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USN – 1BM19CS024

SUBJECT – OOJ LAB

ACADEMIC YEAR – 2020-2021

LAB PROGRAM 1

Question-

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.

Source Code-

```
import java.util.*;

class Main

{

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

```
{

double r1,r2;

Scanner scan = new Scanner(System.in);

System.out.println("Enter the coefficients a, b, c: ");

double a = scan.nextFloat();

double b = scan.nextFloat();

double c = scan.nextFloat();

double d=b*b-4*a*c;

if(d>0)

{

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

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

System.out.printf("root1=%.2f and root2=%.2f",r1,r2);

}

else if(d==0)
```

```
{
r1=r2=-b/(2*a);
System.out.printf("root1=root2=%.2f",r1);
}
else
{
double r=-b/(2*a);
double i=Math.sqrt(-d)/(2*a);
System.out.printf("root1=%.2f+%.2fi and root2=%.2f-%.2fi",r,i,r,i);
}
}
}
```

Writeup-

Week-3

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```
import java.util.*;
class Main
{
  public static void main (String args[])
  {
    double r1, r2;
    Scanner scan = new Scanner (System.in);
    System.out.println("Enter a, b, c: ");
    double a = scan.nextFloat();
    double b = scan.nextFloat();
    double c = scan.nextFloat();
    double d = b*b-4*a*c;
    if (d>0)
    {
      r1 = (-b + Math.sqrt(d)) / (2*a);
      r2 = (-b + Math.sqrt(d)) / (2*a);
      System.out.printf("root1 = %.2f and root2 = %.2f",
                        r1, r2);
    }
    else if (d==0)
    {
      r1 = r2 = -b/(2*a);
      System.out.printf("root1 = root2 = %.2f", r1);
    }
    else
    {
      double r = -b / (2*a);
      double i = Math.sqrt(-d) / (2*a);
      System.out.printf("root1 = %.2f + %.2fi and
```

Screen Shot-

Main.java

```java

import java.util.*;
class Main
{
    public static void main(String args[])
    {
        double r1,r2;

        Scanner scan = new Scanner(System.in);
        System.out.println("Enter the coefficients a, b, c: ");
        double a = scan.nextFloat();
        double b = scan.nextFloat();
        double c = scan.nextFloat();
        double d=b*b-4*a*c;
        if(d>0)
        {
            r1=(-b+Math.sqrt(d))/(2*a);
            r2=(-b-Math.sqrt(d))/(2*a);
            System.out.printf("root1=%.2f and root2=%.2f",r1,r2);
        }
        else if(d==0)
        {
            r1=r2=-b/(2*a);
            System.out.printf("root1=root2=%.2f",r1);
        }
        else
```

input

```
Enter the coefficients a, b, c:
1
-2
1
root1=root2=1.00

...Program finished with exit code 0
```

Main.java

```java

import java.util.*;
class Main
{
    public static void main(String args[])
    {
        double r1,r2;

        Scanner scan = new Scanner(System.in);
        System.out.println("Enter the coefficients a, b, c: ");
        double a = scan.nextFloat();
        double b = scan.nextFloat();
        double c = scan.nextFloat();
        double d=b*b-4*a*c;
        if(d>0)
        {
            r1=(-b+Math.sqrt(d))/(2*a);
            r2=(-b-Math.sqrt(d))/(2*a);
            System.out.printf("root1=%.2f and root2=%.2f",r1,r2);
        }
        else if(d==0)
        {
            r1=r2=-b/(2*a);
            System.out.printf("root1=root2=%.2f",r1);
        }
        else
```

input

```
Enter the coefficients a, b, c:
1
1
1
root1=-0.50+0.87i and root2=-0.50-0.87i

...Program finished with exit code 0
```

Main.java

```java

import java.util.*;
class Main
{
    public static void main(String args[])
    {
        double r1,r2;

        Scanner scan = new Scanner(System.in);
        System.out.println("Enter the coefficients a, b, c: ");
        double a = scan.nextFloat();
        double b = scan.nextFloat();
        double c = scan.nextFloat();
        double d=b*b-4*a*c;
        if(d>0)
        {
            r1=(-b+Math.sqrt(d))/(2*a);
            r2=(-b-Math.sqrt(d))/(2*a);
            System.out.printf("root1=%.2f and root2=%.2f",r1,r2);
        }
        else if(d==0)
        {
            r1=r2=-b/(2*a);
            System.out.printf("root1=root2=%.2f",r1);
        }
        else
```

input

```
Enter the coefficients a, b, c:
4
4
1
root1=root2=-0.50

...Program finished with exit code 0
```

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.

Source Code-

```
import java.util.*;

class Student

{

private String USN;

private String name;

private int n;

private double SGPA = 0;

private int totalCredits = 0;

private int credits[];

private double marks[];

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

```
void accept()

{

System.out.println("Enter USN of the student");

USN = in.nextLine();

System.out.println("Enter Name of the student");

name = in.nextLine();

System.out.println("Enter number of subjects");

n = in.nextInt();

credits = new int[n];

marks = new double[n];

System.out.println("Details of the subjects:");

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

{

System.out.println("Enter credits for subject "+(i+1));

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

```
System.out.println("Enter marks for subject "+(i+1));

marks[i] = in.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<90)

SGPA = SGPA + (9*credit);

else if(mark>=70&&mark<80)

SGPA = SGPA + (8*credit);
```

```
else if(mark>=60&&mark<70)

SGPA = SGPA + (7*credit);

else if(mark>=50 && mark<60)

SGPA = SGPA + (6*credit);

else if(mark>=40&&mark<50)

SGPA = SGPA + (5*credit);

else

System.out.println("Failed in Subject "+(j+1));

}



void Display()

{

System.out.println("Details of the Student");

System.out.println("USN: "+USN);

System.out.println("Name :"+name);
```

```
System.out.println("SGPA of Student "+(SGPA/totalCredits));

}

}

class Main {

public static void main(String args[]) {

Student s1 = new Student();

s1.accept();

s1.Display();

}

}
```

Writeup-

Week 4 1BM19CS024

```
import java.util.*;
class Student
{
    private String USN;
    private String name;
    private int n;
    ~~pro~~ private double SGPA = 0;
    private int totalCredits ~~[]~~ = 0;
    private int credits[];
    private double marks[];
    Scanner in = new Scanner(System.in);
    void accept()
    {
    System.out.println("Enter USN of the student:");
    USN = in.nextLine();
    System.out.println("Enter Name: ");
    name = in.nextLine();
    System.out.println("Enter no. of subjects: ");
    n = in.nextInt();
    credits = new int[n];
    marks = new double[n];
    System.out.println("Details of subject: ");
```

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```
for (int i=0; i<n; i++)
{
System.out.println("Enter credits for subject"+(i+1));
credits[i]= in.nextInt();
System.out.println("Enter marks for subject"+(i+1));
marks[i]=in.nextInt();
Calculate(credits[i], marks[i], i);
}
}
void Calculate(int credit, double mark, int j)
{
totalCredits=total Credits+ credit;
if (mark>=90 && mark<=100)
  SGPA= SGPA+(10*credit);
else if(mark>=80 && mark<90)
  SGPA= SGPA+(9*credit);
else if (mark>=70 && mark<80)
  SGPA=SGPA+(8*credit);
else if (mark>=60 && mark<70)
  SGPA=SGPA+(7*credit);
else if (mark>=50 && mark<60)
  SGPA=SGPA+(6*credit);
else if (mark>=40 && mark<50)
  SGPA=SGPA+(5*credit);
else
  System.out.println("Failed in subject"+(j+1));
}
void display()
{
```

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```
System.out.println("~~Failed~~ Details of Student :-");
System.out.println("USN: "+USN);
System.out.println("Name: "+name);
System.out.println("SGPA of Student "+(SGPA/total credits));
}
}
~~Class~~ class Main
{
public static void main(String args[])
{
 Student s1=new Student();
 s1.accept();
 s1.Display();
 }
}
```

Screen Shot-

```
Enter USN of the student
123nfn123
Enter Name of the student
mldmgagm smgprm
Enter number of subjects
3
Details of the subjects:
Enter credits for subject 1
5
Enter marks for subject 1
79
Enter credits for subject 2
3
Enter marks for subject 2
87
Enter credits for subject 3
6
Enter marks for subject 3
95
Details of the Student
USN: 123nfn123
Name :mldmgagm smgprm
SGPA of Student 9.052631578947368


...Program finished with exit code 0
Press ENTER to exit console.
```

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.

Source Code-

```
import
java.util.*;

class Book {

String name;

String author;

float price;

int num_pages;

Book()

{}

Book(String name,String author,int price,int num_pages)

{

this.name=name;

this.author=author;
```

```
this.price=price;

this.num_pages=num_pages;

}

void display()

{

Scanner inp=new Scanner(System.in);

System.out.println("Enter name of book:");

name=inp.next();

System.out.println("Enter author of book:");

author=inp.next();

System.out.println("Enter price of book:");

price=inp.nextFloat();

System.out.println("Enter number of pages of book:");

num_pages=inp.nextInt();

}
```

```
public String toString()

{

return ("Name: "+name + "\n" + "Author: "+author + "\n" + "Price: "+price + "\n" +"Number of pages: "+num_pages );

}

}

class BookMain {

public static void main(String args[])

{

Scanner a=new Scanner(System.in);

System.out.println("Enter the number of books:");

int n=a.nextInt();

Book b[]=new Book[n];

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

{
```

```
b[i]=new Book();

System.out.println("Enter the details of "+(i+1)+" book");

b[i].display();

}

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

{

System.out.println("Details of book "+(i+1));

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

}

}

}
```

Writeup-

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Week 5

```
import java.util.*;
class Book{
    String name;
    String author;
    Float price;
    int num_pages;
    Book()
    {}
    Book(String name, String author, int price, int num_pages)
    {
    this.name= name;
    this.author=author;    this.num_pages=num_pages;
    this.price=price;
    }
    void display()
    {
    Scanner inp = new Scanner(System.in);
    System.out.println("Enter name of the book:");
    name= inp.next();
    System.out.println("Enter author of book:");
    author=inp.next();
    System.out.println("Enter price of book:");
    price=inp.nextFloat();
    System.out.println("Enter number of pages of book:");
    num_pages=inp.Int();
    }
    public String toString()
    {
     return("Name:"+name+"\n"+"Author:"+author+"\n"+
```

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```
"Price:" + price + "\n" + "Number of pages: " + num_pages);
}
}

class BookMain{
 public static void main (String args[])
{
 Scanner a = new Scanner (System.in);
System.out.println("Enter number of books:");
int n = a.nextInt();
Book b[] = new Book[n];
for (int i = 0; i < n; i++)
{
 b[i] = new Book();
System.out.println("Enter details of "+(i+1)+" book");
b[i].display();
}

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

Screen Shot-

Command Prompt

```
C:\Users\arkas\OneDrive\Desktop>cd java

C:\Users\arkas\OneDrive\Desktop\java>javac BookMain.java

C:\Users\arkas\OneDrive\Desktop\java>java BookMain
Enter the number of books:
2
Enter the details of 1 book
Enter name of book:
Hi
Enter author of book:
Hello
Enter price of book:
123.321
Enter number of pages of book:
256
Enter the details of 2 book
Enter name of book:
Bi
Enter author of book:
Bye
Enter price of book:
456.654
Enter number of pages of book:
258
Details of book 1
Name: Hi
Author: Hello
Price: 123.321
Number of pages: 256
Details of book 2
Name: Bi
Author: Bye
Price: 456.654
Number of pages: 258

C:\Users\arkas\OneDrive\Desktop\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.

Source Code-

```
import java.util.*;

abstract class Shape{

double dim1,dim2;
```

```
abstract double printArea();

}



class Rectangle extends Shape{

Rectangle(double a, double b){

dim1 = a;

dim2 = b;

}

double printArea(){

System.out.println("Inside the Rectangle");

return dim1*dim2;

}

}



class Triangle extends Shape{
```

```
Triangle(double a, double b){

dim1 = a;

dim2 = b;

}

double printArea(){

System.out.println("Inside the Triangle");

return dim1*dim2/2;

}

}


class Circle extends Shape{

Circle(double a){

dim1 = a;

}

double printArea(){
```

```
System.out.println("Inside the Circle");

return 3.14*dim1*dim1;

}

}


class Abs{

public static void main(String args[]){

double rl,rb,th,tb,cr;

Scanner ss = new Scanner(System.in);

System.out.println("Enter length and breadth of rectangle: ");

rl = ss.nextDouble();

rb = ss.nextDouble();

System.out.println("Enter height and base length of triangle: ");

th = ss.nextDouble();

tb = ss.nextDouble();
```

```
System.out.println("Enter radius of circle: ");

cr = ss.nextDouble();

Rectangle r = new Rectangle(rl,rb);

Triangle t = new Triangle(th,tb);

Circle c = new Circle(cr);



System.out.println("Area of Rectangle is:" +r.printArea());

System.out.println("Area of Triangle is:" +t.printArea());

System.out.println("Area of Circle is:" +c.printArea());

}

}
```

Writeup-

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Week-8
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```
abstract class Shape {
double dim1, dim2;
abstract double printArea ();
}
class Rectangle extends Shape {
Rectangle (double a, double b) {
 dim1 = a;
 dim2 = b;
}
 double printArea () {
 S.out.println ("Inside the Rectangle");
 return dim1 * dim2;
}
}
class Triangle extends Shape {
Triangle (double a, double b) {
 dim1 = a;
 dim2 = b;
}
 double printArea () {
 S.out.println ("Inside the Triangle");
 return dim1 * dim2/2;
}
}
Class Circle extends Shape {
Circle (double a) {
dim1 = a;
}
double printArea () {
```

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```
S.out.println ("Inside the Circle");
return 3.14 dim1* dim1;
}
}

class cls1Main{
public static void main(String [] args){
Rectangle r = new Rectangle (1,2);
Triangle t = new Triangle (3,4);
Circle c = new Circle (5);
S.out.println("Area of Rectangle is:" + r.printArea());
S.out.println("Area of Triangle is:" + t.printArea());
S.out.println("Area of Circle is:" + c.printArea());
}
}
```

Screen Shot-

Command Prompt

```
4
Rate of intrest is 0.2
Interest is 86399.99999999999
1.AddBalance
2.displayBalance
3.withdraw
4.CalculateInterest
5.Exit
5

C:\Users\arkas\OneDrive\Desktop\java>java abs
Error: Could not find or load main class abs

C:\Users\arkas\OneDrive\Desktop\java>java Abs
Enter length and breadth of rectangle:
1
2
Enter height and base length of triangle:
3
4
Enter radius of circle:
5
Inside the Rectangle
Area of Rectangle is:2.0
Inside the Triangle
Area of Triangle is:6.0
Inside the Circle
Area of Circle is:78.5

C:\Users\arkas\OneDrive\Desktop\java>
```

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: · 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

Source Code-

```
import
java.util.Scanner;

abstract class Account{

String c_name, acc_type;

int acc_num;

double balance;

int minbalance = 2000;

Account(String c_name, int acc_num, double balance){

this.c_name = c_name;
```

```
this.acc_num = acc_num;

this.balance = balance;

this.acc_type = acc_type;

}



abstract void addbal(double amount);

abstract void display();

abstract void withdraw(double amount);

}



class curr_acct extends Account{

curr_acct(String c_name, int acc_num, double balance){

super(c_name, acc_num, balance);

System.out.println("Details ot the customer:");
```

```
System.out.println("Customer name: " +c_name +"\tAccount number: " +acc_num+ "\tBalance: "
+balance+ "Account type: current");

}

void addbal(double amount){

this.balance += amount;

}

void display(){

System.out.println("The balance is:" +this.balance);

}

void withdraw(double amount){

if(this.balance<amount){

System.out.println("Insufficient funds");
```

```
System.out.println("Yor balance is: " +this.balance);

return;

}

this.balance = this.balance - amount;

if(this.balance<minbalance){

this.balance = this.balance - this.balance*0.5;

System.out.println("A penalty of Rs. " +this.balance*0.5 + "has been charged as minimum
balance is not satisfied");

System.out.println("Updated Balance: " +this.balance);

System.out.println("Cannot withdraw");

}

else if(balance> minbalance){

this.balance = this.balance - amount;

System.out.println("Balance is: " +this.balance);

}

}
```

```
}

class sav_acct extends Account{

sav_acct(String c_name, int acc_num, double balance){

super(c_name, acc_num, balance);

System.out.println("Customer name: " +c_name +"\tAccount number: " +acc_num+ "\tBalance: "
+balance+ "Account type: savings");

}

void addbal(double amount){

this.balance += amount;

}

void display(){

System.out.println("The balance is:" +this.balance);

}
```

```
void withdraw(double amount){

if(this.balance<amount){

System.out.println("Insufficient funds");

System.out.println("Yor balance is: " +this.balance);

}

this.balance = this.balance - amount;

if(this.balance<minbalance){

this.balance = this.balance - this.balance*0.5;

System.out.println("A penalty of Rs. " +this.balance*0.5 + "has been charged as minimum
balance is not satisfied");

System.out.println("Updated Balance: " +this.balance);

System.out.println("Cannot withdraw");

}

else if(balance> minbalance){

this.balance = this.balance - amount;
```

```
System.out.println("Balance is: " +this.balance);

}

}


void interest(){

int time = 3, n=1;

System.out.println("Rate of intrest is 0.2");

this.balance = this.balance*Math.pow(1+(0.2)/n, (n*time));

System.out.println("Amount after adding interest is "+this.balance);

}

}


class Bank{

public static void main(String args[]){

int choice,ch,n=1;
```

```
double amount;

Scanner s1 = new Scanner(System.in);

curr_acct c = new curr_acct("Ram", 12345, 50000);

sav_acct s = new sav_acct("Ram", 12345, 50000);

System.out.println("Press 1.For Current account\nPress 2.For Savings account");

choice = s1.nextInt();

switch(choice){

case 1: System.out.println("*Current Account*");

while(n!=0){

System.out.println("1.AddBalance\n2.displayBalance\n3.withdraw\n4.checkbook\n5.Exit");

ch = s1.nextInt();

String reciever;

double recamount;

switch(ch){

case 1:
```

```
System.out.println("enter amount to be added:");

amount = s1.nextDouble();

c.addbal(amount);

break;



case 2:

c.display();

break;



case 3:

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

amount = s1.nextDouble();

c.withdraw(amount);

break;
```

```
case 4:

System.out.println("Enter the name of the reciever:");

reciever = s1.next();

System.out.println("Enter amount to be debited to reciever:");

recamount = s1.nextDouble();

if(recamount>c.balance){

System.out.println("Inssuficient Balance");

}

else{

System.out.println("Amount of " +recamount+ " sent to " +reciever);

c.balance = c.balance - recamount;

System.out.println("Balance: " +c.balance);

s.balance = c.balance;

}
```

```
case 5:

n=0;

break;



default: System.out.println("Invalid input");

}

}

break;



case 2: System.out.println("*Savings Account*");

while(n!=0){

System.out.println("1.AddBalance\n2.displayBalance\n3.withdraw\n4.CalculateInterest\n5.Exit")

ch = s1.nextInt();

switch(ch){
```

```
case 1:

System.out.println("enter amount to be added:");

amount = s1.nextDouble();

s.addbal(amount);

break;



case 2:

s.display();

break;



case 3:

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

amount = s1.nextDouble();

s.withdraw(amount);

break;
```

```
case 4:

s.interest();

break;



case 5:

n=0;

break;



default:

System.out.println("Invalid input");

}

}
```

```
break;

default: System.out.println("Invalid input");

}

}

}
```

Writeup-

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LabS 1BM19CS024

```
import java . util . Scanner ;
abstract class Account {
String c-name, acc_type ;
int acc_num ;
double balance ;
int minbalance = 2000;
Account (Stringc-name, int-acc-num,
double balance ) {
this . c-name = c-name ;
this . acc-num = acc_num ;
this . balance = balance ;
this acc_type = acc_type ;
}
abstract void addbal(double amount);
  abstract void display ();
  abstract void withdraw (double amount);
}
class curr-acct extends Account {
curr-acct (String c-name , int acc-num,
double balance) {
super (c-name , acc-num , balance);
system . out . print In ("Details of the
customer :");
system . out . print In ("Customer name :
" + c-name + "\t Account number :"
}
Void addbal (double amount) {
this . balance += amount ;
}
```

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Puffin

```
void display () {
System .out. print In ("The balance
is :" +this . balance) ;
}
void withdraw (double amount) {
if (this , balance <amount) {
System . out . print In ("Insufficient funds")
System . out . print In ("Your balance is :" + this
. balance) ;
return ;
}
this . balance = this . balance - amount ;
if (this . balance < minbalance) {

this . balance = this balance - this
balance * 0.5 ;
System . out . print In ("A penalty of Rs
"+this . balance * 0.5+ "has been charged
as minimum balance is not satisfied") ;
System . out . print In ("Updated balance:
"this . balance) ;
System . out . print In ("Cannot withdraw")
}
else if (balance > minbalance) {
this . balance = this . balance - amount.
System . out . print In ("Balance is :"
+this . balance) ;
}
}
```

Date / /
Page

```
}
class sav-acct extends Account {
sav-acct (String c-name, int acc-num,
double balance) {
super (c-name, acc-num, balance);
System.out.print In ("Customer name:
"+c-name +"/t Account number:"
}
void addbal (double amount) {
this.balance += amount;
}

void display () {
System.out.print In ("The balance is:
"+this.balance);
}
void withdraw (double amount) {
if (this.balance <amount) {
System.out.print In ("Insufficient
funds");
system.out.print In ("Your balance is:
"+this.balance);
}
this.balance =this balance -amount;
if (this.balanc <minbalance) {
this.balance =this.balance-this.balance
* 0.5;
System.out.print In ("A penalty of
Rs. "+this balance * 0.5+ "has been
```

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Puffin

```
charged as minimum balance is not
satisfied ");
System.out.print In ("Updated Balance
: "+this balance);
System.out.print In ("Cannot withdraw")
;
}
else if (balance > minbalance ){
this.balance=this.balance-amount;
System.out.print In ("Balance is :
"+this.balance);
}
}

void interest (){
int time = 3, n=1;
System.out.print In ("Rate of intrest
is 0.2");
this.balance = this balance * Math.pow
(1+(0.2)/n, (n* time));
System.out.print In ("Amount after
adding Interest is "+this.balance
}
}
class Bank {
public static void main (String
args [] ) {
int choice, ch, n=1;
double amount;
```

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Puffin

```
Scanner s1 = new Scanner (System.in);
curr-acct c = new curr-acct ("Ram",
12345, 50000);
sav-acct s = new sav-acct ("Ram",
12345, 50000);
System.out.print In ("Press 1. For
Current account /n Press 2. For Saving
account");
choice = s1.next Int ();
Switch (choice) {

case 1 : System.out.print In ("* Current
Account * ");
while (n! =0 ){
System.out.print In ("1. Add Balance /n2.
display Balance \n3. withdraw/n4. check
book\n5. Exit);
ch = s1.next Int ();
String reciever;
double recamount;
switch (ch){

case 1:
System.out.print In ("enter amount
to be added");
    amount = s1.next Double ();
    c.addbal (amount);
    break;
```

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Puffin

```
case 2 :
    c. display ();
    break;

case 3 :
System.out.print In ("enter amount
to be withdrawn:");
amount = s1. next Double ();
c. withdraw (amount);
    break;

case 4 :
System.out.print In ("Enter the name of
the reciever :");
    reciever = s1.next ();
System.out.print In ("Enter amount to
be debited to reciever :");
    recamount = s1.next Double ();
    if (recamount > c. balance) {
System.out.print In ("Insufficient
Balance");
  }
  else {
system.out.print In ("Amount of "
+recamount + " sent to "+reciever);
  c. balance = c.balance-recamout;
System.out.print In("Balance : "+ c.
balance);
}
```

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Puffin

```
case 5 :
  n =0
 break
default : System.out.printIn (
"Invalid input" ) ;
 }
 }
 break ;

case 2: system.out.print In (" *
Savings Account* ") ;
 while (n ! =0 ) {
 System.out.print In ("1. Add Ba-
lance /n2. display Balance\n3. with-
draw / n4. calculate Interest /n5.
Exit ") ;
  ch = s1. next Int ();
 switch (ch) {

case 1:
 System.out. print In ("enter amount
to be added :") ;
  amount = s1. next Double ( ),
   s. addbal (amount) ;
    break ;

Case 2:
     s. display ();
       break ;
```

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Puffin

```
case 3:
System.out.printIn("enter amount
to be withdrawn:");
amount = s1.nextDouble();
s.withdraw(amount);
    break;

case 4:
    s.interest();
      break;

case 5:
        n=0;
         break;
default:
 System.out.printIn("Invalid input");
}
}
  break;
default: system.out.printIn(
"Invalid input");
}
    }
}
```

Screen Shot-

Command Prompt - java Bank
^
symbol: variable balance
location: class Bank
1 error
C:\Users\arkas\OneDrive\Desktop\java>javac Bank.java
C:\Users\arkas\OneDrive\Desktop\java>java Bank
Details ot the customer:
Customer name: Ram Account number: 12345 Balance: 50000.0Account type: current
Customer name: Ram Account number: 12345 Balance: 50000.0Account type: savings
Press 1.For Current account
Press 2.For Savings account
2
Savings Account
1.AddBalance
2.displayBalance
3.withdraw
4.CalculateInterest
5.Exit
4
Rate of intrest is 0.2
Interest is 86399.99999999999
1.AddBalance
2.displayBalance
3.withdraw
4.CalculateInterest
5.Exit

LAB PROGRAM 6

Question-

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.

Source Code-

CIE/internals.java

```
package CIE;

        import CIE.*;

        import java.util.*;



        public class Internals extends Student

        {
```

```
public double[] cie_m;

public void display()

{

cie_m=new double[5];

Scanner ss=new Scanner(System.in);

System.out.println("CIE Marks for 5 subjects(out of 50):");

for(int i=0;i<5;i++)

cie_m[i]=ss.nextDouble();

}

}
```

CIE/student.java

```
package CIE;

import java.util.*;
```

```
public class Student

{

public String name;

public String usn;

public int sem;

public void display()

{

Scanner ss=new Scanner(System.in);

System.out.println("Name:");

name=ss.next();

System.out.println("USN:");

usn=ss.next();

System.out.println("Semester:");

sem=ss.nextInt();
```

```
}

}
```

SEE/externals.java

```
package SEE;

import java.util.*;

import CIE.*;



public class Externals extends CIE.Student

{

public double[] see_m;



public void display()

{

see_m=new double[5];
```

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

System.out.println("SEE Marks for 5 subjects(out of 100):");

for(int i=0;i<5;i++)

see_m[i]=ss.nextDouble();

}

}
```

Main Code-

```
import CIE.*;

import SEE.*;

import java.util.*;

public class pack

{

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

```
{

int n;

Scanner ss=new Scanner(System.in);

System.out.println("Enter the number of students:");

n=ss.nextInt();

CIE.Student[] st =new CIE.Student[n];

CIE.Internals[] in =new CIE.Internals[n];

SEE.Externals[] e =new SEE.Externals[n];

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

{

st[i]=new CIE.Student();

st[i].display();

in[i]=new CIE.Internals();

in[i].display();

e[i]=new SEE.Externals();
```

```
e[i].display();

System.out.println("Total marks of student "+st[i].name+" in 5 subjects are:");

for(int j=0;j<5;j++)

{

System.out.println(in[i].cie_m[j]+(e[i].see_m[j]/2));

}





}

}

}
```

Writeup-

Lab 6
1BM19CS024

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```
import CIE.*;
import SEE.*;
import java.util.*;
public class main {
 public static void main(String[] args){
int n;
Scanner sc= new Scanner (System.in);
S.o.print("enter no. of students: ");
n=sc.nextInt();
CIE.student[] s = new CIE.Student[n];
CIE.Internals[] i = new CIE.Internals [n];
SEE.Externals[] e= new SEE.Externals [n];
for (int i=0 ; i<n ; i++)
{
 e[i]= new SEE.Externals();
 i[i]= new CIE.Internals();
 s[i]= new CIE.Student();
 e[i].display();
 i[i].display();
 s[i].display();
 S.o.println("Total marks of student "+s[i].name+"
 in 5 subs are: ");
{
 for (j=0; j<5 ;j++)
{
 S.o.print(i[i].cie_m[j]+(e[i].see_m[i]/
 }
}
}
}
```

Screen Shot-

Command Prompt - java pack

```
Enter the number of students:
3
Name:
AQW
USN:
12QW
Semester:
2
CIE Marks for 5 subjects(out of 50):
33
22
44
11
34
SEE Marks for 5 subjects(out of 100):
55
66
77
88
99
Total marks of student AQW in 5 subjects are:
60.5
65.0
82.5
55.0
83.5
Name:
ZXC
USN:
34ER
Semester:
4
CIE Marks for 5 subjects(out of 50):
12
32
43
23
44
SEE Marks for 5 subjects(out of 100):
67
78
87
99
78
Total marks of student ZXC in 5 subjects are:
45.5
71.0
86.5
72.5
83.0
```

LAB PROGRAM 7

Question-

Write a program to demonstrate generics with multiple object parameters.

Source Code-

```
class Generics<T, U,S,B,D>
{

                    T o1;
```

```
U o2;

S o3;

B o4;

D o5;

Generics(T o1, U o2,S o3,B o4,D o5){

this.o1 = o1;

this.o2 = o2;

this.o3 = o3;

this.o4 = o4;

this.o5 = o5;

}

public void print(){

System.out.println(o1);

System.out.println(o2);

System.out.println(o3);
```

```
System.out.println(o4);

System.out.println(o5);

}

}


class Gmain{

public static void main (String[] args){

Generics <String,Integer, String, Boolean, Double> o =

new Generics<String, Integer, String, Boolean, Double>("Hello",
9,"World",true,6.45);


o.print();

}

}
```

Writeup-

Week 10
Lab 7
1BM19CS024

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Puffin

```
class Generics<T, U, S>{
{ T obj1;
  U obj2;
  S obj3;
  Generics(T obj1, U obj2, S obj3){
  this.obj1=obj1;
  this.obj2=obj2;
  this.obj3=obj3;
}
public void print(){
S.out.println(obj1);
S.out.println(obj2);
S.out.println(obj3);
}
}
class Gmain{
public static void main(String[] args){
Generics<String, Integer, String> obj = new
Generics<String, Integer, String>("Hello", 9, "world");
obj.print();
}
}
```

Screen Shot-

Command Prompt
Microsoft Windows [Version 10.0.18363.1198]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\arkas>cd onedrive
C:\Users\arkas\OneDrive>cd desktop
C:\Users\arkas\OneDrive\Desktop>cd java
C:\Users\arkas\OneDrive\Desktop\java>javac Gmain.java
C:\Users\arkas\OneDrive\Desktop\java>javac Gmain.java
C:\Users\arkas\OneDrive\Desktop\java>java Gmain
Hello
9
World
true
6.45
C:\Users\arkas\OneDrive\Desktop\java>

LAB PROGRAM 8

Question-

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 Wrong Age( ) when the input age=father’s age.

Source Code-

```
import java.util.*;
```

```
class WrongAge extends Exception

{

public String toString()

{

return "Please enter the correct age:"+"Son's age cannot be greater than Father's age";



}

}

class Father

{

int age;

Father(int age1)

{

age=age1;
```

```
System.out.println("Father age:"+age);

}

}

class Son extends Father

{

Son(int age2)

{

System.out.println("Son age:"+age2);

}

}

class Agemain1

{

public static void main(String args[]) throws WrongAge

{

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

```
System.out.print("Enter the age of father: ");

int j=ss.nextInt();

System.out.print("Enter the age of son: ");

int k=ss.nextInt();



if(k>=j)

{

throw new WrongAge();

}

else

{

Father f=new Father(j);

Son s=new Son(k);

}
```

}

}

Writeup-

Week 10

Lab 8 1BM19CS024

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Puffin

```
import java.util.*;
class WrongAge extends Exception
{
public String toString()
{
return "Please enter the correct age:"+"Son's age
cannot be greater than Father's age";
}
}
class Father
{
int age;
Father(int age1)
{
age=age1;
S.out.println("Father age:"+age);
}
}
Class Son Extends Father.
{
    son(int age2)
    {
        S.out.println("Son age:"+age2);
    }
}
Class AgeMain1
{
    public static void main(String[] args) throws WrongAge
{
```

Date __/__/__
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Puffin

```
Scanner ss = new Scanner(System.in);
S.out.println("Enter age of father:");
int j = ss.nextInt();
S.out.println("Enter age of son:");
int k = ss.nextInt();
if(k>=j)
{
  throw new WrongAge();
}
else
{
  Father f = new Father(j)
    Son s = new Son(k);
  }
}
}
```

Screen Shot-

```
Command Prompt
Microsoft Windows [Version 10.0.18363.1198]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\arkas>cd onedrive

C:\Users\arkas\OneDrive>cd desktop

C:\Users\arkas\OneDrive\Desktop>cd java

C:\Users\arkas\OneDrive\Desktop\java>java Agemain1.java
Error: Could not find or load main class Agemain1.java

C:\Users\arkas\OneDrive\Desktop\java>java Agemain1
Enter the age of father: 23
Enter the age of son: 23
Exception in thread "main" Please enter the correct age:Son's age cannot be greater than Father's age
        at Agemain1.main(Agemain1.java:40)

C:\Users\arkas\OneDrive\Desktop\java>java Agemain1
Enter the age of father: 23
Enter the age of son: 1
Father age:23
[redacted]
Son age:1

C:\Users\arkas\OneDrive\Desktop\java>
```

LAB PROGRAM 9

Question-

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.

Source Code-

```
class Threadt implements Runnable
{

                                        String name;
```

```
Thread t;

int time;

Threadt(String threadname,int time) {

name = threadname;

this.time=time;

t = new Thread(this, name);

System.out.println("thread:"+ t);

t.start();

}

public void run() {

try {

for(int i = 5; i > 0; i--) {

System.out.println(name);

Thread.sleep(time);

}
```

```
} catch (InterruptedException e) {

System.out.println(name + "Interrupted");

}

System.out.println(name + " exiting.");

}

}

class Week11 {

public static void main(String args[]) {

Threadt t1=new Threadt("BMS COLLEGE OF ENGINEERING",10000);

Threadt t2=new Threadt("COMPUTER SCIENCE OF
ENGINEERING",2000);

}

}
```

Writeup-

Week 11
1BM19CS024

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Puffin

```
class NewThread implement Runnable
{
Thread t;
NewThread()
{
t = new Thread(this, "NThread");
t.start();
}
public void run()
{
try
{
for(int i=20; i>0; i--)
{
S.out.println("CSE");
Thread.sleep(2000);
}
}
catch (InterruptedException ie)
{
S.out.println("Child Thread Interrupted");
}
}
}
Class Week11
{
public static void main(String args[])
{
NewThread n = new NewThread();
```

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Puffin

```
try
{
for (int i=5; i>0; i--)
{
S.out.println ("BTS College of Engineering");
Thread.sleep (10000);
}
}
catch (InterruptedException ie)
{
S.out.println ("Main Thread interrupted");
}
}
}
```

Screen Shot-

Command Prompt

```
    constructor Thread.Thread(Runnable,AccessControlContext) is not applicable
      (argument mismatch; String cannot be converted to Runnable)
    constructor Thread.Thread(ThreadGroup,Runnable) is not applicable
      (argument mismatch; String cannot be converted to ThreadGroup)
    constructor Thread.Thread(ThreadGroup,String) is not applicable
      (argument mismatch; String cannot be converted to ThreadGroup)
    constructor Thread.Thread(Runnable,String) is not applicable
      (argument mismatch; String cannot be converted to Runnable)
Note: Some messages have been simplified; recompile with -Xdiags:verbose to get full output
2 errors

C:\Users\arkas\OneDrive\Desktop\java>javac Week11.java

C:\Users\arkas\OneDrive\Desktop\java>java Week11
thread:Thread[BMS COLLEGE OF ENGINEERING,5,main]
thread:Thread[COMPUTER SCIENCE OF ENGINEERING,5,main]
BMS COLLEGE OF ENGINEERING
COMPUTER SCIENCE OF ENGINEERING
COMPUTER SCIENCE OF ENGINEERING
COMPUTER SCIENCE OF ENGINEERING
COMPUTER SCIENCE OF ENGINEERING
COMPUTER SCIENCE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
COMPUTER SCIENCE OF ENGINEERING exiting.
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERING exiting.

C:\Users\arkas\OneDrive\Desktop\java>
```

LAB PROGRAM 10

Question-

Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

Source Code-

```
import java.awt.*;

import java.awt.event.*;

class DivisionInteger extends Frame implements ActionListener{

TextField num1TextField;

TextField num2TextField;

Button calculate;

int a,b;

float result;

String msg="Enter the numbers";

public DivisionInteger(){



setLayout(new FlowLayout());



calculate=new Button("Calculate");
```

```
num1TextField=new TextField(5);

Label num1Label=new Label("Number 1",Label.RIGHT);

num2TextField=new TextField(5);

Label num2Label=new Label("Number 2",Label.RIGHT);



add(num1Label);

add(num1TextField);

add(num2Label);

add(num2TextField);

add(calculate);

num1TextField.addActionListener(this);

num2TextField.addActionListener(this);

calculate.addActionListener(this);
```

```
addWindowListener(new MyWindowAdapter());

}

public void actionPerformed(ActionEvent ae){

try{

result=divideNumbers();

msg=("The result is "+result);

repaint();

}catch(NumberFormatException e){

msg="Number is not Integer."+e;

repaint();

}catch(ArithmeticException e){

msg="Divide By zero not Allowed."+e;

repaint();

}

}
```

```
public float divideNumbers(){

a=Integer.parseInt(num1TextField.getText());

b=Integer.parseInt(num2TextField.getText());

if(b==0){

throw new ArithmeticException();

}

return (float)a/b;

}

public void paint(Graphics g){

g.drawString(msg,50,100);

}

public static void main(String args[]){

DivisionInteger div=new DivisionInteger();

div.setSize(new Dimension(500,500));

div.setTitle("Division Calculater");
```

```
div.setVisible(true);

}

}

class MyWindowAdapter extends WindowAdapter{

public void windowClosing(WindowEvent event){

System.exit(0);

}

}
```

Writeup-

Week 12
1BM19CS024

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Puffin

```
import java.awt.*;
import java.awt.event.*;
Class DivisionInteger extends Frame implements
ActionListener {
TextField num1TextField;
Text Field num2TextField;
Button Calculate;
int a, b;
float result;
String msg="Enter a the numbers";
public DivisionInteger() {
setLayout(new FlowLayout());
calculate = new Button("Calculate");
num1TextField = new TextField(5);
Label num1Label = new Label("Number 1", Label.
RIGHT);
num2TextField = new TextField(5);
Label num2Label = new Label("Number 2", Label.RIGHT);
add(num1Label);
add(num1TextField);
add(num2Label);
add(num2TextField);
add(calculate);
num1TextField.addActionListener(this);
num2TextField.addActionListener(this);
calculate.addActionListener(this);
addWindowListener(new MyWindowAdapter());
}
public void actionPerformed(ActionEvent ae) {
try {
```

```
result=divideNumbers();
msg=("The result is "+result);
repaint();
}catch(NumberFormatException e){
msg=("Number is not integer "+e);
repaint();
}catch(ArithmeticException e){
msg=("Divide by 0 not possible "+e);
repaint();
}}
public float divideNumbers(){
a=Integer.parseInt(num1TextField.getText());
b=Integer.parseInt(num2TextField.getText());
if(b==0){
throw new ArithmeticException();
}
return (float)a/b;
}
public void paint(Graphics g){
g.drawString(msg,50,100);
}
public static void main(String[] args){
DivisionInteger div=new DivisionInteger();
div.setSize(new Dimension(50,100));
div.setTitle("Division Calculator");
div.setVisible(true);
}}
class MyWindowAdapter extends WindowAdapter{
public void windowClosing(WindowEvent event){
```

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Puff

```
System.exit(0);
}
}
```

Screen Shot-

Source Code(Updated)-

```
import java.awt.*;

import java.awt.event.*;

public class DivisionInteger extends Frame implements ActionListener {

TextField tf1, tf2;

Label l;
```

```
Button b;

DivisionInteger() {

tf1 = new TextField();

tf1.setBounds(50, 50, 200, 50);

tf2 = new TextField();

tf2.setBounds(50, 100, 200, 50);

l = new Label();

l.setBounds(50, 150, 200, 50);

b = new Button("Divide");

b.setBounds(50, 200, 100, 50);

b.addActionListener(this);

add(b);

add(tf1);

add(tf2);

add(l);
```

```
setSize(800,800);

setLayout(null);

setVisible(true);

}

public void actionPerformed(ActionEvent e) {

try {

String n1 = tf1.getText();

String n2 = tf2.getText();

l.setText("Quotient: " + (Integer.parseInt(n1) / Integer.parseInt(n2)));

}

catch(NumberFormatException ze) {

l.setText("Cannot divide non-numerical / non-integer values");

}

catch(ArithmeticException ze) {

l.setText("Cannot divide by zero");
```

```
}

catch(Exception ex) {

System.out.println(ex);

}

}

public static void main(String[] args) {

new DivisionInteger();

}

}
```

Screen Shot-

Command Prompt - java DivisionInteger
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\arkas>cd onedrive
C:\Users\arkas\OneDrive>cd desktop
C:\Users\arkas\OneDrive\Desktop>cd java
C:\Users\arkas\OneDrive\Desktop\java>javac divisioninteger.java
divisioninteger.java:3: error: class Main is public, should be declared in a file named Main.java
public class Main extends Frame implements ActionListener {
^
1 error
C:\Users\arkas\OneDrive\Desktop\java>javac divisioninteger.java
C:\Users\arkas\OneDrive\Desktop\java>java divisioninteger
Error: Could not find or load main class divisioninteger
C:\Users\arkas\OneDrive\Desktop\java>java DivisionInteger
ew DivisionInteger();
85
25
Quotient: 3
Divide