

NAME : Ramya Famesh
USN : 1BM19CH038

LAB Program 1

```
if (count == 1)  
{
```

```
    double r1 = ((-b + Math.sqrt(D))/(2*a));  
    double r2 = ((-b - Math.sqrt(D))/(2*a));
```

```
    System.out.println ("\\n Roots are : " + r1 +  
    " , " + r2);
```

{

{

LAB PROGRAM 1

QUESTION:

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 discriminant b^2-4ac is negative, display a message stating that there are no real solutions.

CODE:

```
import java.util.*;

class Quad{

public static void main(String args[])
{
int a,b,c,count=0;
double D;
Scanner sc=new Scanner(System.in);
System.out.println("\n Enter the values of a,b,c: ");
a=sc.nextInt();
b=sc.nextInt();
c=sc.nextInt();
D= (b*b)-(4*a*c);
if(D==0)
{
System.out.println("\n Roots are real and equal");
count=1;
}
else if(D>0)
{
System.out.println("\n Roots are real and distinct");
count=1;
}
else if(D<0)
{
System.out.println("\n Roots are imaginary");
```

```
}

if(count==1)

{

double r1 = ((-b + Math.sqrt(D))/(2*a));

double r2 = ((-b - Math.sqrt(D))/(2*a));

System.out.println("\n Roots are : "+r1+ "," +r2);

}

}

}
```

OUTPUT:

```
C:\ Command Prompt
Microsoft Windows [Version 10.0.18363.693]
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C:\Users\Ramya>cd..

C:\Users>cd..

C:\>cd java

C:\java>javac Quad.java

C:\java>java Quad

Enter the values of a,b,c:
1 5 6

Roots are real and distinct

Roots are : -2.0,-3.0

C:\java>
```

NAME: Ramya Rameesh
VSN: 1BM19CH038

Lab Program 2.

```
import java.util.*;  
class Student  
{  
    String USN;  
    String name;  
    int credits[];  
    int marks[];  
    int n, total = 0;  
    double SGPA ;
```

```
Student ()  
{
```

```
    SGPA = 0 ;
```

```
}
```

```
void input ()
```

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

```
System.out.println ("In Enter the USN and the  
name of the student : ");
```

```
USN = sc.nextLine();
```

```
name = sc.nextLine();
```

```
System.out.println ("In Enter the number of  
subjects : ");
```

```
n = sc.nextInt();
```

```
credits = new int[n];
```

```
marks = new int[n];
```

```
for (int i=0; i<n; i++)
```

```
{
```

```
    System.out.println ("In Enter the marks  
of the student for the subject: "+(i+1));
```

? marks[i] = sc.nextInt();

{
void grade_points()
{

int i;
for(i=0; i<n; i++)
{

if (marks[i] >= 90 && marks[i] < 100)
{

marks[i] = 10;

}

else if (marks[i] >= 80 && marks[i] < 90)
{

marks[i] = 9;

{

else if (marks[i] >= 70 && marks[i] < 80)
{

marks[i] = 8;

{

else if (marks[i] >= 60 && marks[i] < 70)
{

marks[i] = 7;

{

else if (marks[i] >= 50 && marks[i] < 60)
{

marks[i] = 6;

{

else if (marks[i] >= 40 && marks[i] < 50)
{

marks[i] = 5;

{

else if (marks[i] < 40)
{

marks[i] = 0 ;

{
void calculate_SGPA()
{

 int i;
 for (i=0; i<n; i++)
 {

 SGPA = SGPA + (credits[i] * marks[i]);

 }
 SGPA = SGPA / total;

void display_details()
{

 System.out.println ("The student with
 USN : " + USN + ", Name : " + name + " has
 secured SGPA : " + SGPA);
}

public static void main (String [] args)
{

 Student obj = new Student();

 obj.input();

 obj.grade_points();

 obj.calculate_SGPA();

 obj.display_details();

}

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 :

```
import java.util.*;  
  
class Student  
{  
    String USN;  
    String name;  
    int credits[];  
    int marks[];  
    int n,total=0;  
    double SGPA;  
  
    Student()  
    {  
        SGPA=0;  
    }  
    void input()  
    {  
        Scanner sc=new Scanner(System.in);  
        System.out.println("\n Enter the USN and the name of the student: ");  
        USN=sc.nextLine();  
        name=sc.nextLine();  
        System.out.println("\n Enter the number of subjects: ");  
        n=sc.nextInt();  
        credits=new int[n];  
        marks =new int[n];  
        for(int i=0;i<n;i++)
```

```
{  
    System.out.println("\n Enter the credits for subject: "+(i+1));  
    credits[i]=sc.nextInt();  
    total=total+credits[i];  
}  
  
for(int i=0;i<n;i++)  
{  
    System.out.println("\n Enter the marks of the student for subject: "+(i+1));  
    marks[i]=sc.nextInt();  
}  
  
void grade_points()  
{  
    int i;  
    for(i=0;i<n;i++)  
    {  
        if(marks[i]>=90 && marks[i]<100)  
        {  
            marks[i]=10;  
        }  
        else if(marks[i]>=80 && marks[i]<90)  
        {  
            marks[i]=9;  
        }  
        else if(marks[i]>=70 && marks[i]<80)  
        {  
            marks[i]=8;  
        }  
        else if(marks[i]>=60 && marks[i]<70)  
        {  
            marks[i]=7;  
        }  
    }  
}
```

```
        }

    else if(marks[i]>=50 && marks[i]<60)

    {

        marks[i]=6;

    }

    else if(marks[i]>=40 && marks[i]<50)

    {

        marks[i]=4;

    }

    else if(marks[i]<40)

    {

        marks[i]=0;

    }

}

void calculate_SGPA()

{

    int i;

    for(i=0;i<n;i++)

    {

        SGPA=SGPA+(credits[i]*marks[i]);

    }

    SGPA=SGPA/total;

}

void display_details()

{

    System.out.println("\n The student with USN: "+USN+" and Name: "+name+" has secured SGPA:

"+SGPA);

}

public static void main(String[] args)

{
```

```
Student obj=new Student();
obj.input();
obj.grade_points();
obj.calculate_SGPA();
obj.display_details();
}
}
```

OUTPUT :

```
Command Prompt
Microsoft Windows [Version 10.0.18363.693]
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C:\Users\Ramya>cd..
C:\Users>cd..
C:\>cd java
C:\java>javac Student.java
C:\java>java Student

Enter the USN and the name of the student:
1BM19CS001
Ramya

Enter the number of subjects:
5

Enter the credits for subject: 1
4

Enter the credits for subject: 2
3

Enter the credits for subject: 3
3

Enter the credits for subject: 4
3

Enter the credits for subject: 5
4

Enter the marks of the student for subject: 1
89

Enter the marks of the student for subject: 2
90

Enter the marks of the student for subject: 3
83

Enter the marks of the student for subject: 4
87

Enter the marks of the student for subject: 5
91

The student with USN: 1BM19CS001 and Name: Ramya has secured SGPA: 9.411764705882353
C:\java>
```

NAME : Ramya Ramesh
USN : 1BM19CH038

LAB PROGRAM 3 :

class Book_details

```
private String name, author;  
private double price;  
private int num_pages;
```

Book_details ()

{

```
name = "The Immortals of Meluha";  
author = "Amish";  
price = 234.00;  
num_pages = 390;
```

void getDetails()

{

```
Scanner in = new Scanner (System.in);  
System.out.println("In Enter the book name");  
name = in.nextLine();  
System.out.println("In Enter the author name");  
author = in.nextLine();  
System.out.println("In Enter the no. of pages");  
num_pages = in.nextInt();  
System.out.println("In Enter the price");  
price = in.nextDouble();
```

```
public String toString()
{
```

```
    String temp = "\n Book name : " + name + "\n"
    + "Author name : " + author + "\n" + "No. of pages : "
    + num_pages + "\n" + "Price : " + price + "\n";
    return temp;
}
```

```
class Book
{
```

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

```
    int i, n;
```

```
    Scanner in = new Scanner (System.in);
    System.out.println ("Enter the number of
books : ");
```

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

```
    Book_details [] obj = new Book_details [n];
    for (i=0; i<n; i++)
    {
```

```
        obj[i] = new Book_details();
    }
```

```
    System.out.println ("Enter Book
Details ***");
    for (i=0; i<n; i++)
    {
```

```
        System.out.println ("Book " + (i+1) + ":");
        obj[i].getDetails();
    }
```

```
    System.out.println ("*** Book Details ***");
    for (i=0; i<n; i++)
    {
```

{

System.out.println (obj[i]);

}

}

}

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 :

```
class Book_details

{
    private String name,author;
    private double price;
    private int num_pages;

    Book_details()
    {
        name="The Immortals of Meluha";
        author="Amish";
        price=234.00;
        num_pages=390;
    }

    void getDetails()
    {
        Scanner in=new Scanner(System.in);
        System.out.println("\n Enter the book name: ");
        name=in.nextLine();
        System.out.println("\n Enter the author name: ");
        author=in.nextLine();
        System.out.println("\n Enter the the no.of pages: ");
        num_pages=in.nextInt();
        System.out.println("\n Enter the price: ");
        price=in.nextDouble();
    }
}
```

```

public String toString()
{
    String temp="\n Book name: "+name+"\n Author name: "+author+"\n No. of pages:
"+num_pages+"\n Price: "+price+"\n";
    return(temp);
}

}

class Book
{
    public static void main(String args[])
    {
        int i,n;
        Scanner in=new Scanner(System.in);
        System.out.print("\n Enter the number of books: ");
        n=in.nextInt();
        Book_details[] obj=new Book_details[n];
        for(i=0;i<n;i++)
        {
            obj[i]=new Book_details();
        }
        System.out.println("\t\t***Enter Book Details***");
        for(i=0;i<n;i++)
        {
            System.out.println("\n Book "+(i+1)+";");
            obj[i].getDetails();
        }
        System.out.println("\t\t***Book Details***");
        for(i=0;i<n;i++)
        {
            System.out.println(obj[i]);
        }
    }
}

```

```
}
```

```
}
```

OUTPUT:

```
C:\ Command Prompt
Microsoft Windows [Version 10.0.18363.693]
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C:\Users\Ramya>cd..

C:\Users>cd..

C:\>cd java

C:\java>javac Book.java

C:\java>java Book

Enter the number of books: 2
***Enter Book Details***

Book 1;

Enter the book name:
BhagadvadGita

Enter the author name:
Vyasa

Enter the the no.of pages:
739

Enter the price:
299.00

Book 2;

Enter the book name:
Ramayana

Enter the author name:
Valmiki

Enter the the no.of pages:
500

Enter the price:
546.00
***Book Details***

Book name: BhagadvadGita
Author name: Vyasa
No. of pages: 739
Price: 299.0

Book name: Ramayana
Author name: Valmiki
No. of pages: 500
Price: 546.0

C:\java>
```

NAME : Ramya Rameesh
USN : 1BM19CHD038

LAB PROGRAM 4

abstract Class Shape {

int a = 3;

int b = 4;

abstract public void point_area();

class rectangle extends Shape

{ public int area_rect;

public void point_area()

{ area_rect = a * b;

System.out.println ("\\n The area of the rectangle is : " + area_rect);

}

class triangle extends Shape

{ int area_tri;

public void point_area()

{ area_tri = (int)(0.5 * a * b);

System.out.println ("\\n The area of triangle is : " + area_tri);

}

class circle extends Shape

{

int area_circle;

public void point_area()

{

```
area_circle = (int)(3.14 * 2 * 2);
```

```
System.out.println("The area of circle is : " +  
    area_circle);
```

{

{

```
class Shape-area {
```

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

```
rectangle rec = new rectangle();
```

```
rec.point_area();
```

```
triangle tri = new triangle();
```

```
tri.point_area();
```

```
circle cir = new circle();
```

```
cir.point_area();
```

{

{

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:

```
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("\n 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("\n 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("\n The area of circle is: "+area_circle);

}
}

class Shape_area{
public static void main(String[] args){
rectangle rec = new rectangle();

rec.print_area();

triangle tri = new triangle();

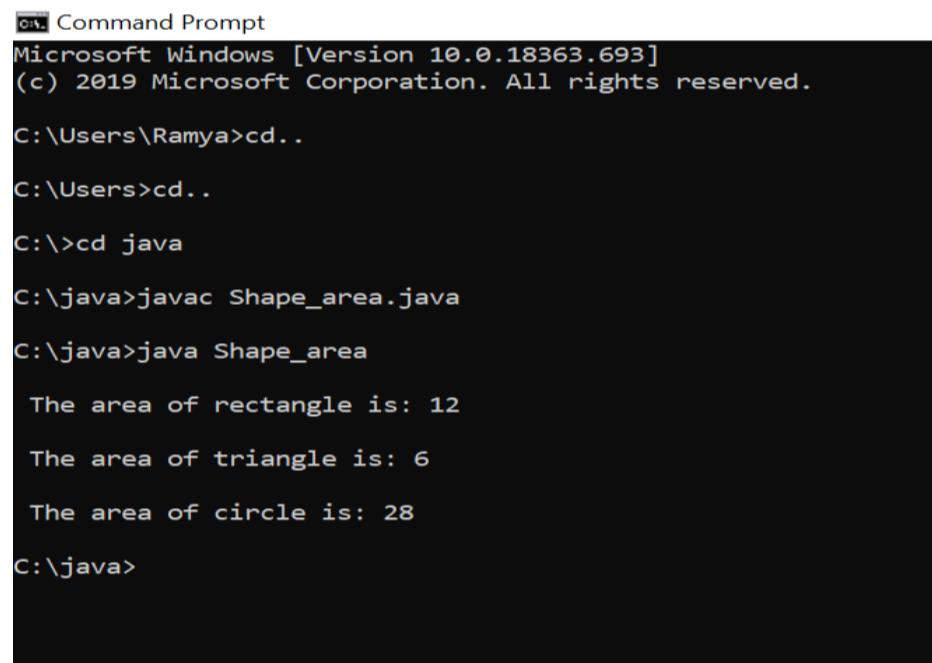
tri.print_area();

circle cir = new circle();

cir.print_area();
}
}

```

OUTPUT:



```

C:\ Command Prompt
Microsoft Windows [Version 10.0.18363.693]
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C:\Users\Ramya>cd..

C:\Users>cd..

C:\>cd java

C:\java>javac Shape_area.java

C:\java>java Shape_area

The area of rectangle is: 12
The area of triangle is: 6
The area of circle is: 28

C:\java>

```

NAME: Ramya Famesh
VSN: IBM19CH038

LAB PROGRAM 5 :

```
import java.util.Scanner ;
class Account {
    private String name ;
    private long account_number ;
    private int account_type ;
    double balance ;
    void get_data()
    {
```

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

```
System.out.println ("In Enter your Name : ");
name = ss.nextLine();
```

```
System.out.println ("In Enter the Account Number : ");
account_number = ss.nextLong();
```

```
System.out.println ("In Choose the account type : ");
```

```
System.out.println ("1. Savings account ");
```

```
System.out.println ("2. Current account ");
```

```
account_type = ss.nextInt();
```

```
int return_account_type ()
```

```
{  
    return account_type ;  
}
```

class Sav acct extends Account

{

Scanner ss = new Scanner (System.in);
 double amount;
 void get_sav_balance ()

{

System.out.println ("In Enter the amount to
 be placed in your savings account: ");
 amount = ss.nextDouble();
 balance = balance + amount;

{

void display_sav_blnce ()

{

System.out.println ("Balance = " + balance);

void compute_sav_interest ()

{

System.out.println ("Interest of 5% shall be
 added to your balance ");

{

balance = balance + (0.05 * balance);

void withdrawal_sav ()

{

System.out.println ("Enter the amount to be
 withdrawn: ");

amount = ss.nextDouble();

balance = balance - amount;

{

9

class Curr_acct extends Account

{
Scanner ss = new Scanner (System.in);

double amount ;

final double min_balance = 5000 ;

void get_cvr_balance()

{
System.out.println ("In Enter the amount to be placed
in your current account : ");

amount = ss.nextDouble();

balance += amount ;

}

void display_cvr_balance()

{
System.out.println ("In Balance = " + balance);

void compute_cvr_service_charges()

{
if (balance < min_balance)

System.out.println ("In Service tax of rs. 500 shall be
levied ");

balance = balance - 500 ;

}

else

{

System.out.println ("In Minimum Balance is
maintained ");

}

{

```
void withdrawal_acr()
{
```

System.out.println("nEnter the amount to be
withdrawn : ");

amount = ss.nextDouble();

balance = balance - amount;

}

}

class Bank

{

public static void main (String [] args)
{

System.out.println ("nEnter the bank details: ");

Account acc = new Account();

acc.get_data();

int type = acc.return_account_type();

if (type == 1)

{

System.out.println ("*** SAVINGS ACCOUNT ***");

Sav_acct sav = new Sav_acct();

sav.get_sav_balance();

sav.display_sav_blnce();

sav.compute_sav_interest();

sav.display_sav_blnce();

sav.withdrawal_sav();

sav.display_sav_blnce();

}

{ if (type == 2)

System.out.println("**** CURRENT ACCOUNT ****");

Curr_acct cur = new Curr_acct();

cur.get_cvr_balance();

cur.display_cvr_blnce();

cur.compute_cvr_service_charges();

cur.display_cvr_blnce();

cur.withdrawal_cvr();

cur.display_cvr_blnce();

}

}

}

LAB PROGRAM 5

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 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.

CODE:

```
import java.util.Scanner;

class Account
{
    private String name;
    private long account_number;
    private int account_type;
    double balance;

    void get_data()
    {
        Scanner ss=new Scanner(System.in);
        System.out.println("\n Enter your name: ");
        name=ss.next();
        System.out.println("\n Enter the Account number: ");
        account_number=ss.nextLong();
        System.out.println("\n Choose the account type: ");
        System.out.println("\n 1. Savings account");
        System.out.println("\n 2. Current account");
        account_type=ss.nextInt();
    }
}
```

```
int return_account_type()
{
    return account_type;
}

}

class Sav_acct extends Account
{
    Scanner ss=new Scanner(System.in);
    double amount;

    void get_sav_balance()
    {
        System.out.println("\n Enter the amount to be placed in your savings account: ");
        amount=ss.nextDouble();
        balance= balance+amount;
    }

    void display_sav_blnce()
    {
        System.out.println("\n Balance = "+balance);
    }

    void compute_sav_interest()
    {
        System.out.println("\n Interest of 5% shall be added to your balance");
        balance=balance+(0.05*balance);
    }

    void withdrawl_sav()

```

```
{  
    System.out.println("\n Enter the amount to be withdrawn: ");  
    amount=ss.nextDouble();  
    balance=balance-amount;  
}  
  
}  
  
class Curr_acct extends Account  
{  
    Scanner ss=new Scanner(System.in);  
    double amount;  
    final double min_balance=5000;  
  
    void get_cur_balance()  
    {  
        System.out.println("\n Enter the amount to be placed in your current account: ");  
        amount=ss.nextDouble();  
        balance+=amount;  
    }  
  
    void display_cur_blnce()  
    {  
        System.out.println("\n Balance = "+balance);  
    }  
  
    void compute_cur_service_charges()  
    {  
        if(balance<min_balance)  
        {  
            System.out.println("\n Service tax of rs.500 shall be levied");  
        }  
    }  
}
```

```
        balance=balance-500;
    }
else
{
    System.out.println("\n Minimum balance is maintained");
}
}

void withdrawl_cur()
{
    System.out.println("\n Enter the amount to be withdrawn: ");
    amount=ss.nextDouble();
    balance=balance-amount;
}

}

class Bank
{
public static void main(String args[])
{
    System.out.println("\n Enter the bank details: ");
    Account acc=new Account();
    acc.get_data();
    int type=acc.return_account_type();
    if (type==1)
    {
        System.out.println("****SAVINGS ACCOUNT***");
        Sav_acct sav=new Sav_acct();
        sav.get_sav_balance();
    }
}
```

```
    sav.display_sav_blnce();
    sav.compute_sav_interest();
    sav.display_sav_blnce();
    sav.withdrawl_sav();
    sav.display_sav_blnce();
}

if(type==2)
{
    System.out.println("***CURRENT ACCOUNT***");
    Curr_acct cur=new Curr_acct();
    cur.get_cur_balance();
    cur.display_cur_blnce();
    cur.compute_cur_service_charges();
    cur.display_cur_blnce();
    cur.withdrawl_cur();
    cur.display_cur_blnce();
}

}

}


```

OUTPUT:

```
cmd Command Prompt
C:\Users\Ramya>cd..

C:\Users>cd..

C:\>cd java

C:\java>javac Bank.java

C:\java>java Bank

Enter the bank details:

Enter your name:
Ramya

Enter the Account number:
4058767

Choose the account type:

1. Savings account
2. Current account
1
***SAVINGS ACCOUNT***

Enter the amount to be placed in your savings account:
20000

Balance = 20000.0

Interest of 5% shall be added to your balance

Balance = 21000.0

Enter the amount to be withdrawn:
4000

Balance = 17000.0

C:\java>_
```

```
C:\ Command Prompt
C:\Users\Ramya>cd..

C:\Users>cd..

C:\>cd java

C:\java>javac Bank.java

C:\java>java Bank

Enter the bank details:

Enter your name:
Ramya

Enter the Account number:
6789032

Choose the account type:

1. Savings account
2. Current account
2
***CURRENT ACCOUNT***

Enter the amount to be placed in your current account:
3000

Balance = 3000.0

Service tax of rs.500 shall be levied

Balance = 2500.0

Enter the amount to be withdrawn:
1000

Balance = 1500.0

C:\java>_
```