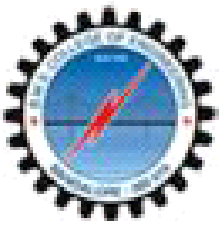


B. M. S. COLLEGE OF ENGINEERING, BENGALURU
Autonomous Institute, Affiliated to VTU

DEPARTMENT OF CSE

2020

Lab Report of Object Oriented Java Programming Lab

OOJ-19CS3PCOOJ

Submitted by

Name:Yashaswini Shah
USN:1BM19CS216
Semester : 3

Lab Program	Program Details
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.
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.
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.
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.
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 a penalty if necessary and update the balance.
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.
7	Write a program to demonstrate generics with multiple object parameters.
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 Wrong Age( ) when the input age<0. In Son class, implement a constructor that cases both father and son’s age and throws an exception if son’s age is >=father’s age.
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.
10	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.

Date:09/10/2020
USN : 1BM19CS216

LAB PROGRAM : 1

Develop a Java program that prints all real solutions to the quadratic equation ax2 +bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminant b2-4ac is negative, display a message stating that there are no real solutions.

1BM19CS216 09/10/2020

classmate Date Page

LAB-1

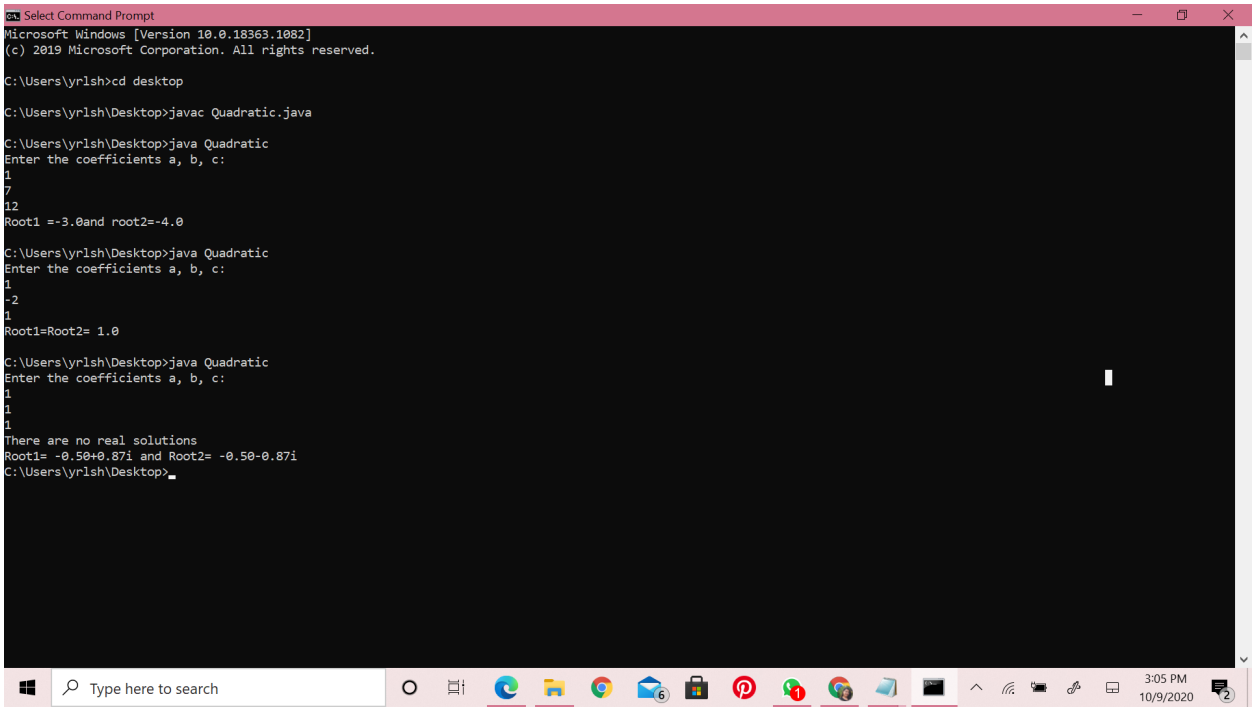
Develop a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$ Read in a, b, c and use the quadratic formula. If the discriminante b^2-4ac is negative, display a message stating that there are no real solution.

```
import java.util.Scanner;
import java.lang.Math;
class Quadratic
{
  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.println("Root1 = "+r1+" and root2 = "+r2);
    }
    else if (d==0)
    {
      r1 = r2 = -b / (2*a);
```

```
        System.out.println("Root1 = Root2 = " + r1);
    }
    else
    {
        System.out.println("There are no real solution");
        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);
    }
}
}
```

```
import java.util.Scanner;
import java.lang.Math;
class Quadratic
{
   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.println("Root1 ="+r1+ "and root2="+r2);
   }
   else if(d==0)
   {
   r1=r2=-b/(2*a);
   System.out.println("Root1=Root2= "+r1);
   }
   else
   {
   System.out.println("There are no real solutions");
   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);
   }
   }
}
```

THE OUTPUT FOR PROGRAM 1:



LAB PROGRAM: 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 the SGPA of a student.

1BM19CS216
Yashaswini Shah

16/10/2020

Week-4

Lab Program2

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.

```
import java.util.*;
class Student {
    private String usn;
    private String name;
    private int credits[]
    private int marks[]
    private int n;

void accept()
{
  Scanner s=new Scanner(System.in);
   System.out.println("Enter the student details:");
   System.out.println("USN
   usn = s.next();
   System.out.println("Name
   name = s.next();
   System.out.println("Enter the number of
                              subjects : ");
   n = s.nextInt();
   credits = new int[n];
   marks = new int[n];
  System.out.println("Enter details for the subjects
                              : ");
```

```
for(int i=0; i<n; i++)
{
 System.out.println("Enter credits for subject :
                    + (i+1));
 credits[i] = s.nextInt();
System.out.println(" Enter marks for subject :"
                    + (i+1));
 marks[i] = s.nextInt();
}
}
void display()
{
  System.out.println("----------");
 System.out.println("The Student's details are:");
 System.out.println("USN : "+usn);
 System.out.println("Name :"+name);
 System.out.println("Marks in each subject :");
 for(int i=0; i<n; i++)
 {
     System.out.println("Subject "+(i+1)+" = "+marks[
 }
}
double calculate()
{
 int tcp=0, tc=0;
 for(int i=0; i<n; i++)
 {
   tc=tc+credits[i];
   if(marks[i]>=50)
```

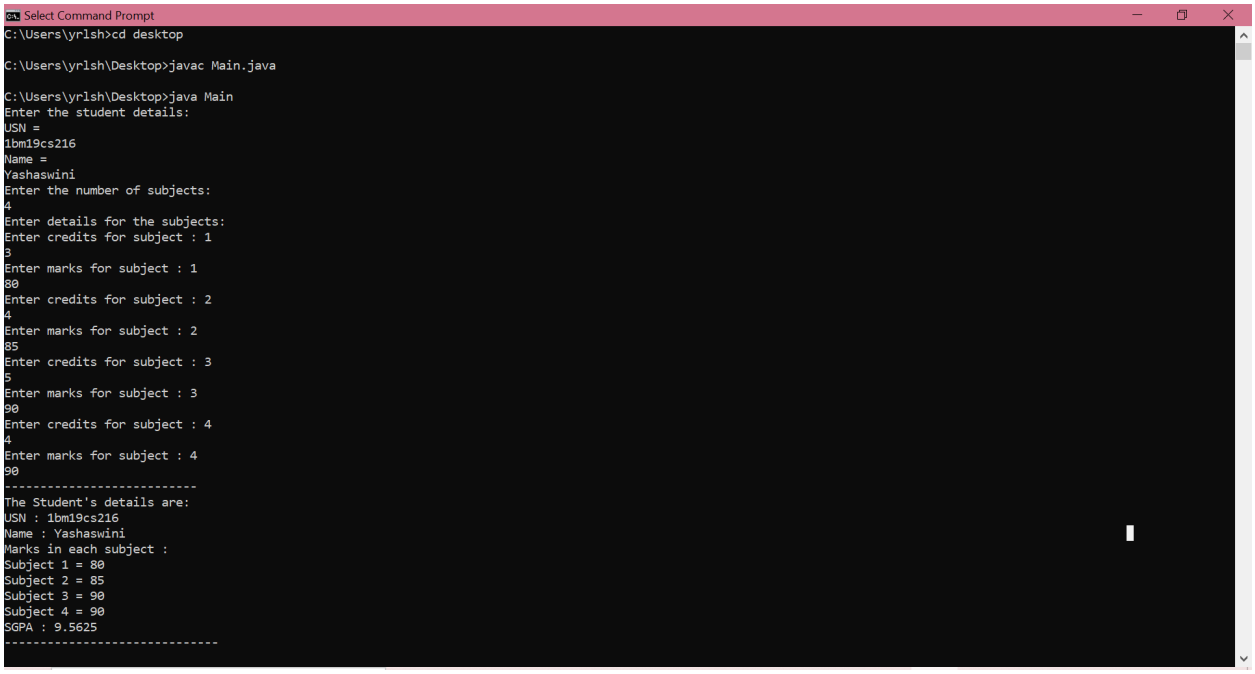
```
{
  tcp=tcp+(((marks[i]/10)+1)*credits[i]);
}
else if(marks[i]>=40 && marks[i]<50)
{
  tcp=tcp+(4*credits[i]);
}
}
return (double)tcp/tc;
}
}

public class Main
{
  public static void main(String args[]){
    Student s1=new Student();
    s1.accept();
    s1.display();
  System.out.println("SGPA : "+s1.calculate());
  System.out.println("----------");
}
}
```

import java.util.*;

```
class Student {
	private String usn;
	private String name;
	private int credits[];
	private int marks[];
	private int n;

void accept()
{
	Scanner s=new Scanner(System.in);
	System.out.println("Enter the student details: ");
	System.out.println("USN = ");
	usn=s.next();
	System.out.println("Name = ");
	name=s.next();
	System.out.println("Enter the number of subjects: ");
	n=s.nextInt();
	credits=new int[n];
	marks=new int[n];
	System.out.println("Enter details for the subjects: ");
	for(int i=0;i<n;i++)
	{
		 System.out.println("Enter credits for subject : " + (i+1));
		credits[i]=s.nextInt();
		System.out.println("Enter marks for subject : "+ (i+1));
		marks[i]=s.nextInt();
	}
}
	void display()
	{
	   System.out.println("----------------------------");
		System.out.println("The Student's details are: ");
		System.out.println("USN : "+usn);
		System.out.println("Name : "+name);
		System.out.println("Marks in each subject :");
		for(int i=0;i<n;i++)
		{
			System.out.println("Subject "+(i+1)+" = "+marks[i]);
		}
	}
	double calculate()
	{
		int tcp=0,tc=0;
		for(int i=0;i<n;i++)
```

```
        {
        tc=tc+credits[i];
        if(marks[i]>=50)
        {
        tcp=tcp+(((marks[i]/10)+1)*credits[i]);
        }
        else if(marks[i]>=40 && marks[i]<50)
        {
                tcp=tcp+(4*credits[i]);
        }
        }
        return (double)tcp/tc;
}
}



public class Main
        {

        public static void main(String args[]) {
                Student s1=new Student();
                s1.accept();
                s1.display();
                System.out.println("SGPA : "+s1.calculate());
                System.out.println("------------------------------");
}
}
```

THE OUTPUT FOR PROGRAM 2:



1BM19CS216

Date: 6/11/2020
USN:1BM19CS216

Lab program 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 object

1BM19CS216

06/11/2020

classmate
Date
Page

Lab program 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 to String() method that could display the complete details of the book. Develop a Java Program to create n book objects.

```
import java.util.Scanner;

class Book
{
int deposit_balance;
int withdraw

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 the name of the book:");
name=inp.next()
System.out.println("Enter the name of the
                    author:");
name=inp.next();
System.out.println("Enter the price of the book:");
price=inp.nextFloat()
System.out.println("Enter the number of pages
        of the book:");
num_pages=inp.nextInt();
}

public String toString()
{
return("Name:"+name+"\n"+"Author:"+author
    +"\n"+"Price:"+price+"\n"+"Number
    of pages:"+num_pages);
}
}
```

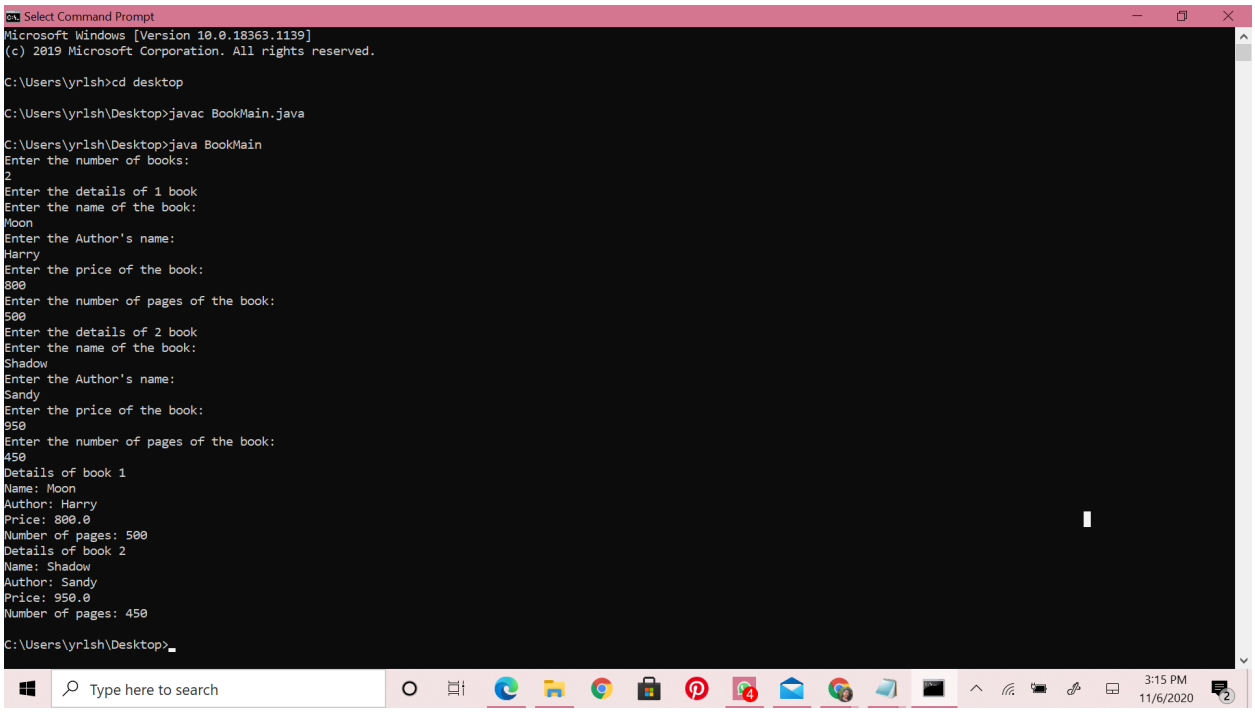
→

```
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]);
}
}
}
```

```
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 the name of the book:");
name=inp.next();
System.out.println("Enter the Author's name:");
author=inp.next();
System.out.println("Enter the price of the book:");
price=inp.nextFloat();
System.out.println("Enter the number of pages of the 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]);
}
}
}
```

The output for program 3:



USN:1BM19CS216

Lab Program 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.

1BM19CS216

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 Rectange, 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.

```
import java.util.Scanner;

abstract class Shape
{
 int length, breadth;
void printArea()
{ }
}
double areaR;
void printArea(){
areaR = (length *breadth);
System.out.println("The area of rectangle is
        "+areaR+" cm^2 );
}
}
class Triangle extends Shape
{
  double areaT;
  void printArea() {
```

```
areaT = (0.5) *(length*breadth);
System.out.println("The area of triangle is
        "+areaT+"cm^2");
}
}

class Circle extends Shape
{
 double areaC;
void printArea()
areaC = (3.14) * (length * length);
System.out.println("The area of circle is
      "+areaC+"cm^2");
}
}

class main
{
public static void main (String args[])
{
Scanner A=new Scanner(System.in);
Rectangle R1 = new Rectangle();
Triangle  T1 = new Triangle();
Circle    C1 = new Circle();
System.out.println("---- Area of generator
        of Reatangle, Triangle and circle---
```

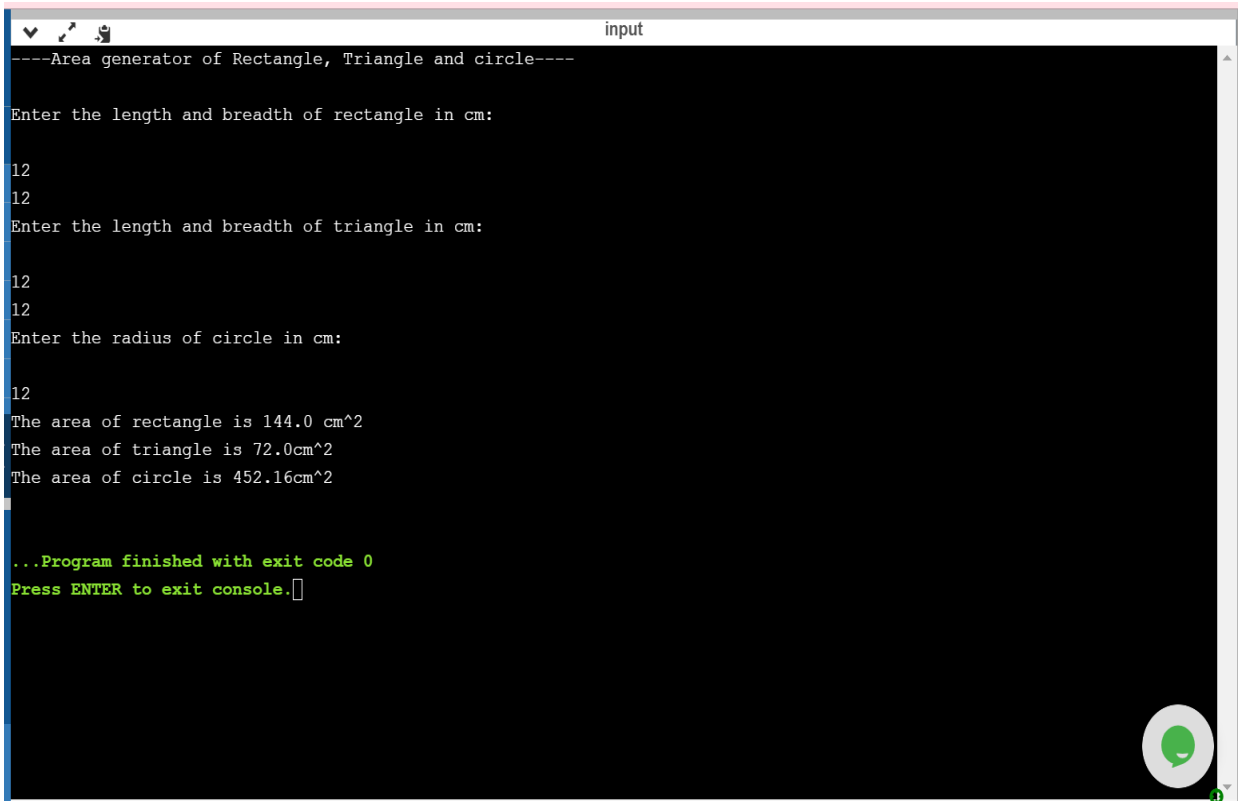
```
System.out.println("Enter the length and breadth
                    of rectangle in cm: \n");
R1.length = A.nextInt();
R1.breadth = A.nextInt();
System.out.println("Enter the height and
                    base of triangle in cm: \n");
T1.length = A.nextInt();
T1.breadth = A.nextInt();
System.out.println("Enter the radius of
          circle in cm: \n");
C1.length = A.nextInt();
R1.printArea();
T1.printArea();
C1.printArea();
}
}
```

import java.util.Scanner;

```
abstract class Shape
{
  int length,breadth;
void printArea()
{}
}
class Rectangle extends Shape
{
double areaR;
void printArea(){
areaR=(length*breadth);
System.out.println("The area of rectangle is "+areaR+" cm^2");
}
}
class Triangle extends Shape
{

double areaT;
void printArea(){
areaT=(0.5)*(length*breadth);
System.out.println("The area of triangle is "+areaT+"cm^2");
}
}
class Circle extends Shape
{

double areaC;
void printArea(){
areaC=(3.14)*(length*length);
System.out.println("The area of circle is "+areaC+"cm^2");
}
}
class Main
{
public static void main(String args[])
{
Scanner A=new Scanner(System.in);
Rectangle R1=new Rectangle();
Triangle T1=new Triangle();
Circle C1=new Circle();
System.out.println("----Area generator of Rectangle, Triangle and circle---- \n ");
System.out.println("Enter the length and breadth of rectangle in cm:\n");
R1.length=A.nextInt();
R1.breadth=A.nextInt();
System.out.println("Enter the height and base of triangle in cm:\n");
T1.length=A.nextInt();
T1.breadth=A.nextInt();
```

```
System.out.println("Enter the radius of circle in cm:\n");
C1.length=A.nextInt();
R1.printArea();
T1.printArea();
C1.printArea();
}
}
```

The Output for program 4:



date:6/11/2020
usn:1bm19cs216

Lab Program 5:

Develop a Java program to create a class Bank that maintains two kinds of accounts 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.

1BM19CS216

6/11/2020

Lab 5:

```
import java.util.*;
import java.lang.math;
class Account
{
   String name;
   int acctno;
   char type;
   double balance ;
   double dep;
   boolean cheq;

 void get (char c)
 {
    type = c;
  if (c=='s' || c=='S')
   cheq=~~true~~false;
   else cheq = true;
Scanner sc = new Scanner (System.in);
System.out.println ("Enter your name");
name = sc.nextLine();
System.out.println("Enter your account no.");
acctno = sc.nextInt();
System.out.println("Enter the current balance
        in your account");
   balance = sc.nextDouble();
}
void putd()
{
  System.out.println("Account details");
```

```
        System.out.println("Name : "+name);
System.out.println("Account number :"+accno);
System.out.println("Account type :"+type);
System.out.println("balance :"+balance);
}

void dep()
{
  Scanner ss = new Scanner(System.in);
  System.out.println("Enter the amount to
      be deposited");
  dep = ss.nextDouble();
balance = balance + dep;
System.out.println("Amount has been deposited
      and balance has been updated");
}
void display()
{
    System.out.println("Balance amount is"+
      balance);
}
}
class Saving extends Account.
{
    double rate;
    double s_with;
    int n;
```

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

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

    balance + = amt;
System.out.println (" Interest is compounded
    and deposited");
}
void with_s()
{
  Scanner ss = new Scanner (System.in);
  System.out.println (" Enter the amount to
      be withdrawn");
```

```
    s_with = ss.nextDouble();
  if (s_with > balance)
System.out.println("Insufficient balance");
else.
{
 balance = balance - s_with;
System.out.println("Money has been withdraw
   and balance is updated");
}
}
class Current extend Account
{
      double c_with;
      double pen;
      double min;
     Current()
  {
    pen = 100;
    min = 500;
  }
void with_c()
{
 Scanner xx = new Scanner(System.in);
System.out.println("Enter the amoon t to be
                withdrawn");
  c_with = xx.nextDouble()
   if (c_with > balance)
{
  System.out.println("Insufficient funds!");
```

```
return;
}
else
{
   balance = balance_with;
System.out.println("Amount has been withdrawn
   and balanced has been updated"); }
if (balance<min)
{
System.out.println("Balance is below the
   minimum threshold. Service penalty
   charge = 100 !-");
if (balance < pen)
System.out.println("Due to insufficient
funds penalty charg will be debuted
from account after replenishing. Current
balance is" + balance);
{
   balance = balance - pen;
System.out.println("Penalty charge has
been deducted from acc. balance.
Curunt balance is" + balance);
}
}
}
class Bank {
   public static void (String sss[])
{
```

```
int cch, chh
Scanner sx = new Scanner (System.in);
System.out.println (" welcome ");
System.out.println (" 1. Saving ; 2: Current
int ch = sx.next()
if (ch==1)
{
    Saving s = new Saing()
      s.get ('s')
do {
System.out.println (" 1. Deposit \n 2. Calculate
  interest \n 3. Withdraw \n 4. Display
  \n 5. Exit ");
System.out.println ("Enter your choice");
    chh = sx.nextInt();
    switch (chh)
{
  case 1:
    s.dep()
    break;

  case 2:
   s.with-s();
   break;

   case 4:
   s.display()
  break;
```

```
case 5:
  break;

default:
 System.out.println("wrong opt.");
 break;
}
while (chh! =5);
}
else if (ch==2)
{
  Current cr = new Current()
     cr.get('C')
   do {
System.out.println(" 1. Deposit \n2 withdraw
     3. In Display \n4. Exit");
   ch = sc.nextInt()
    Switch (ch)
{

   case 1:
    cr.dep()
     break;

  case 2:
   cr.with_c()
    break;

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

```
        case 4:
          break;

        default:
        System.out.println (" wrong option.");
        break;
    }
  }
  while (ch!=5);
}
else
    System.out.println ("wrong!");
}
}
```

```
import java.util.*;
import java.lang.Math;
class Account
{
	String name;
	int acctno;
	char type;
	double balance;
	double dep;
	boolean cheq;

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

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

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

```
        }



}

class Saving extends Account
{

        double rate;

        double s_with;
        int n;

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



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

        }

        void with_s()
        {

                                Scanner ss = new Scanner(System.in);
                                System.out.println("Enter the amount of money to be withdrawn");
                                s_with = ss.nextDouble();
```

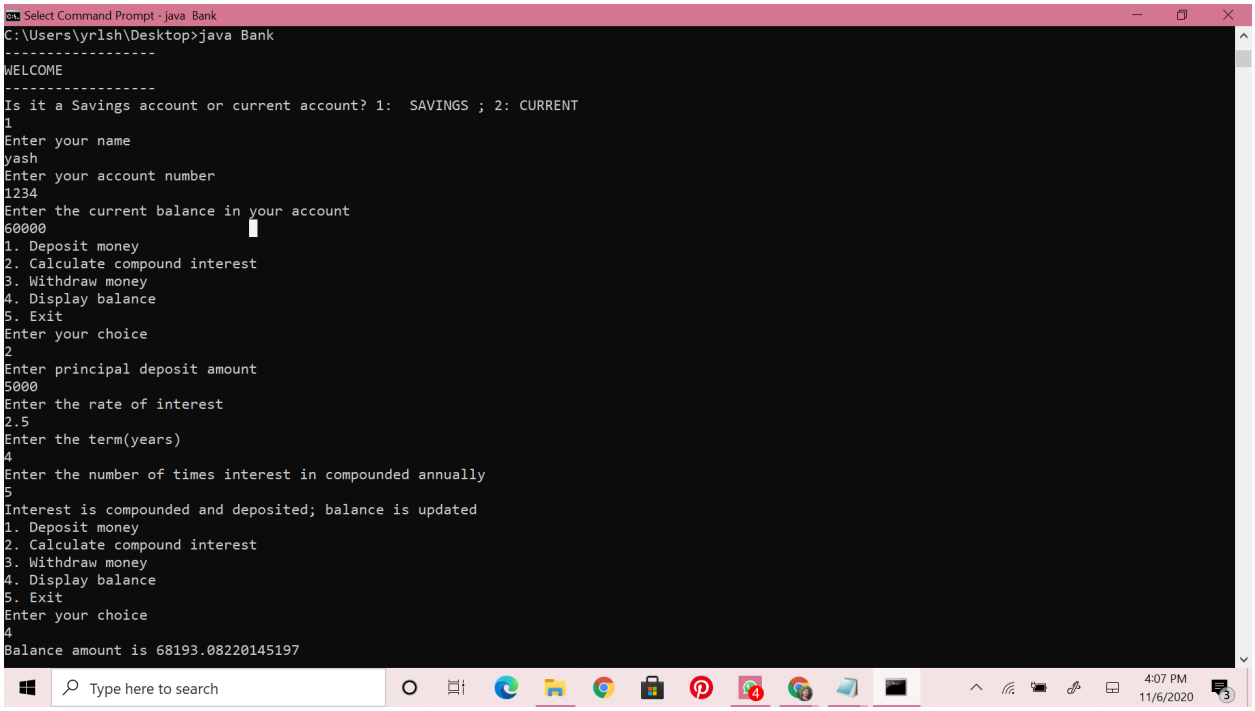
```
                                        if(s_with>balance)
                                        System.out.println("Insufficient balance");
                                        else
                                        {balance= balance - s_with;
                                        System.out.println("Money has been withdrawn and balance has been
updated");}
        }




}

class Current extends Account
{

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

        void with_c()
        {
                                        Scanner xx = new Scanner(System.in);
                                        System.out.println("Enter the amount to be withdrawn");
                                        c_with= xx.nextDouble();
                                        if(c_with>balance)
                                        {System.out.println("Insufficient funds!");
                                        return;}
                                        else
                                        {balance= balance- c_with;
                                        System.out.println("Amount has been withdrawn and balance has been
updated");}
                                        if(balance<min)
                                        {
                                                System.out.println("Balance is below the minimum threshold.
Service penalty charge = 100/- .");
                                                if(balance<pen)
                                                System.out.println("Due to insufficient funds, penalty charge will
be deducted from account after replenishing. Current balance is "+balance);
                                                else
                                                {
```

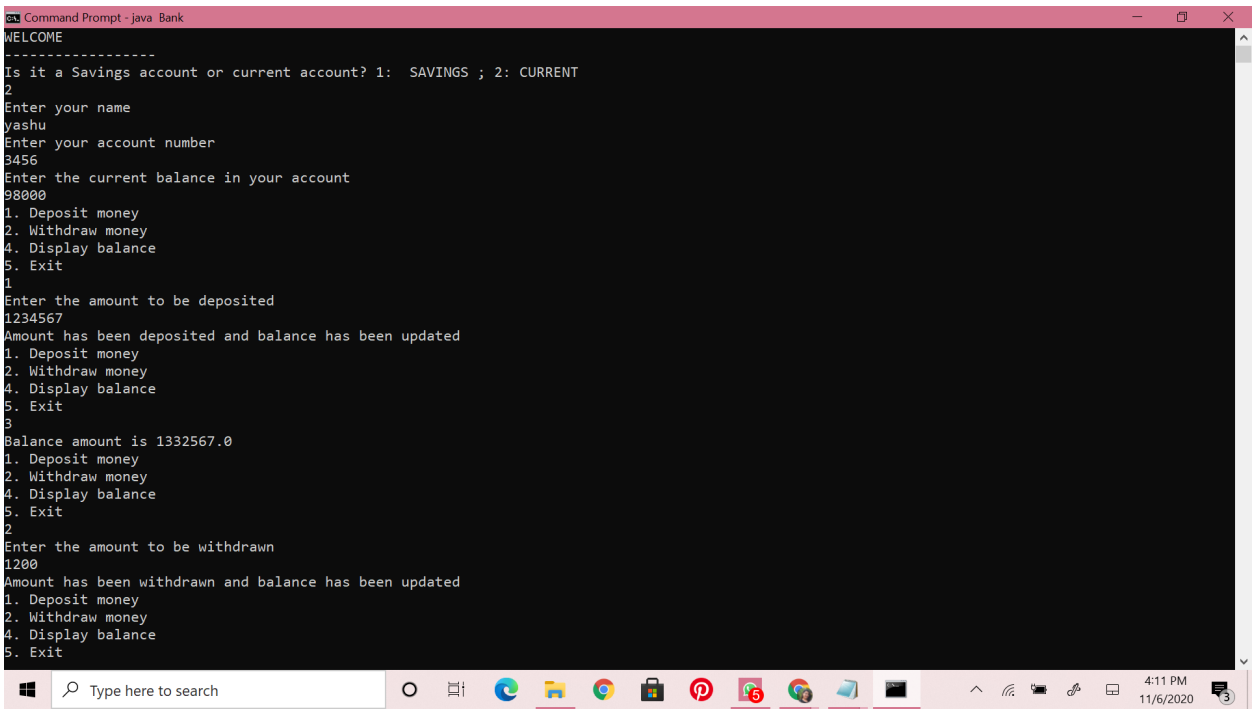
```
                                                balance= balance-pen;
                                                System.out.println("Penalty charge has been deducted
from account balance. Current balance is "+balance);
                                                }
                                        }
        }


}

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

                                case 2:
                                s.ci();
                                break;

                                case 3:
                                s.with_s();
                                break;

                                case 4:
                                s.display();
```

```
                        break;


                        case 5:
                        break;

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

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


                        case 2:
                        cr.with_c();
                        break;

                        case 3:
                        cr.display();
                        break;

                        case 4:
                        break;

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

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

THE OUTPUT:





Lab Program 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.

program:

1BM19CS216

classmate
Date
Page

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 5 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 5 courses of the current sem of the Student. Import the two packages in a file that declares the final marks of n students

```
package CIE;
```

- student

```
import java.util.Scanner;
public class Student
{
  String name, usn;
  int sem;
  Scanner xx=new Scanner(System.in);
public void accept()
public void accept()
{
```

```
System.out.println("Enter Name: ");
name = xx.nextLine();
System.out.println("Enter USN : ");
usn = xx.nextline();
System.out.println("Enter Semester : ");
sem = xx.nextline();
}
public void display()
{
  System.out.displayprintln("Name : "+name);
  System.out.println("Usn : "+usn);
  System.out.println("Semester : "+sem);
}
}
```

```
package CIE;
import java.util.Scanner;
public class Internals extends CIE.Students
{
public int ciem[] = new int[5];
Scanner xx=new Scanner(System.in);
public void accept()
{
  for (int i=0; i<5 ;i++)
{
   System.out.println("Enter the cie marks of
     subject "+(i+1)+" out of 50");
```

```
    {
        ciem[i]=xx.nextInt();
    }
}
}
```

```
package SEE;
import CIE.*;
import java.util.Scanner;

public class Externals extends CIE.Student
{
 public int seem[]=new int[5];
 Scanner xx=new Scanner(System.in);
 public void accept()
{
 for(int i=0;i<5;i++)
 {
 System.out.println("Enter the see marks of
 subject "+(i+1)+" out of 100");
  {
      seem[i]=xx.nextInt();
  }
}
}
}
```

```
import CIE.*;
import SEE.*;
import java.util.*;

class TotalMarks
{
 public static void main (String ss s[])
 {
  int i, j, n;
  int total[] = new int[5];
  Scanner xx = new Scanner (System.in);
  System.out.println ("Enter the number of
        students");
  n = xx.nextInt();
  CIE.Student S[] = new CIE.Student[n];
  CIE.Internals ci[] = new CIE.Internals[n];
  SEE.Externals se[] = new SEE.Externals[n];
 for (i=0; i<n ; i++)
  {
   System.out.println ("Enter student "+(i+1)+"
        details");
   S[i] = new CIE.Student();
   S[i].accept();
   ci[i] = new CIE.Internals();
   ci[i].accept();
   se[i] = new SEE.Externals();
   se[i].accept()
 }
  for (i=0; i<n; i++)
```

```
{
System.out.println("Details of Student "
                    + (i+1));
s[i].display();
for(j=0;j<5;j++)
{
total[j]=ci[i].ciem[j]+(sei[i].seem[j])/2
System.out.println("Total marks in subject "+
(j+1)" is " total[j]);
}
}
}
}
}
```

```
package CIE;
```

```java
import java.util.Scanner;

public class Student
{
    String name,usn;
    int sem;
    Scanner xx=new Scanner(System.in);
    public void accept()
    {
        System.out.println("Enter Name:");
        name=xx.nextLine();
        System.out.println("Enter USN:");
        usn=xx.next();
        System.out.println("Enter Semester:");
        sem=xx.nextInt();
    }
    public void display()
    {
        System.out.println("Name :"+name);
        System.out.println("Usn :"+usn);
        System.out.println("Semester :"+sem);
    }
}
```

```java
package CIE;
import java.util.Scanner;
public class Internals extends CIE.Student
{
    public int ciem[]=new int[5];
    Scanner xx =new Scanner (System.in);
    public void accept()
    {
        for(int i=0;i<5;i++)
        {
            System.out.println("Enter the cie marks of subject"+(i+1)+"
out of 50");
            {
                ciem[i]=xx.nextInt();
```

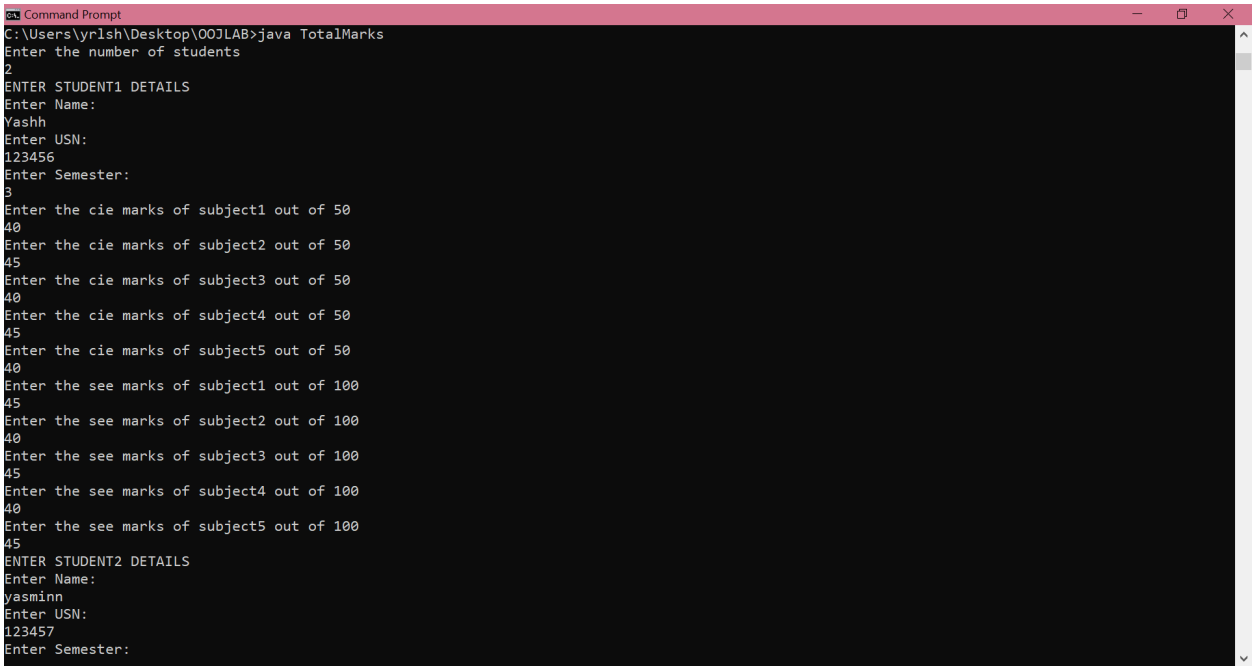
```
            }
        }
    }


}
```

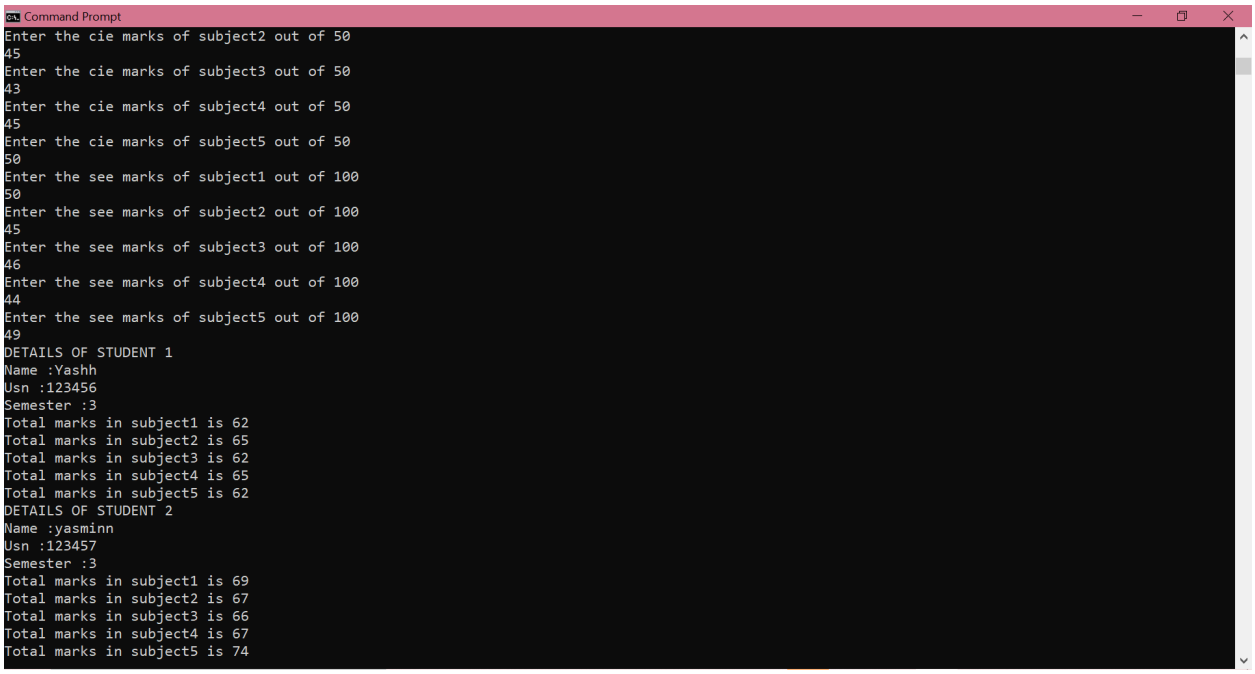
```
package SEE;
import  CIE.*;
import java.util.Scanner;

public class Externals extends CIE.Student
{
    public int seem[]=new int[5];
    Scanner xx =new Scanner (System.in);
    public void accept()
    {
        for(int i=0;i<5;i++)
        {
            System.out.println("Enter the see marks of subject"+(i+1)+"
out of 100");
            {
                seem[i]=xx.nextInt();
            }
        }
    }

}
```

```
import  CIE.*;
import  SEE.*;
import java.util.*;

class TotalMarks
{
    public static void main(String sss[])
    {
        int i,j,n;
        int total[]=new int[5];
```

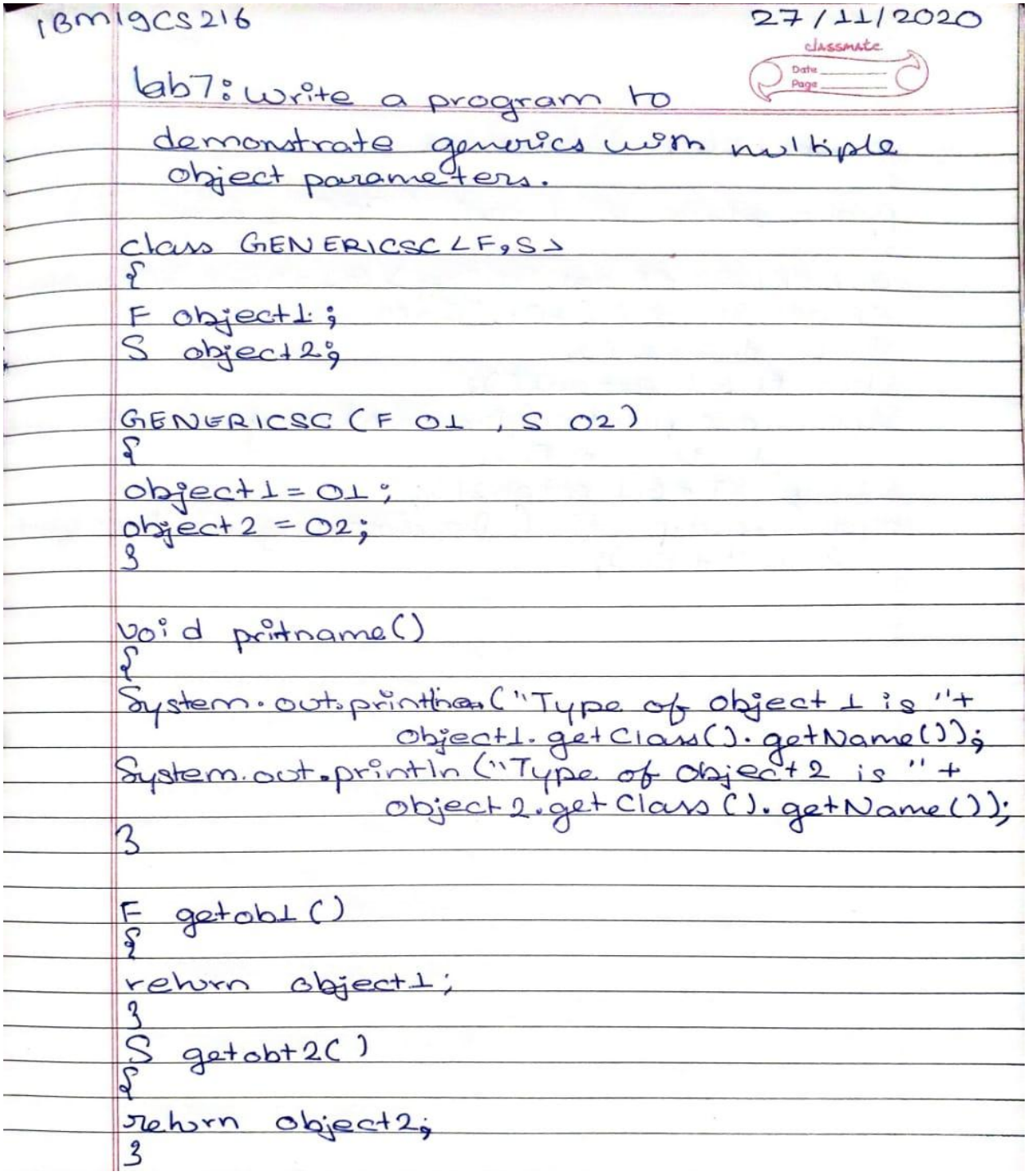
```
        Scanner xx=new Scanner(System.in);
        System.out.println("Enter the number of students");
        n=xx.nextInt();
        CIE.Student s[]=new CIE.Student[n];
        CIE.Internals ci[]= new CIE.Internals[n];
        SEE.Externals se[]=new SEE.Externals[n];
        for(i=0;i<n;i++)
        {
            System.out.println("ENTER STUDENT"+(i+1)+" DETAILS");
            s[i]=new CIE.Student();
            s[i].accept();
            ci[i]=new CIE.Internals();
            ci[i].accept();
            se[i]=new SEE.Externals();
            se[i].accept();
        }
        for(i=0;i<n;i++)
        {
            System.out.println("DETAILS OF STUDENT "+(i+1));
            s[i].display();
            for(j=0;j<5;j++)
            {
                total[j]=ci[i].ciem[j]+(se[i].seem[j]/2);
                System.out.println("Total marks in subject"+(j+1)+" is
"+total[j]);
            }
        }
    }
}
```

OUTPUT:


Command Prompt
C:\Users\yrlsh\Desktop\OOJLAB>java TotalMarks
Enter the number of students
2
ENTER STUDENT1 DETAILS
Enter Name:
Yashh
Enter USN:
123456
Enter Semester:
3
Enter the cie marks of subject1 out of 50
40
Enter the cie marks of subject2 out of 50
45
Enter the cie marks of subject3 out of 50
40
Enter the cie marks of subject4 out of 50
45
Enter the cie marks of subject5 out of 50
40
Enter the see marks of subject1 out of 100
45
Enter the see marks of subject2 out of 100
40
Enter the see marks of subject3 out of 100
45
Enter the see marks of subject4 out of 100
40
Enter the see marks of subject5 out of 100
45
ENTER STUDENT2 DETAILS
Enter Name:
yasminn
Enter USN:
123457
Enter Semester:


Command Prompt
Enter the cie marks of subject2 out of 50
45
Enter the cie marks of subject3 out of 50
43
Enter the cie marks of subject4 out of 50
45
Enter the cie marks of subject5 out of 50
50
Enter the see marks of subject1 out of 100
50
Enter the see marks of subject2 out of 100
45
Enter the see marks of subject3 out of 100
46
Enter the see marks of subject4 out of 100
44
Enter the see marks of subject5 out of 100
49
DETAILS OF STUDENT 1
Name :Yashh
Usn :123456
Semester :3
Total marks in subject1 is 62
Total marks in subject2 is 65
Total marks in subject3 is 62
Total marks in subject4 is 65
Total marks in subject5 is 62
DETAILS OF STUDENT 2
Name :yasminn
Usn :123457
Semester :3
Total marks in subject1 is 69
Total marks in subject2 is 67
Total marks in subject3 is 66
Total marks in subject4 is 67
Total marks in subject5 is 74

LAB7: Write a program to demonstrate generics with multiple object parameters.



1BM19CS216 27/11/2020

lab7: Write a program to demonstrate generics with multiple object parameters.

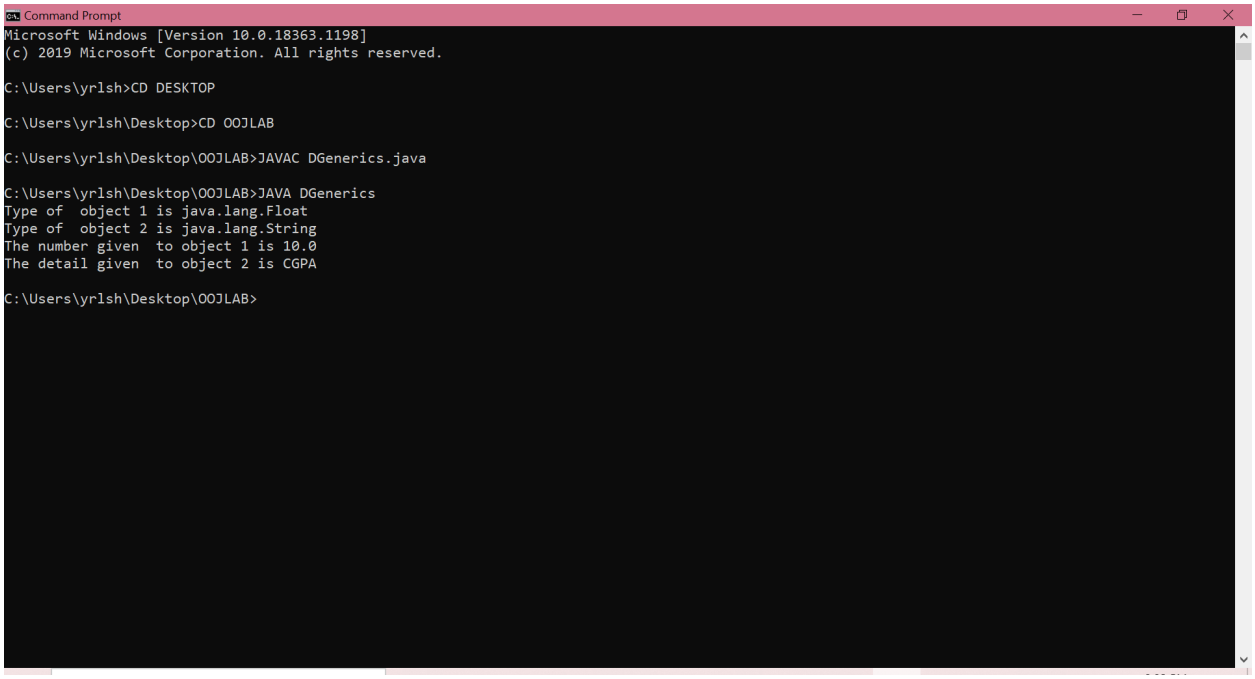
```
class GENERICSC<F,S>
{
F object1;
S object2;

GENERICSC(F O1 , S O2)
{
object1 = O1;
object2 = O2;
}

void printname()
{
System.out.println("Type of object 1 is "+
                    object1.getClass().getName());
System.out.println("Type of object2 is " +
                    object2.getClass().getName());
}

F getob1()
{
return object1;
}
S getobt2()
{
return object2;
}
```

```
public class DGenerics
{
public static void main(String args[])
{
GENERICSC<Float, String> G1 = new GENERICS
<Float, String>(10f, "CGPA");
G1.printname();
float FL. G1.getob1();
System.out.println("The number given to objec
        1 is " + FL);
String ST = G1.getob2();
System.out.println("The detail given to object
    2 is " + ST);
}
}
```

THE PROGRAM:

```
class GENERICSC<F,S>
{
F object1;
S object2;

GENERICSC(F O1,S O2)
{
object1=O1;
object2=O2;
}
void printname()
{
System.out.println("Type of  object 1 is "+object1.getClass().getName());
System.out.println("Type of  object 2 is "+object2.getClass().getName());
}
F getob1()
{
return object1;
}
S getob2()
{
return object2;
}
}
public class DGenerics
{
public static void main(String args[])
{
GENERICSC<Float,String> G1=new GENERICSC<Float,String>(10f,"CGPA");
G1.printname();
float FL=G1.getob1();
System.out.println("The number given  to object 1 is "+FL);
String ST=G1.getob2();
System.out.println("The detail given  to object 2 is "+ST);
}
}
```

THE OUTPUT:



Lab Program 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 cases both father and son’s age and throws an exception if son’s age is >=father’s age.

1BM19CS216

27/11/2020

Lab 8: WAP that demonstrates handling of exceptions in inheritance tree. Create a base called Father and derived class "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 cases both father and son's age and throws an exception if son's age >= father's age.

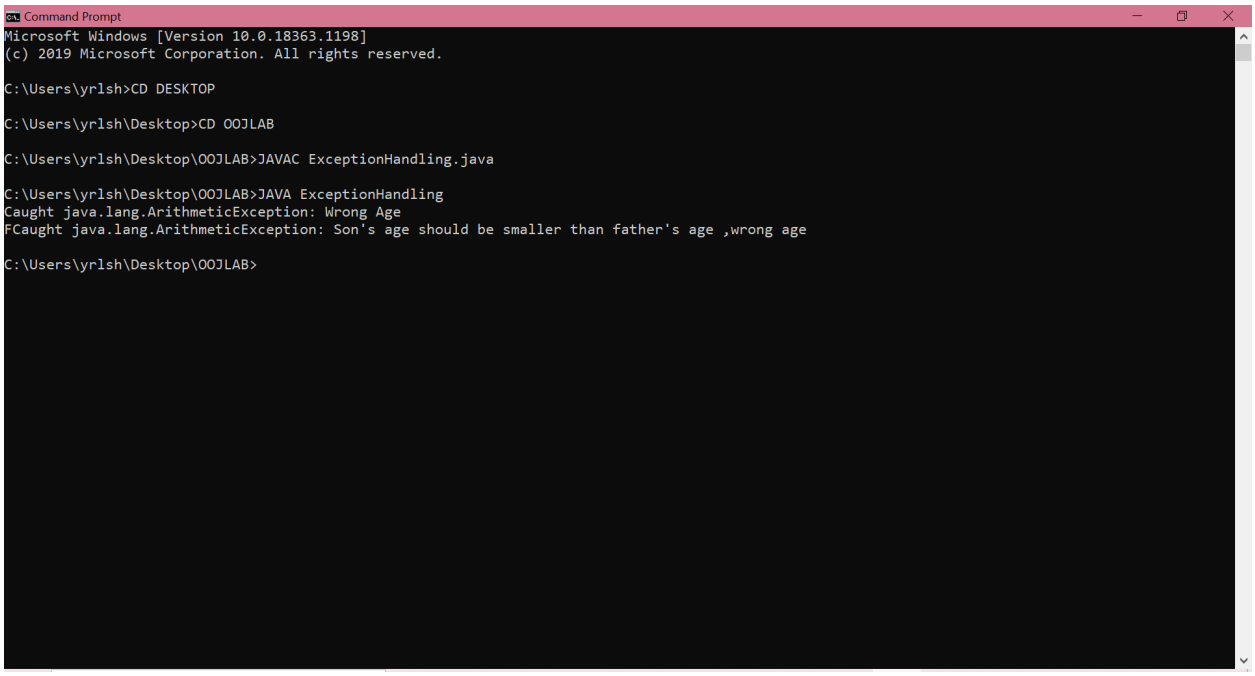
```
class Father
{
Static void acceptNameF(int inputAge) throws
    ArithmeticException.
{
try
{
if (inputAge < 0)
throw new ArithmeticException("Wrong Age");
}
catch (ArithmeticExpection e) {
System.out.println("Caught " + e);
}
}
}
class Son extends Father.
{
Static void checkSFage(int S_Age, int F_Age)
```

```
throws ArithmeticException
{
try {
if (S_Age >= F_Age)
throw new ArithmeticException ("Son's age
        should be smaller than father's age,
        wrong age");
System.out.println ("Son's age is " + S_Age +
        "Fathers age is " + F_Age);
}
catch (ArithmeticException e) {
System.out.println ("Caught " + e);
}
}
}

public class ExceptionHandling {
public static void main (String args[]) {

Father.acceptNameF(-1);
Son.CheckSFage (40, 20);
}
}
```

```
class Father
{

static void acceptNameF(int inputAge) throws ArithmeticException
{
try
{
if(inputAge<0)
throw new ArithmeticException("Wrong Age");
}
catch (ArithmeticException e) {
System.out.println("Caught " + e);
}
}



}
class Son extends Father
{

static void CheckSFage(int S_Age, int F_Age) throws ArithmeticException

{
try{
if(S_Age>=F_Age)
throw new ArithmeticException("Son's age should be smaller than father's age ,wrong age");
System.out.println("Son's age is"+S_Age+"Fathers age is "+F_Age);


}
catch (ArithmeticException e) {
System.out.println("FCaught " + e);
}

}
}
public class ExceptionHandling{
public static void main(String args[]) {


Father.acceptNameF(-1);
Son.CheckSFage(40,20);


}
```

}

OUTPUT:



LAB PROGRAM 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.

Week-11 1BM19CS216 12/11/2020

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

```
class NewThread implements Runnable
{
 Thread t;
  NewThread();
 {
   t =new Thread (this, "NThread");
   t.start();
 }

public void run()
{
  try
  {
    for (int n = 5000; n>0; n--)
  {
   System.out.println ("CSE");
   Thread.sleep (2000);
  }
}
  catch (InterruptedException :e)
{
  System.out.println ("Child Thread Interrupted
}
}
}
```

```
class
{
public static void main (String ss[])
{
  NewThread nt = new NewThread();

  try
  {
    for (int n=5; n>0; n--)
  {
   System.out.println("BMS College of Engineering");
   Thread.sleep(10000);
  }
}
  catch (InterruptedException ie)
{
  System.out.println ("main Thread interrupted");
}
}
}
```

```
class
{
public static void main (String ss[])
{
  NewThread nt = new NewThread();

  try
  {
    for (int n=5; n>0; n--)
  {
   System.out.println("BMS College of Engineering");
   Thread.sleep(10000);
  }
}
  catch (InterruptedException ie)
{
  System.out.println ("main Thread interrupted");
}
}
}
```

```
class NewThread implements Runnable
{ Thread t;
   NewThread()
   {
     t = new Thread(this, "NThread");
     t.start();
   }

  public void run()
   {
       try
       {
           for(int n=5;n>0;n--)
           {
             System.out.println("CSE");
             Thread.sleep(2000);
           }
       }
       catch(InterruptedException ie)
       {
           System.out.println("Child Thread Interrupted");
       }

   }
}

class Main
{
    public static void main(String ss[])
    {
        NewThread n1=new NewThread();
        //n1.t.start();


        try
        {
            for(int n=5;n>0;n--)
            {
                System.out.println("BMS College of Engineering");
                Thread.sleep(10000);
```

```
            }
        }
        catch(InterruptedException ie)
        {
            System.out.println("Main Thread interrupted");
        }

    }
```

OUTPUT:

```
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
```

Lab Program 10:

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.

Week-12 1BM19CS216 23/01/2021

Lab 10:

WAP that creates a user interface integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division

```
import java.awt.*;
import java.awt.event.*;

class DivisionInteger extends Frame implements
                        ActionListner{
 TextField num1TextField;
 TextField num2TextField;
 Button calculate;
 int a, b;
 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.addActionListner(this);
```

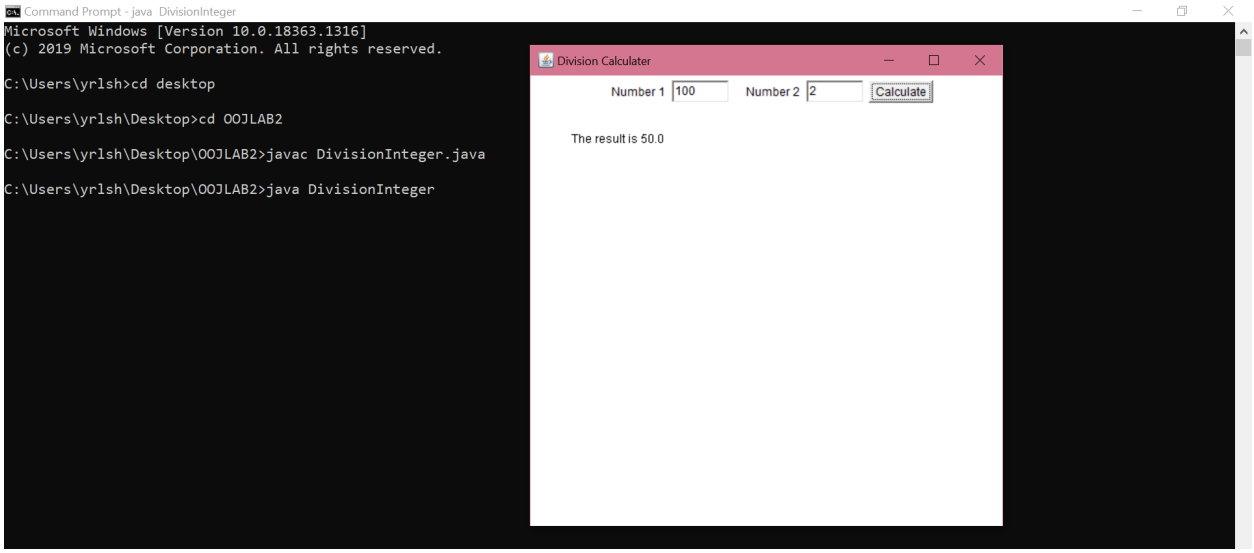
```
num2TextField.addActionListner(this);
calculate.addActionListner(this);

addWindowListner(new myWindowsAdapter());
}
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;
}
```

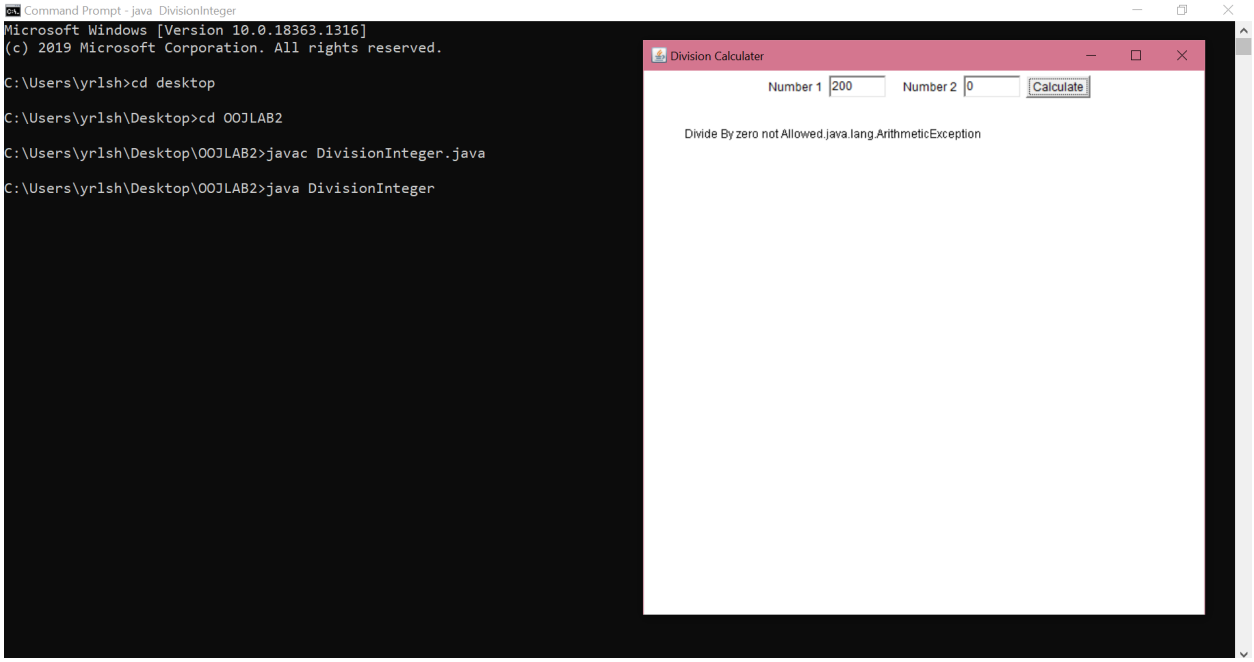
```
public void paint (Graphics g) {
        g.drawString (msg, 50, 100);
}
public static void main (String args[]) {
    DivisionInteger div = new DivisionInteger ();
    div.setSize (new Dimension (500,500));
    div.setTitle ("Division Calculator")
    div.setVisible (true);
}
}
class myWindowAdapter extends WindowAdapter {
  public void windowClosing (WindowEvent
                             event) {
      System.exit(0);
}
}
```

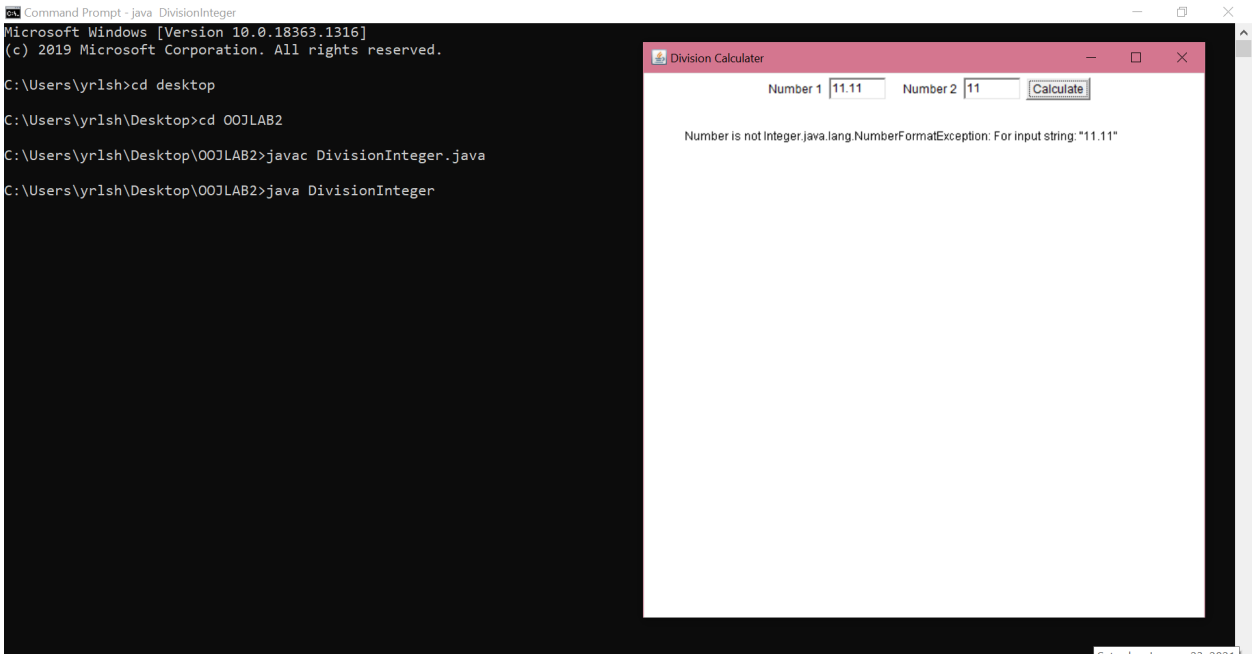
```
import java.awt.*;
import java.awt.event.*;
class DivisionInteger extends Frame implements ActionListener{
    TextField num1TextField;
    TextField num2TextField;
    Button calculate;
    int a,b;
    float result;
    String msg="Enter the numbers";
    public DivisionInteger(){

        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);
    }
}
```

OUTPUT:


Command Prompt - java DivisionInteger
Microsoft Windows [Version 10.0.18363.1316]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\yrlsh>cd desktop
C:\Users\yrlsh\Desktop>cd OOJLAB2
C:\Users\yrlsh\Desktop\OOJLAB2>javac DivisionInteger.java
C:\Users\yrlsh\Desktop\OOJLAB2>java DivisionInteger
Division Calculater
Number 1 100
Number 2 2
Calculate
The result is 50.0


Command Prompt - java DivisionInteger
Microsoft Windows [Version 10.0.18363.1316]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\yrlsh>cd desktop
C:\Users\yrlsh\Desktop>cd OOJLAB2
C:\Users\yrlsh\Desktop\OOJLAB2>javac DivisionInteger.java
C:\Users\yrlsh\Desktop\OOJLAB2>java DivisionInteger
Division Calculater
Number 1 200
Number 2 0
Calculate
Divide By zero not Allowed.java.lang.ArithmeticException



1BM19CS216
Thank you!