

VARSHA.S.

1BM19CS179
'3D'BATCH-1

OOJ LAB PROGRAMS

LAB 1

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

WRITEUP:-

Varsha S
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'3D'

classmate
Date
Page

OOP Lab-1

```
import java.util.Scanner;
import java.lang.*;
class Quadratic {
    public static void main(String[] args) {
        double a, b, c, r1, r2, d;
        Scanner scan = new Scanner(System.in);
        System.out.println("Enter the coefficients of  
the quadratic equation a, b & c in");
        a = scan.nextDouble();
        b = scan.nextDouble();
        c = scan.nextDouble();

        d = b * b - (4 * a * c);
        if (d < 0) {
            System.out.println("There are no real  
solutions for this quadratic equation");
            System.exit(0);
        }
        r1 = (-b + Math.sqrt(d)) / (2 * a);
        r2 = (-b - Math.sqrt(d)) / (2 * a);
        if (d == 0) {
            System.out.println("The solutions are real  
and equal to " + r1);
        }
        else {
            System.out.println("The real solutions  
are " + r1 + " and " + r2);
        }
    }
}
```

OUTPUT:-

```
E:\>cd java
E:\Java>javac lab1.java
E:\Java>java lab1
enter the a,b,c values:1
2
3
the roots are imaginary:-2.0+(-8.0i),-2.0+(8.0i)
E:\Java>java lab1
enter the a,b,c values:2
2
2
the roots are imaginary:-2.0+(-12.0i),-2.0+(12.0i)
E:\Java>lab1
'lab1' is not recognized as an internal or external command,
operable program or batch file.
E:\Java>java lab1
enter the a,b,c values:2
3
5
the roots are imaginary:-3.0+(-31.0i),-3.0+(31.0i)
```

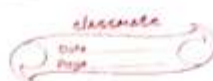
LAB 2

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

WRITEUP:-

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18M19CS179

16/10/2020



3D 00J

Lab - 2

```
import java.util.*;
public class student {
    public static void main(String args[]) {
        int usn, n;
        int sgpa, sum = 0, msum = 0;
        int[] credit;
        int[] marks;
        String name;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the number  
of subjects");
        n = sc.nextInt();
        credit = new int[n];
        marks = new int[n];
        System.out.println("Enter the name of the  
student");
        name = sc.next();
        System.out.println("Enter the USN of the  
student");
        usn = sc.nextInt();
        for (int i = 0; i < n; i++) {
            System.out.println("Enter the credits and  
marks of the subject " + (i + 1));
            credit[i] = sc.nextInt();
            marks[i] = sc.nextInt();
        }
        student s1 = new student();
        for (int x : credit) {
            sum += x;
        }
    }
}
```

```
for (int y: marks) {
    msum += y;
}
```

```
st.accept(usn, credits, marks, name);
sgpa = st.findSgpa(sum);
st.display(msum, sgpa);
}
```

```
}
Class Student {
```

```
int usn;
int[] credits = new int[100];
int[] marks = new int[100];
String name;
void accept(int usn, int[] credits, int[] marks, String name) {
```

```
    this.usn = usn;
    this.credits = credits;
    this.marks = marks;
    this.name = name;
}
```

```
void display(double tot, int sgpa) {
```

```
    System.out.println("\nName: " + name + " USN: " + usn + "\nTotal marks: " + tot + "\nSgpa: " + sgpa);
}
```

```
int findSgpa(int v sum) {
    int sgpa; int sum = 0, v = 0;
    for (int x: marks) {
```

classmate
Date _____
Page _____

```

sum += (credits[i] + 7 * x);
}
sgpa = sum / (vsum * 10);
return (sgpa);
}
}

```

Scanned with CamScanner

OUTPUT:

```

E:\>cd java
E:\Java>javac abs.java
E:\Java>java abs
The area of rectangle is: 12
The area of triangle is: 6
The area of circle is: 28
E:\Java>

```


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.

WRITEUP:-

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'30'

00J
Lab - 3

6/11/2020

```
import java.util.*;  
class book {  
    String name;  
    String author;  
    double price;  
    int num_pages;  
    public book() {  
        name = "java the complete reference";  
        author = "herbert schildt";  
        price = 1000.0;  
        num_pages = 1882;  
    }  
    public book (String name, String author,  
                double price, int num_pages) {  
        this.name = name;  
        this.author = author;  
        this.price = price;  
        this.num_pages = num_pages;  
    }  
    void setdetails () {  
        Scanner x = new Scanner (System.in);  
        name = x.nextLine();  
        author = x.nextLine();  
        price = x.nextDouble();  
        num_pages = x.nextInt();  
    }  
    public String toString () {  
        return (name + ", " + author + ", " + price + ",  
                " + num_pages);  
    }  
}
```

Scanned with CamScanner

```

public class Main {
    public static void main(String[] args) {
        int n=0;
        Scanner x = new Scanner(System.in);
        System.out.println("enter the value for n:");
        n = x.nextInt();
        book[] b = new book[n];
        System.out.println("enter the details of book (name, author, price, num pages);");
        for (int i=0; i<n; i++) {
            b[i] = newbook();
            System.out.println("details of "+(i+1)+" book:");
            b[i].setdetails();
        }
        System.out.println("the details of the book are:");
        for (int i=0; i<n; i++) {
            System.out.printLn((i+1)+" book:");
            System.out.println(b[i]);
        }
    }
}

```

Scanned with CamScanner

OUTPUT:-

```

E:\Java>java Main
enter the value for n:2
enter the details of book(name,author,price,num_pages)
details of 1 book:
java the complete reference
herbert schildt
1000
1882
details of 2 book:
introduction to java programming
y daniel liang
999
1446
the details of the books are:
1 book:
java the complete reference,herbert schildt,1000.0,1882
2 book:
introduction to java programming,y daniel liang,999.0,1446

```


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 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.

WRITEUP:-

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30 OCT
Lab 4

```
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 * b);
        System.out.println("The area of triangle is : " + area_tri);
    }
}
```

```

    }
    }
    class Circle extends Shape
    {
        int area = 0;
        public void printArea()
        {
            area = circle = (int) (3.14 * a * a);
            System.out.println("The area of circle is "
                               + area + "sq. units");
        }
    }

    class abs {
        public static void main (String[] args)
        {
            Rectangle rec = new Rectangle();
            rec.printArea();
            Triangle tri = new Triangle();
            tri.printArea();
            Circle cir = new Circle();
            cir.printArea();
        }
    }
}

```

Scanned with CamScanner

```

C:\Users\javan> java Student.java
C:\Users\javan> java Student
Enter the Number of Subjects
4
Enter the name of the Student
VADHANTHON
Enter the ID of the Student
187
Enter the Credits And Marks Of The Subjects
4
Enter the Credits And Marks Of The Subject2
4
name: VADHANTHON, 187
total marks: 168.0
gpa: 4
C:\Users\javan>

```

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 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.

WRITEUP:-

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3D
00J
Lab 5
6/11/2020

```
import java.util.*;  
class account {  
    String customer-name;  
    int account-number;  
    String account-type;  
}  
class curr-acct extends account {  
    Scanner x = new Scanner(System.in);  
    double temp = 0.0;  
    double amount = 0.0;  
    double fine = 0.0;  
    double minimum-amount = 1000.0;  
    void getDetails() {  
        customer-name = x.nextLine();  
        account-number = x.nextInt();  
    }  
    void deposit() {  
        System.out.println("Enter the deposit amount:");  
        temp = x.nextDouble();  
        amount += temp;  
    }  
    void showBalance() {  
        if (amount >= min-amount)  
        {  
            System.out.println("Balance is: " + amount);  
        }  
        else {  
            fine = (amount * 1.0 * 10) / 100;  
            amount -= fine;  
            System.out.println("the fine imposed: " + fine);  
            System.out.println("Balance is: " + amount);  
        }  
    }  
}
```

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```
void withdrawal() {  
    System.out.println("Enter the withdrawal amount:");  
    temp = x.nextDouble();  
    amount = temp;  
}
```

```
}  
class sav_acct extends account {  
    Scanner x = new Scanner(System.in);  
    double temp = 0.0;  
    double amount = 0.0;  
    double interest = 0.0;  
    void get_details() {  
        customer_name = x.nextLine();  
        account_number = x.nextInt();  
    }
```

```
    void showbalance() {  
        System.out.println("Balance is: " + amount);  
    }
```

```
    void withdrawal() {  
        System.out.println("Enter the withdrawal  
                                amount:");
```

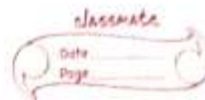
```
        temp = x.nextDouble();  
        amount = temp;
```

```
    }  
    void interest() {  
        interest = (amount * 10 * 3) / 100;  
        amount += interest;  
        System.out.println("Interest added: " + interest);  
    }
```

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

```
}  
}
```


6/11/2020



```
public class Main {  
    public static void main(String[] args) {  
        int opt = 0;  
        String type = null;  
        Scanner x = new Scanner(System.in);  
        System.out.println("Welcome to the bank service");  
        System.out.println("Enter the type of account  
        (curr_acct/sav_acct)");  
        type = x.nextLine();  
        if (type.equals("curr_acct")) {  
            curr_acct a = new curr_acct();  
            System.out.println("Enter the customer name,  
            account-number:");  
            a.getdetails();  
            while (true) {  
                System.out.println("press 1: Accept deposit and  
                update the balance");  
                System.out.println("press 2: Display the balance");  
                System.out.println("press 3: Withdrawal and  
                update the balance");  
                System.out.println("Enter option:");  
                opt = x.nextInt();  
                switch (opt) {  
                    case 1: a.deposit();  
                        a.showbalance();  
                        break;  
                    case 2: a.showbalance();  
                        break;  
                    case 3: a.withdrawal();  
                        a.showbalance();  
                        break;  
                }  
            }  
        }  
    }  
}
```

6/11/2020



```
if (type.equals("sav-acc")) {  
    sav-acc a = new sav-acc ();  
    System.out.println("Enter the customer-name,  
                        account-number:");  
    a.getdetails();  
    while (true) {  
        System.out.println("press 1: Accept details and  
                           update the balance");  
        System.out.println("press 2: Display the amount");  
        System.out.println("press 3: Compute and deposit  
                           interest");  
        System.out.println("press 4: Withdrawal and  
                           update the balance");  
        System.out.println("Enter option:");  
        opt = sc.nextLine();  
        switch (opt) {  
            case 1: a.deposit();  
                   a.showbalance();  
                   break;  
            case 2: a.showbalance();  
                   break;  
            case 3: a.interest();  
                   a.showbalance();  
                   break;  
            case 4: a.withdrawal();  
                   a.showbalance();  
                   break;  
        }  
    }  
}
```


OUTPUT:-

```
C:\Java>javac Main.java
C:\Java>java Main
Welcome to the bank service
Enter the type of account (curr_acct/sav_acct)
sav_acct
Enter the customer_name,account_number:
OJASWATH KIRAN 1
Name
press 1 : Accept deposit and update the balance
press 2 : Display the balance
press 3 : Compute and deposit interest
press 4 : Withdrawal and update the balance
Enter option : 1
Enter the deposit amount : 1000000
Balance is : 1000000.0
press 1 : Accept deposit and update the balance
press 2 : Display the balance
press 3 : Compute and deposit interest
press 4 : Withdrawal and update the balance
Enter option : 2
Balance is : 1000000.0
press 1 : Accept deposit and update the balance
press 2 : Display the balance
press 3 : Compute and deposit interest
press 4 : Withdrawal and update the balance
Enter option : 3
Interest added : 30000.0
Balance is : 1030000.0
Balance is : 1030000.0
press 1 : Accept deposit and update the balance
press 2 : Display the balance
press 3 : Compute and deposit interest
press 4 : Withdrawal and update the balance
Enter option : 4
Enter the withdrawal amount : 1
Balance is : 1029999.0
press 1 : Accept deposit and update the balance
press 2 : Display the balance
press 3 : Compute and deposit interest
press 4 : Withdrawal and update the balance
Enter option :
```

LAB 6

Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class Internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.

WRITEUP:-

```
package CTF;
import java.util.*;
public class personal
{
    public String name;
    public int sem;
    public String usn;

    public void read()
    {
        Scanner sc = new
        Scanner(System.in);
        System.out.println("Enter the semester");
        sem = sc.nextInt();
        System.out.println("Enter the USN");
        usn = sc.next();
    }

    public void display()
    {
        System.out.println("Student details:");
        System.out.println("Name: " + name + "\n"
        usn: " + usn + "\n sem: " + sem);
    }
}
```

Teacher's Signature : _____

```

package SEE;
import java.util.*;
import CIE.*;
public class externals extends personal
{
    public double see[];
    public void get()
    {
        see = new double[5];
        scanner sc = new
        scanner (system.in);
        for (int i=0 ; i<5 ; i++)
        {
            System.out.println("SEE mark for course"
                               + (i+1) + " : ");
            see[i] = sc.nextDouble();
        }
    }
}

```

```

package CIE;
import java.util.*;
public class internals extends personal

```

```
{  
    public double cie[];  
    public void accept()  
{  
        cie = new double [5];  
        Scanner SC = new  
        Scanner (System.in);  
        for (int i=0; i<5; i++)  
{  
            System.out.println("CIE mark for course"  
                                + (i+1) + ": ");  
            cie[i] = SC.nextDouble();  
        }  
    }  
}  
  
import CIE.*;  
import SEF.*;  
import java.util.*;  
  
class Main  
{
```

Teacher's Signature : _____


```

public static void main (String arg [])
{
    Scanner sx = new Scanner (System.in);
    System.out.println ("Enter the number of
                        students");
    int n = sx.nextInt();
    CIE.internals in[] = new
    CIE.internals [n];
    SEE.externals en[] = new
    SEE.externals [n];

    int i, j;
    for (i=0; i<n; i++)
    {
        System.out.println ("Student" + (i+1));
        in[i] = new CIE.internals ();
        en[i] = new SEE.externals ();
        in[i].read();

        System.out.println ("CIE marks:");
        in[i].accept();
        System.out.println ("SEE MARKS:");
        en[i].get();
        System.out.println ();
        in[i].display ();
        for (j=0; j<5; j++)
    }
}

```

```
System.out.println("Total Marks for course"  
+ (j+1) + " : " + (in[i] * (ceil[j]  
+ (en[i]  
+ (j)/2)));
```

}

}

}

Teacher's Signature : _____

OUTPUT -

```
Enter the number of students
2
Student 1
Enter the name
yashwanth
Enter the semester
3
Enter the USN
1bm19cs187
CIE MARKS:
CIE mark for course 1 :
40
CIE mark for course 2 :
38
CIE mark for course 3 :
36
CIE mark for course 4 :
34
CIE mark for course 5 :
32
SEE MARKS:
SEE mark for course 1 :
100
SEE mark for course 2 :
98
SEE mark for course 3 :
97
SEE mark for course 4 :
96
SEE mark for course 5 :
95

Student details:
Name: yashwanth
USN: 1bm19cs187
Sem: 3
Total Marks for course 1: 98.0
Total Marks for course 2: 87.0
Total Marks for course 3: 84.5
Total Marks for course 4: 82.0
Total Marks for course 5: 79.5
C:\Command Prompt

Student 2
Enter the name
kiran
Enter the semester
3
Enter the USN
1bm19cs188
CIE MARKS:
CIE mark for course 1 :
88
CIE mark for course 2 :
89
CIE mark for course 3 :
88
CIE mark for course 4 :
87
CIE mark for course 5 :
86
SEE MARKS:
SEE mark for course 1 :
100
SEE mark for course 2 :
99
SEE mark for course 3 :
98
SEE mark for course 4 :
97
SEE mark for course 5 :
96

Student details:
Name: kiran
USN: 1bm19cs188
Sem: 3
Total Marks for course 1: 90.0
Total Marks for course 2: 88.5
Total Marks for course 3: 87.0
Total Marks for course 4: 85.5
Total Marks for course 5: 84.0
C:\Java\packages>
```

LAB-7

Write a program to demonstrate generics with multiple object parameters.

WRITEUP:-

```
27/11/2020 Lab 7
Vansha S 1BM19CS179 3D Batch-1
// A simple generic class with two type
parameters T and V.
class TwoGen <T, V> {
    T ob1;
    V ob2;
    // Pass the constructor a reference to an object
    // of type T and an object of type V.
    TwoGen (T o1, V o2) {
        ob1 = o1;
        ob2 = o2;
    }
    // Show types of T and V
    void Show Types () {
        System.out.println("Type of T is" + ob1.getClass().
            getName());
        System.out.println("Type of V is" + ob2.getClass().
            getName());
    }
}
```

```
T get Obj1 () {  
    return obj1;  
}
```

```
V get Obj2 () {  
    return Obj2;  
}  
}
```

// Demonstrate TwoGen

```
class SimpGen {
```

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

```
        TwoGen < Integer, String > tg Obj =  
        new TwoGen < Integer, String > (88, "Generics");
```

// show the types

```
tg Obj.showTypes();
```

Teacher's Signature : _____

//obtain and show values.

```
int v = tg.Obj.get ob1();
```

```
System.out.println("value : " + v);
```

```
String str = tg.Obj.get ob2();
```

```
System.out.println("value : " + str);
```

```
}
```

```
}
```


OUTPUT :-

```
Type of T is java.lang.Integer
Type of V is java.lang.String
value: 88
value: Generics
```

LAB-8

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<0. In Son class, implement a constructor that takes both father and son's age and throws an exception if son's age is >=father's age.

WRITEUP:-

Varsha.S 18M19CS179 Date _____

Expt. No. _____ 30 Batch - 1 Page No. _____

Lab 8

```
import java.util.*;
class WrongAge extends Exception {
    int f, s;
    WrongAge (int fage, int sage) {
        f = fage;
        s = sage;
    }

    public String toString() {
        return "Please enter the correct ages as father's age
        can't be less than or equal to the son's
        age.";
    }
}

class NegativeAge extends Exception {
    int x;
    NegativeAge (int fage) {
        x = fage;
    }

    public String toString() {
        return "Age can't be a negative value.";
    }
}
```

Teacher's Signature : _____

```
class Father
```

```
{
```

```
    int fage;
```

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

```
    Father () throws Negative Age.
```

```
{
```

```
    System.out.println("Enter the father's age:");
```

```
    fage = in.nextInt();
```

```
    if (fage < 0) {
```

```
        throw new NegativeAge (fage);
```

```
    }
```

```
class Son extends Father.
```

```
{
```

```
    int Sage;
```

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

```
    Son () throws Negative Age, WrongAge {
```

```
        super();
```

```
    System.out.println("Enter the son's age:");
```

```
    Sage = in.nextInt();
```



```
if (sage < 0)
{
    throw new Negative Age (sage);
}
if (sage >= fage) {
    throw new Wrong Age (fage, sage);
}
}

class Age Display {
    public static void main (String args[]) {
        try {
            Son s = new Son ();
        }
        catch (Negative Age n) {
            System.out.println(" Exception: "+n);
        }
    }
}
```

Teacher's Signature : _____

```
catch (Wrong Age w) {  
    System.out.println("Exception: " + w);  
}  
}
```

Scanned with CamScanner

OUTPUT :-

```
Enter the father's age  
25  
Enter the son's age  
60  
Exception arised:   Age of son and father cannot be less than 0 as well Age of t  
he Son cannot be more than age of father or illegal marriage  
  
-----  
(program exited with code: 0)  
Press return to continue  
■
```

LAB-9

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.

WRITEUP:-

3D Batch - 1 Varsha S Date _____

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```
class thread1 implements Runnable {
    Thread t;
    thread1()
    {
        t = new Thread(this, "thread1");
        t.start();
    }
    public void run()
    {
        for(;;)
        {
            try
            {
                System.out.println("BMS college of Engineering");
                Thread.sleep(10000);
            }
            catch (InterruptedException ie)
```

Teacher's Signature : _____

```

    {
        System.out.println(" Interrupted ");
    }
}
}
}
}
class thread 2 implements Runnable
{
    Thread t2;
    thread 2()
    {
        t2 = new Thread (this, "thread 2");
        t2.start();
    }
    public void run ()
    {
        for (;;)
        {
            try

```



```
{
    System.out.println("KSE");
    Thread.sleep(2000);
}
catch (InterruptedException ie)
{
    System.out.println("Interrupted");
}
}
}
}
}
class thread_main
{
    public static void main(String args[])
    {
        System.out.println("Enter CONTROL + c  
to stop");
        Thread t1 = new Thread(1);
        Thread t2 = new Thread(2);
    }
}
```

Teacher's Signature : _____

OUTPUT :-

```
Enter CONTROL+C to stop
BMS College Of Engineering
CSE
CSE
CSE
CSE
CSE
CSE
BMS College Of Engineering
CSE
CSE
CSE
CSE
CSE
CSE
BMS College Of Engineering
CSE
CSE
CSE
CSE
CSE
CSE
BMS College Of Engineering
CSE
CSE
CSE
CSE
CSE
CSE
BMS College Of Engineering
CSE
CSE
CSE
CSE
CSE
```