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Section: 3B

OOJ LAB OBSERVATION

LAB PROGRAM 1:

Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$.

Read in a , b , c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

Q Develop a Java program that prints all the real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a , b , c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are not real solutions.

```
import java.util.Scanner;
```

```
class quadratic {
```

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

```
        double root1 = 0, root2 = 0;
```

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

```
        System.out.print ("Enter the value of a in  
                        ax^2 + bx + c = 0 : ");
```

```
        double a = ss.nextDouble();
```

```
        System.out.print ("Enter the value of b in  
                        ax^2 + bx + c = 0 : ");
```

```
        double b = ss.nextDouble();
```

```
        System.out.print ("Enter the value of c in ax^2 + bx +  
                        c = 0 : ");
```

```
        double c = ss.nextDouble();
```

```
        double denominator = 2 * a;
```

```
        double D = (b * b) - 4 * a * c;
```

```
        if (D > 0)
```

```
            System.out.println ("The solutions are real and  
                            distinct.");
```

```
            root1 = ((-b + Math.sqrt(D)) / denominator);
```

```
            root2 = ((-b - Math.sqrt(D)) / denominator);
```

```
            System.out.println ("Roots are " + root1 + " " + root2);
```

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else if ($D = 0$)
{

System.out.println ("The solutions are real and equal");
 $\text{root}_1 = \text{root}_2 = -b / \text{denominator};$

System.out.println ("Roots are " + root₁ + " and " + root₂);
}

else {

System.out.println ("Equation has no real solutions");
}

5

OUTPUT

Enter the coefficient of a of $ax^2 + bx + c = 0 : 15$

Enter the coefficient of b of $ax^2 + bx + c = 0 : 68$

Enter the coefficient of c of $ax^2 + bx + c = 0 : 3$

The solutions are real and distinct

Roots are -0.044555558333472335 -4.48877777499
9861

Enter the coefficient of a of $ax^2 + bx + c = 0 : 1$

Enter the coefficient of b of $ax^2 + bx + c = 0 : -3$

Enter the coefficient of c of $ax^2 + bx + c = 0 : 4$

Equation has no real solutions

Enter the coefficient of a of $ax^2 + bx + c = 0 : 4$

Enter the coefficient of b of $ax^2 + bx + c = 0 : 4$

Enter the coefficient of c of $ax^2 + bx + c = 0 : 1$

The solutions are real and equal

Roots are -0.5 and -0.5

```
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\akki>cd Desktop

C:\Users\akki\Desktop>cd "PROJECT WORK"

C:\Users\akki\Desktop\PROJECT WORK>javac quadratic.java

C:\Users\akki\Desktop\PROJECT WORK>java quadratic
Enter the coefficient of a of ax^2+bx+c=0:15
Enter the coefficient of b of ax^2+bx+c=0:68
Enter the coefficient of C of ax^2+bx+c=0:3
The solutions are real and distinct
Roots are -0.04455558333472335 -4.48877774999861

C:\Users\akki\Desktop\PROJECT WORK>java quadratic
Enter the coefficient of a of ax^2+bx+c=0:1
Enter the coefficient of b of ax^2+bx+c=0:-3
Enter the coefficient of C of ax^2+bx+c=0:4
Equation has no real solutions

C:\Users\akki\Desktop\PROJECT WORK>java quadratic
Enter the coefficient of a of ax^2+bx+c=0:4
Enter the coefficient of b of ax^2+bx+c=0:4
Enter the coefficient of C of ax^2+bx+c=0:1
The solutions are real and equal
Roots are -0.5 and -0.5

C:\Users\akki\Desktop\PROJECT WORK>
```

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 SGPA of a student.

Lab 2 Programs

Q Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to calculate SGPA of a student.

```
import java.util.Scanner;  
class Student {
```

```
    private String usn;  
    private String sname;  
    private double sgpa;  
    private int[] c;  
    private int[] marks;  
    private int size=5;
```

```
    void acceptDetails ()
```

```
{  
    Scanner s1 = new Scanner (System.in)
```

```
    System.out.print ("Enter the USN");
```

```
    usn = s1.next();
```

```
    System.out.print ("Enter the name");
```

```
    sname = s1.next();
```

```
    c = new int [size];
```

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

```
{  
    System.out.print ("Enter the credits and  
    marks of the subject "+i);
```

```
    c[i] = s1.nextInt();
```

```
    marks[i] = s1.nextInt();
```

```
void calculate()
```

```
{  
    int num=0, clen=0, gradept=0;
```

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

```
{  
    if (marks[i] >= 90)
```

```
        gradept = 10;
```

```
    else if (marks[i] >= 80)
```

```
        gradept = 9;
```

```
    else if (marks[i] >= 70)
```

```
        gradept = 8;
```

```
    else if (marks[i] >= 60)
```

```
        gradept = 7;
```

```
    else if (marks[i] >= 50)
```

```
        gradept = 6;
```

```
    else if (marks[i] >= 40)
```

```
        gradept = 5;
```

```
    else if (marks[i] <= 40)
```

```
        gradept = 4;
```

```
    num += gradept * c[i];
```

```
    clen += c[i];
```

```
{  
    sgpa = num / clen;
```

```
    System.out.println ("Student sgpa is : "+sgpa);
```

```
void printDetails()
```

```
{  
    System.out.println ("*** * STUDENT DETAILS ***");
```

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```
System.out.println ("Student USN : " + usn);  
System.out.println ("Student namee : " + sname);  
for (int i=0; i<size; i++)
```

```
    System.out.println ("Credit is : " + c[i]);  
    System.out.println ("Marks of subject " + i + "  
        + marks[i]);
```

{ } { }

class StudentMain

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

```
    Student s1 = new Student();
```

```
    s1.acceptDetails();
```

```
    s1.printDetails();
```

```
    s1.calculate();
```

{ }

```
PS C:\Users\akki\Desktop\PROJECT WORK> javac lab2.java
PS C:\Users\akki\Desktop\PROJECT WORK> java StudentMain
Enter the USN
1BM19CS091
Enter the name
Muskan
enter the credits and marks of subject0
4
78
enter the credits and marks of subject1
3
70
enter the credits and marks of subject2
2
98
enter the credits and marks of subject3
3
86
enter the credits and marks of subject4
4
80
*****Student Details*****
Student USN:1BM19CS091
Student name:Muskan
Credit is:4
Marks of subject0 78
Credit is:3
Marks of subject1 70
Credit is:2
Marks of subject2 98
Credit is:3
Marks of subject3 86
Credit is:4
Marks of subject4 80
Student sgra is:8.0
PS C:\Users\akki\Desktop\PROJECT WORK>
```

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 a book object.



Q Create a class Book which contains four members: name, author, price, num-pages. Inside a constructor to set the values for the members. Include methods to set the details of the object. Include a toString() method that could display the complete details of the book. Develop a Java program to create n objects.

```
import java.util.*;
import java.lang.*;
class Book
```

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

```
Book ()
```

```
{  
    name = " ";  
    author = " ";  
    price = 0.0;  
    num_pages = 0;
```

```
public void getDetails ()
```

```
{  
    Scanner x = new Scanner (System.in);  
    System.out.println ("Enter Book Details");  
    System.out.print ("Enter Book Name :");  
    name = x.next();  
    System.out.print ("Enter the Author ");  
    author = x.next();
```

```
System.out.println ("Enter the price of the book");
price = x.nextDouble();
```

```
System.out.println ("Enter the number of pages
in the book");
```

```
num-pages = x.nextInt();
```

```
}
```

```
public String toString()
```

```
{ return ("The name of the book : " + name + "\n The
author of the book : " + author + "\n The price
of the book : " + price + "\n Number of pages in
the book : " + num-pages); }
```

```
}
```

```
class Bookmain
```

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

```
int i, n;
```

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

```
System.out.println ("Enter the number of books");
n = x.nextInt();
```

```
Book b[] = new Book [n];
```

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

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

```

```
    b[i].getdetails ();
}
```

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

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{
System.out.println ("DETAILS OF BOOK" + (i+1));

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

}

{
}

```
C:\Users\akki\Desktop\PROJECT WORK>javac books.java

C:\Users\akki\Desktop\PROJECT WORK>java BookMain
Enter the number of books
2
Enter Book Details
Enter Book Name:
Communications
Enter the Author:
J.K.Brownie
Enter the Price of the book:
450.75
Enter the number of pages in the book:
250
Enter Book Details
Enter Book Name:
Reports
Enter the Author:
Simon.K
Enter the Price of the book:
660.40
Enter the number of pages in the book:
320
DETAILS OF BOOK1
The name of the book : Communications
The author of the book :J.K.Brownie
The price of the book: 450.75
Number of pages in book :250
DETAILS OF BOOK2
The name of the book : Reports
The author of the book :Simon.K
The price of the book: 660.4
Number of pages in book :320

C:\Users\akki\Desktop\PROJECT WORK>
```

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.

Lab program 4

Q 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 Shape class. Each one of the class contain only the method printArea() that prints the area of the given shape.

import java.util.Scanner;
abstract class Shape

{

int d1;
int d2;
Shape (int a, int b)

{

d1 = a;
d2 = b;

{

abstract void printarea();

{

class Rectangle extends Shape

{

Rectangle (int a , int b)

{

super (a , b)

{

void printarea()

{

float area = (float) ~~float~~ d1 * d2 .

System.out.println (" Area of Rectangle : " + area);

{

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class Triangle extends Shape

{
Triangle (int a, int b)
}

Super (a,b);
}

void printArea ()
{

float area = (float) d1 * d2 / 2;

System.out.println ("Area of the Triangle :"
+ area);
}

}
class Circle extends Shape
{

Circle (int a, int b)
{

super (a,b);
}

void printArea ()
{

float area = (float) 3.14 * d1 * d1;

System.out.println ("Area of the Circle :"
+ area);
}

}
class Main
{

public static void main (String args [])
{

int ch, flag=0;

Scanner ss = new Scanner (System.in);

while (flag == 0)

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{
 }

System.out.println("Enter the choice whose
area has to be calculated");

System.out.println("1.RECTANGLE\n2.TRIANGLE\n3.CIRCLE");

ch = ss.nextInt();

switch(ch)

{

case 1:

System.out.println("Enter the dimensions
of rectangle");

int x = ss.nextInt();

int y = ss.nextInt();

Rectangle r = new Rectangle(x,y);

r.printarea();

break;

case 2 :

System.out.println("Enter the dimensions
of triangle");

int s = ss.nextInt();

int w = ss.nextInt();

Triangle t = new Triangle(s,w);

t.printarea();

break;

case 3 :

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

int f = ss.nextInt();

Circle c = new Circle(f,f);

c.printarea();

break;

default :

 fly = 1;

, } }

```
C:\Users\akki\Desktop\PROJECT WORK>javac areas.java

C:\Users\akki\Desktop\PROJECT WORK>java Main
Enter the choice whose area has to be calculated
1.RECTANGLE
2.TRIANGLE
3.CIRCLE
1
Enter the dimensions of rectangle
20 10
Area of the rectangle :200.0
Enter the choice whose area has to be calculated
1.RECTANGLE
2.TRIANGLE
3.CIRCLE
2
Enter the dimensions of triangle
9 7
Area of the triangle :31.5
Enter the choice whose area has to be calculated
1.RECTANGLE
2.TRIANGLE
3.CIRCLE
3
Enter the radius of circle
6
Area of the circle :113.04
Enter the choice whose area has to be calculated
1.RECTANGLE
2.TRIANGLE
3.CIRCLE
5

C:\Users\akki\Desktop\PROJECT WORK>
```

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:

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

Lab Program 5

```
import java.util.Scanner;  
abstract class Account
```

{

```
String cust_name;
```

```
long acc_no;
```

```
String acc_type;
```

```
double balance;
```

```
double main_bal = 1000.0;
```

```
Account (String cust_name, long acc_no, String  
acc_type, double balance)
```

{

```
this.cust_name = cust_name,
```

```
this.acc_no = acc_no;
```

```
this.acc_type = acc_type;
```

```
this.balance = balance;
```

{

```
abstract void deposit (double amount);
```

```
abstract void display();
```

```
abstract void withdrawal (double amount);
```

{

```
class Curr_acct extends Account
```

{

```
double penalty = 100.0;
```

```
Curr_acct (String cust_name, long acc_no,  
String acc_type, double balance).
```

{

```
super (cust_name, acc_no, acc_type, balance);  
System.out.println ("Name of the customer " +
```

```
cust_name);
```

```
System.out.println ("Account Number : " + acc_no);
```

```
System.out.println ("Account type : " + acc-type);  
System.out.println ("Balance : " + balance);
```

{

```
void deposit (double amount)
```

{

```
this.balance = this.balance + amount;
```

{

```
void withdrawal (double amount)
```

{

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

```
imposepenalty ();
```

```
System.out.println ("The current balance is " +  
balance);
```

{

```
void imposepenalty ()
```

{

```
if (this.balance < min-bal)
```

{

```
this.balance = this.balance - penalty;
```

```
System.out.println ("The balance amount is  
insufficient, the penalty imposed = 100%");
```

{

```
void display ()
```

{

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

{

```
class Sav-acct extends Account
```

{

```
Sav-acct (String cust-name, long acc-no, String  
acc-type, double balance);
```

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{

super(cust_name, acc_no, acc_type, balance)

System.out.println("Name of the customers :"
+ cust_name)

System.out.println("Account Number : " + acc_no)

System.out.println("Account type : " + acc_type)

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

}

void deposit (double amount)

{

this.balance = this.balance + amount;

interest();

}

void interest()

{

int rate = 10, time = 1;

float ci = (float) (this.balance * Math.pow
(1 + rate / 100.0, time) -
this.balance);

System.out.println

{ this.balance = this.balance + ci; }

}

void withdrawal (double amount)

{

this.balance = this.balance - amount;

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

}

void display()

{

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

}

class AccountMain

{
public static void main (String [] args)

{
Scanner xx = new Scanner (System.in);
Double amount;

int flag = 0;
while (flag == 0)

{
System.out.println ("Enter type of Account : \n 1. Current account \n 2. Savings account");

int choice = xx.nextInt();

switch (choice)

{
Case 1 : System.out.println ("Current Account");

System.out.println ("Enter the name of account holder");

String f = xx.next();

System.out.println ("Enter the account number");

long g = xx.nextLong();

System.out.println ("Enter the balance amount");

double h = xx.nextDouble();

Curr_act c = new Curr_acct (f, g, "Current", h);

int flag1 = 0;

while (flag1 == 0)

{
System.out.println ("Enter your choice \n 1: Deposit amount \n 2: Display Balance \n 3: Withdraw");

```
int choice = xx. nextInt();
switch (choice)
{
```

case 1 :

```
System.out.println ("Enter amount to be
deposited :");
```

```
amount = xx. nextDouble();
c. deposit (amount);
break;
```

case 2 :

```
c. display ();
break;
```

case 3 :

```
System.out.println ("Enter amount you
want to withdraw");
```

```
amount = xx. nextDouble();
c. withdrawal (amount);
break;
```

default :

```
flag = 1;
}
```

break;

case 2 : System.out.println ("Savings Account");
System.out.println ("Enter the name of the
account holder");

String p = xx. next();

System.out.println ("Enter the account
number");

long q = xx. nextLong();

```

System.out.println ("Enter the balance amount");
double r = sc.nextInt();
Sav.acct s = new Sav.acct (p, q, "Savings", r);
int flag2 = 0;
while (flag2 == 0)
{
    System.out.println ("Enter your choice\n"
        + "1: Deposit amount\n"
        + "2: Display balance\n"
        + "3: Withdraw");
    int choice2 = sc.nextInt();
    switch (choice2)
    {
        case 1: System.out.println ("Enter amount to be deposited:");
                    amount = sc.nextDouble();
                    s.deposit (amount);
                    break;
        case 2: s.display ();
                    break;
        case 3: System.out.println ("Enter amount you want to withdraw:");
                    amount = sc.nextDouble();
                    s.withdrawal (amount);
                    break;
        default:
            flag2 = 1;
    }
}
break;
}

```

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default : flag = 1 ;

}

}

}

}

```
C:\Users\akki\Desktop\PROJECT WORK>javac bank.java

C:\Users\akki\Desktop\PROJECT WORK>java AccountMain
Enter the type of Account:
1:Current account
2:Savings account
1

Current account:

Enter the name of account holder
Geetika
Enter the account number
873257
Enter the balance amount
50000
Name of the customer: Geetika
Account Number : 873257
Account type: current
Balance: 50000.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
1
Enter amount to be deposited:
400
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
2
Balance is: 50400.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
3
Enter amount you want to withdraw:
600
The current balance is 49800.0
Enter your choice
1:Deposit amount
```

```
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
2
Balance is: 49800.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
8
Enter the type of Account:
1:Current account
2:Savings account
2

Savings account:

Enter the name of account holder
Mili
Enter the account number
926346
Enter the balance amount
8000
Name of the customer: Mili
Account Number : 926346
Account type: Savings
Balance: 8000.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
1
Enter amount to be deposited:
400
The interest amount added to balance is 840.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
2
Balance is: 9240.0
Enter your choice
1:Deposit amount
```

```
Enter the name of account holder
Mili
Enter the account number
926346
Enter the balance amount
8000
Name of the customer: Mili
Account Number : 926346
Account type: Savings
Balance: 8000.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
1
Enter amount to be deposited:
400
The interest amount added to balance is 840.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
2
Balance is: 9240.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
3
Enter amount you want to withdraw:
600
The current balance is 8640.0
Enter your choice
1:Deposit amount
2:DisplayBalance
3:Withdraw
8
Enter the type of Account:
1:Current account
2:Savings account
8
```

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.



Lab Program 6

Solve this program and write the procedure you have used to execute this in your discussion. Create a package CIE which has two classes Student and Internals. The class Student 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. 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.

```

package CIE;
import java.util.Scanner;
public class Student
{
    String name, usn;
    int sem;
    Scanner sc = new Scanner (System.in);
    public void accept()
    {
        System.out.println ("Enter name :");
        name = sc.nextLine();
        System.out.println ("Enter usn :");
        usn = sc.nextLine();
        System.out.println ("Enter sem :");
        sem = sc.nextInt();
    }
}

```

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{

public void display()

{

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

System.out.println("Usn : " + usn);

System.out.println("Sem : " + sem);

}

{

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 ci marks
of subject " + (i+1) + " out of 50");

ciem[i] = xx.nextInt();

}

{

{



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```
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();  
        }  
    }  
}
```

150);
import CIE.*;
import SEE.*;
import java.util.Scanner;

```
class TotalMarks
```

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



Date _____

Scanner xx = new Scanner (System.in);
System.out.println ("Enter the number of student");

n = xx.nextInt();

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

CIE.Internal ci[] = new CIE.Internal[n];

SEE.External se[] = new SEE.External[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.Internal();

ci[i].accept();

se[i] = new SEE.External();

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].clem[j] + (se[i].seem[j]
/2);

System.out.println ("Total Marks in subject "+
(j+1)+" is "+ total[j]);

}

}



Procedure to execute this program :-

1. Created two folders ~~at~~ name and named one folder as CIE and other as SEE.
2. Created one Super class file as Student.java and two sub class files (Internals.java and Externals.java) and one driver class named TotalMarks.java.
3. First, compiled Student.java and placed it in CIE folder. Student.class file in CIE folder.
4. Second, compiled Internals.java and placed the Internals.class again in CIE folder.
5. Third, compiled Externals.java and placed Externals.class file inside SEE folder.
6. Last, Compiled TotalMarks.java (~~main~~ driver class) and then executed the program.

```
C:\Users\akki\Desktop\java files\package>java TotalMarks
Enter the number of students
1
ENTER STUDENT1 DETAILS
Enter name:
Rashmi Singh

C:\Users\akki\Desktop\java files\package>javac Student.java

C:\Users\akki\Desktop\java files\package>javac Internals.java

C:\Users\akki\Desktop\java files\package>javac Externals.java

C:\Users\akki\Desktop\java files\package>javac TotalMarks.java

C:\Users\akki\Desktop\java files\package>java TotalMarks
Enter the number of students
1
ENTER STUDENT1 DETAILS
Enter name:
Rashmi Singh
Enter usn:
1BM19CS293
Enter sem:
2
Enter the cie marks of subject1 out of 50
34
Enter the cie marks of subject2 out of 50
45
Enter the cie marks of subject3 out of 50
42
Enter the cie marks of subject4 out of 50
38
Enter the cie marks of subject5 out of 50
39
Enter the see marks of subject1 out of 100
78
Enter the see marks of subject2 out of 100
76
Enter the see marks of subject3 out of 100
88
Enter the see marks of subject4 out of 100
80
```

```
C:\Users\akki\Desktop\java files\package>javac Externals.java
C:\Users\akki\Desktop\java files\package>javac TotalMarks.java
C:\Users\akki\Desktop\java files\package>java TotalMarks
Enter the number of students
1
ENTER STUDENT1 DETAILS
Enter name:
Rashmi Simgh
Enter usn:
1BM19CS293
Enter sem:
2
Enter the cie marks of subject1 out of 50
34
Enter the cie marks of subject2 out of 50
45
Enter the cie marks of subject3 out of 50
42
Enter the cie marks of subject4 out of 50
38
Enter the cie marks of subject5 out of 50
39
Enter the see marks of subject1 out of 100
78
Enter the see marks of subject2 out of 100
76
Enter the see marks of subject3 out of 100
88
Enter the see marks of subject4 out of 100
80
Enter the see marks of subject5 out of 100
72
DETAILS OF STUDENT 1
Name :Rashmi Simgh
Usn :1BM19CS293
Sem :2
Total marks in subject1 is 73
Total marks in subject2 is 83
Total marks in subject3 is 86
Total marks in subject4 is 78
Total marks in subject5 is 75
```

LAB PROGRAM 7 : Write a program to demonstrate generics with multiple object parameters.

Date _____ / _____ / _____

Lab program 7

Q Write a program to demonstrate generics with multiple object parameters.

class Gren<T₁, T₂, T₃>

{

T₁ obj1;

T₂ obj2;

T₃ obj3;

Gren(T₁ x, T₂ y, T₃ z)

{

obj1 = x;

obj2 = y;

obj3 = z;

}

T₁ getobj1()

{

return obj1;

T₂ getobj2()

{

return obj2;

T₃ getobj3()

{

return obj3;

void showST()

{

System.out.println("Type used is :" + obj1.
getClass().getName())

System.out.println("Type used is :" + obj2.getClass().
getName());

System.out.println("Type used is :" + obj3.getClass().
getName());

}

class GenMain

{

public static void main (String args [])

{

Gen<Integer, String, Double> ob = new
Gen<Integer, String, Double>
(77, "FRUITS", 55.63);

ob.showDT();

System.out.println("integer value = " + ob.getobj1()
());

System.out.println("string value = " + ob.getobj2());

System.out.println("double value = " + ob.getobj3());

}

OUTPUT DEBUG CONSOLE TERMINAL

```
C:\Users\akki\Desktop\java files>javac GenMain.java
```

```
C:\Users\akki\Desktop\java files>java GenMain
Type used is:java.lang.Integer
Type used is:java.lang.String
Type used is:java.lang.Double
integer value=77
string value=FRUITS
double value=55.63
```

```
C:\Users\akki\Desktop\java files>
```

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 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.

Date / /

Lab Program 8

& Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived called "Son" which extends the base class. In father class, implement a constructor which takes the age and throws the age and throws the exception WrongAge() when the input age = father's age. In Son class, implement a constructor that cases both father and son's age and throws an exception if son's age is \geq father's age.

```
import java.util.*;
class WrongAge extends Exception
{
    public String toString()
    {
        return ("Wrong Age Exception");
    }
}
```

```
class Father
{
    int fage;
    Father (int f) throws WrongAge
    {
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter Father's age : ");
        fage = sc.nextInt();
        if (fage <= f || fage < 0 || f < 0)
```

```
        System.out.println ("Wrong Age");
    }
}
```

{

} throw new WrongAge();

had
thy
re

}

class Son extends Father

{

int sage;

Son (int s) throws WrongAge

{

super(s);

sage = s;

{

{

class AgeMain

{

public static void main (String args [])

{

Scanner sc = new Scanner (System.in);

System.out.println ("Enter Son's age:");

try

{

int i = sc.nextInt();

Son age = new Son(i);

{

catch (WrongAge e)

{

System.out.println (e);

{

{

{

```
C:\Users\akki\Desktop\java files>javac exception_age.java
C:\Users\akki\Desktop\java files>java AgeMain
Enter Son's age:
78
Enter Father's age:
20
Wrong Age Exception

C:\Users\akki\Desktop\java files>java AgeMain
Enter Son's age:
23
Enter Father's age:
-65
Wrong Age Exception

C:\Users\akki\Desktop\java files>
```

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.

Date / /

Lab Program 9

Q Write a program which creates two threads, one thread displaying "BMS College of Engineering" once every ten seconds and another display "CSE" once every two seconds.

class Newthread implements Runnable

```
{  
    Thread t;  
    String name;  
    int n;  
    Newthread( String threadname , int x )  
    {  
        name = threadname ;  
        n = x ;  
        t = new Thread ( this , name ) ;  
        System.out.println ("New thread : " + t );  
        t.start ();  
    }  
}
```

public void run ()

```
{  
    try  
    {  
        for ( int i=10 ; i>0 ; i-- )  
    }  
}
```

```
        System.out.println ( name );  
        Thread.sleep (n);  
    }  
}
```

Date / /



```
catch (InterruptedException e)
```

```
{  
    System.out.println ("Interrupted");  
}
```

```
}  
}  
class Multithreaddemo
```

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

```
{  
    Newthread t1 = new Newthread ("BMS College  
        of Engineering", 10000);
```

```
    Newthread t2 = new Newthread ("CSE", 2000);  
}
```

```
}
```

```
C:\Users\akki\Desktop\java files>javac thread2.java

C:\Users\akki\Desktop\java files>java Multithreaddemo
New thread:Thread[BMS COLLEGE OF ENGINEERING,5,main]
New thread:Thread[CSE,5,main]
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING

C:\Users\akki\Desktop\java files>[]
```

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 ArithmeticException. Display the exception in a message dialog box.

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Lab Program 10 (week 12)

Q Write a program that creates a user interface to perform integer division. 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 and Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were zero, the program would throw an ArithmeticException. Display the exception in a message dialog box.

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

```
public class Division extends Frame implements
ActionListener {
TextField n1, n2, res;
Label l1, l2, lres;
Button b;
public Division()
{
setLayout(new FlowLayout());
l1 = new Label("NUM1", Label.RIGHT);
l2 = new Label("NUM2", Label.RIGHT);
lres = new Label("RESULT", Label.RIGHT);
n1 = new TextField(12);
n2 = new TextField(8);
res = new TextField(10);
}
```

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```
b = new Button ("DIVIDE");
add(l1);
add(n1);
add(l2);
add(n2);
add(b);
add(res);
add(res);
b.addActionListener (this);
addWindowListener (new MyWindowAdapter ());
```

}

```
public void actionPerformed (ActionEvent ae)
```

{

```
if (ae.getSource () == b)
```

```
try {
```

```
int num1 = Integer.parseInt (n1.getText ())
```

```
int num2 = Integer.parseInt (n2.getText ());
```

```
int num3 = num1 / num2;
```

```
res.setText (String.valueOf (num3));
```

```
} catch (NumberFormatException ne)
```

{

```
JOptionPane.showMessageDialog (this, ne, "ERROR",
JOptionPane.ERROR_MESSAGE);
```

}

```
} catch (ArithmaticException a)
```

```
JOptionPane.showMessageDialog (this, a, "ERROR",
JOptionPane.ERROR_MESSAGE);
```

? } ?

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public static void main (String args [])

{ Division i = new Division ();

i. setSize (new Dimension (400, 400));

i. setTitle ("INTEGER DIVISION OF TWO NUMBERS");

i. setVisible (true);

}

class MywindowAdapter extends WindowAdapter {

public void windowClosing (WindowEvent we)

{ System.exit (0);

}

}

INTEGER DIVISION OF TWO NUMBERS

NUM1 NUM2 DIVIDE RESULT

INTEGER DIVISION OF TWO NUMBERS

NUM1 NUM2 DIVIDE RESULT



