Ooj lab programs
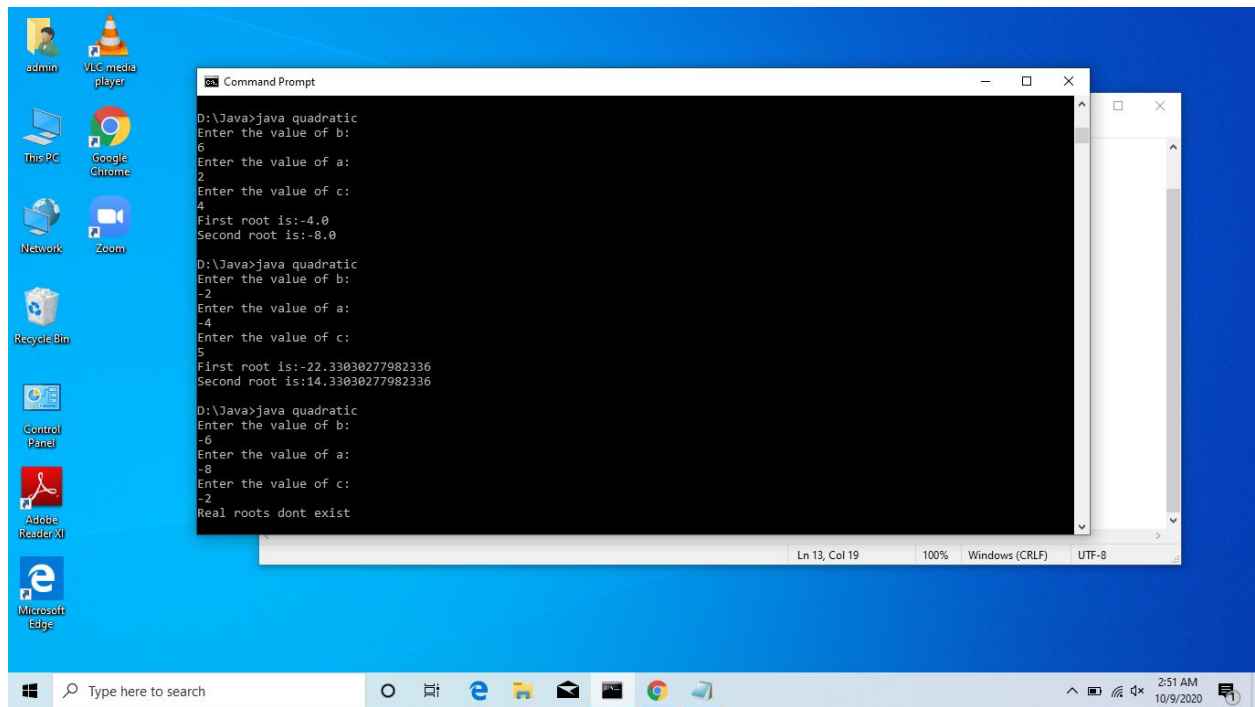Vakamalla keerthi priya
(1BM19CS176)

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;
 class quadratic {
public static void main(String[] args) {
double a, b, c, root1, root2;
double det;
Scanner sc= new Scanner(System.in);
System.out.println("Enter the value of b:");
b = sc.nextDouble();
System.out.println("Enter the value of a:");
a = sc.nextDouble();
System.out.println("Enter the value of c:");
c = sc.nextDouble();

det = b*b - 4*a*c;
if (det > 0)
{
root1= (-b + Math.sqrt(b*b - 4*a*c))/2*a;
root2 = (-b -Math.sqrt(b*b - 4*a*c))/2*a;
System.out.println("First root is:" +root1);
System.out.println("Second root is:" +root2);
}
else if ( det == 0)
{
root1= -b/(2*a);
System.out.println("Both roots are same and are equal to:" +root1);
}
else if (det < 0)
{
System.out.println("Real roots dont exist");
}
}
}
```

VAKAMALLA
KEERTHI
PRIYA
1BM19CS176
D1 BATCH

9/10/20

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.

```java
import java.util.Scanner;
class quadratic {
public static void main(String[] args) {
double a, b, c, root1, root2;

double det;
Scanner sc = new Scanner(System.in);
System.out.println("Enter the value of b:");
b = sc.nextDouble();
System.out.println("Enter the value of a:");
a = sc.nextDouble();
System.out.println("Enter the value of c:");
c = sc.nextDouble();
det = b*b - 4*a*c;
if (det > 0)

{
root1 = (-b + Math.sqrt(b*b-4*a*c)) /2*a;
root2 = (-b - Math.sqrt(b*b-4*a*c)) /2*a;
System.out.println("First root is:" +root1);
System.out.println("Second root is:" + root2);
}
else if ( det == 0)

{
```

```
    root1 = -b/(2*a);
    System.out.println("Both rooth are same
                               and equal to:
                                          "
                                          +root1)
                                          ;
    }

    else if (det < 0)
    {
    System.out.println("Real roots dont exist");
    }
    }
    }
```

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.

```java
import  java.util.*;

class student
{
    String name;
    String usn;
    int marks[]=new int[5];
    int credits[]=new int[5];
    int tot=0;
    int i;
    int grade=0;
    void read_data()
    {
        Scanner obj=new Scanner(System.in);
        System.out.println("Enter the name of the student");
        name=obj.next();
        System.out.println("Enter the USN");
        usn=obj.next();
        System.out.println("Enter the credits and marks for 5 subjects");

        for(i=0;i<5;i++)
        {
            System.out.println("Credits for subject"+(i+1)+":");
            credits[i]=obj.nextInt();
            System.out.println("Marks for subject"+(i+1)+": ");
            marks[i]=obj.nextInt();
        }
    }
    void calc_SGPA()
    {
        for(i=0;i<5;i++)
        {
            if(marks[i]>=90&&marks[i]<=100)
            grade=10;
            else  if(marks[i]>=75&&marks[i]<90)
            grade=9;
            else  if(marks[i]>=60&&marks[i]<75)
            grade=8;
            else  if(marks[i]>=50&&marks[i]<60)
            grade=7;
```

```java
        else  if(marks[i]>=45&&marks[i]<50)
        grade=6;
        else  if(marks[i]>=40&&marks[i]<45)
        grade=5;
        else if(marks[i]<40)
        grade=0;

        tot=tot+grade*credits[i];
    }
    tot=tot/20;
    System.out.println("SGPA:"+tot);
}
    void details()
    {
     System.out.println("Name:"+name);
     System.out.println("USN:"+usn);
     System.out.println("Marks and Credits for all 5 subjects:");
     for(i=0;i<5;i++)
     {
        System.out.println(marks[i]);
        System.out.println(credits[i]);
     }
     calc_SGPA();
     }

public static void main(String args[])
{
    student obj=new student();
    obj.read_data();
    obj.calc_SGPA();
    obj.details();

}
}
```

```
D:\Java>javac student.java

D:\Java>java student
Enter the name of the student
keerthi
Enter the USN
1BM19CS176
Enter the credits and marks for 5 subjects
Credits for subject1:
3
Marks for subject1:
67
Credits for subject2:
3
Marks for subject2:
89
Credits for subject3:
4
Marks for subject3:
78
Credits for subject4:
5
Marks for subject4:
75
Credits for subject5:
5
Marks for subject5:
90
SGPA:9
Name:keerthi
USN:1BM19CS176
Marks and Credits for all 5 subjects:
67
3
89
3
78
4
75
5
90
5
SGPA:9
```

OOJ LAB-4

16/10/20   D1 BATCH

VAKAHALLA
KEGRTHI
PRIYA
1BH19CS176

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.

```java
import java.util.*;

class student {
        String name;
        String USN;
        int marks[] = new int[5];
        int credits[] = new int[5];
        int tot = 0;
        int i;
        int grade = 0;
        void read_data()
        {
        Scanner obj = new Scanner(System.in);
        System.out.println("Enter the name of the student");
        name = obj.next();
        System.out.println("Enter the USN");
        usn = obj.next();
```

```java
System.out.println("Enter the credits and marks
                    for 5 subjects");
for(i=0; i<5; i++)
{
System.out.println("credits for subject"+(i+1)+":");
credits[i] = obj.nextInt();
System.out.println("Marks for subject"+(i+1)+":");
marks[i] = obj.nextInt();
}
}
void calc_SGPA()
{
for(i=0; i<5; i++)
{
if(marks[i]>=90 && marks[i]<=100)
  grade=10;
elseif(marks[i]>=75 && marks[i]<90)
grade=9;
elseif(marks[i]>=60 && marks[i]<75)
grade=8;
else if(marks[i]>=50 && marks[i]<60)
grade=7;
else if(marks[i]>=45 && marks[i]<50)
  grade=6;
else if(marks[i]>=40 && marks[i]<45)
  grade=5;
```

```java
        else if (marks[i]<40)
            grade = 0;

        tot = tot + grade * credit[i];
    }

    tot = tot/20;
    System.out.println("SGPA: "+tot);
}

    void details()
    {
        System.out.println("Name: "+name);
        System.out.println("USN: "+usn);
        System.out.println("Marks and credit
                        for all 5 subjects:");
        for (i=0; i<5, i++)
        {
            System.out.println(marks[i]);
            System.out.println(credit[i]);
        }
        calc_SGPA();
    }
Public static void main(string args[])
{
    student obj = new student();
    Obj.read_data();
    obj.calc_SGPA();
    obj.details();
}}
```

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.

```java
import java.util.*;
class Book1
{
    String name,author;
    double price;
    int num_pages;

    public Book1()
    {
        this.name="";
        this.author="";
        this.price=0.0;
        this.num_pages=0;
    }

    public void DETAILS()
    {
        Scanner ob=new Scanner(System.in);
        System.out.println("ENTER THE NAME OF THE BOOK\n");
        name=ob.nextLine();
        System.out.println("ENTER THE NAME OF THE AUTHOR");
        author=ob.nextLine();
        System.out.println("ENTER THE PRICE OF THE BOOK");
        price=ob.nextDouble();
        System.out.println("ENTER THE NUMBER OF PAGES OF THE BOOK");
        num_pages=ob.nextInt();
    }

    public void ToString()
    {
        System.out.println("DETAILS OF THE BOOK");
        System.out.println("NAME OF THE BOOK:"+name);
        System.out.println("NAME OF THE AUTHOR:"+author);
        System.out.println("PRICE OF THE BOOK:"+price);
        System.out.println("NO. OF PAGES OF THE BOOK:"+num_pages);
    }
    public static void main(String args[])
    {
```
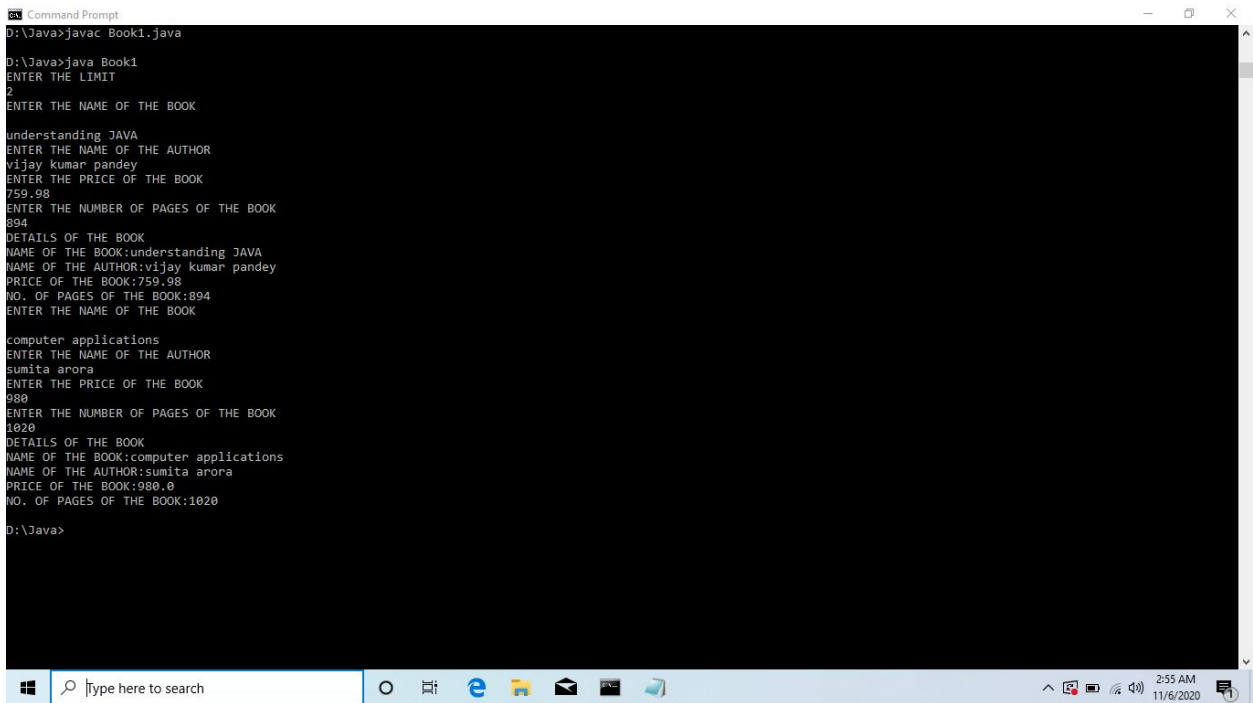
```
int i=0,n;
Book1 obj=new Book1();
Scanner ob1=new Scanner(System.in);
System.out.println("ENTER THE LIMIT");
n=ob1.nextInt();
for(i=1;i<=n;i++)
{
   obj.DETAILS();
   obj.ToString();
}
}
}
```

6/11/20   OOJ LAB   VAKAMALLA KEERTHI
                                   PRIYA
              DI - BATCH   (IBM19CS176)

Lab program - 3

```java
Import java.util.*;
class Book
{
  String name, author;
    double price;
    int num_pages;

  public Book()

  {
   this.name = " ";
   this.author = " ";
   this.price = 0.0;
   this.num_pages = 0;
  }
   public void DETAILS()

  {
   Scanner ob = new Scanner(System.in);
   System.out.println("ENTER THE NAME OF THE BOOK\n");
   name = ob.nextLine();
   System.out.println("ENTER THE NAME OF THE AUTHOR");
   author = ob.nextLine();
```

```java
        System.out.println("ENTER THE PRICE OF THE BOOK");
        Price = ob.nextDouble();
        System.out.println("ENTER THE NUMBER OF PAGES OF
                            THE BOOK");

        num_pages = ob.nextInt();
    }

   public void ToString()
  {

    System.out.println("DETAILS OF THE BOOK");
    System.out.println("NAME OF THE BOOK:" + name);
    System.out.println("NAME OF THE AUTHOR:" + author);
    System.out.println("PRICE OF THE BOOK:" + price);
    System.out.println("No. OF PAGES OF THE BOOK:" + num_pages);
  }
    public static void main(String args[])
   {
     int i=0, n;
     Book obj = new Book();
     Scanner ob1 = new Scanner(System.in);
     System.out.println("ENTER THE LIMIT");
     n = ob1.nextInt();
     for(i=1; i<=n; i++)
   {
     obj.DETAILS();
     obj.ToString();
   }
 }
}
```

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.

```java
import java.util.*;
import java.lang.Math.*;

abstract class shape{
    public int a;
    public int b;
    abstract public void printArea();
    Scanner s=new Scanner(System.in);
}

class rectangle extends shape{
    public void printArea(){
        System.out.print("Enter length and breadth of rectangle: ");
        float a=s.nextFloat();
        float b=s.nextFloat();
        float area=a*b;
        System.out.println("Area="+area+"sq.units");
    }
}

class triangle extends shape{
    public void printArea(){
        System.out.print("Enter three sides of triangle: ");
        float a=s.nextFloat();
        float b=s.nextFloat();
        float c=s.nextFloat();
        float d=(a+b+c)/2;
        double area=Math.sqrt(d*(d-a)*(d-b)*(d-c));
        System.out.println("Area="+area+"sq.units");
    }
}

class circle extends shape{
    public void printArea(){
        System.out.print("Enter radius of circle: ");
        float a=s.nextFloat();
        float area=22/7*a*a;
        System.out.println("Area="+area+"sq.units");
```

```java
            }
    }

class shapedemo{
    public static void main(String args[]){
        shape r=new rectangle();
        shape t=new triangle();
        shape c=new circle();
        for(int i=0;i<100;i++){
        System.out.println("\n1)Triangle\n2)Rectangle\n3)Circle\n");
        System.out.println("Enter your choice: ");
        Scanner s=new Scanner(System.in);
        int ch=s.nextInt();
        switch(ch){
            case 1: t.printArea();
                break;
            case 2: r.printArea();
                break;
            case 3: c.printArea();
                break;
                default:
            System.out.println("Invalid choice");
            }
        }
    }
}
```

```
1)Triangle
2)Rectangle
3)Circle

Enter your choice:
2
Enter length and breadth of rectangle: 5
2
Area=10.0sq.units

1)Triangle
2)Rectangle
3)Circle

Enter your choice:
1
Enter three sides of triangle: 3
5
7
Area=6.49519052838329sq.units

1)Triangle
2)Rectangle
3)Circle

Enter your choice:
3
Enter radius of circle: 5
Area=75.0sq.units

1)Triangle
2)Rectangle
3)Circle

Enter your choice:
6
Invalid choice

1)Triangle
2)Rectangle
3)Circle

Enter your choice:
```

LAB program - 4

```java
import java.util.*;
import java.lang.Math.*;

abstract class shape {
    public int a;
    public int b;
    abstract public void printArea();
    Scanner s = new Scanner(System.In);
}
class rectangle extends shape {
        public void printArea() {
    System.out.print("Enter length and breadth of
                                  rectangle:");
    float a = S.nextFloat();
    float b = S.nextFloat();
    float area = a*b;
    System.out.println("Area ="+area+"sq.unit");
    }
}
    class triangle extends shape {
    public void printArea() {
    System.out.print("Enter three sides of triangle:");
    float a = S.nextFloat();
    float b = S.nextFloat();
```

```java
        float c = s.nextFloat();
        float d = (a+b+c)/2;
        double area = Math.sqrt(d*(d-a)*(d-b)*(d-c));
        System.out.println("Area="+area+"sq. unit");
    }
}


class circle extends shape {
    public void printArea() {
        System.out.print("Enter radius of circle:");
        float a = s.nextFloat();
        float area = 22/7*a*a;
        System.out.println("Area="+area+"sq. unit");
    }
}

class shapedemo {
        public static void main(String args[]) {
            shape r = new rectangle();
            shape t = new triangle();
            shape c = new circle();
            for(int i=0; i<100; i++) {
    System.out.println("\n1)Triangle \n 2) Rectangle\n3)circle\n");
    System.out.println("Enter your choice:");
    Scanner s = new Scanner(System.in);
```

```java
int ch = s.nextInt();
switch(ch){
        case 1: t.print Area();
            break;
        case 2: r.print Area();
            break;
        case 3: c.print Area();
            break;
        default :
        System.out.println("Invalid choice");
    }
  }
 }
}
```

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.


```java
import java.util.*;
class Account
{
    String name,type;
    int acc_no;
    double amount;
    Scanner in=new Scanner(System.in);
    void type(int choice)
    {
        if(choice==1)
            type="Savings Account";
        if(choice==2)
            type="Current Account";
    }
    void input()
    {
        System.out.println("Enter the Name,Account number and Balance:");
        name=in.next();
        acc_no=in.nextInt();
        amount=in.nextDouble();
    }
    void deposit()
    {
        System.out.println("Enter the amount to be deposited:");
        double x=in.nextDouble();
        amount=amount+x;
    }
    void display()
    {
        System.out.println("Name:"+name);
```

```java
            System.out.println("Account number:"+acc_no);
            System.out.println("Type:"+type);
            System.out.println("balance:"+amount);
        }
}
class Savings_acc extends Account
{
        double a,cinterest;
        int r,t;
        Scanner in=new Scanner(System.in);
        void withdrawal()
        {
            System.out.println("Enter amount to be withdrawn:");
            double amtw=in.nextDouble();
            if(amtw<=amount)
                    amount=amount-amtw;
            else
                    System.out.println("Invalid amount");
        }
        void cmp_interest()
        {
            System.out.println("Enter the rate and time:");
            r=in.nextInt();
            t=in.nextInt();
            a=amount* Math.pow(1 + (r *0.01),t);
            cinterest= a - amount;

        }
         void display()
        {
            super.display();
            System.out.println("Compound Interest after " + t + " years: "+cinterest);
            System.out.println("Amount after " + t + " years: "+a);
        }
}
class Current_acc extends Account
{
        double min=10000;
        void input()
        {
            super.input();
        }
        void service_charge()
        {
```

```java
            if(amount<min)
            amount=amount-500;
        }
        void display()
        {
            super.display();
        }
}
class bankdemo
{
    public static void main(String args[])
    {
        Scanner in=new Scanner(System.in);
        System.out.println("Choose type of account.");
        System.out.println("1.Savings account.");
        System.out.println("2.Current account.");
        int choice=in.nextInt();

        if(choice==1)
        {
            Savings_acc b=new Savings_acc();
            b.type(choice);
            b.input();
            System.out.println("Do you want to deposit or
withdraw?\n1.Deposit.\n2.Withdraw\n");
            int ch=in.nextInt();
            if(ch==1)
            b.deposit();
            else if(ch==2)
            b.withdrawal();
            else
            System.out.println("Invalid choice");
            b.cmp_interest();
            b.display();
        }
        else if(choice==2)
        {
            Current_acc b=new Current_acc();
            b.type(choice);
             b.input();
            b.deposit();
            b.service_charge();
            b.display();
        }
```
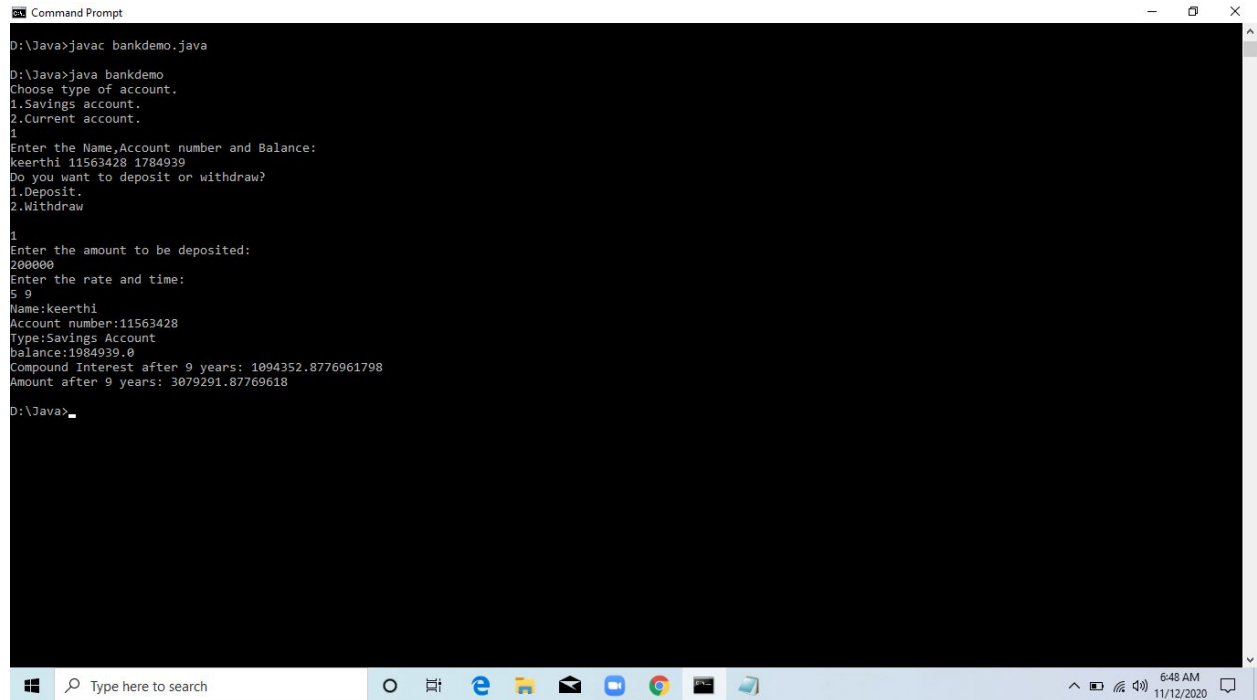
```
        else
            System.out.println("Invalid choice");


    }
}
```

Lab program 5

```java
import java.util.*;
class Account
{
  String name, type;
  int acc_no;
  double amount;
  Scanner in=new Scanner(System.in);
  void type(int choice)
  {
     if(choice==1)
          type="savings Account";
     if(choice==2)
          type="current Account";
  }
  void input()
  {
    system.out.println("Enter the name, Account number
                                and Balance:");
    name = in.next();
    acc_no= in.nextInt();
    amount= in.nextDouble();
  }
  void deposit()
  {
    system.out.println("Enter the amount to be deposited:");
    double x=in.nextDouble();
    amount = amount+x;
```

```java
    }
    void display()
    {
        System.out.println("Name:"+name);
        System.out.println("Account number:"+ acc_no);
        System.out.println("Type: "+type);
        System.out.println("Balance:"+amount);
    }
}
class savings_acc extends Account
{
    double a, cinterest;
    int s, t;
    Scanner in=new Scanner(System.in);
    void withdrawal()
    {
        System.out.println("Enter amount to be withdrawn:");
        double amtw =in.nextDouble();
        if(amtw<=amount)
                amount=amount-amtw;
        else
                System.out.println("Invalid amount");
    }
    void cmp_interest()
    {
        System.out.println("Enter the rate and time:");
        s=in.nextInt();
        t=in.nextInt();
```

```java
        a = amount * Math.pow(1+(r*0.01),t);
        (interest = a - amount;
    }
  void display()

  {
    super.display();
    System.out.println("Compound interest after"+t+"years:
                                               "+(interest);
    System.out.println("Amount after"+t+"years:"+a);

  }
}
class current_acc extends Account
{
    double min = 10000;
    void input()
    {
        super.input();
    }
    void service_charge()
    {
      if(amount < min)
      amount = amount - 500;
    }
  void display()
  {
   super.display();
  }
}
```

```java
class bankdemo
{
    public static void main (String args[])
    {
        Scanner in = new Scanner(System.in);
        System.out.println("choose type of account.");
        System.out.println("1. savings account.");
        System.out.println("2. current account.");
        int choice = in.nextInt();

        if (choice ==1)
        {
            Savings_acc b = new Savings_acc();
            b.type(choice);
            b.input();
            System.out.println("Do you want to deposit or
                                withdraw? \n1. deposit.\n2. withdraw
                                \n");

            int ch = in.nextInt();
            if (ch==1)
                b.deposit();
            elseif (ch==2)
                b.withdrawal();
            else
            System.out.println("Invalid choice");
            b.cmp_interest();
            b.display();
        } else if (choice == 2)
        {
        current_acc b = new current_acc();
            b.type(choice);
            b.input();
            b.deposit();    b.service_charge();  b.display(); } else System.out.println
                                                                  ("Invalid choice");
```