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Dept: CSE

Section: C

Lab_batch: C-2

Lab Program-1(09/10/2020)

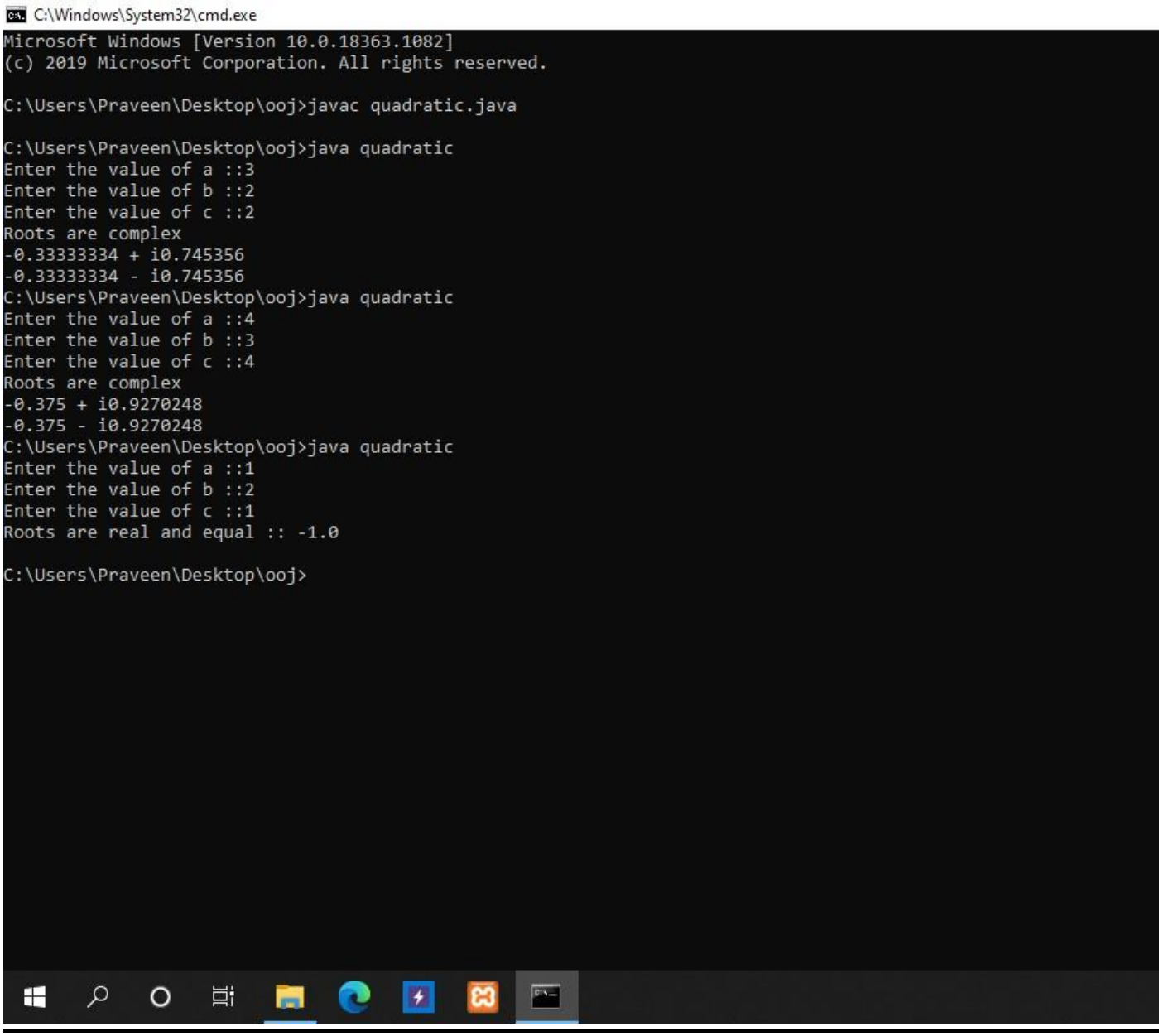
1) Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.

```
Import   java.util.Scanner;
import static java.lang.Math.*;
class quadratic
{
 public static void main(String args[])
  {
    quadratic obj = new quadratic();
```

```
   Scanner sc = new Scanner(System.in);
System.out.print("Enter the value of a ::");
float a = sc.nextFloat();
   System.out.print("Enter the value of b ::");
float b = sc.nextFloat();
   System.out.print("Enter the value of c ::");
float c = sc.nextFloat();


    if (a == 0)
    {
         System.out.println("Invalid");
         return;
    }
         float d = b*b - 4*a*c;
floatsqrt_val = (float)Math.sqrt(abs(d));
         float root1= (-b + sqrt_val) / (2 * a);
         float root2=(-b - sqrt_val) / (2 * a);
    if(d == 0)
    {
      System.out.println("Roots are real and equal :: "+root1);
    }
    else if (d > 0)
    {
         System.out.print("Roots are real and different \n");
         System.out.print(root1 + "\n"+ root2);
    }
    else
    {
     System.out.print("Roots are complex \n");
```

```
    System.out.print( -b / ( 2 * a ) + " + i"+ sqrt_val/( 2 * a ) + "\n" + -b / ( 2 * a )+ " - i" + sqrt_val/( 2 * a ));
    }
  }
```

Output :



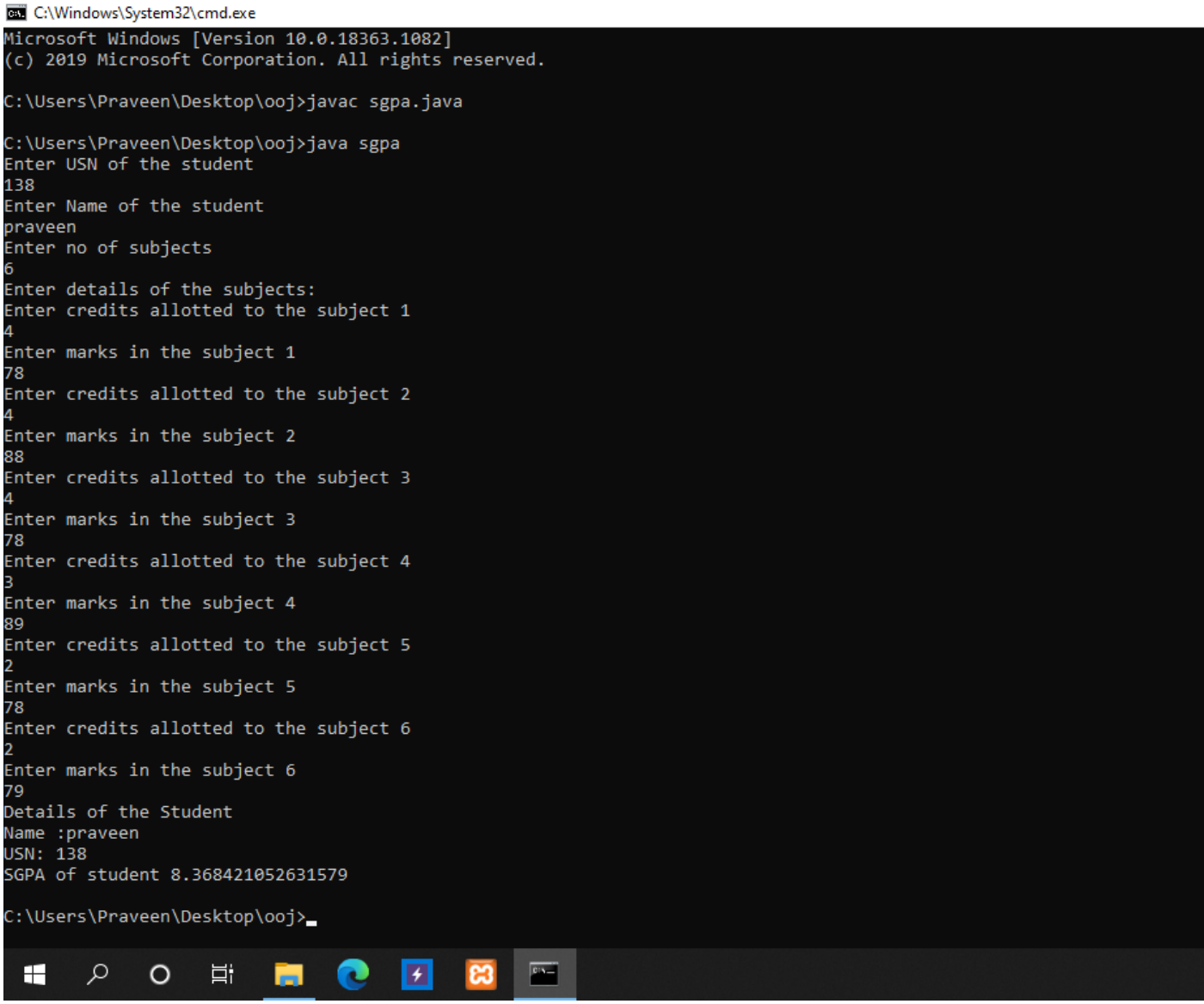
Lab Program-2(09/10/2020)

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.Scanner;

class Student
{
  String USN;
String name;
  int n;
  double SGPA = 0;
  int Credits = 0;
 Scanner in = new Scanner(System.in);

 void Details()
 {
 System.out.println("Enter USN of the student");
 USN = in.nextLine();
 System.out.println("Enter Name of the student");
name = in.nextLine();
 System.out.println("Enter no of subjects");
 n = in.nextInt();  int credits[] =
new int[n];  double marks[] =
new double[n];
 System.out.println("Enter details of the subjects:");
 for(int i=0;i<n;i++)
 {
  System.out.println("Enter credits allotted to the subject "+(i+1));
credits[i] = in.nextInt();
  System.out.println("Enter marks in the subject "+(i+1));
  marks[i] = in.nextInt();
```

```
 Calculate(credits[i],marks[i],i);
 }
   }
   void Calculate(int credit,double mark,int j)
   {
 Credits = Credits + credit;
 if(mark>=90&&mark<=100)
SGPA = SGPA + (10*credit);   else
if(mark>=80 && mark<=89)
SGPA = SGPA + (9*credit);   else
if(mark>=70&&mark<=79)
SGPA = SGPA + (8*credit);   else
if(mark>=60&&mark<=69)
SGPA = SGPA + (7*credit);   else
if(mark>=50 && mark<=59)
SGPA = SGPA + (6*credit);   else
if(mark>=40&&mark<=49)
SGPA = SGPA + (5*credit);   else
  System.out.println("Failed in subject "+(j+1));
 }
 void Display()
 {
 System.out.println("Details of the Student");
 System.out.println("Name :"+name);
 System.out.println("USN: "+USN);
 System.out.println("SGPA of student "+(SGPA/Credits));
 }
}

public class sgpa
{
 public static void main(String args[])
 {
  Student s1 = newStudent();
 s1.Details();
s1.Display();
 }
}
```

Output :



Lab Program-3(16/10/2020)

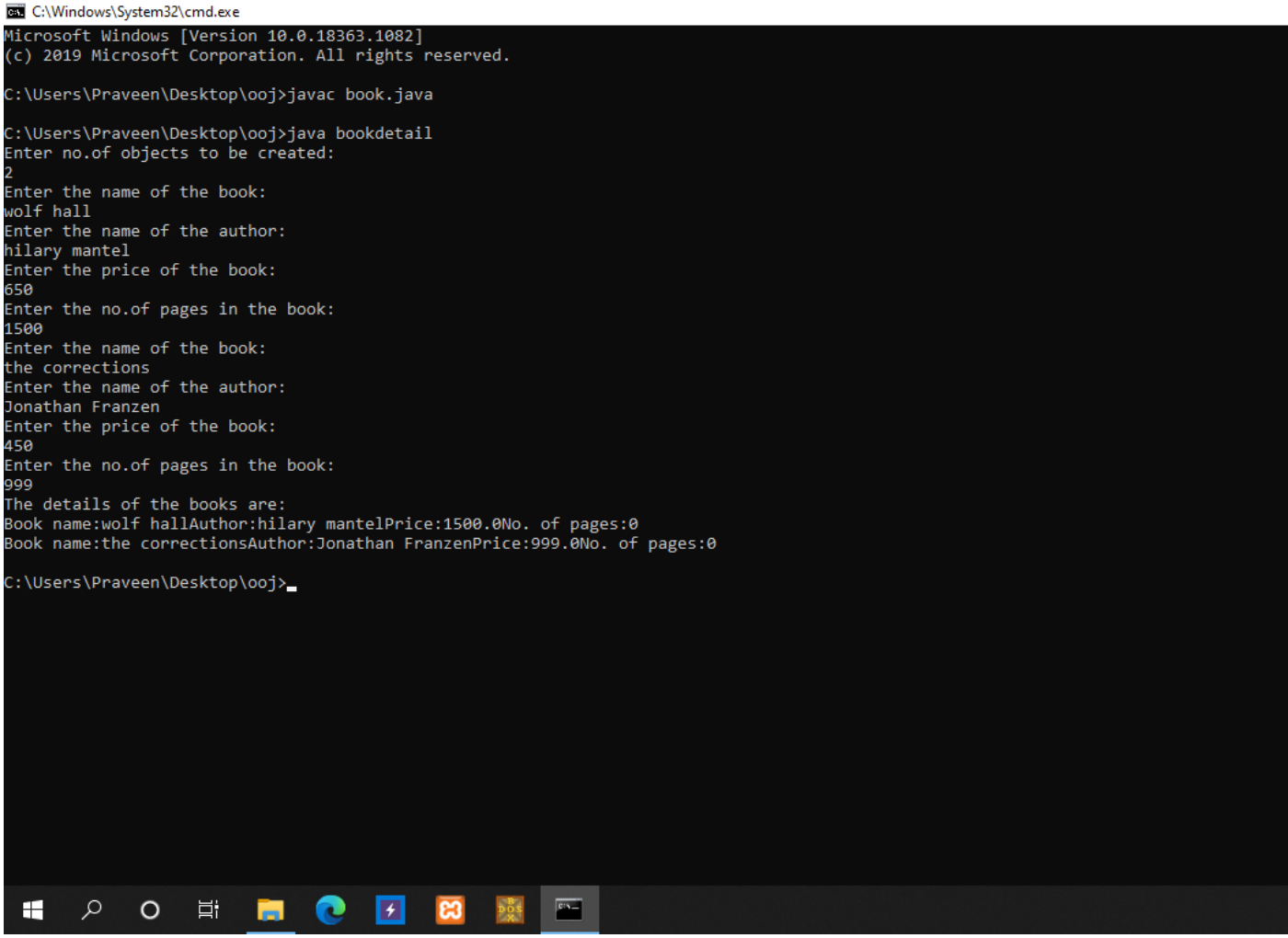
3) Create a class Book which contains four members: name, author, price, num_pages. Include a Constructor to set the values for the members. Include a toString() method that could display the

complete details of the Book. Develop a Java program to create n book objects.

```
import java.util.*;
class book
{
  String name;
  String author;
  double price;
  int num_pages;
 Scanner in=new Scanner(System.in);
book()
{
System.out.println("Enter the name of the book:");
name=in.nextLine();
System.out.println("Enter the name of the author:");
author=in.nextLine();
System.out.println("Enter the price of the book:");
price=in.nextDouble();
System.out.println("Enter the no.of pages in the book:");
price=in.nextInt();
}
public String toString()
{
return("Book name:"+name+"Author:"+author+"Price:"+price+"No. of pages:"+num_pages);
}
}
```

```
class bookdetail
{
public static void main(String[] args)
{
int i,n;
Scanner in=new Scanner(System.in);
System.out.println("Enter no.of objects to be created:");
n=in.nextInt();
book obj[];
obj=new book[n];
for(i=0;i<n;i++)
{
obj[i]=new book();
}
System.out.println("The details of the books are:");
for(i=0;i<n;i++)
{
System.out.println(obj[i].toString());
}
}
}
```

Output:



Lab Program-4(06/11/2020)

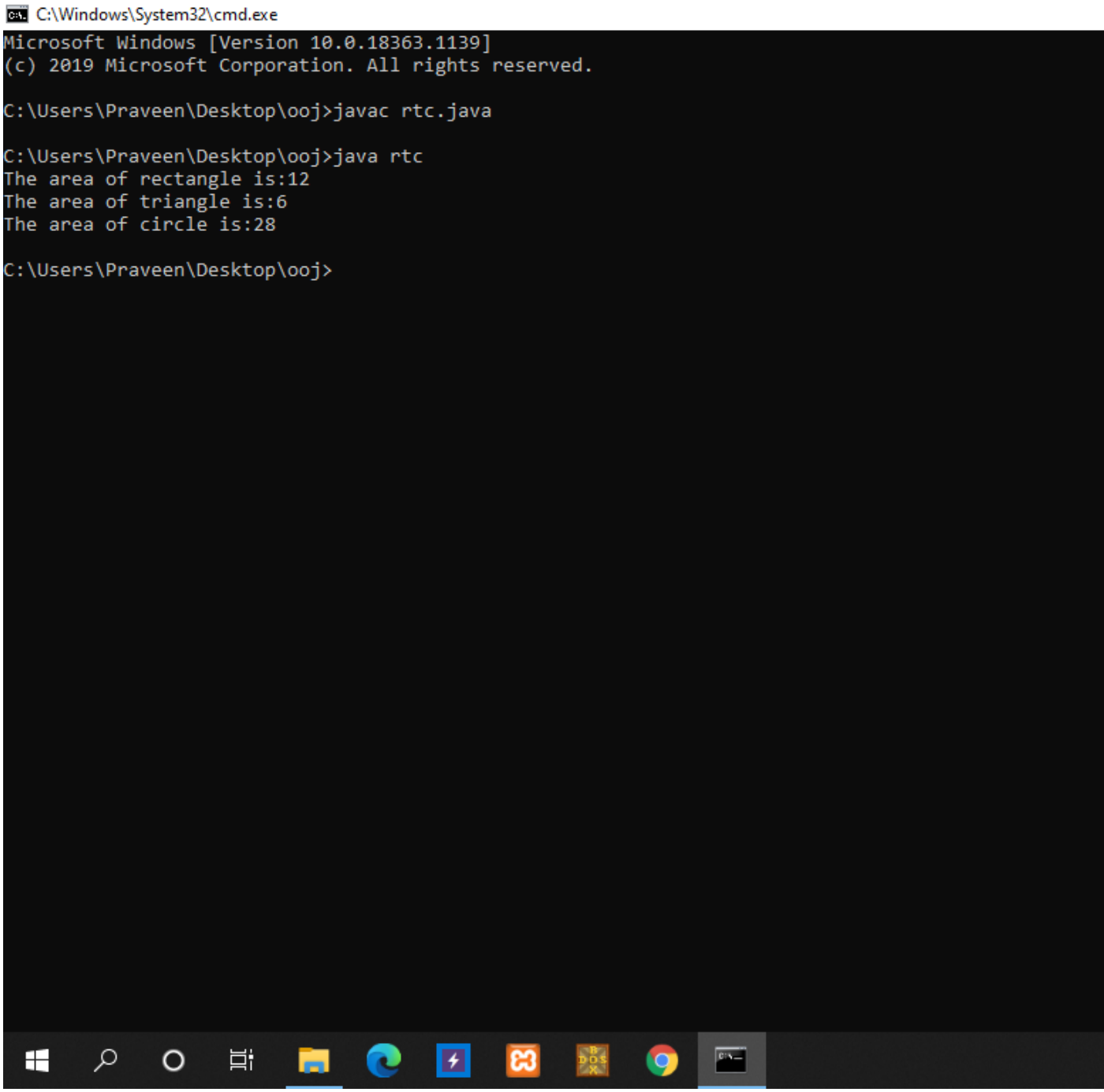
4) Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea(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

import java.util.Scanner;

```
abstract class shape
{
int a=3,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);
 }
}

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

      rectangle r=new rectangle();
      r.print_area();
      triangle t=new triangle();
      t.print_area();
      circle r1=new circle();
      r1.print_area();
 }
}
```

Output :



Lab Program-5(06/11/2020)

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

```
import java.util.Scanner;

        class Account{
                String name;
                int accountNo;
                String
accountType;
                double balance;
                Account(String
name,int accountNo,String
accountType,double balance){

        this.name = name;

        this.accountNo =
accountNo;
```

```
	this.accountType =
accountType;

	this.balance = balance;
		}
		void
DisplayStatus() {

	System.out.println("**"
+this.accountType+"***");

	System.out.println("Na
me: "+this.name);

	System.out.println("Acc
ount no.:  "+this.accountNo);

	System.out.println("Acc
ount Type:
"+this.accountType);

	System.out.println("Bal
ance: "+this.balance);
		}
	}

	class SavAcct extends
Account{
		double
depositAmount;
		double
Withdrawmount;
		SavAcct(String
name,int accountNo,String
accountType,double balance){

	super(name,accountNo
,accountType,balance);
		}
		static Scanner
input = new
Scanner(System.in);
```

```
        private void
checkBalance() {

        if(balance<0) {

        System.out.println("Tra
nsaction is not possible.
Balance becomes less than
zero");

        balance+=Withdrawmo
unt;

        Withdrawmount=0;

        Withdraw();
                        }
                }
                void
CalInterest() {

        System.out.println("Int
erest To Be added");

        System.out.println("An
nual rate of interest: 4%");

        System.out.println("Ent
er the tenure in terms of
year");
                        int
tenure = input.nextInt();
                        balance
= balance*Math.pow(1.04,
tenure);
                }
                void Deposit() {

        System.out.println("Ent
er the Deposit amount");

        depositAmount =
input.nextDouble();
```

```
        balance+=depositAmou
nt;
                }
                void Withdraw()
{

        System.out.println("Ent
er the Withdrawal amount");

        Withdrawmount =
input.nextDouble();
                        balance-
=Withdrawmount;

        checkBalance();

        System.out.println("Wit
hdraw amount =
"+Withdrawmount);
                }
        }

        class CurrAcct extends
Account{
                double
minBalance = 1000;
                double
depositAmount;
                double
Withdrawmount;
                static Scanner
input = new
Scanner(System.in);
                CurrAcct(String
name,int accountNo,String
accountType,double balance){

        super(name,accountNo
,accountType,balance);
                }
                private void
checkBalance() {
```

```
        if(balance<minBalance)
{

        System.out.println("Tra
nsaction is not possible.
Balance becomes less than
minimum balance.");

        balance+=Withdrawmo
unt;

        System.out.println("Do
u still want to do the
transaction with added service
charges");

        String ans =
input.next();

        if(ans.toLowerCase().eq
uals("yes")) {

        balance-
=(Withdrawmount+(0.05*With
drawmount)+1000);

        System.out.println("AL
ERT: Negative
balance.\nService Charge
added:
"+(0.05*Withdrawmount));

        }else {

        Withdrawmount = 0;
                                }
                        }
                }
                void Deposit() {

        System.out.println("Ent
er the Deposit amount");
```

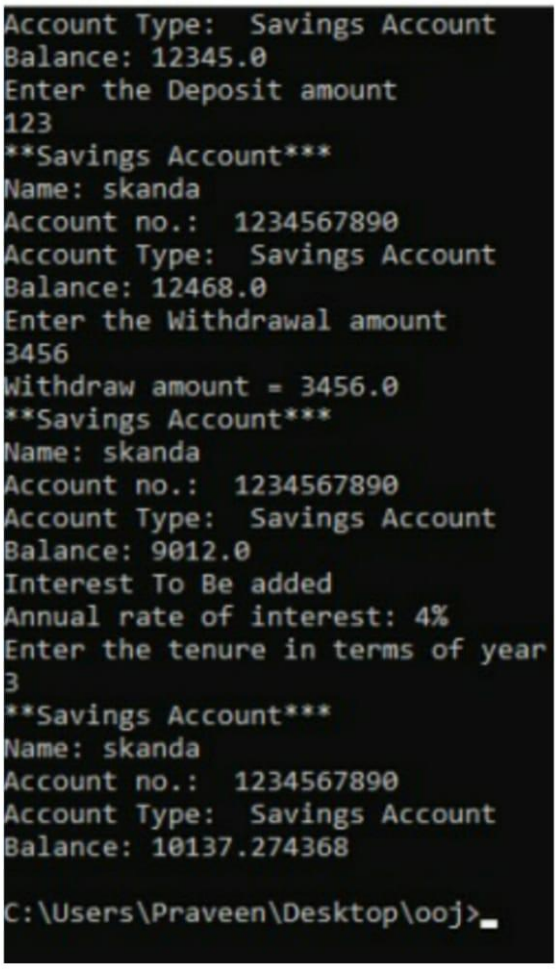
```
        depositAmount =
input.nextDouble();

        balance+=depositAmou
nt;
                }
                void Withdraw()
{

        System.out.println("Ent
er the Withdrawal amount");

        Withdrawmount =
input.nextDouble();
                        balance-
=Withdrawmount;

        checkBalance();

        System.out.println("wit
hdraw amount =
"+Withdrawmount);
                }
        }

        public class BankTest {

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

        System.out.println("Ent
er the name");
                        String
name = in.next();

        System.out.println("Ent
er the account no.");
                        int num
= in.nextInt();
                        int i=0;
```

```
        while(i<2) {

        System.out.println("Ent
er the account type\ncurr-
current acc.\nsav-savings
acct.\t And Balance.");
                        String
type = in.next();

        if(type.equals("curr")) {

        double bal =
in.nextInt();

        CurrAcct c1 = new
CurrAcct(name,num,"Current
Account",bal);

        c1.DisplayStatus();

        c1.Deposit();

        c1.DisplayStatus();

        c1.Withdraw();

        c1.DisplayStatus();
                        }else
if(type.toLowerCase().equals("
sav")) {

        double bal =
in.nextInt();

        SavAcct s1 = new
SavAcct(name,num,"Savings
Account",bal);

        s1.DisplayStatus();

        s1.Deposit();
```

```
s1.DisplayStatus();

s1.Withdraw();

s1.DisplayStatus();

s1.CalInterest();

s1.DisplayStatus();
                    }
                    i++;
                    }

in.close();
          }
}
```

Output:


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.18363.1139]
(c) 2019 Microsoft Corporation. All rights re
C:\Users\Praveen\Desktop\ooj>javac BankTest.j
C:\Users\Praveen\Desktop\ooj>java BankTest
Enter the name
skanda
Enter the account no.
1234567890
Enter the account type
curr-current acc.
sav-savings acct. And Balance.
curr
560000
Current Account*
Name: skanda
Account no.: 1234567890
Account Type: Current Account
Balance: 560000.0
Enter the Deposit amount
12000
Current Account*
Name: skanda
Account no.: 1234567890
Account Type: Current Account
Balance: 572000.0
Enter the Withdrawal amount
34000
withdraw amount = 34000.0
Current Account*
Name: skanda
Account no.: 1234567890
Account Type: Current Account
Balance: 538000.0
Enter the account type
curr-current acc.
sav-savings acct. And Balance.
sav
12345
Savings Account*
Name: skanda
Account no.: 1234567890
Account Type: Savings Account


Account Type: Savings Account
Balance: 12345.0
Enter the Deposit amount
123
Savings Account*
Name: skanda
Account no.: 1234567890
Account Type: Savings Account
Balance: 12468.0
Enter the Withdrawal amount
3456
Withdraw amount = 3456.0
Savings Account*
Name: skanda
Account no.: 1234567890
Account Type: Savings Account
Balance: 9012.0
Interest To Be added
Annual rate of interest: 4%
Enter the tenure in terms of year
3
Savings Account*
Name: skanda
Account no.: 1234567890
Account Type: Savings Account
Balance: 10137.274368
C:\Users\Praveen\Desktop\ooj>