# NAME-TASMIYA FATHIMA

## **USN-1BM19CS172**

# 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 discriminate b2-4ac is negative, display a message stating that there are no real solutions.

import java.util.\*;

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NAME: - TASMIYA FATHIMA
Date:
Develop a Java Conqueum that points all oual solutions to the quadratic equation
real solutions to the guarderatic legent all
ax2 + 5x + C = 0. Read in a, b, c and
use the guader to bound 21 th
discriminale b2-lace in was alive disch
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discreminate be-400 us megative display a message staking that there were us
uniport gava. ulil. x;
class of 1
volas Quad
willer at he was a let o F7
public static void made (String [] congs)
unt a, b, c, count;
double A :
Scauner SC = new Scaunce (System in).  System out peculter (" \n Enter the Values of a, b, c"),  a = SC. next Lut ();
System out possitles (" In Enter the Values of a b c")
$\alpha = SC. mext 2ut();$
b = SC. mext 2nt ();
C = Sc. next lut ().
\$ D = (6*6) - (4 * 0 *c).
2 (D = = 0)
that at it is a constant
dyptem. out println ("Roots acce real and equal");
) (aut = 1.
else if (D>0)
1
shysten. ad. println (" Roots are real and unequal" ).
unequal " ).
(ount = 1.)
3

```
ulæ if (D<0)

E

System. out. panith ("Roots are sinceginazy");

if (count ==1)

2

clouble * 1 = ((-b + Math. sqrt (D)) /(2*a));

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

System. out. printles ("Roots are: "+81+" "+82);

3
```

#### **PROGRAM:-**

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

```
System.out.println("Roots are real and
 unequal"); f=1; } else if(D<0)
 System.out.println("Roots are imaginary");
 } if(f==1)
 double
                     r1 = ((-b + Math.sqrt(D))/(2*a));
 double
                      r2 = ((-b-Math.sqrt(D))/(2*a));
 System.out.println("Roots are:"+r1+","+r2);
OUTPUT:-
 icrosoft Windows [Version 10.0.18363.1082]
c) 2019 Microsoft Corporation. All rights reserved.
 :\java>javac Qd.java
 ter the values of a,b,c:
 coots are real and unequal coots are:1.0,-4.0
```

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# Lab Program 2:

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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.

```
NAME : - TASMIYA FATHIMA
1 1 1 1 1 1 1 1 1 1 1 1 Date:
                  LAB-2
   Develop a Java pressoum to verate a class student with unembers usn, mame an array marks. Include meteod to racept and display details and a motiod to racept and display details and a motiod to racept and some sorre of a student.
    import java. util . *;
    iclass Student 13
       String USN;
      stelling mame
       unt coudits ();
       und unacks [];
       int n, tol = 0;
        double SGRA.
        Students()
         3 SAPA = 0;
        void input ()
        Scanner 50 = new scanner ( System . in );
       System out paintles ("Enter the USN and the
                                 mame of the student V.
       USN = Sc. mext Line ().
       name = sc. ment Line ().
      System. out printle Co Enter Mu number of
                               subjects ").
       m = S(. mext Dut().
       wendits = new int [n].
      marks = new int [n].
```

```
COMPASS
M T W T F S S
    for (autico; ien; i+1)
   System out pointly ("Enter the wedits for subject"
                    + (i+1));
   weedils (I) = Sc. next and ()
     tot = tot + ta coudits (i);
   for ( int i=0; 12 m; i+4)
   System out puidle (" Enter the marks of the student for subject: " + (i+i));
marks [i] = sc. next Int();
     Void egrade-points ()
      for ( i=0; i<n; i++)
         ef (marks [i] >= 90 KA marks [i] < 100)
         Dunorks [i] = 10:
     else if (marks [i] >= 80 KK marks [i] < 8 90)
            unasks [:] = 9;
    else if (marks [i] >= 70 & & marks [i] < 80)
           unacks [i] = 8;
    else if (marks [i] >= 60 kk marks [i] < 70)
         marks [i] = 7;
```

```
Date:
M T W T F S S
    else if ( masks [i] > $0 & & masks [i] (60)
masks [i) = 60;
   else & (marks [i] >= 60 & k marks [i] <50)
marks [i] = 4;
    else if (marks [i] < 40)
      marks [i] = 0.
     3
    3
    void calculate_SGPA()
     unt i
     for (i=0; i<n; i++)
        SGRAZ SGRA ATOK.
       SGPA = SGPA + ( widits [i] * marks[i]);
       SORA = SORA/ tot;
     Void display _ details ()
        System out possible (" The student with USN: " + USN + ", Name: " + wante + " Sq 14
          + SGPA)
    public static void main (String [ ] args)
         student 13 obj = new Student ().
```

import java.util.\*;

```
Obj. input ();
Obj. input ();
Obj. (alculate _ Soven ();
Obj. clispby _ alctails ();
3
```

class Student13

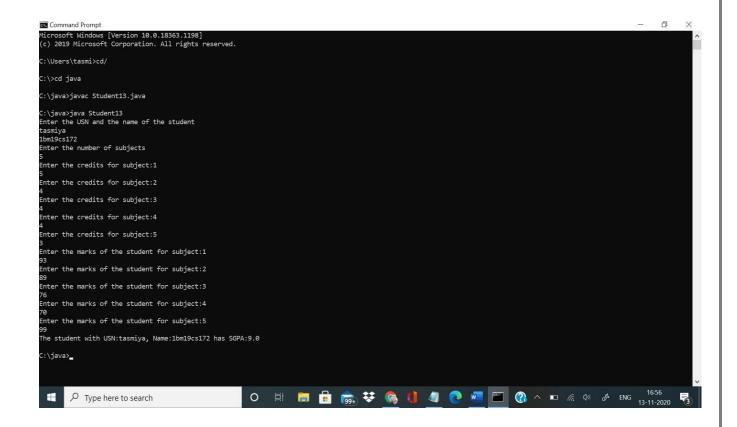
```
{
String USN;
String name;
int credits[];
int marks[]; int
n,tot=0;
double SGPA;
Student13()
SGPA=0;
} void
input()
Scanner sc=new Scanner(System.in);
System.out.println("Enter the USN and the name of the
student"); USN=sc.nextLine(); name=sc.nextLine();
System.out.println("Enter the number of subjects");
n=sc.nextInt(); credits=new int[n]; marks =new
int[n]; for(int i=0;i<n;i++)
System.out.println("Enter the credits for
subject:"+(i+1)); credits[i]=sc.nextInt();
tot=tot+credits[i];
} for(int
i=0;i< n;i++)
```

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

```
else if(marks[i]>=60 && marks[i]<70)
{
  marks[i]=7;
}
else if(marks[i]>=50 && marks[i]<60)
{
  marks[i]=6;
}
else if(marks[i]>=40 && marks[i]<50)
{
  marks[i]=4;
}
else if(marks[i]<40)
{
  marks[i]=0;
}
```

```
void calculate_SGPA()
{ int
i;
for(i=0;i<n;i++)
 SGPA=SGPA+(credits[i]*marks[i]);
 SGPA=SGPA/tot;
} void
display_details()
  System.out.println("The student with USN:"+USN+",
Name:"+name+" has SGPA:"+SGPA);
} public static void main(String[]
args)
{
Student13 obj=new
Student13(); obj.input();
obj.grade_points();
obj.calculate_SGPA();
obj.display_details();
```

#### **OUTPUT:-**



## **LAB PROGRAM -3**

<u>Lab program 3</u>: 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.

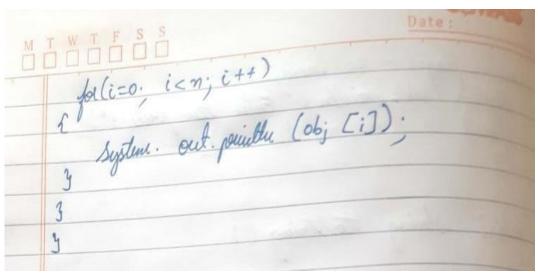
### Write Up:-

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	LAB-3
	0
	Ironate a class Book which contains four
-	members: mame, author, voice mun and
_	members: mame, cauthor, price, mun pages unlude ice donstructor to sel the values
	rget the details of the objects. Include a tostring () inelled that could display it complete details of the book. Develop a Ton program to louste n book objects.
	to String () inethed that (will ideal
	complete details of the book. Decelor of
	program to lount on book object
	The segents.
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	iclass Book
	1
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	pourate string name, author; pourate double pour ; pourate unt neun pages;
	fags,
	Book ()
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	author = " Rejendre ".
	price = 499.00.
	mum-pages = 500.
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	Void get Details ()
	to the second se
	Scanner & = new Scann, / later in).
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	System out pointly (" In Enter the author mame:
	system out pointly (" \n Enter the pour");

```
Date :
System out populle (" Euler the pouce:").

pouce = sc. next Double();
public istoring to storing ()
string demp = "Book name: "+ name + " \n Author

mame: " + author + " \n No. of pages: " + num_ pages+
"In lorice: " + price + "\n".
   oction (temp);
class Book details
    public static void main (string augs [ ])
   Seanner & = new Seanner (System in).
System out pointly ("Enter the number of book :").
   n= sc. next gut ();
   Book [] obj = new Book [n].
   for (i=0; i<n; i++)
          Obj[i] = Mew ob Book();
 System. ord. pointly (" It \t * * * Ente Book Defails * * * ").
   for(i=0; Kn; i++)
           Sylum. out printle ("In Book" + (i+1) +"; ").
```



import java.util.Scanner;

```
class Book
{
     private String name, author;
     private
                double
                          price;
     private int num_pages;
     Book()
           name="The Secret key";
           author="Rajendra";
           price=399.00;
           num_pages=500;
      }
     void getDetails()
           Scanner in=new Scanner(System.in);
           System.out.println("\nEnter the book name: ");
           name=in.nextLine();
           System.out.println("Enter the author name: ");
           author=in.nextLine();
```

```
System.out.println("Enter the no.of pages: ");
          num_pages=in.nextInt(); System.out.println("Enter the
          price: "); price=in.nextDouble();
     }
     public String toString()
          String temp="Book name: "+name+"\nAuthor name:
"+author+"\nNo.of pages: "+num_pages+"\nPrice: "+price+"\n";
          return(temp);
     }
} class
BOOK_details
{
 public static void main(String args[]) {
     int i,n;
     Scanner in=new Scanner(System.in);
     System.out.print("Enter the number of books: ");
     n=in.nextInt();
     Book[] obj=new Book[n]; for(i=0;i<n;i++)
```

```
{
          obj[i]=new Book();
     System.out.println("\t\t***Enter Book Details***");
    for(i=0;i<n;i++)
          System.out.println("\nBook"+(i+1)+";");
          obj[i].getDetails();
     }
     System.out.println("\t\t***Book Details***");
    for(i=0;i<n;i++)
          System.out.println(obj[i]);
     }
OUTPUT:
```

```
O
Administrator: Command Prompt
 :\java>java BOOK_details
inter the number of books: 3
***Enter Book Details***
Enter the book name:
 herlock Homes
inter the author name:
 annon Doyle
inter the the no.of pages:
 look 2;
 Enter the book name:
 k rowling
inter the the no.of pages:
  nter the price:
 inter the book name:
  nter the the no.of pages:
  ter the price:
                   ***Book Details***
  pok name: sherlock Homes
ok name: sherlock Homes
othor name: cannon Doyle
of pages: 780
                                                                                                                                                          0
```

## 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.

NAME: TASMIYA FATHIMA VSN: 6 18M 19CS172 LAB-4 Date: COMPASS Develop a Java perogram to oreate an atostract class manuel shape that contains there integers class manuel is hape the tentame the integers and an empty method mamed pointstreet)

Broviole three classes manuel Rectangle

Teriangle and circuble such that each an a the classes extends the class

Ishape. Each one of the classes contain only other mothod print brea () that points they arms the cares of the agriculary of the containers. sabstract class shape ut a = 3. unt 6= 4; abstract public void print area (); class rectangle extends shape public and variey rect. public void point\_area() area a mact = ax6. system out pointly (" The source of rectangle class briangle extends Shape

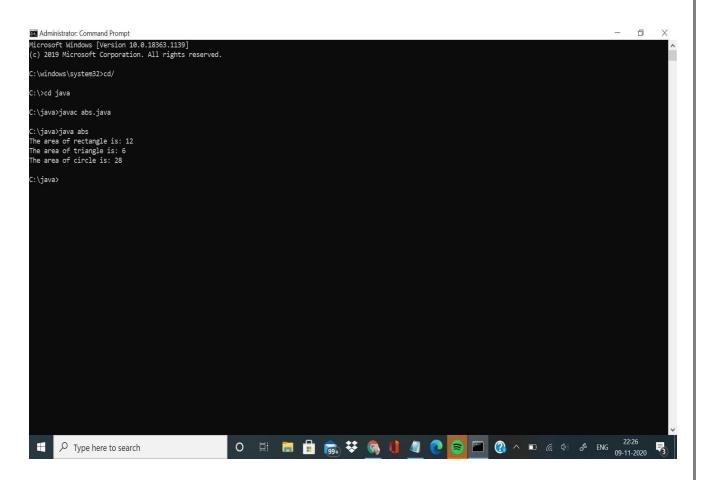
```
But aver _ tore :
 public void petent - area()
     avea - toi = ( tut ) (0.5 * a * b).
System out printle ("The area of triange is: "and tri).
class lincle extends Shape
unt area_ livele.
   public void penut traveal)
System out pointly ("The was of circle " "

+ area - circle):
 class also
a public estatic void amain (slowing 1) array)
   rectangle out = new ocelangle ();
  thiangle their - wew thingsel);
   trie point _ area ().
   circle in = man dircle ();
  (il point - area ();
```

```
abstract class Shape
{ int a=3; int b=4; abstract
public void print_area();
} class rectangle extends
Shape {
public int area_rect;
```

```
public void print_area()
{ area_rect=a*b;
System.out.println("The area of rectangle is: "+area_rect);
} class triangle extends
Shape
int area_tri;
public void print_area()
area_tri=(int) (0.5*a*b);
System.out.println("The area of triangle is: "+area_tri);
} } class circle extends
Shape
int area_circle;
public void print_area()
area_circle=(int) (3.14*a*a);
System.out.println("The area of circle is: "+area_circle);
} } class abs{ public static void
main(String[] args){ rectangle rec =
new rectangle(); rec.print_area();
triangle tri = new triangle();
```

```
tri.print_area(); circle cir = new
circle(); cir.print_area();
}
OUTPUT:-
```



## LAB PROGRAM-5

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Curr-acct and Sav-acct to make them more specific

to their requirements. Include the necessary methods in order to achieve the following tasks:

- a) Accept deposit from customer and update the balance.
- b) Display the balance.
- c) Compute and deposit interest
- d) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.

JASMIYA FAT HIMA 1 1 VSM: - 18M19CS172 LAB-5: Develop a Java pragram to wate a class Bout that maildains the kinds of account you its unstorners, one called savings account and the offer unsent randent. The savings amount perovides compound interest and withdrawal faceleties but no chaque book book facility but no interest burnet account holders should also main town so minimum Valance and if the balance fells below this level, a knowice charge is imposed. dereate is class Account that stoles customer mame, account number and type of account Forom this derive the classes when - acc and Sax - acc to make them more specific to dis their originients. Enclude the necessary methods in order the acherise the following clasks:

a) Accept deposit from customer and update the balance

b) Display blu balance c) Permit withdraws and update the balance bleck for the minimum balance suppose perally if mussary and update the balance import gava. util. Scanner; clas account poirate string mame; poirate song account muniter;

Date: double chalance; Void get\_data () Seauvor St = new Seauvor ( System, in). System out printhe (" Enter your mame "). maml = sc. next(); System . Oct. printle (" Enter the account number vaccant - number = SE. mext Long (); System · out printly (" bloose the account type" System. Out petulle ("1. Savings secount"); System out printle (" 2. Irunal account "). account - type = sc next Int (); but outure august type () 3 oretween account type. class savings extends vaccount Scauner 90 = men Scauner (Septem. in) double amount: void get sav\_ balana () placed in your Savings recount "); balance + = amount.

void display - sav - blna () System out printer ("balance = "+ balance); void compute - sax interest () sixtem out pointly (" Interest of 5% shall be added to your balance"); balance = balance + (.05 \* balance); Void withdrawl\_ sav () System out printly (" Enter the amount to be with drawn "); amount = sc. mext Double (); palance = balana - amount; class wurent extends account Scaunce se = new Scaunce (Sylun in); double amount final double min balance = 5000; Void get un balance () System out pointly (" Inter the amount to In placed in your account"); amount = Sc. Mex & Double (). balance + = amount

M T W T F S S void display -un- balance () System. out pointer l'aslance = " + balance); Void compute\_cur\_ service-charges () if (Isolance < min \_ balonce) System out pourithe (" sorrie dax of Rs. 500 shall be so levied"). balance - Soo . System out pointly l'universem balones 20
maintained "); olse Void liteth drawl\_ (cer () System out printer ( " Enter the comount to doe with down "); amount = sc . mext Double (). balance - balance - amount; class bankmain public state void unain (string args []) system out perioller (" Enter the bank delail

```
Date:
M T W T F S S
   account acc = new account ();
     acc. got_data ();
    But type = acc. section - account type 0;
   if ( dype = = 1)
   System out peculter ( Sorings Acount").
            sav = new savings();
    Sav. get_ sav_ balance ().
    San. display - say - blace ();
   Sav. compute_sav_ unterest ();
    Sar. display - sar - Unce ();
     Say. withdrawal _ sar().
    son. display_sar_ blace ().
   2 ( type = = 2)
    System. out. periulle (" CURRENT ACCOUNT");
    westert are = new current ();
      un . get: aux - balance ();
     un. display - cur bln(e().
      cus. Compute _ cur - service - charges ();
      Cur. display _ cur - blna ().
      lus. withdraw al - auc ()
     cur display - cur - blace().
    3
```

import java.util.Scanner;

```
class account
```

```
private String name; private
long account_number; private
     account_type;
                      double
int
balance;
void get_data()
Scanner ss=new Scanner(System.in);
System.out.println("enter your name");
name=ss.next();
System.out.println("enter the account_number");
account_number=ss.nextLong();
System.out.println("choose the account type ");
System.out.println("1.savings account");
System.out.println("2.current account");
account_type=ss.nextInt();
int return_account_type()
{ return
account_type;
```

```
class savings extends account
     Scanner ss=new Scanner(System.in); double
     amount;
     void get_sav_balance()
      System.out.println("enter the amount to be placed in your
savings account"); amount=ss.nextDouble(); balance+=amount;
     void display_sav_blnce()
      System.out.println("balance="+balance);
     void compute_sav_interest()
      System.out.println("interest of 5% shall be added to your
balance"); balance=balance+(.05*balance);
     void withdrawl_sav()
```

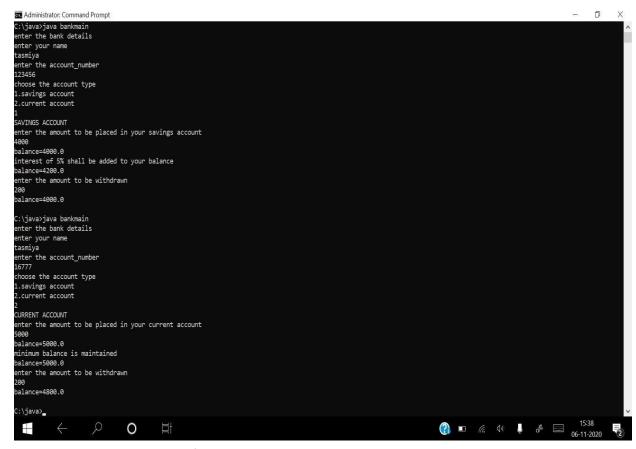
```
System.out.println("enter the amount to be withdrawn");
      amount=ss.nextDouble();
      balance=balance-amount;
}
class current extends account
     Scanner ss=new Scanner(System.in); double
     amount;
     final double min_balance=5000;
     void get_cur_balance()
      System.out.println("enter the amount to be placed in your
current account"); amount=ss.nextDouble(); balance+=amount;
     void display_cur_blnce()
      System.out.println("balance="+balance);
```

```
void compute_cur_service_charges()
      { if(balance<min_balance)
           System.out.println("service tax of rs.500 shall be levied");
           balance=balance-500;
      else
           {
           System.out.println("minimum balance is maintained");
           }
      }
     void withdrawl_cur()
      System.out.println("enter the amount to be
      withdrawn"); amount=ss.nextDouble();
      balance=balance-amount;
class bankmain
```

```
{ public static void main(String
args[])
     System.out.println("enter the bank
     details"); account acc=new account();
     acc.get_data(); int
     type=acc.return_account_type(); if
     (type==1)
     System.out.println("SAVINGS
     ACCOUNT"); savings sav=new savings();
     sav.get_sav_balance();
     sav.display_sav_blnce();
     sav.compute_sav_interest();
     sav.display_sav_blnce();
     sav.withdrawl_sav();
     sav.display_sav_blnce();
     } if(type==2)
     System.out.println("CURRENT
     ACCOUNT"); current cur=new current();
     cur.get_cur_balance();
     cur.display_cur_blnce();
     cur.compute_cur_service_charges();
     cur.display_cur_blnce(); cur.withdrawl_cur();
     cur.display_cur_blnce();
```

```
}
}
```

#### **OUTPUT:-**

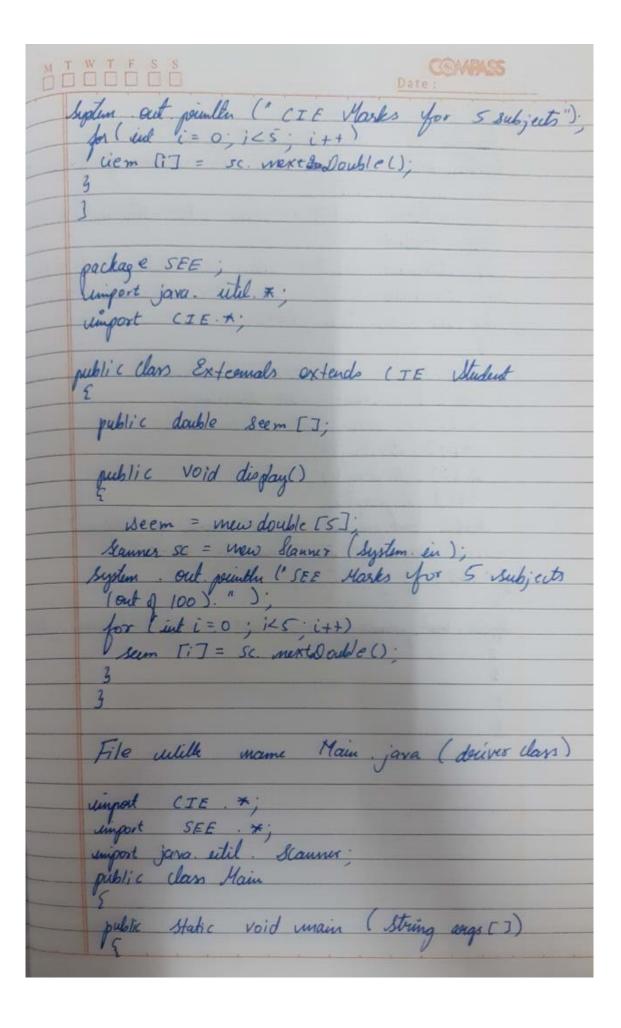


Lab Program: 6

/\*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. Below is

two programs of class Student and class Internals. Both belong to a package named CIE. Class Internals extends from class Student. */

```
LAB-6
                                        Date:
lereals a package CIE which has 2 classes - Shelet & Buterials . The
class student has member like usn, nanu, som. The class Internal in
an away that stow the internal marks knowed in 5 county
I the wecent semester of the student break another parker
SEE which was the class external which is a drived damping
       package CIE;
        umport java. echl. Scannes;
         public class student
          public string mame;
         public string vsn;
public int sem;
public void display ()
         Scamer sc = new Scanner ( System in );
         Septem ail printle ("Name :").
         mame = sc. next();
         System. out printle (" USN:");
         VSN = Sc. ment ();
         esystem out printle (" Semeste ");
         Sem = Sc. mextlut().
         package CIE;
         ungest java . ielil . Slaunos;
        public class Internals extade student
         public double cient];
         queblic void display ()
          ciem = new double [5].
          scaures SC = new Scauner (System un)
```



```
2000
Scanner sc = new Scanner (System un);
System out pointly ("Enter the number of Studies;
n = sc next 2nt();
CJE Student st [] = new (IE. Student [n]
CIE. Student
 CIE. Internals in [] = Men CIE Internals [n]
 SEE. Externals el] = New SEE. Externals [n]
  for (int i=0; i=n; i++)
    St [i] = men (IE. Student ();
    in [i] = new CIE. Internals ();
    e[i] = Mlw SEE. Externals ();
    St[i] display();
   in [i] . dis play ();
System. out. peniller (" Total marks of student"
+5(i7. mame + " in 5 ent; ects one : ")
for (int j =0 - j <5; j ++)
System. out pountly (in [i]. cientj] + (c[i]. seem [j]:
```

## File with name Student.java

package CIE; import java.util.Scanner; public class Student

```
{ public String
name; public String
usn; public int sem;
public void display()
Scanner s=new Scanner(System.in);
System.out.println("Name:");
name=s.next();
System.out.println("USN:"); usn=s.next();
System.out.println("Semester:");
sem=s.nextInt(); }
File with name Internals.java
package CIE;
import java.util.Scanner;
public class Internals extends Student
{ public double
ciem[]; public void
display()
ciem=new double[5];
Scanner t=new Scanner(System.in);
System.out.println("CIE Marks for 5 subjects(out of 50):");
for(int i=0;i<5;i++) ciem[i]=t.nextDouble();</pre>
```

```
}
```

## File with name Externals.java

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

public class Externals extends CIE.Student
{ public double
  seem[]; public void
  display()
  {
    seem=new double[5];
    Scanner s=new Scanner(System.in);
    System.out.println("SEE Marks for 5 subjects(out of 100):"); for(int i=0;i<5;i++) seem[i]=s.nextDouble();
  }
}</pre>
```

## File with name Main.java

```
import CIE.*; import
SEE.*; import
java.util.Scanner; public
class Main
```

```
{ public static void main(String
args[])
{ int
n;
Scanner s=new Scanner(System.in);
System.out.println("Enter the number of students:"); n=s.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(); in[i]=new
CIE.Internals(); e[i]=new
SEE.Externals();
st[i].display();
in[i].display();
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].ciem[j]+(e[i].seem[j]/2));
```

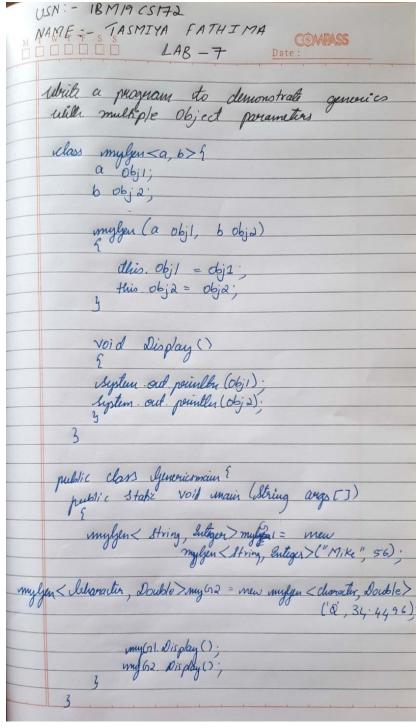
#### **OUTPUT:-**

**M.** Administrator: Command Prompt

```
C:\java>cd lab6
C:\java\lab6>java Main
Enter the number of students:
Name:
tasmiya
USN:
1BM19CS172
Semester:
CIE Marks for 5 subjects(out of 50):
50
40
30
SEE Marks for 5 subjects(out of 100):
80
70
60
Total marks of studenttasmiya in 5 subjects are:
85.0
90.0
75.0
60.0
95.0
C:\java\lab6>_
                                                              i w
        {\cal P} Type here to search
```

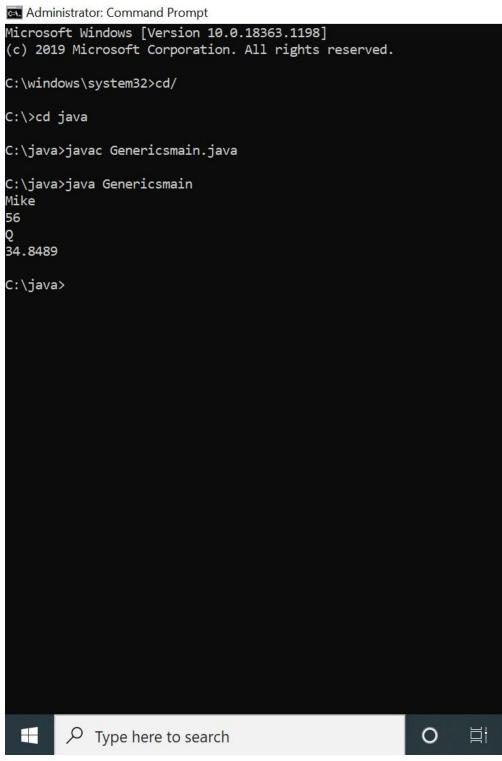
Write a program to demonstrate generics with multiple object parameters.

#### WRITE UP :-



class myGen<a,b>{ a
 obj1;

```
b obj2;
 myGen(a obj1, b obj2){
   this.obj1 = obj1; this.obj2
   = obj2;
 } void
 Display(){
   System.out.println(obj1);
   System.out.println(obj2);
public class Genericsmain{
  public static void main(String args[]){
    myGen<String,Integer>myG1 = new
myGen<String,Integer>("Mike",56);
    myGen<Character,Double>myG2 = new
myGen<Character,Double>('Q',34.8489);
    myG1.Display(); myG2.Display();
OUTPUT:-
```



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.

# WRITE UP:-

LAB-8  WAP that demonstrates bounding of exceptions in where takes to be derived class called its in which where there is not derived class called its in who extends the bax class. On Fakus class is age and thrown The exception which takes is age and thrown The exception when the simplement a construction that classes book fakur and son's age and thrown son exception if son's age and thrown son exception if son's age is - faller's age.  Timport Javo will scannes; that classes book fakur through fige extends Exception  public retrong fige (altrings)  super (s);  The third is through through through through the condition of the c	MAME: TASMIYA FATHIMA		
WAP that demonstrates boundling of exceptions in where takes town believed class called "Son" who extends the base class called "Son" who extends the base class on Fakus class implement to constructor which takes the age and throws the exception when the singul age 20. In son class implement a constructors that cases book father and son's age and althorous can be exception if son's age is >= faller's age timport gava wild. Scaunes; class through ge extends Exception  I super (s);  I super (s);  I super (s);  I super (s);  I faller ( wit fage; act sage) throws whrong fage of faller ( with fage; act sage).	WS	Now I LBM19 CS172	
WAP that demonstrates handling of exceptions in where itans town allow inheritance town. Is seen a base who allow "Father" and derieved class called "Son" who extends the base the Father says implement to constructor which takes the age and throws the exception that was book father and constructors that wasts book father and con's age and eleverous and exception if son's age and eleverous and exception of son's age to >= father sage through gave with Exception and through ge extends Exception  I super (s);  Super (s);  Father (aut flage, that shop) throws whoong fige  I flage <0)			
extends the base class. In Father class while extends the base class. In Father class while age and throws the exception whom how when the right age 20. In Son class while the right age 20. In Son class while father and son's age and allowows can exception if son's age is >= father's age.  Import gavo wild scaums; class whom the sexception is super (s);  Jublic relongting extends Exception  The super (s);  The		LAB- 8	
extends the base class. In Father class while extends the base class. In Father class while age and throws the exception whom how when the right age 20. In Son class while the right age 20. In Son class while father and son's age and allowows can exception if son's age is >= father's age.  Import gavo wild scaums; class whom the sexception is super (s);  Jublic relongting extends Exception  The super (s);  The		1112 1111 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
extends the base class. In Father class while extends the base class. In Father class while age and throws the exception whom how when the right age 20. In Son class while the right age 20. In Son class while father and son's age and allowows can exception if son's age is >= father's age.  Import gavo wild scaums; class whom the sexception is super (s);  Jublic relongting extends Exception  The super (s);  The		WAP ctrat demonstrates handling by exceptions in	
extends the base class. In Father class while extends the base class. In Father class while age and throws the exception whom how when the right age 20. In Son class while the right age 20. In Son class while father and son's age and allowows can exception if son's age is >= father's age.  Import gavo wild scaums; class whom the sexception is super (s);  Jublic relongting extends Exception  The super (s);  The		interitance tous. Wellate a base class called	
implement (a Constructor which takes the age and throws The exception through age (0. In Son Class when the singlement a Constructors that classes both father and son's age and Morons can exception if son's age is >= father's age.  Simport Java with Scauns;  Class Wrong tige extends Exception  public Utrong tige ( Strings)  super (s);  super (s);  that Jakes tige;  at sample;  Father ( with flage , all stage) throws whrong tige  if ( flage <0)  I flage <0)		Father did derieved suit sail son"	
age and throws The exception Ulama Age () when the singut age < 0. In Som Class insplement a constructor that cases both father and son's age and obvious van exception if son's age is >= father is age import gava. wild. Scanner; class Ulronglige extends Exception  public Ulronglige (strings)  super (s);  that dather the ; at smalle;  Father ( out fage , at stage ) throws whronglige  I ( fage < 0)		Trentes are sur	
import gava . will . Scaunce;  class Ulrong Age extends Exception  public Ulrong Age ( Whring c)  Super (s);  super (s);  ulan Father  int Jaker Age;  int Jaker Age;  father ( wit fAge, int sAge) throughge  If ( JAge < 0)  Super (s) throughge		made and themas The exception Warms & co	
import gava . will . Scaunce;  class Ulrong Age extends Exception  public Ulrong Age ( Whring c)  Super (s);  super (s);  ulan Father  int Jaker Age;  int Jaker Age;  father ( wit fAge, int sAge) throughge  If ( JAge < 0)  Super (s) throughge		when the input need on In In	
import gava . will . Scaunce;  class Ulrong Age extends Exception  public Ulrong Age ( Whring c)  Super (s);  super (s);  ulan Father  int Jaker Age;  int Jaker Age;  father ( wit fAge, int sAge) throughge  If ( JAge < 0)  Super (s) throughge		implement a constructors that lases books	
import gava . will . Scaunce;  class Ulrong Age extends Exception  public Ulrong Age ( Whring c)  Super (s);  super (s);  ulan Father  int Jaker Age;  int Jaker Age;  father ( wit fAge, int sAge) throughge  If ( JAge < 0)  Super (s) throughge		father and son's age and Morons van	
import gava . will . Scaunce;  class Ulrong Age extends Exception  public Ulrong Age ( Whring c)  Super (s);  super (s);  ulan Father  int Jaker Age;  int Jaker Age;  father ( wit fAge, int sAge) throughge  If ( JAge < 0)  Super (s) throughge		l'exception if son's age is >= father 's age	
Jublic Idnorg Age (Strings)  Super (s);  Super (s);  What Father  The state of the string of the str			
Jublic Idnorg Age (Strings)  Super (s);  Super (s);  What Father  The state of the string of the str		import gava util scauses;	
Jublic Idnorg Age (Strings)  Super (s);  Super (s);  What Father  The state of the string of the str		Class Ulrongtige extends Exception	
Super (s);  3  Vlan Fakler  1  Vlut Sakler Age;  Ant Sage)  Faller (ant fage, act sage) throughge  3  4 ( Jaye < 0)		L .	
Whan Father  T  what faller Age;  Aut Santys;  Father ( wit fage, at sage) throws whrong Age  If ( Jage < 0)			
Whan Father  T  what faller Age;  Aut Santys;  Father ( wit fage, at sage) throws whrong Age  If ( Jage < 0)		Super (s);	
Whan Father  T  what faller Age;  Aut Santys;  Father ( wit fage, at sage) throws whrong Age  If ( Jage < 0)		3	
int faller Age;  int sommy ;  Faller ( and fAge, and sAge) through tetrong Age  If ( fAge < 0)			
int faller Age;  int sommy ;  Faller ( and fAge, and sAge) through tetrong Age  If ( fAge < 0)		at Fu	
int faller Age;  int sommy ;  Faller ( and fAge, and sAge) through tetrong Age  If ( fAge < 0)		Man father	
Fallur ( unt fAge, at sAge) throws whrong Age			
Fallur ( unt fAge, at sAge) throws whrong Age		at sonthy:	
5 0 0			
5 0 0		Father ( ant fage, at stage) thrown whom her	
5 0 0		2/5/11	
throw new "ulrongAge ("Fafter's age is less than Jero");		5 0 0	
Man Jero").		throw men, 4home And " " " "	
3		Man Jero"):	
		3	

```
COMPASS
4000000
  celse
     father Age = fAge F;
  class was extends Father
   unt sonAge;
   Son ( int / Age, int sAge) thous libroug Age
        super (fAge);
       sonAge = sAge;
   if (sAge > = fAge)
   thoros new WrongAge (" Son's age is equal to or quoter Man fallers's age");
   quater Man
    void Display ()
   Sigtem out pouille ("Father's age: " + father Age).
   3
   public class exp
   public static void main (String ags [7)
    unt flage, slage;
    Scanner sc = new Scanner ( System in ):
   isystem out pourth (" Enter father's age: ");
```

```
fly e = St. next Int();

system. out. pountln (" Entoo Son's age");

shy e = St. next Int();

they

Son son = new Son (fly, shye);

Son. display ();

3

catch (ntrong hye err)

further out. pacielln ("Exception" + err);

3

3
```

```
import java.util.Scanner; class
WrongAge extends Exception {
  public WrongAge(String s){ super(s);
  }
class Father { int
  fatherAge;
  Father(int fAge) throws WrongAge{ if(fAge
     <=0){
       throw new WrongAge("Father's age is less than 0");
     } else{
       this.fatherAge = fAge;
     }
class Son extends Father {
 int sonAge;
  Son(int fAge, int sAge) throws
     WrongAge{ super(fAge); sonAge=sAge;
    if(sAge >= fAge){
```

```
throw new WrongAge("Sons's age is equal to or greater than
father's age");
     }
  void Display(){
     System.out.println("Father's age: "+fatherAge);
     System.out.println("Son's age: "+sonAge); }
}
class lab8 {
  public static void main(String[] args){
     int fAge,sAge;
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter father's age: ");
     fAge = sc.nextInt();
     System.out.println("Enter sons's age:
     "); sAge = sc.nextInt(); try{
       Son son = new Son(fAge, sAge);
       son.Display();
     }catch(WrongAge err){
       System.out.println("Exception " + err); }
OUTPUT:-
```

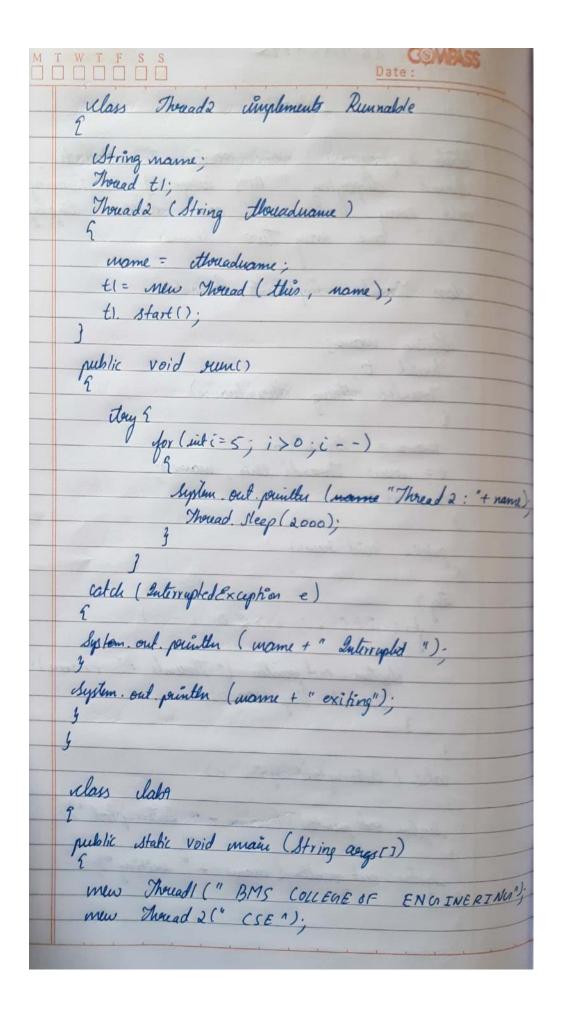
```
Command Prompt
Microsoft Windows [Version 10.0.18363.1198]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\tasmi>cd c:\
c:\>cd java
c:\java>javac lab8.java
c:\java>java lab8
Enter father's age:
Enter sons's age:
Father's age: 10
Son's age: 8
c:\java>java lab8
Enter father's age:
Enter sons's age:
Exception WrongAge: Father's age is less than 0
c:\java>java lab8
Enter father's age:
Enter sons's age:
Exception WrongAge: Sons's age is equal to or greater than father's age
c:\java>
        Type here to search
                                                        0
                                                              ∐i
```

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.

#### **WRITE UP:-**

```
NAM:- TASMIYA FATH IMA
WSN'S SIBMICS 172
                                    Date:
                 Lab-9
Moved displaying " BMS College of Engineer
Moread displaying "Bris lollege of Engineering" once every ten seconds and always displaying "CSE" once every two seconds.
class Thouad! implements Rumable
  Steering manne;
   Thouad t;
   Thouads ( storing Mreaduance)
    mame = thouadrame;
  t = new Thouad (this mane).
   t. start();
 qublic void sum()
  try 9
      for ( int i=5; i>40; i--)
       system. out possibles (" Thouad! : " + name).
          Thread. Heep (10000);
      3
  cald ( Suterrupted Exception e)
  Septem out pointly (name + " Zuterrupted").
   System out pointly ( mame + " exiting ").
```



```
touy?

Suptem out pointly (" Main Mouad is weak");

Suptem out pointly (" Main Mouad Interrupted);

System out pointly (" Main Mouad Interrupted);

System out pointly (" Main Mouad exiting");

3
```

class Thread1 implements Runnable {

```
String name;
Thread t;
Thread1(String threadname)
{
    name=threadname; t=new
    Thread(this,name);
    t.start();
}
public void run()
{
```

```
try{
   for(int i=5;i>0;i--)
     System.out.println("Thread1"+name);
     Thread.sleep(10000);
  catch(InterruptedException e)
  {
   System.out.println(name+"Interrupted");
  }
  System.out.println(name+"exiting");
class Thread2 implements Runnable
{
 String name;
 Thread t1;
 Thread2(String threadname)
 {
```

```
name=threadname; t1=new
  Thread(this,name);
  t1.start();
 }
 public void run()
  try{ for(int
   i=5;i>0;i--)
    {
     System.out.println("Thread2"+name);
     Thread.sleep(2000);
  catch(InterruptedException e)
   {
   System.out.println(name+"Interrupted"); }
  System.out.println(name+"exiting");
class lab9{
```

```
public static void main(String args[])
{
    new Thread1("BMS COLLEGE OF ENGINEERING");
    new Thread2("CSE"); try{
        Thread.sleep(100000);
        System.out.println("Main thread is awake");
    } catch(InterruptedException
    e)
    {
        System.out.println("Main thread Interrupted");
    }
        System.out.println("Main thread exiting");
}
```

#### **OUTPUT:-**

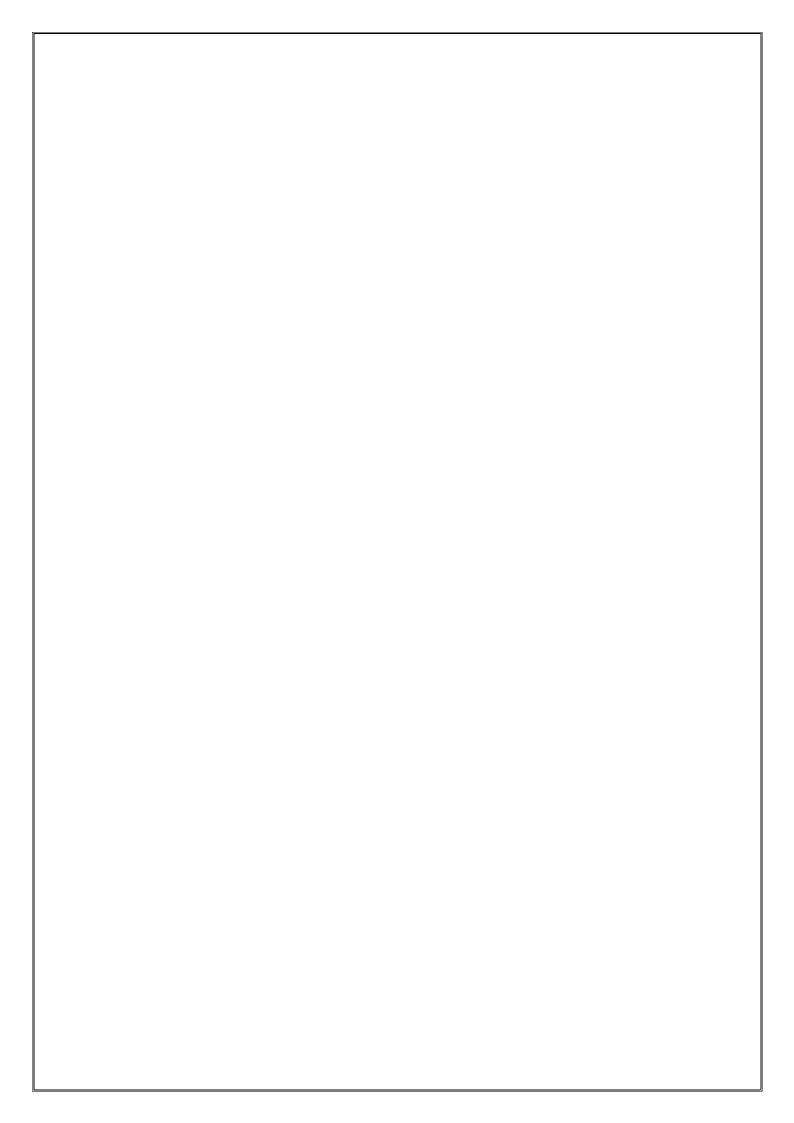
```
Command Prompt
Microsoft Windows [Version 10.0.18363.1198]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\tasmi>cd c:\
c:\>cd java
c:\java>javac lab9.java
c:\java>java lab9
Thread1BMS COLLEGE OF ENGINEERING
Thread2CSE
Thread2CSE
Thread2CSE
Thread2CSE
Thread2CSE
Thread1BMS COLLEGE OF ENGINEERING
CSEexiting
Thread1BMS COLLEGE OF ENGINEERING
Thread1BMS COLLEGE OF ENGINEERING
Thread1BMS COLLEGE OF ENGINEERING
BMS COLLEGE OF ENGINEERINGexiting
Main thread is awake
Main thread exiting
c:\java>
                                                                  ∐†
        Type here to search
```

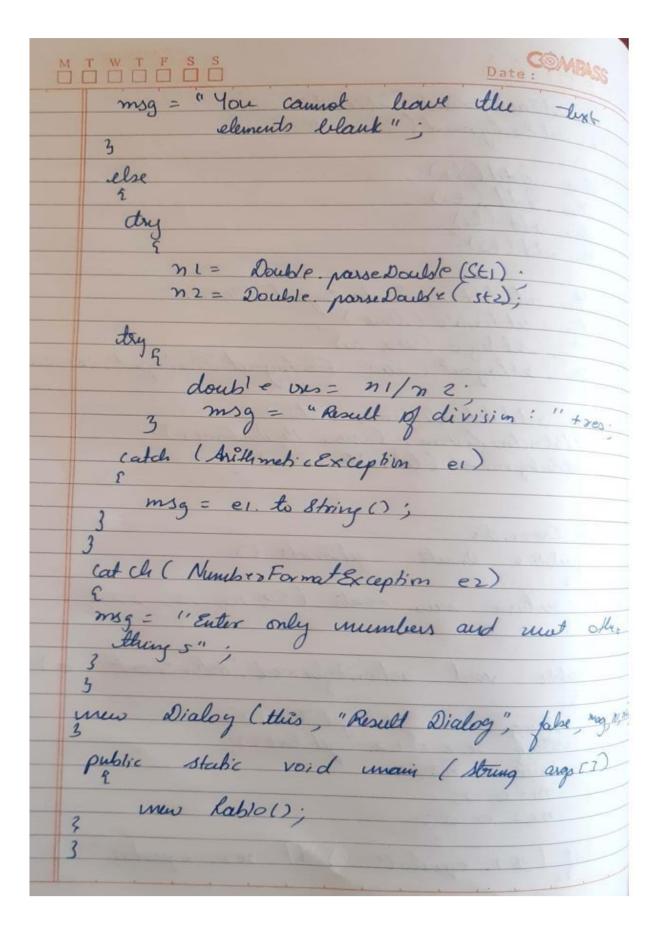
Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException.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

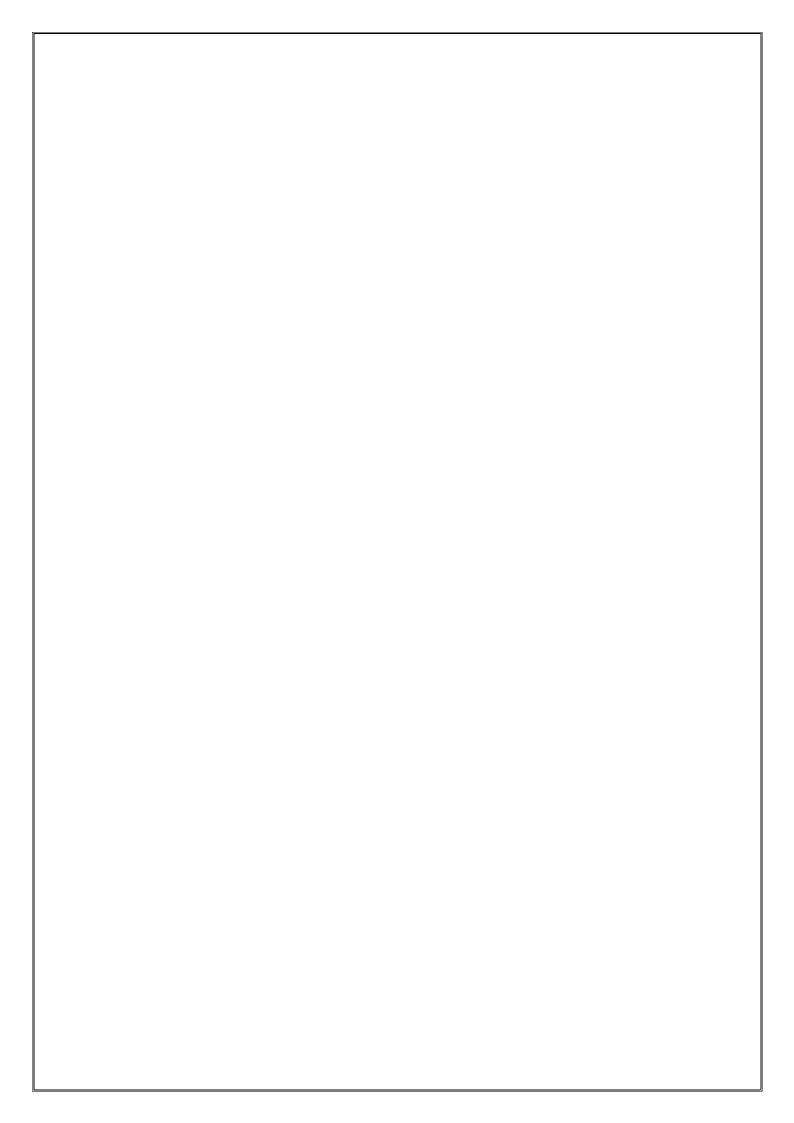
#### WRITE UP:-

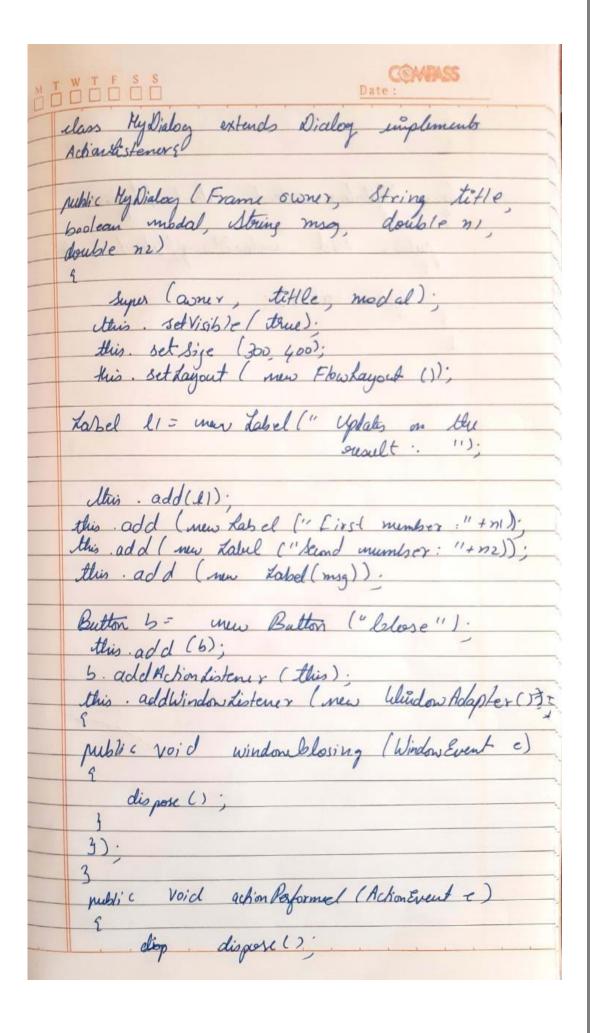
	VAME :- TASMIYA FATHIMA
M I	Date:
	LAB-10
	Enters two amenders the the text
	unterface to perform untiger divisions. The
	enters two amuniciss are the text
	fields Num 1 and Neum 2. The division of Num 1 and Neum 2 is displayed in
	Result Field when the Divide but
	is clicked. Of Num 1 or Num 2 with
	Result Field when the Divide but is clicked. Of Num 1 or Num 2 with when the program is
	theron a NumberFormatexception of Number when Zero the perogram whould the on Arithmet & Exception Display the exception in a message dialog box.
	where Zero the perogram whould the
	in wintener concept on wispray were except
	on a musicy con.
	import gava. aut. *;
	import gava aut. *;
	rublic class Lablo extends Frame implement
	public class Lablo extends Frame implime
	Textfield £1, £2;
1	Text Field £ 1, £2; String unag = " "; Button btn;
	which on
	Xab 10 ()
	6
	Label 11 = new Label (" First Number: " to
	ti = new text Field (10). Tabel 12 = new Kabel (" Second Number : ", Label RIGHT);
-	t 2 = new Text Field (10);
	Hn = new Button (" Sum bi" (").

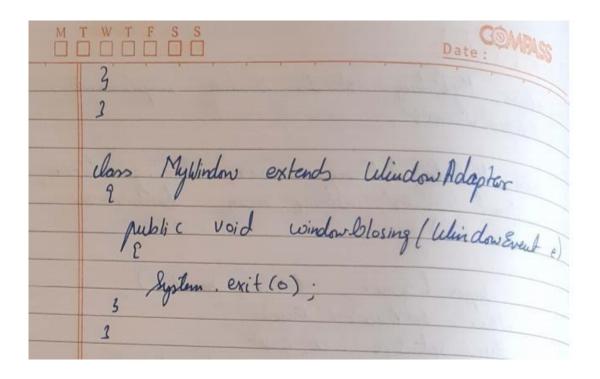
MI	W T F S S Date:
1	OI sellackaround ((dor. YELLOW),
_	1) est Recharged ( War: YELLOW).
-	1). sel Background ((dor. YELLOW);
	this add(l1).
	Mi add (ti).
_	this add (ti).
_	W: dd(+2).
_	this add (+2);
_	11. 11(11. D. 1 V. 1 (5.558).
	this add (Hr Border Layout (ENTER);
	this set isible (thue)
	this set Size (600, 20);
	this set layout (new Flowlayout (Flowlayout, (ENTER, 20
	this set Size (600, 20); this set layout (new Florkayout (Florekayout (ENTER 20).
	btn. add Action Listener (this)
	addwindow Listem & ( Men Hywindow ();
	set Rick round ( lator YELL ).
	setBackground (Color. YELLOW)
	January Market M
	0.0
	(a cresyide
	@ Overide  public Rusets gelânsets ()
	neturn men Insets (50, 10, 10, 20);
	3
	public void action Performed (Action Event e)
200	string St 1 = t1. get Text (); string St 2 = t2. get text ();
	estruly st 2 = t2 gettext ().
	double ni, n2;
71	m1=0.0;
	n2 = 0.0;
	if (St). equals ("") // 3+2. equals ("")
-	











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

public class Lab10 extends Frame implements ActionListener{
    TextField t1,t2;
    String msg="";
    Button btn;
    Lab10(){
        Label 11 = new Label("First Number: ",Label.RIGHT);
        t1 = new TextField(10);

        Label 12 = new Label("Second Number:

",Label.RIGHT);
    t2 = new TextField(10);

    btn = new

Button("Submit");
    //Label 1 = new Label("Updates:");

11.setBackground(Color.YELLOW);
```

```
12.setBackground(Color.YELLOW);
//this.setResizable(false);
this.add(l1);
                        this.add(t1);
      this.add(12);
this.add(t2);
//the following command will make sure that the input char is not visible to the user
      //(it has been added just to demonstrate). Can be used for passwords.
            //t1.setEchoChar('*');
//t2.setEchoChar('#');
this.add(btn,BorderLayout.CENTER);
this.setVisible(true);
            this.setSize(600, 300);
                                           this.setLayout(new
FlowLayout(FlowLayout.CENTER,20,10));
            //t1.addActionListener(this);
btn.addActionListener(this);
                                    addWindowListener(new
                        setBackground(Color.YELLOW);
MyWindow());
            //System.out.println(BorderLayout.CENTER);
```

```
}
         @Override
          public Insets getInsets() {
            return new Insets(50,10,10,20);
         }
            @Override
      public void actionPerformed(ActionEvent e) {
            String st1 = t1.getText();
            String st2 =
t2.getText();
                         double
n1,n2;
                   n1 = 0.0;
n2 = 0.0;
            if(st1.equals("")||st2.equals("")) \ \{\\
                   msg="You cannot leave the text elements blank";
             }else{
                   try {
                         n1 = Double.parseDouble(st1);
                   n2 = Double.parseDouble(st2);
                         try {
                                double res = n1/n2;
                                msg = "Result of division: "+res;
                          }catch(ArithmeticException e1) {
                   msg = e1.toString();
                          }
```

```
}catch(NumberFormatException e2) {
      msg = "Enter only numbers and not other things";
            new MyDialog(this, "Result Dialog", false, msg, n1, n2);
public static void main(String[] args) {
            new Lab10();
      }
}
class MyDialog extends Dialog implements ActionListener{
public MyDialog(Frame owner, String title, boolean modal, String msg, double n1, double
n2) {
            super(owner, title, modal);
this.setVisible(true);
                               this.setSize(300,
400);
                   this.setLayout(new
FlowLayout()); //System.out.println(owner);
            Label 11 = new Label("
                                         Updates on the result:
                                                                     ");
            //11.setSize(300, 20);
this.add(11);
            this.add(new Label("First Number: "+n1));
this.add(new Label("Second Number: "+n2));
this.add(new Label(msg));
            Button b = new Button("Close");
this.add(b);
```

```
b.addActionListener(this);
this.addWindowListener(new WindowAdapter() {
public void windowClosing(WindowEvent e) {
                       dispose();
                  }
      });
      }
      @Override
      public void actionPerformed(ActionEvent e) {
            dispose();
      }
}
class MyWindow extends WindowAdapter{
public void windowClosing(WindowEvent e) {
System.exit(0);
      }
}
```

# **OUTPUT**

