B.M.S College of Engineering

(Autonomous Institution affiliated to VTU, Belagavi)
Bengaluru – 20

Department of Computer Science and Engineering

Report on

OOJP LAB PROGRAMS

Course Title: Object Oriented Java Programming

Course Code: 19CS3PCOOJ

(Autonomous Scheme 2020)

Submitted by

Name: AVIRATH MANOHAR HEGDE
USN: 1BM19CS195

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.

CODE

```
import java.util.Scanner;
public class Quadratic
{
    public static void main(String args[])
    {
        double x=0, y=0;
        double a,b,c;
        double det;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the value of a:");
        a = sc.nextDouble();

        System.out.println("enter the value of b:");
        b = sc.nextDouble();

        System.out.println("Enter the value for c:");
        c = sc.nextDouble();

        det= (b*b)-(4*a*c);
        double sqrt = Math.sqrt(det);
        if(det>0)
        {
            x = (-b+sqrt)/(2*a);
            y = (-b-sqrt)/(2*a);
            System.out.println("Roots are :: "+x+" and "+y);
        }
        else if(det==0)
        {
            System.out.println("Root is :: "+(-b + sqrt)/(2*a));
        }
        else
```

```java
        System.out.println("There are no real solutions");
    }
}
```

LAB PROGRAM 2

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

```java
import java.util.Scanner;
class Student
{
```

```java
private String USN;
private String name;
private int n;
private double SGPA = 0;
private int totalCredits = 0;
Scanner ss = new Scanner(System.in);

void Details()
{
System.out.println("Enter USN of the student");
USN = ss.nextLine();
System.out.println("Enter Name of the student");
name = ss.nextLine();
System.out.println("Enter no of subjects");
n = ss.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] = ss.nextInt();
 System.out.println("Enter marks in the subject "+(i+1));
 marks[i] = ss.nextInt();
 Calculate(credits[i],marks[i],i);
}
  }
  void Calculate(int credit,double mark,int j)
  {
totalCredits = totalCredits + 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));
```

```java
   }
 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/totalCredits));
 }
}

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

<div align="center">OUTPUT</div>

```
G:\Java>java Studetns
Error: Could not find or load main class Studetns

G:\Java>java Students
Enter USN of the student
1BM19CS195
Enter Name of the student
Avirath Hegde
Enter no of subjects
2
Enter details of the subjects:
Enter credits allotted to the subject 1
4
Enter marks in the subject 1
90
Enter credits allotted to the subject 2
3
Enter marks in the subject 2
94
Details of the Student
Name :Avirath Hegde
USN: 1BM19CS195
SGPA of student 10.0

G:\Java>
```

LAB PROGRAM 3

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

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

        Book()
        {
                name="xyz";
                author="abc";
                price= 0.0;
                num_pages=10;
        }
        void getdata()
        {
                Scanner sc= new Scanner(System.in);
                System.out.println("enter the name of book");
                name = sc.nextLine();
                System.out.println("enter the name of author");
                author = sc.nextLine();
                System.out.println("enter the price of book");
                price = sc.nextDouble();
                System.out.println("enter the number of pages");
                num_pages = sc.nextInt();
        }
```

```java
        public String toString()
        {
                return("Book: "+name+"\nAuthor: "+author+"\nPrice: Rs "+price+"\nNo.of pages: "+num_pages);
        }
}
class lab4
{
        public static void main(String ss[])
        {
         Scanner xx=new Scanner(System.in);
         System.out.println("Enter the no of books:");
         int n=xx.nextInt();
         Book b[]=new Book[n];
         int i;
         System.out.println("Enter the book details");
         for(i=0;i<n;i++)
         {
           System.out.println("Book "+(i+1));
           b[i]=new Book();
                b[i].getdata();
         }
         System.out.println("Printing book details....");
         for(i=0;i<n;i++)
         {
           System.out.println("Book "+(i+1));
                System.out.println(b[i]);
                System.out.println("----------------------");

         }
         }
}
```

OUTPUT

```
Command Prompt                                                    —  □  ×
           4 Dir(s)  997,255,081,984 bytes free

G:\Java>java lab3
Enter the no of books:
2
Enter the book details
Book 1
enter the name of book
River of journey
enter the name of author
Vas
enter the price of book
100
enter the number of pages
200
Book 2
enter the name of book
Rich dad poor dad
enter the name of author
muckles
enter the price of book
200
enter the number of pages
400
Printing book details....
Book 1
Book: River of journey
Author: Vas
Price: Rs 100.0
No.of pages: 200
----------------------
Book 2
Book: Rich dad poor dad
Author: muckles
Price: Rs 200.0
No.of pages: 400
----------------------

G:\Java>_
```

LAB PROGRAM 4

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

```java
import java.util.*;
abstract class Shape
{
        int a;
        int b;

        abstract void printArea();
}
```

```java
class Rectangle extends Shape
{
        Rectangle(int x, int y)
        {
                a=x;
                b=y;
        }

        void printArea()
        {
                System.out.println("Area is "+(a*b));
        }
}

class Triangle extends Shape
{
        Triangle(int x, int y)
        {
                a=x;
                b=y;
        }
        void printArea()
        {
                System.out.println("Area is "+(a*b*0.5));
        }
}
class Circle extends Shape
{
        Circle(int x)
        {
                a=x;
        }
        void printArea()
        {
                System.out.println("Area is "+(a*a*3.14));
        }
}

class lab4
{
        public static void main(String ss[])
        {
                int l,b,ba,h,ra;
                Scanner sc = new Scanner(System.in);
```

```java
System.out.println("enter the length and breadth of rectangle");
l= sc.nextInt();
b= sc.nextInt();
Rectangle r= new Rectangle(l,b);
r.printArea();

System.out.println("enter the base and height of triangle");
ba= sc.nextInt();
h= sc.nextInt();
Triangle t = new Triangle(ba,h);
t.printArea();

System.out.println("enter the radius of circle");
ra= sc.nextInt();
Circle c = new Circle(ra);
c.printArea();
        }
}
```

OUTPUT

```
                18 File(s)       174,093 bytes
                 4 Dir(s)  960,857,100,288 bytes free

G:\Java>java lab4
enter the length and breadth of rectangle
4
6
Area is 24
enter the base and height of triangle
6
12
Area is 36.0
enter the radius of circle
5
Area is 78.5

G:\Java>
```

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.

CODE

```
import java.util.*;
import java.lang.Math;
class Account
{
        String name;
        int acctno;
```

```java
        char type;
        double balance;
        double dep;
        boolean cheq;

        void get(char c)
        {
                type = c;
                if(c=='s' || c == 'S')
                cheq=false;
                else cheq=true;
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter your name");
                name = sc.nextLine();
                System.out.println("Enter the account number");
                acctno = sc.nextInt();
                System.out.println("Enter the current available balance in your account");
                balance= sc.nextDouble();
        }

        void putd()
        {
                System.out.println("Account details");
                System.out.println("Name: "+name);
                System.out.println("Account number: "+acctno);
                System.out.println("Account type :"+type);
                System.out.println("balance: "+balance);
        }
        void dep()
        {
                                Scanner ss = new Scanner(System.in);
                                System.out.println("Enter the amount to be deposited");
                                dep= ss.nextDouble();
                                balance=balance +dep;
                                System.out.println("Amount has been deposited and balance has been
updated");
        }
        void display()
        {

                                System.out.println("Balance amount is "+balance);
        }

        void check()
```

```java
        {
                        if(cheq==false)
                        System.out.println("Cheque book facility is not available");
                        else
                        System.out.println("Cheque book facility is available");


        }


}

class Saving extends Account
{

        double rate;

        double s_with;
        int n;

        int ch;
        double amt;
        double term;
        double pr;



        void ci()
        {
                                Scanner ss = new Scanner(System.in);
                                System.out.println("Enter principal deposit amount");
                                pr = ss.nextDouble();
                                System.out.println("Enter the rate of interest");
                                rate = ss.nextDouble();
                                System.out.println("Enter the term(years)");
                                term = ss.nextDouble();
                                System.out.println("Enter the number of times interest in
compounded annually");
                                n = ss.nextInt();
                                amt = pr* Math.pow((1+(rate/100)),(n*term));
                                balance+= amt;
                                System.out.println("Interest is compounded and deposited;
balance is updated");

        }
```

```java
        void with_s()
        {

                                Scanner ss = new Scanner(System.in);
                                System.out.println("Enter the amount of money to be withdrawn");
                                s_with = ss.nextDouble();
                                if(s_with>balance)
                                System.out.println("Insufficient balance");
                                else
                                {balance= balance - s_with;
                                System.out.println("Money has been withdrawn and balance has been
updated");}
        }




}

class Current extends Account
{

        double c_with;
        double pen;
        double min;
        Current()
        {
                pen=100;
                min=500;
        }

        void with_c()
        {
                                Scanner xx = new Scanner(System.in);
                                System.out.println("Enter the amount to be withdrawn");
                                c_with= xx.nextDouble();
                                if(c_with>balance)
                                {System.out.println("Insufficient funds!");
                                return;}
                                else
                                {balance= balance- c_with;
```

```java
                                        System.out.println("Amount has been withdrawn and balance has been
updated");}
                                if(balance<min)
                                {
                                        System.out.println("Balance is below the minimum threshold.
Service penalty charge = 100/- .");
                                        if(balance<pen)
                                        System.out.println("Due to insufficient funds, penalty charge
will be deducted from account after replenishing. Current balance is "+balance);
                                        else
                                        {
                                                balance= balance-pen;
                                                System.out.println("Penalty charge has been deducted
from account balance. Current balance is "+balance);
                                        }
                                }
                }


}

class lab5
{
        public static void main(String sss[])
        {
                int cch, chh;
                Scanner sx = new Scanner(System.in);
                System.out.println("--------Welcome----------");
                System.out.println("Savings account or current account? 1- Savings; 2- Current");
                int ch= sx.nextInt();
                if(ch==1)
                {
                        Saving s = new Saving();
                        s.get('S');
                        do{
                        System.out.println("1. Deposit money\n2. Calculate compound interest\n3.
Withdraw money\n4. Display balance\n5. Cheque book facility\n6. Exit");
                        System.out.println("Enter your choice");
                        chh= sx.nextInt();
                        switch(chh)
                        {
                                case 1:
                                s.dep();
                                break;
```

```java
                case 2:
                s.ci();
                break;

                case 3:
                s.with_s();
                break;

                case 4:
                s.display();
                break;

                case 5:
                s.check();
                break;

                case 6:
                break;

                default:
                System.out.println("Wrong option.");
                break;
        }
        }while(chh!=6);

    }
    else if(ch==2)
    {
        Current cr = new Current();
        cr.get('C');
        do{
        System.out.println("1. Deposit money\n2. Chequebook facility\n3. Withdraw
money\n4. Display balance\n5. Exit");
        cch= sx.nextInt();
        switch(cch)
        {
                case 1:
                cr.dep();
                break;

                case 2:
                cr.check();
                break;
```

```
                    case 3:
                    cr.with_c();
                    break;

                    case 4:
                    cr.display();
                    break;

                    case 5:
                    break;

                    default:
                    System.out.println("Wrong option.");
                    break;
                }
        }while(cch!=5);



        }
        else System.out.println("Wrong!");
    }
}
```

```
Avirath Hegde
Enter the account number
21025762
Enter the current available balance in your account
1500
1. Deposit money
2. Calculate compound interest
3. Withdraw money
4. Display balance
5. Cheque book facility
6. Exit
Enter your choice
2
Enter principal deposit amount
200
Enter the rate of interest
3
Enter the term(years)
2
Enter the number of times interest in compounded annually
4
Interest is compounded and deposited; balance is updated
1. Deposit money
2. Calculate compound interest
3. Withdraw money
4. Display balance
5. Cheque book facility
6. Exit
Enter your choice
```