VISVESVARAYA TECHNOLOGICAL UNIVERSITY
"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

OBJECT ORIENTED JAVA LAB
(22CS3PC00J)

Submitted by

MANJIL RAJ PANTA(1BM21CS103)

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU) BENGALURU-560019
October-2022 to Feb-2023

B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "Database Management Systems (22CS3PCDBM)" carried out by **MANJIL RAJ PANTA(1BM21CS103),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a Database Management Systems (22CS3PCDBM) work prescribed for the said degree.

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PROGRAM -01

QUESTION: 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.

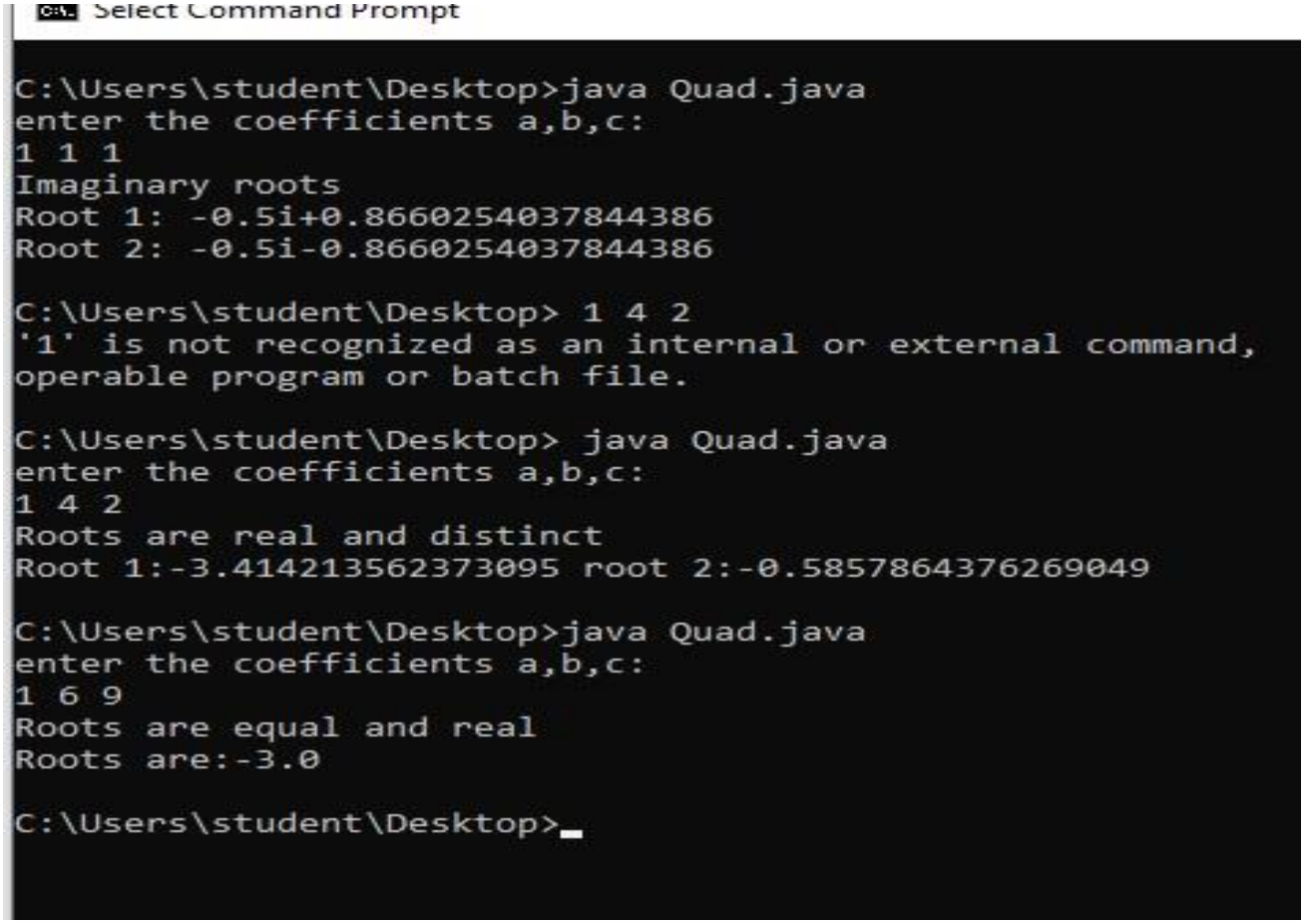
CODE:

```
importjava.util.*;
                    class QuadraticEquation{

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

```
Scanner sc = new Scanner(System.in);

        System.out.println("Enter value of a: ");
    double a = sc.nextDouble();
        System.out.println("Enter value of b: ");
    double b = sc.nextDouble();
        System.out.println("Enter value of c: ");
        double c = sc.nextDouble();
double d = (b*b)-(4*a*c);
         if (d>0)
         {
                double r1 = (-b+Math.sqrt(d))/(2*a);
            double r2 = (-b-Math.sqrt(d))/(2*a);
    System.out.format("Root 1: %.2f", r1);
                 System.out.format("Root 2: %.2f", r2);
         }
         else if (d==0)
         {
                double r1,r2;
                r1= r2 = -b/(2*a);
                 System.out.format("Root 1 = Root 2 =
 %.2f", r1, r2);
         }

         else
         {
                double real = -b / (2 * a);
    double imaginary = Math.sqrt(-d) / (2 * a);
            System.out.format("Root1 = %.2f+%.2fi", real,
imaginary);
       System.out.format("Root2 = %.2f-%.2fi",  real,
imaginary);

         }
```

}

OUTPUT:



PROGRAM-02

QUESTION: 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.

CODE:

```
import java.util.Scanner;
                    class student {
                        String usn;
                    String name;
                    int credits[];
```

```
  double marks[];
  student() {
                    Scanner s=new Scanner(System.in);
                    int n;
                    System.out.println("Enter no. of subjects: ");
                   n=s.nextInt();
  this.credits=new int[n];
  this.marks=new double[n];

            }

            void getsd() {
                    Scanner x=new Scanner(System.in);
      System.out.println("Enter USN, Name, Credits,  Marks for
subjects");
                   usn=x.nextLine();
  name=x.nextLine();
  for(int i=0;i<6;i++) {
                            credits[i]=x.nextInt();

                    }
                    for(int i=0;i<6;i++) {

                            marks[i]=x.nextDouble();
                    }


            }

            void putsd() {
                    System.out.println("USN: "+this.usn);
  System.out.println("Name:                    "+this.name);
System.out.println("Marks: ");    for(int i=0;i<6;i++) {
                            System.out.print(this.marks[i]+" ");
                    }
```

```
        System.out.println("\nCredits: ");
    for(int i=0;i<6;i++) {
            System.out.print(this.credits[i]+" ");
        }
     }

    void sgpa() {                   double marks=0;
    double t_credits=0;                 for(int
i=0;i<6;i++) {                          if(this.marks[i]>=90) {
                            marks=marks+(10*(this.credits[i]));
                        }
                    else if(this.marks[i]>=80) {
                marks=marks+(9*(this.credits[i]));
                        }
                    else if(this.marks[i]>=70) {
                marks=marks+(8*(this.credits[i]));
                        }
                    else if(this.marks[i]>=60) {
                marks=marks+(7*(this.credits[i]));
                        }
                    else if(this.marks[i]>=50) {
                marks=marks+(6*(this.credits[i]));
                        }
                    else if(this.marks[i]>=40) {
                marks=marks+(5*(this.credits[i]));
                        }
                        else if(this.marks[i]>=30) {
                            marks=marks+(4*(this.credits[i]));
                        }

                        else {
                            marks=marks+0;
                        }
                        t_credits=t_credits+(this.credits[i]);
                    }
```

```
                double sgp=(marks/t_credits);
                System.out.println("\nYour SGPA is: "+sgp);
            }
        }
        class smain {                public static void
    main(String xx[]) {                    student
    s1=new student();                      s1.getsd();
                    s1.putsd();
        s1.sgpa();
            }
        }
```

OUTPUT:

```
Enter no. of subjects:
6
Enter USN, Name, Credits, Marks for subjects
1BM21CS070
Haaid
3 3 3 3 3 3
89
98
88
96
98
79
USN: 1BM21CS070
Name: Haaid
Marks:
89.0 98.0 88.0 96.0 98.0 79.0
Credits:
3 3 3 3 3 3
Your SGPA is: 9.333333333333334
```

PROGRAM-03

QUESTION: 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.

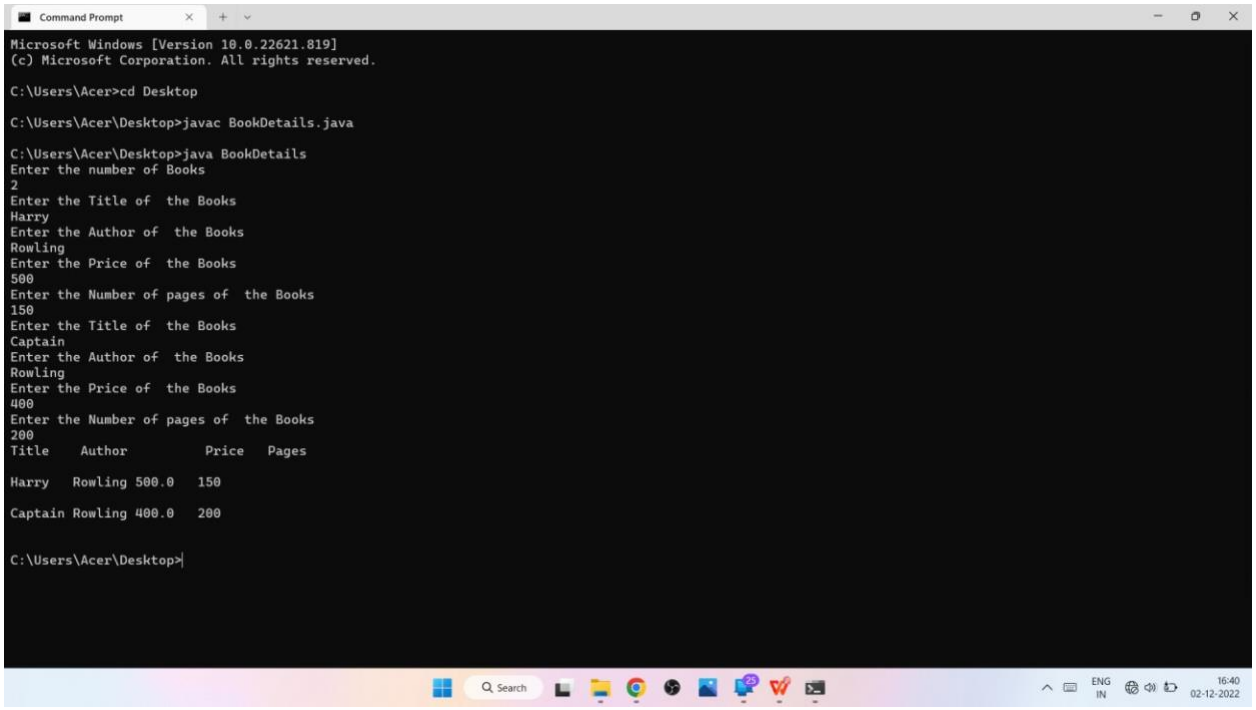
CODE:

```
importjava.io.*;
                    import java.util.*;
                    class Book {
                            String title,
                author;         double
                price;          int
                numPages;
                    Book() {

                                title="Default";
                            author="Default";
                    price=0.0;
                    numPages=0;
                            }
                            void setTitle(String t) {
                                    title=t;

                            }
                            void setAuthor(String a) {


                                    author=a;


                    }
                            void setPrice(double p) {


                                    price=p;

               }
                void setPages(int np) {
```

```
                numPages=np;
        }
         public String toString() {
         return
title+"\t"+author+"\t"+price+"\t"+numPages+"\n";
        }
}
class BookDetails {
        public static void main(String args[]) {
                String t, a;
                double p;
                int np,n;
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter the number of Books");
                n = sc.nextInt();
                Book b[]= new Book[n];
                for(int i=0; i<n;i++) {
                        System.out.println("Enter the Title of  the
Books");
                        t= sc.next();
                         System.out.println("Enter the Author of  the
Books");
                        a= sc.next();
                        System.out.println("Enter the Price of  the
Books");
                        p= sc.nextDouble();
                        System.out.println("Enter the Number of
pages of  the Books");
                        np= sc.nextInt();

                         b[i] = new Book();
         b[i].setTitle(t);
 b[i].setAuthor(a);
 b[i].setPrice(p);
 b[i].setPages(np);
                }
```

```
                System.out.println("Title \t Author \t Price \t Pages\n");

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

                }
            }
```

OUTPUT:



PROGRAM-04

QUESTION: 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.

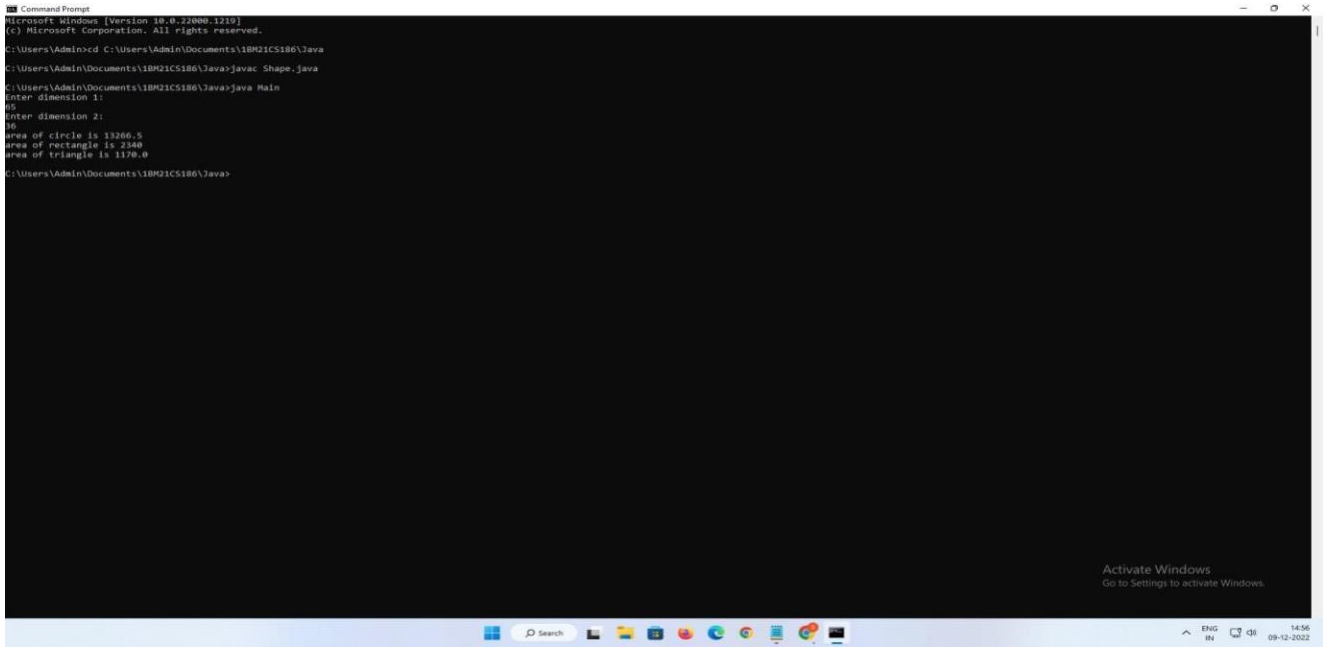
CODE:

```
import
```

```
java.util.*;   abstract class Shape {
               int a, b;
                public Shape(int a, int b) {
                   this.a = a;
                   this.b = b;
                        }
                        abstract void Printarea();
                        }
              class Circle extends Shape {
             Circle(int a, int b) {
             super(a, b);
                   }
                   void Printarea() {
                      System.out.println("area of circle is " + (3.14 * a * a));
                   }
                }
                class Rectangle extends Shape {
             public Rectangle(int a, int b) {
             super(a, b);
                }
                void Printarea()
                {
                   System.out.println("area of rectangle is " + (a * b));
                }
                }
                class Triangle extends Shape {
                public Triangle(int a, int b) {
             super(a, b);

                }
                void Printarea()
                {
                   System.out.println("area of triangle is " + (0.5 * a * b));
                }
                }
```

```
class Main {
public static void main(String args[]) {
        Scanner in = new Scanner(System.in);
System.out.println("Enter dimension 1: ");
int x = in.nextInt();
        System.out.println("Enter dimension 2: ");
        int y = in.nextInt();          Shape b;      b
= new Circle(x, y);       b.Printarea();
    b = new Rectangle(x, y);
    b.Printarea();        b =
new Triangle(x, y);
b.Printarea();
  }
  }
```

OUTPUT:



PROGRAM-05

QUESTION: 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.

CODE:

```
import
java.util.Scanne
r;
                    class Account
                    {
                            String name;
                            int type;
                    long accno;
                    double balance;
                    void setA()
                            {
                                    Scanner s=new Scanner(System.in);
                    System.out.print("Enter customer name: ");
                                    name=s.nextLine();


                                    System.out.print("Enter account number: ");
                            accno=s.nextLong();
                                    System.out.println("Account Balance Should Not
                    Be Less than 5000");
                                    System.out.print("Enter bank balance: ");
                                    balance=s.nextDouble();
                            }
                            void display()
                            {
                             System.out.println("Customer name is: "+name);  if(type==1) {
                                            System.out.println("Customer account type
                    is: Savings");
                                    }
```

```
                else {
        System.out.println("Customer account type  is: Current");
                }
       System.out.println("Customer account number is:  "+accno);
                System.out.println("Current balance is: "+balance);
        }
        void deposit()
        {
       System.out.print("Enter the amount to be  deposited: ");
                Scanner x=new Scanner(System.in);
                double amt=x.nextDouble();
                balance+=amt;
                System.out.println("Updated Balance: "+balance);
        }
    }
    class Sav_acct extends Account
    {           double
interest;
        Scanner s=new Scanner(System.in);

        Sav_acct() {
                type=1;
        }
        void cinterest()
        {
      int timey;   float irate;
    int times;
                System.out.println("Compound Interest details:");
                System.out.println("Enter time in years: ");
                timey=s.nextInt();
                System.out.println("Enter rate of interest: ");
                irate=s.nextFloat();
        System.out.println("Enter number of times: ");
    times=s.nextInt();
                System.out.println("Interest will be compunded
    "+times+" times a year");
```

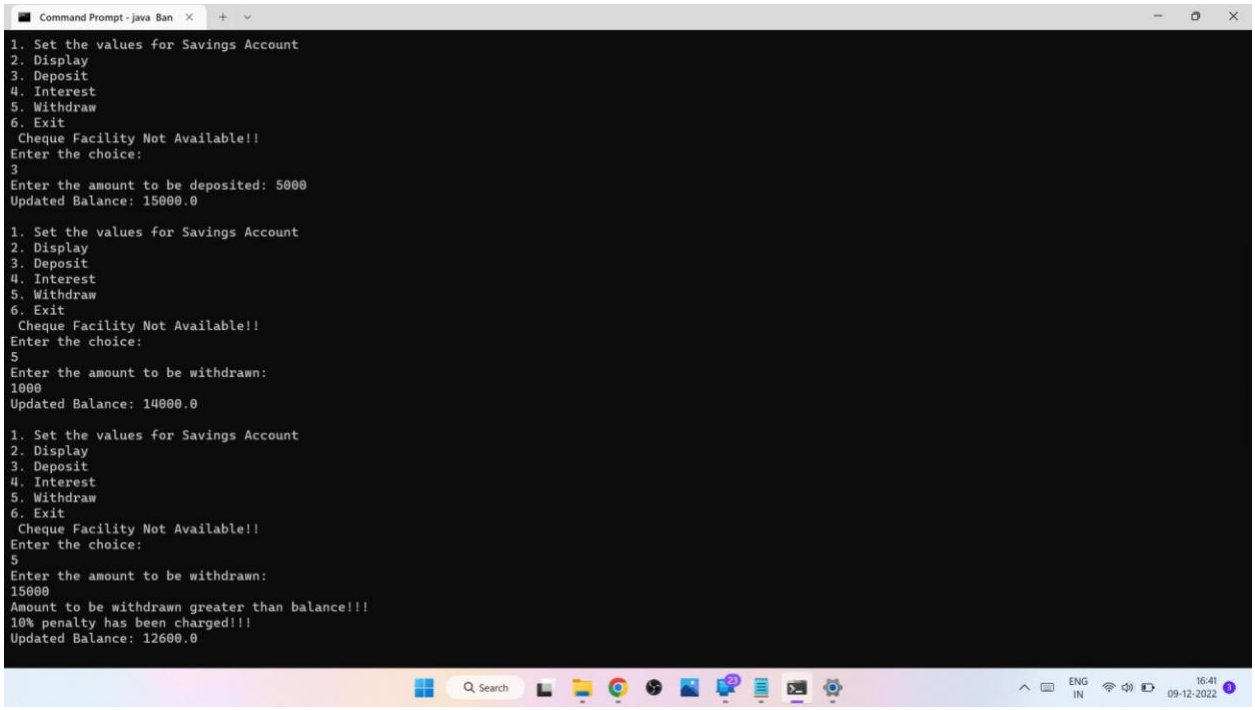
```
        interest=balance*(Math.pow((1+irate/times),(times*time
y)));
                balance+=interest;
                System.out.println("Balance:"+balance);
        }
        void withdraw()
        {
                System.out.println("Enter the amount to be
withdrawn: ");
                double amt=s.nextDouble();
                if(balance>amt)
{balance-=amt;
                        System.out.println("Updated Balance:
"+balance);
                }
                else
                {System.out.println("Amount to be withdrawn
greater than balance!!!");
                        balance=balance-(balance/10);
                        System.out.println("10% penalty has been
charged!!!");
                        System.out.println("Updated Balance:
"+balance);
                }
        }
}
class Curr_acct extends Account
{ double check_amt;
        Curr_acct() {
                type=2;
        }

        void cheque()
        {
```

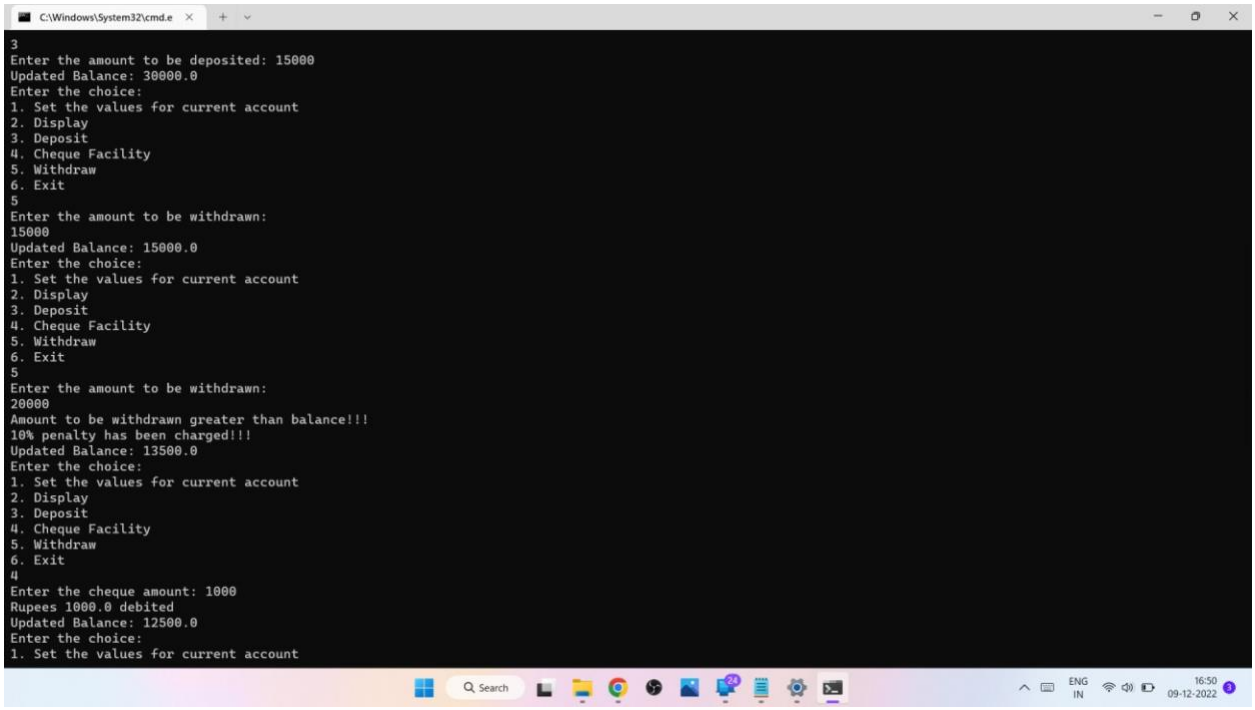
```
        System.out.print("Enter the cheque amount: ");
        Scanner s=new Scanner(System.in);
check_amt = s.nextDouble();
if(check_amt>balance)
                {
                        System.out.println("Rs. 500 penalty
imposed...Is it ok to proceed? Enter y for yes and n for no");
                        String option=s.next();
if(option.equals("y"))
                                {balance=balance-500;}
                        else {System.out.println("no Check
debited");}
                }
                else
                {
                        System.out.println("Rupees "+check_amt+"
debited");
                        balance-=check_amt;
                        System.out.println("Updated Balance:
"+balance);
                }
        }
        void withdraw()
        {
                System.out.println("Enter the amount to be
withdrawn: ");
                Scanner s=new Scanner(System.in);
        double amt=s.nextDouble();
                if(balance>amt)
        {balance-=amt;
                        System.out.println("Updated Balance:
"+balance);
                }
                else
                {       System.out.println("Amount to be
withdrawn greater than balance!!!");
```

```
  balance=balance-(balance/10);      System.out.println("10%
penalty has been charged!!!");
                        System.out.println("Updated Balance:
"+balance);}
        }
}
class Bank {
        public static void main(String ss[]) {
                String op1,op2;
                Scanner s=new Scanner(System.in);
                System.out.println("1. Savings or   2. Current");
                int q;
                q=s.nextInt();
                if(q==1) {
                        Sav_acct s1 = new Sav_acct();
        while(true) {
                        System.out.print("\n1. Set the values for
Savings Account\n2. Display\n3. Deposit\n4. Interest\n5.
Withdraw\n6. Exit\n Cheque Facility Not Available!!\n");
        System.out.println("Enter the choice: ");
                        op1=s.next();
        switch(op1)
                        {
                        case "1":s1.setA();
                                break;
                        case "2":s1.display();
                                break;
                        case "3":s1.deposit();
                                break;
                        case "4":s1.cinterest();
                                break;
                        case "5":s1.withdraw();
                                break;
                        case "6":System.exit(0);
                        }
```

```
                }
            }
            else if(q==2) {

                Curr_acct c1 = new Curr_acct();
            while(true) {
                System.out.print("Enter the choice: \n1. Set
the values for current account\n2. Display\n3. Deposit\n4.  Cheque
Facility\n5. Withdraw\n6. Exit\n");
                op2=s.next();
                switch(op2)
                {
                case "1":c1.setA();
                    break;
                case "2":c1.display();
                    break;
                case "3":c1.deposit();
                    break;
                case "4":c1.cheque();
                    break;
                case "5":c1.withdraw();
                    break;
                case "6":System.exit(0);
                }
                }
            }
        }
    }
```

OUTPUT:


Command Prompt - java Ban
1. Set the values for Savings Account
2. Display
3. Deposit
4. Interest
5. Withdraw
6. Exit
Cheque Facility Not Available!!
Enter the choice:
3
Enter the amount to be deposited: 5000
Updated Balance: 15000.0
1. Set the values for Savings Account
2. Display
3. Deposit
4. Interest
5. Withdraw
6. Exit
Cheque Facility Not Available!!
Enter the choice:
5
Enter the amount to be withdrawn:
1000
Updated Balance: 14000.0
1. Set the values for Savings Account
2. Display
3. Deposit
4. Interest
5. Withdraw
6. Exit
Cheque Facility Not Available!!
Enter the choice:
5
Enter the amount to be withdrawn:
15000
Amount to be withdrawn greater than balance!!!
10% penalty has been charged!!!
Updated Balance: 12600.0
Search
ENG
IN
16:41
09-12-2022


C:\Windows\System32\cmd.e
3
Enter the amount to be deposited: 15000
Updated Balance: 30000.0
Enter the choice:
1. Set the values for current account
2. Display
3. Deposit
4. Cheque Facility
5. Withdraw
6. Exit
5
Enter the amount to be withdrawn:
15000
Updated Balance: 15000.0
Enter the choice:
1. Set the values for current account
2. Display
3. Deposit
4. Cheque Facility
5. Withdraw
6. Exit
5
Enter the amount to be withdrawn:
20000
Amount to be withdrawn greater than balance!!!
10% penalty has been charged!!!
Updated Balance: 13500.0
Enter the choice:
1. Set the values for current account
2. Display
3. Deposit
4. Cheque Facility
5. Withdraw
6. Exit
4
Enter the cheque amount: 1000
Rupees 1000.0 debited
Updated Balance: 12500.0
Enter the choice:
1. Set the values for current account
Search
ENG
IN
16:50
09-12-2022

PROGRAM-06

QUESTION: 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,

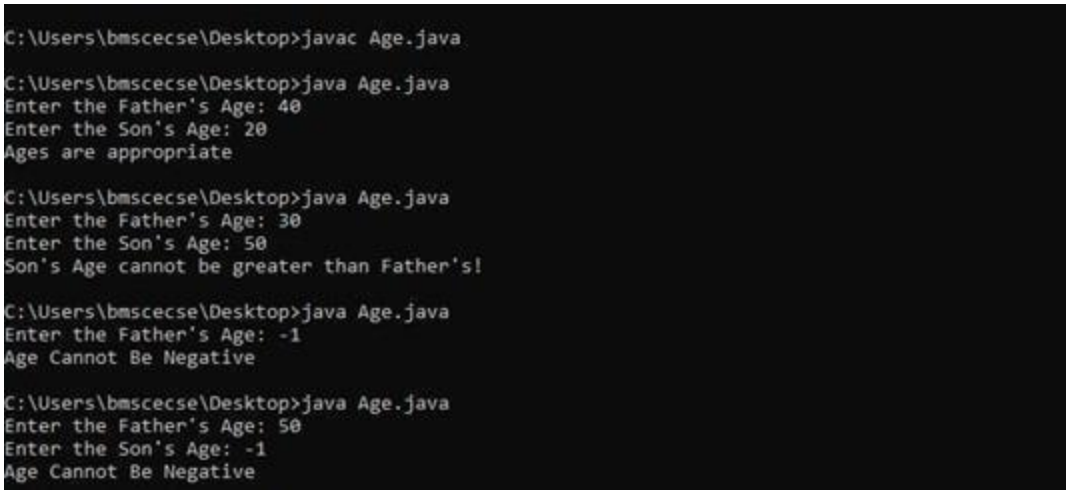
CODE:

```
import
java.util.*;
                class WrongAge extends Exception
                {
                   public String getMessage()
                   {
                      return "Age Cannot Be Negative";
                   }
                }
                class InvalidAge extends Exception
                {
                   public String getMessage()
                   {
                      return "Son's Age cannot be greater than Father's!";
                   }
                }
                class Father
                {
                   Scanner s = new Scanner(System.in);
                   int fatherAge;
                   Father() throws WrongAge
                   {
                    System.out.print("Enter the Father's Age: ");
            fatherAge = s.nextInt();
                    try
                    {
                                if(fatherAge<0)
                        throw new WrongAge();
                      }
```

```
            catch(WrongAge e1)
            {

               System.out.println(e1.getMessage());
               System.exit(0);
            }
         }
      }
      class Son extends Father
      {
         int sonAge;
         Son() throws WrongAge,InvalidAge
       {
super();
          System.out.print("Enter the Son's Age: ");
sonAge = s.nextInt();
          try               {
if(sonAge<0)                    throw
new WrongAge();
            }
            catch(WrongAge e2)
            {
               System.out.println(e2.getMessage());
          }                 try               {
           if(sonAge>fatherAge)
throw new InvalidAge();
            }
            catch(InvalidAge e3)
            {
               System.out.println(e3.getMessage());
            }
         }
      }
      class Agecheck
      {
```

```
    public static void main(String[] args) throws
  WrongAge,InvalidAge
   {        new
Son();
    }}
```

OUTPUT:



PROGRAM-07

QUESTION: 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.

CODE:

```
import java.util.Scanner;
class BMSCE extends Thread {
    synchronized public void run()
    {
    try
        {
            int i=0;
            while (i<5)
            {
                sleep(10000);
                System.out.println("BMS College of Engineering ");
                i++;
            }
        }
        catch (Exception e) {
        }
     System.out.println("Exiting Thread 1");
     }
}
class CSE extends Thread
     {
     synchronized public void run()
    {
    try
        {
            int i=0;
            while (i<5)
            {
```

```
                    sleep(2000);
                    System.out.println("CSE");

                    i++;
                }
            }

            catch (Exception e) {
            }
        System.out.println("Exiting Thread 2");
        }
}
class Multithreading
{
        public static void main(String args[])
        {
            BMSCE t1 = new BMSCE();
            CSE t2 = new CSE();
       t1.start();                t2.start();
        }
}
```

OUTPUT:

```
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
Exiting Thread 2
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
Exiting Thread 1
```