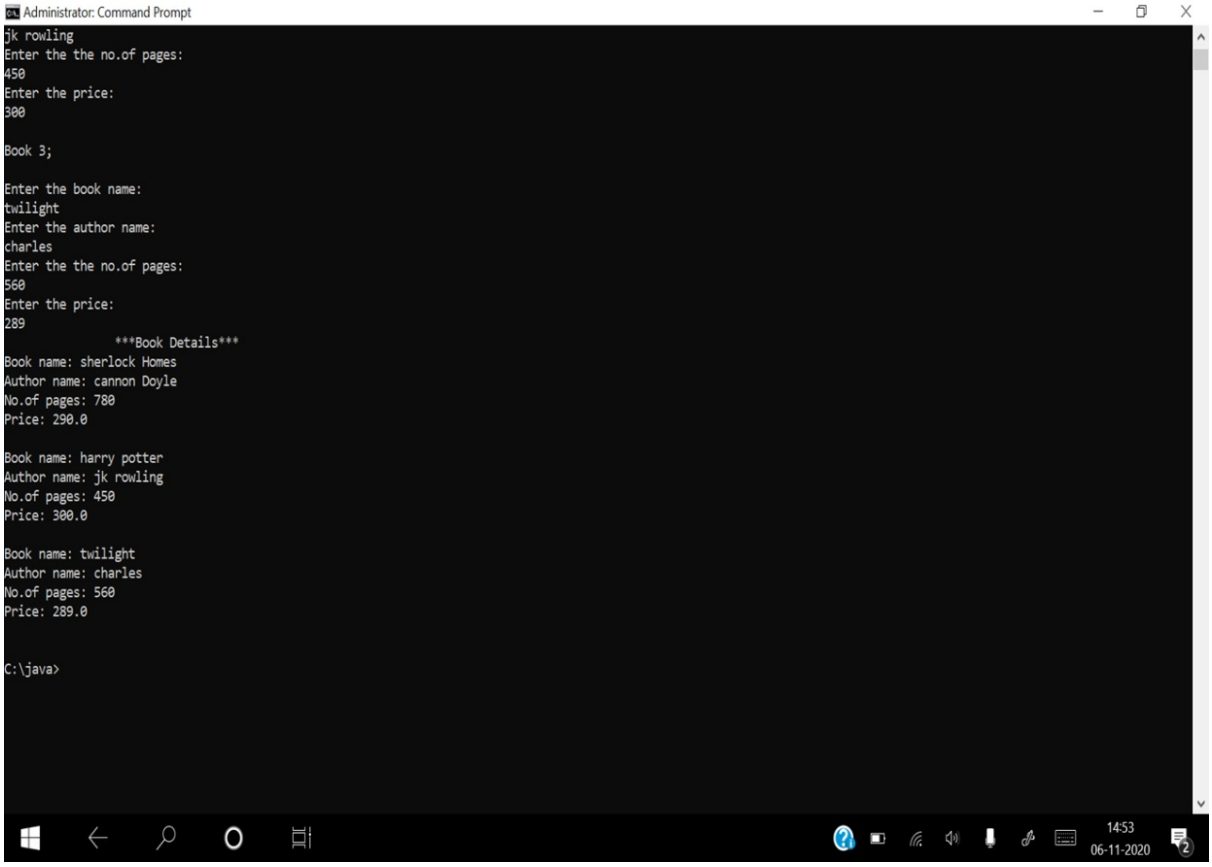
```
import java.util.Scanner;

class Book
{
        private String name,author;
        private double price;
        private int num_pages;

       Book()
        {
                name="The Secret key";
                author="Rajendra";
                price=399.00;
                num_pages=500;
        }

        void getDetails()
        {
                Scanner in=new Scanner(System.in);
                System.out.println("\nEnter the book name: ");
                name=in.nextLine();
                System.out.println("Enter the author name: ");
                author=in.nextLine();
                System.out.println("Enter the the no.of pages: ");
                num_pages=in.nextInt();
```

```
            System.out.println("Enter the price: ");
            price=in.nextDouble();
        }

        public String toString()
        {
            String temp="Book name: "+name+"\nAuthor name:
"+author+"\nNo.of pages: "+num_pages+"\nPrice: "+price+"\n";
            return(temp);
        }

}
class BOOK_details
{
  public static void main(String args[])
  {
        int i,n;
        Scanner in=new Scanner(System.in);
        System.out.print("Enter the number of books: ");
        n=in.nextInt();
        Book[] obj=new Book[n];
        for(i=0;i<n;i++)
        {
            obj[i]=new Book();
        }
```

```
        System.out.println("\t\t***Enter Book Details***");
      for(i=0;i<n;i++)
       {
            System.out.println("\nBook "+(i+1)+";");
            obj[i].getDetails();
       }
        System.out.println("\t\t***Book Details***");
      for(i=0;i<n;i++)
       {
            System.out.println(obj[i]);
       }
  }
}
```

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.

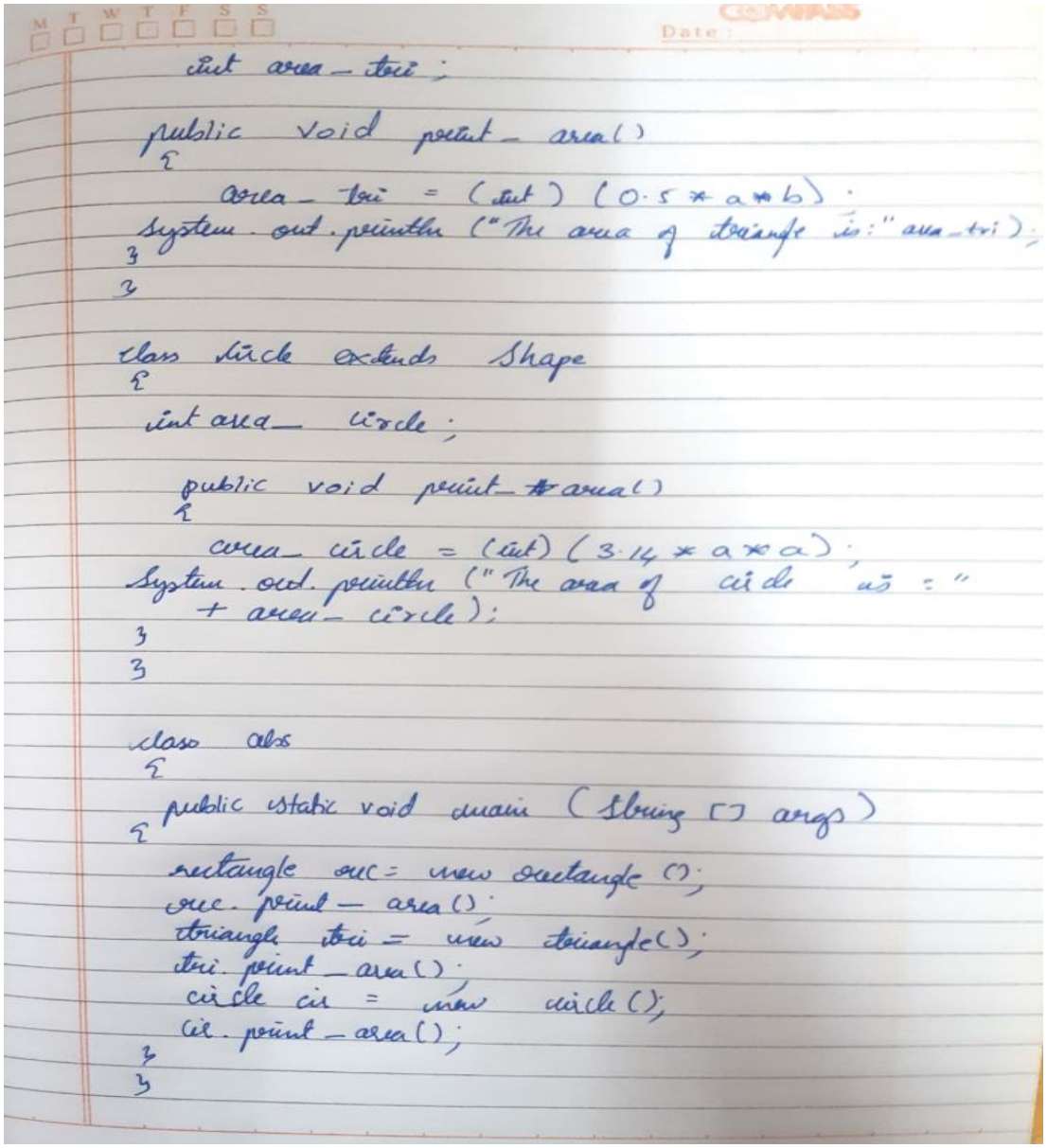
WRITE UP:-

NAME:- TASMIYA FATHIMA

USN: 1BM19CS172 LAB-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 of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

```
abstract class Shape
{
    int a = 3;
    int b = 4;

    abstract public void printArea();
}

class Rectangle extends Shape
{
    public int area_rect;

    public void print_area()
    {
        area_rect = a*b;
    System.out.println("The area of rectangle
                is: " + area_rect);
    }
}

class Triangle extends Shape
{
```



```
int area_tri;

public void print_area()
{
    area_tri = (int) (0.5 * a * b);
System.out.println("The area of triangle is:" area_tri);
}
}

class circle extends Shape
{
 int area_circle;

   public void print_area()
   {
     area_circle = (int) (3.14 * a * a);
System.out.println("The area of circle is :"
   + area_circle);
}
}

class abs
{
  public static void main (String [] args)
{
  rectangle rec = new rectangle ();
  rec.print_area();
  triangle tri = new triangle();
  tri.print_area();
  circle cir = new circle();
  cir.print_area();
}
}
```

abstract class Shape

{

int a=3;

int b=4;

abstract public void print_area();

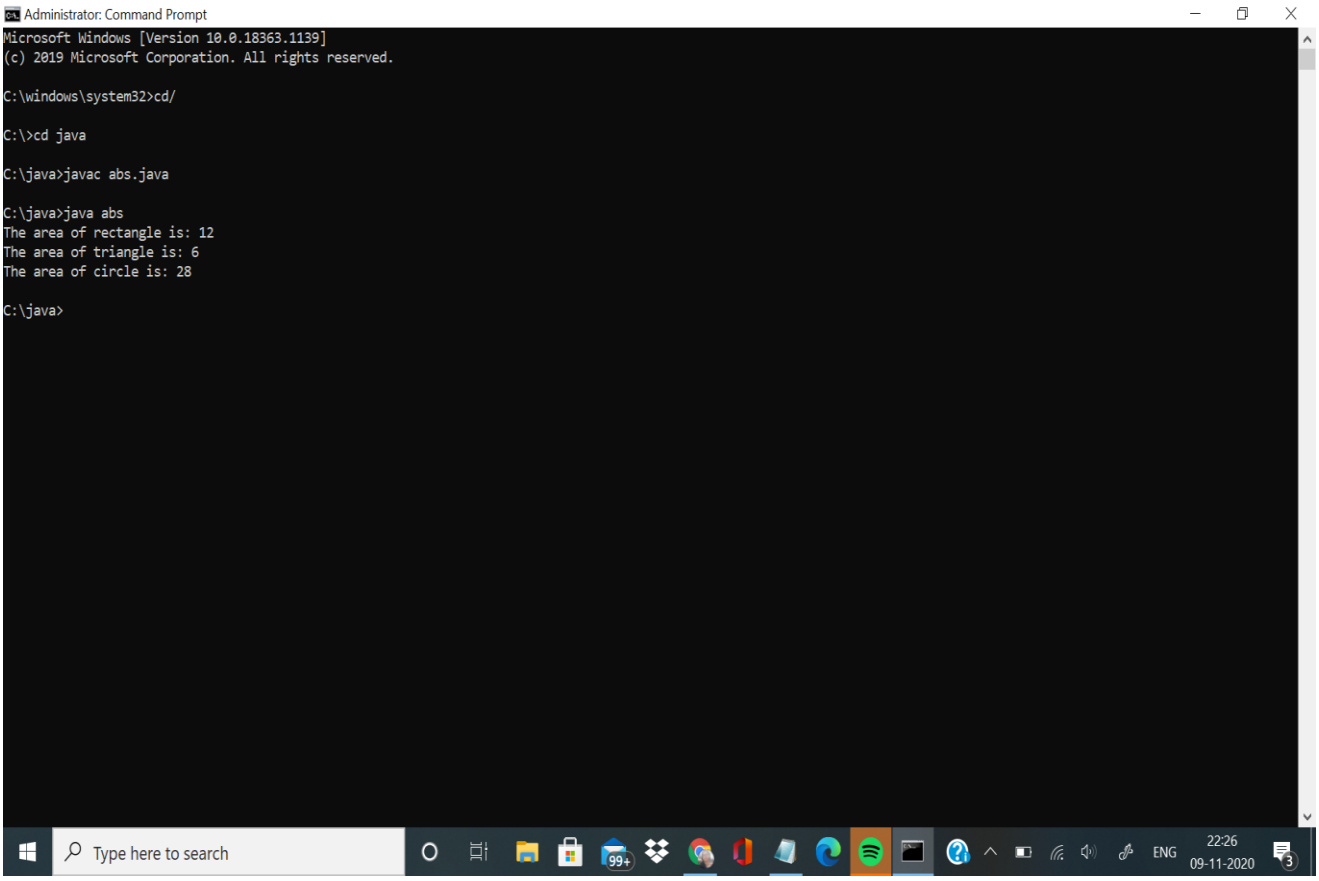
}

class rectangle extends Shape

```
{
public int area_rect;

public void print_area()
{
area_rect=a*b;
System.out.println("The area of rectangle is: "+area_rect);
}
}
class triangle extends Shape
{
int area_tri;

public void print_area()
{
area_tri=(int) (0.5*a*b);
System.out.println("The area of triangle is: "+area_tri);
}
}
class circle extends Shape
{
int area_circle;

public void print_area()
{
```

```
area_circle=(int) (3.14*a*a);
System.out.println("The area of circle is: "+area_circle);
}
}
class abs{
public static void main(String[] args){
rectangle rec = new rectangle();
rec.print_area();
triangle tri = new triangle();
tri.print_area();
circle cir = new circle();
cir.print_area();
}
}
```

OUTPUT:-



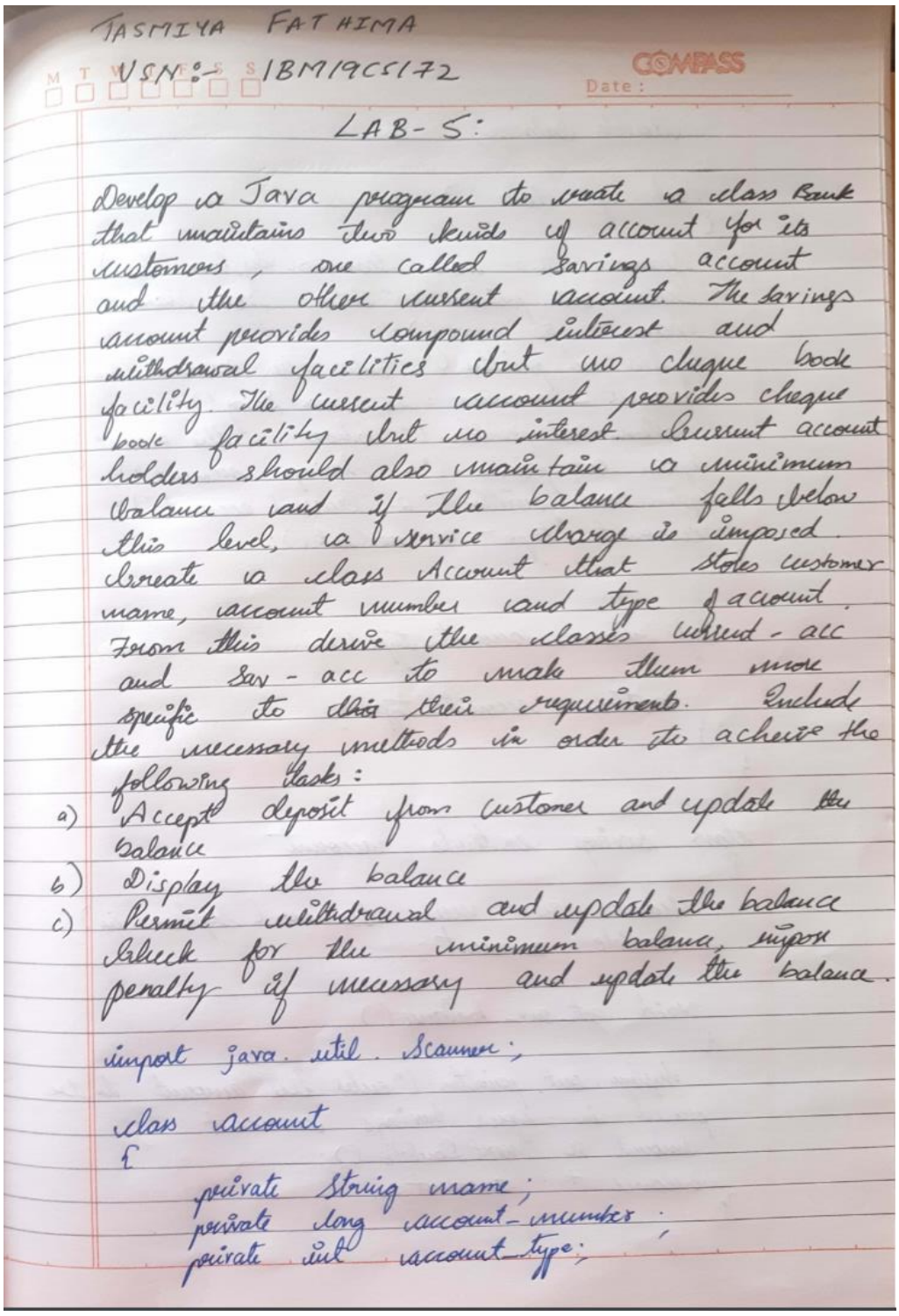
LAB PROGRAM-5

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:

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.

WRITE UP:-



JASMIYA FATHIMA
USN:- 1BM19CS172
Date :

LAB-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-acc and sav-acc to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

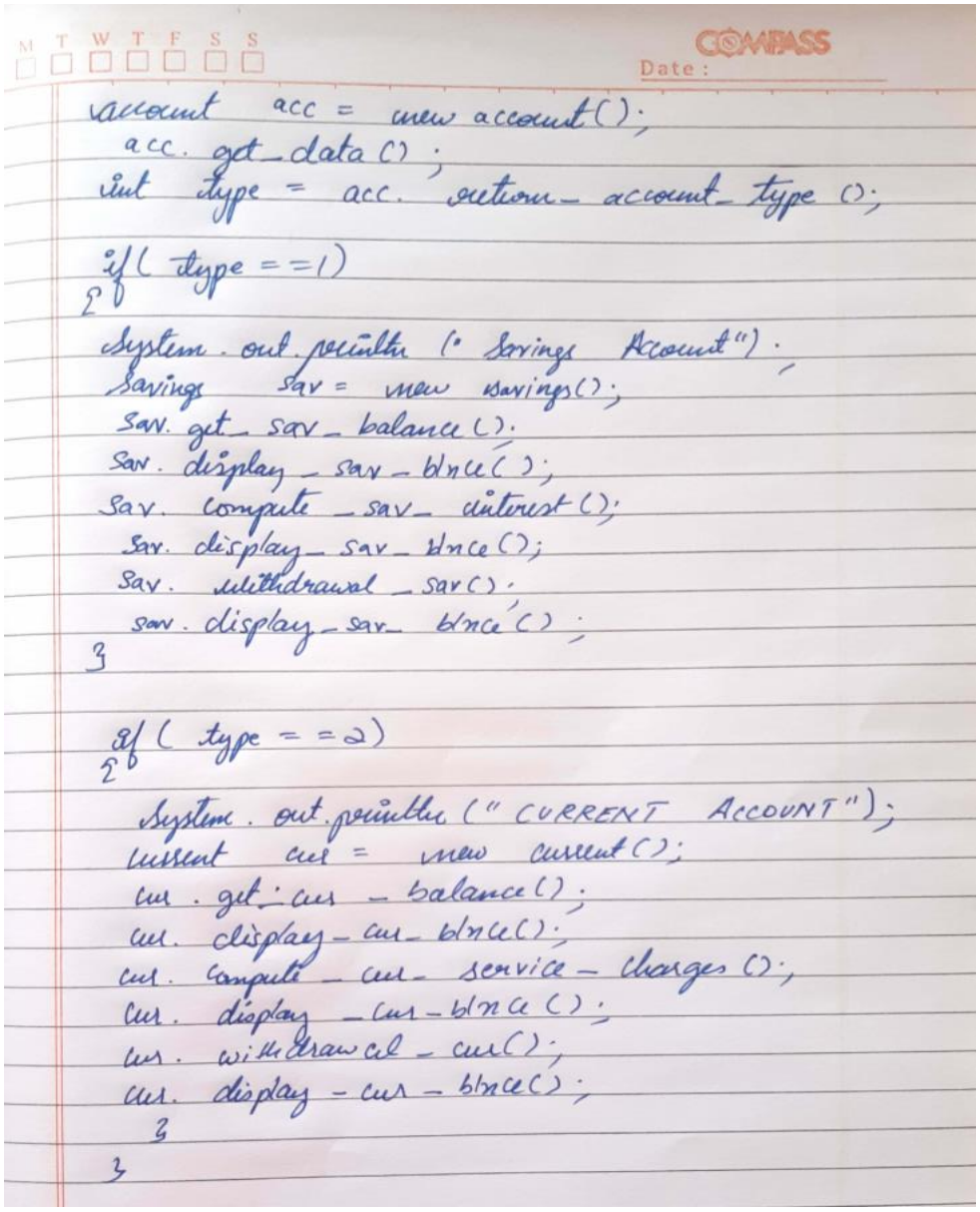
a) Accept deposit from customer and update the balance
b) Display the balance
c) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.

```
import java.util.Scanner;

class account
{
    private String name;
    private long account_number;
    private int account_type;
```

```
    double balance;

    void get_data ()
    {
      Scanner sc = new Scanner(System.in);
      System.out.println ("Enter your name");
      name = sc.next();
      System.out.println ("Enter the account_number");
      account_number = sc.nextLong();
      System.out.println ("Choose the account type");
      System.out.println ("1. Savings account");
      System.out.println ("2. Current account");
      account_type = sc.nextInt();
    }

    int return_account_type()
    {
      return account_type;
    }
}

class savings extends account
{
    Scanner sc = new Scanner(System.in);
    double amount;

    void get_sav_balance()
    {
      System.out.println ("enter the amount to be
      placed in your savings account");
      amount sc.nextDouble();
      balance += amount;
    }
```

```
void display_sav_bln()
{
  System.out.println("balance =" + balance);
}

void compute_sav_interest()
{
 System.out.println("Interest @ 5% shall be
added to your balance");
 balance = balance + (.05 * balance);
}

void withdrawl_sav()
{
System.out.println("Enter the amount to be
withdrawn");
 amount = sc.nextDouble();
  balance = balance - amount;
}
}

class current extends account
{
    Scanner sc = new Scanner(System.in);
     double amount;
     final double min_balance = 5000;

    void get_cur_balance()
    {
    System.out.println("Enter the amount to
be placed in your account");
    amount = sc.nextDouble();
   balance += amount;
}
```

```
void display_cur_balance()
{
System.out.println("balance = " +balance);
}

Void compute_cur_service_charges()
{
  if (balance < min_balance)
  {
    System.out.println("service tax of Rs. 500
    shall be levied");
    balance = balance - 500;
  }
else
  {
    System.out.println("minimum balance is
    maintained");
  }
}

Void withdrawl_cur()
{
System.out.println("Enter the amount to
be withdrawn");
amount = sc.nextDouble();
balance = balance - amount;
  }
}

class bankmain
{
public static void main(String args[])
{
System.out.println("Enter the bank details
```



```
account acc = new account();
acc.get_data();
int type = acc.return_account_type();

if(type==1)
{
System.out.println("Savings Account");
Savings sav = new savings();
sav.get_sav_balance();
sav.display_sav_blnce();
sav.compute_sav_interest();
sav.display_sav_blnce();
sav.withdrawal_sav();
sav.display_sav_blnce();
}

if(type==2)
{
System.out.println("CURRENT ACCOUNT");
current cur = new current();
cur.get_cur_balance();
cur.display_cur_blnce();
cur.compute_cur_service_charges();
cur.display_cur_blnce();
cur.withdrawal_cur();
cur.display_cur_blnce();
}
}
```

```
import java.util.Scanner;

class account
{
    private String name;
    private long account_number;
    private int account_type;
```

```
        double balance;

        void get_data()
        {
         Scanner ss=new Scanner(System.in);
         System.out.println("enter your name");
         name=ss.next();
         System.out.println("enter the account_number");
         account_number=ss.nextLong();
        System.out.println("choose the account type ");
         System.out.println("1.savings account");
         System.out.println("2.current account");
         account_type=ss.nextInt();
        }

        int return_account_type()
        {
         return account_type;
        }
}

class savings extends account
{
        Scanner ss=new Scanner(System.in);
        double amount;
```

```
    void get_sav_balance()
    {
     System.out.println("enter the amount to be placed in your
savings account");
     amount=ss.nextDouble();
     balance+=amount;
    }

    void display_sav_blnce()
    {
     System.out.println("balance="+balance);
    }

    void compute_sav_interest()
    {
     System.out.println("interest of 5% shall be added to your
balance");
     balance=balance+(.05*balance);
    }

    void withdrawl_sav()
    {
     System.out.println("enter the amount to be withdrawn");
     amount=ss.nextDouble();
```

```
        balance=balance-amount;
        }

}

class current extends account
{
        Scanner ss=new Scanner(System.in);
        double amount;
        final double min_balance=5000;

        void get_cur_balance()
        {
        System.out.println("enter the amount to be placed in your
current account");
        amount=ss.nextDouble();
        balance+=amount;
        }

        void display_cur_blnce()
        {
        System.out.println("balance="+balance);
        }

        void compute_cur_service_charges()
```

```
        {
          if(balance<min_balance)
                {
                 System.out.println("service tax of rs.500 shall be levied");
                 balance=balance-500;
                }
          else
                {
                 System.out.println("minimum balance is maintained");
                }
        }

        void withdrawl_cur()
        {
          System.out.println("enter the amount to be withdrawn");
          amount=ss.nextDouble();
          balance=balance-amount;
        }

}

class bankmain
{
public static void main(String args[])
{
```

```
 System.out.println("enter the bank details");
 account acc=new account();
 acc.get_data();
 int type=acc.return_account_type();
 if (type==1)
{
 System.out.println("SAVINGS ACCOUNT");
 savings sav=new savings();
  sav.get_sav_balance();
  sav.display_sav_blnce();
  sav.compute_sav_interest();
  sav.display_sav_blnce();
  sav.withdrawl_sav();
  sav.display_sav_blnce();
}
if(type==2)
{
 System.out.println("CURRENT ACCOUNT");
  current cur=new current();
  cur.get_cur_balance();
  cur.display_cur_blnce();
  cur.compute_cur_service_charges();
  cur.display_cur_blnce();
  cur.withdrawl_cur();
```

```
            cur.display_cur_blnce();
        }
}


}
```

OUTPUT:-