

**YASHWANTH KIRAN S
1BM19CS187
'3D' BATCH-2**

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

PROGRAM:-

```
import java.util.Scanner;
public class lab1{
public static int det(int a,int b,int c){
int d=b*b-4*a*c;
return d;
}
public static void main(String[] args){
double r1,r2,real,imag;
Scanner x=new Scanner(System.in);
System.out.print("enter the a,b,c values:");
int a=x.nextInt();
int b=x.nextInt();
int c=x.nextInt();
int d=det(a,b,c);
if(d==0){
r1=-b+Math.sqrt(d*1.0);
r2=-b-Math.sqrt(d*1.0);
System.out.println("the roots are real and equal:"+r1+","+r2);
}
if(d>0){
r1=-b+Math.sqrt(d*1.0);
r2=-b-Math.sqrt(d*1.0);
System.out.println("the roots are real but not equal:"+r1+","+r2);
}
if(d<0){
real=-b;
imag=d;
System.out.println("the roots are
imaginary:"+ (real)+"+" +( +1.0*imag)+"i) , "+(real)+"+" +(+(-
1.0*imag)+"i)");
}
}
```

}
}

WRITEUP:-

LAB-1

Date: / /

```
import java.util.Scanner;
public class lab1{
    public static int det (int a, int b, int c){
        int d = b*b - 4*a*c;
        return d;
    }
    public static void main (String [] args){
        double r1, r2, real, imag;
        Scanner x = new Scanner (System.in);
        System.out.println ("enter the a,b,c, values:");
        int a = x.nextInt();
        int b = x.nextInt();
        int c = x.nextInt();
        int d = x.nextInt(); det (a, b, c);
        if (d == 0){
            r1 = -b + Math.sqrt (d*1.0);
            r2 = -b - Math.sqrt (d*1.0);
            System.out.println ("the roots are real and equal:"
                +r1+", "+r2);
        }
        if (d > 0){
            r1 = -b + Math.sqrt (d*1.0);
            r2 = -b - Math.sqrt (d*1.0);
            System.out.println ("the roots are real but not equal:"
                +r1+", "+r2);
        }
    }
}
```

```

if (d<0){
    real = -b;
    imag = d;
    System.out.println("the roots are imaginary:"+(real)+""
                        +( "+(+1.0*imag)+"i),"+(real)+""
                        +( "+(-1.0*imag)+"i));
}
}
}

```

OUTPUT :-

```

C:\ Command Prompt
Microsoft Windows [Version 10.0.19041.508]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Yashwanth>e:
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.

PROGRAM:-

```
import java.util.*;
public class Student{
    public static void main(String args[]) {
        int usn ,n;
        int Sgpa,sum=0,msum=0;
        int[] credits;
        int[] marks;
        String name;
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the Number Of Subjects");
        n=sc.nextInt();
        credits=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));
            credits[i]=sc.nextInt();
            marks[i]=sc.nextInt();
        }
        Student1 s1 = new Student1();
        for(int x: credits) {
        sum +=x;}
        for(int y: marks) {
        msum +=y;}
        s1.accept(usn,credits,marks,name);
        Sgpa = s1.FindSgpa(sum);
        s1.display(msum, Sgpa);

    }
}
class Student1 {
    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 vsum) {
    int Sgpa ; int sum=0,v=0;
    for(int x: marks) {

        sum +=(credits[v++]* x);

    }
    Sgpa = sum/(vsum*10);
    return (Sgpa);
}
}
```

WRITEUP:-

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Date: 16/10/2020

LAB - 2

```
import java.util.*;  
public class Student {  
    public static void main(String args[]) {  
        int usn, n;  
        int Sgpa, sum=0, msum=0;  
        int [] credits;  
        int [] marks;  
        String name;  
        Scanner sc = new Scanner(System.in);  
        System.out.println("Enter the number of Subjects");  
        n = sc.nextInt();  
        credits = new int [n];  
        marks = new int [n];  
        sc.nextLine();  
        System.out.println("Enter the name of the  
        student");  
        name = sc.next();  
  
        System.out.println("Enter the USN of the  
        student");  
        usn = sc.nextInt();
```

Date: / /

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

```
    System.out.println ("Enter the Credits and  
marks of the Subject" + (i+1));
```

```
    credits[i] = sc.nextInt();
```

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

```
}
```

```
Student1 s1 = new Student1();
```

```
for (int x: credits) {
```

```
    sum += x; }
```

```
for (int y: marks) {
```

```
    msum += y; }
```

```
s1.accept (usn, credits, marks, name);
```

```
Sgpa = s1.FindSgpa (sum);
```

```
s1.display (msum, Sgpa);
```

```
}
```

```
}
```

Date: / /

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 ("\\n Name: " + name + " USN: " + usn +
                            "\\n Total Marks: " + tot + "\\n Sgpa: " + Sgpa);
    }
```

```
    int FindSgpa (int vsum) {
        int Sgpa; int sum = 0, v = 0;
        for (int x : marks) {
            sum += (credits[v++] * x);
        }
    }
```

Dat

$$Sgpa = \text{sum} / (\text{vsum} * 10);$$

return (Sgpa);

}

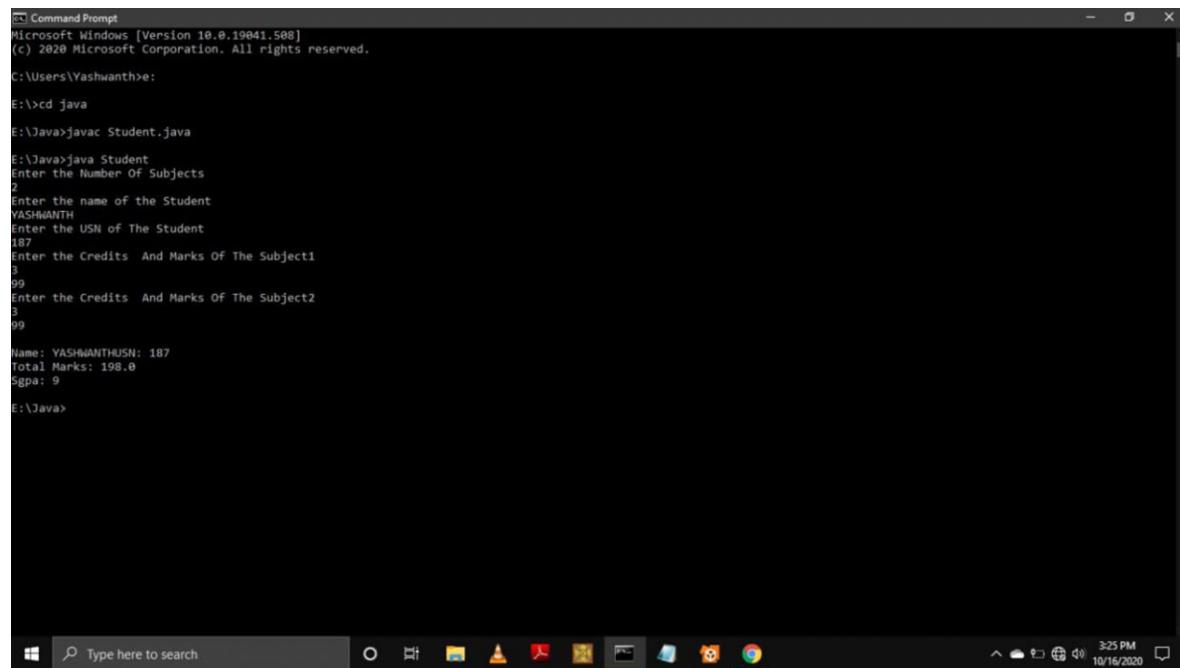
{

} (mpa point)

} (90% tai, tot aldrab) pulgub, kov

new("name") create("name of ") at tail, head
+ new("name of "+ tail + " at start total at")

OUTPUT:-



```
C:\Command Prompt
Microsoft Windows [Version 10.0.19041.508]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\Yashwanth>:
E:\>cd java
E:\Java>javar Student.java
E:\Java>Java Student
Enter the Number Of Subjects
2
Enter the name of the Student
YASHWANTH
Enter the USN of The Student
187
Enter the Credits And Marks Of The Subject1
3
99
Enter the Credits And Marks Of The Subject2
3
99
Name: YASHWANTHUSN: 187
Total Marks: 198.0
Sgpa: 9
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.

PROGRAM:-

```
import java.util.*;
class book{
    String name;
    String author;
    double price;
    int num_pages;
    public book(){
        name="india's Hero";
        author="panday";
        price=455.3;
        num_pages=600;
    }
    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);
    }
}
public class Main{
    public static void main(String[] args){
        int n=0;
        Scanner x=new Scanner(System.in);
        System.out.print("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]=new book();
            System.out.println("details of "+(i+1)+" book:");
            b[i].setdetails();
        }
        System.out.println("the details of the books are:");
        for(int i=0;i<n;i++){
            System.out.println((i+1)+" book:");
            System.out.println(b[i]);
        }
    }
}

```

WRITEUP:-

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Date: 6/11/2020

LAB - 3

```
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;
```

Date: 6 / 11 / 2021

```
void setDetails() {
    Scanner x = new Scanner(System.in);
    name = x.nextLine();
    author = x.nextLine();
    price = x.nextDouble();
    numPages = x.nextInt();
}

public String toString() {
    return name + ", " + author + ", " + price +
        return(name + ", " + author + ", " + price + ", " + num.
        pages);
}

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, numPages));
```

Date: 6 / 11 / 2020

```
for (int i=0 ; i<n ; i++) {  
    b[i] = new book();  
    System.out.println ("details of " +(i+1) + " book  
    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]);  
}  
}
```

OUTPUT:-

```
C:\Users\Yashwanth>e:  
E:\>cd java  
E:\Java>javac Main.java  
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  
heribert 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,heribert 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.

PROGRAM:-

```
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*a*b);
System.out.println("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("The area of circle is: "+area_circle);
}
}
class abs{
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();
}
}
```

WRITEUP:-

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'3D' Batch 2 OOT

Date: 6/11/2020

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()

{

15

Date: 6/11/2021

```
area_tri = (int) (0.5 * a * b);
System.out.println("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("The area of circle is :"
+ area_circle);
}
```

}

}

Date: 6 / 11 / 2020

```
class abs {  
    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:-

The screenshot shows a Microsoft Windows Command Prompt window. The title bar says "Command Prompt". The window content is as follows:

```
Microsoft Windows [Version 10.0.19041.508]  
(c) 2020 Microsoft Corporation. All rights reserved.  
C:\Users\Yashwanth>e:  
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 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.

PROGRAM:-

```
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 min_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);
        }
    }
}
```

```

void withdrawal(){
    System.out.print("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 getdetails(){
        customer_name=x.nextLine();
        account_number=x.nextInt();
    }
    void deposit(){
        System.out.print("Enter the deposit amount : ");
        temp=x.nextDouble();
        amount+=temp;
    }
    void showbalance(){
        System.out.println("Balance is : "+amount);
    }
    void withdrawal(){
        System.out.print("Enter the withdrawal amount : ");
        temp=x.nextDouble();
        amount-=temp;
    }
    void interest(){
        interest=(amount*1.0*3)/100;
        amount+=interest;
        System.out.println("interest added : "+interest);
        System.out.println("Balance is : "+amount);
    }
}
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;
        }
    }
}

if(type.equals("sav_acct")){
    sav_acct a=new sav_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 : Compute and deposit interest");
        System.out.println("press 4 : 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.interest();
                a.showbalance();
                break;
            case 4 :a.withdrawal();
                a.showbalance();
                break;
        }
    }
}
}
}

```

WRITEUP:-

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'3D'

OOJ

Date: 6/11/2021

LAB 5

```
import java.util.*;  
class account {  
    String customer_name;  
    int account_number;  
    String account_type;  
}  
class curr_acct extends account {  
    Scanner s = new Scanner (System.in);  
    double temp = 0.0;  
    double amount = 0.0;  
    double fine = 0.0;  
    double minimum_amount = 1000.0;
```

Date: 6/11/2020

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

Date: 6/11/2020

```
? } 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:  
" + amount);  
temp = x.nextDouble();  
amount = temp;  
}  
void interest () {  
interest = (amount * 1.0 * 3) / 100;  
amount += interest;  
System.out.println ("Interest added :" + interest);  
System.out.println ("Balance is :" + amount);  
}  
}
```

Date: / /

```
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 ();
                    case 2: a.showbalance ();
                    break;
                }
            }
        }
    }
}
```

Date: / /

```
case 2 : a.showbalance();  
        break;  
case 3 : a.withdrawal();  
          a.showbalance();  
          break;  
    }  
  }  
}  
if (type.equals("sav_acct")){  
  sav_acct a = new sav_acct();  
  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 = x.nextLine();  
    if (opt == "1") {  
      a.acceptdetails();  
      a.updatebalance();  
    } else if (opt == "2") {  
      a.displayamount();  
    } else if (opt == "3") {  
      a.computeinterest();  
    } else if (opt == "4") {  
      a.withdrawal();  
      a.updatebalance();  
    } else {  
      System.out.println("Invalid option");  
    }  
  }  
}
```

Date: 6 / 11 / 2020

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:-

```
Command Prompt - java Main
E:\Java>javac Main.java
E:\Java>java Main
Welcome to the bank service
Enter the the of account (curr_acct/sav_acct)
sav_acct
Enter the customer_name,account_number:
YASHWANTH KIRAN S
88888
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 :
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 :
```