

LAB PROGRAM -1(WEEK-3)

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..

Week 3

Date 29/09/20

Expt. No. 1

Page No.

Q. Java Program to find out roots of quadratic equation

```
import java.util.Scanner;
import java.lang.*;
public class Quadratic
public static void main (String [] args){
double a,b,c,d,R1,R2;
Scanner sc = new Scanner(System.in);
System.out.println("Enter the values of a,b,c:");
a = sc.nextDouble();
b = sc.nextDouble();
c = sc.nextDouble();
sc.close();
d = (Math.pow(b,2) - (4*a*c));
```

if ($d < 0$)

```
System.out.println("No real roots");
```

else if ($d == 0$)

```
System.out.println("Roots are real and equal");
```

```
R1 = -b / (2*a);
```

```
R2 = -b / (2*a);
```

```
System.out.println("First root = " + R1 + "\nSecond root = " + R2);
```

}

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case if ($d > 0$)

System.out.println("Roots are real and
distinct");

$$R_1 = (-b + \text{Math.sqrt}(d)) / (2 * a);$$

$$R_2 = (-b - \text{Math.sqrt}(d)) / (2 * a);$$

System.out.println("First root = " + R₁ + "\nSecond
root = " + R₂);

{}

{}

{}

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```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Appy>cd desktop

C:\Users\Appy\Desktop>cd java lab

C:\Users\Appy\Desktop\java lab>javac Quadratic.java

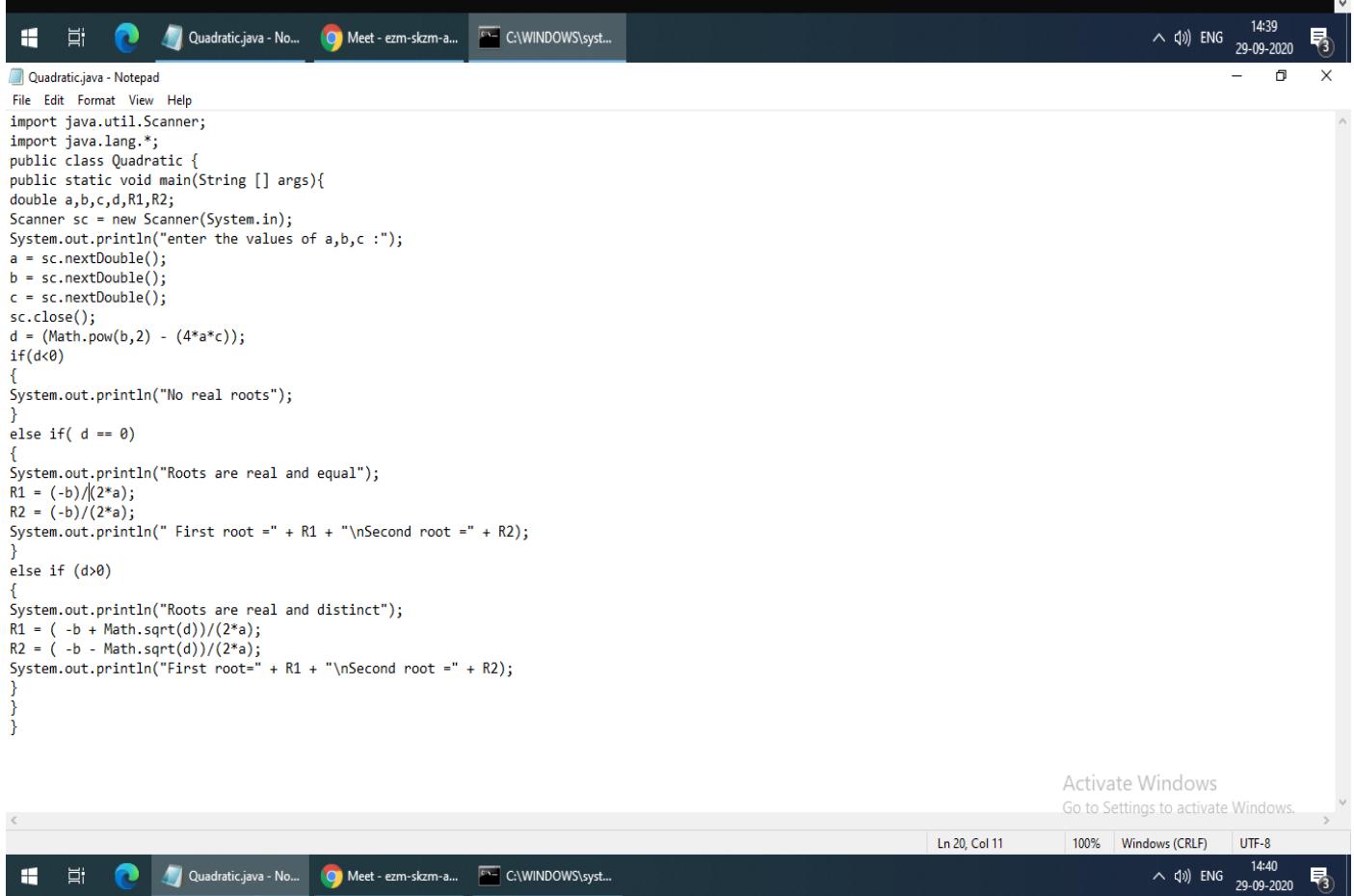
C:\Users\Appy\Desktop\java lab>java Quadratic
enter the values of a,b,c :
1 2 1
Roots are real and equal
First root =-1.0
Second root =-1.0

C:\Users\Appy\Desktop\java lab>java Quadratic
enter the values of a,b,c :
1 1 1
No real roots

C:\Users\Appy\Desktop\java lab>java Quadratic
enter the values of a,b,c :
4 4 1
Roots are real and equal
First root =-0.5
Second root =-0.5

C:\Users\Appy\Desktop\java lab>
```

Activate Windows
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```
Quadratic.java - Notepad
File Edit Format View Help
import java.util.Scanner;
import java.lang.*;
public class Quadratic {
public static void main(String [] args){
double a,b,c,d,R1,R2;
Scanner sc = new Scanner(System.in);
System.out.println("enter the values of a,b,c :");
a = sc.nextDouble();
b = sc.nextDouble();
c = sc.nextDouble();
sc.close();
d = (Math.pow(b,2) - (4*a*c));
if(d<0)
{
System.out.println("No real roots");
}
else if( d == 0)
{
System.out.println("Roots are real and equal");
R1 = (-b)/(2*a);
R2 = (-b)/(2*a);
System.out.println(" First root =" + R1 + "\nSecond root =" + R2);
}
else if (d>0)
{
System.out.println("Roots are real and distinct");
R1 = ( -b + Math.sqrt(d))/(2*a);
R2 = ( -b - Math.sqrt(d))/(2*a);
System.out.println("First root=" + R1 + "\nSecond root =" + R2);
}
}
}
```

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LAB PROGRAM-2 (WEEK-4)

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.

Q. Java program to find SGPA of students.

```
import java.util.Scanner;
class Student{
    Scanner sc = new Scanner(System.in);
    String USN;
    String Name;
    int credits[] = new int[5];
    double marks[] = new double[5];
    int point[] = new int[5];
    float SGPA;
    int total credits = 0;

    void getStudentData()
    {
        System.out.println("Enter the student USN:");
        USN = sc.nextLine();
        System.out.println("Enter the student Name:");
        Name = sc.nextLine();
        for(int i=0; i<5, i++)
        {
            System.out.println("Enter the credits of the subject " + (i+1) + ":");
            credits[i] = sc.nextInt();
            total credits += credits[i];
            System.out.println("Enter the marks of the subject " + (i+1) + ":");
            marks[i] = sc.nextDouble();
        }
    }
}
```

Teacher's Signature : _____

```

Void showStudentData()
{
    System.out.println("Student USN: " + USN);
    System.out.println("Student Name: " + Name);
    for (int i = 0; i < 5; i++)
    {
        System.out.println("Subject" + (i + 1) + " credits: "
                           + credits[i] + " marks: " + marks[i]);
    }
    System.out.println("CGPA of " + Name + " is " +
                       (float) (CGPA / totalCredits));
}

Void calcGpa()
{
    for (int i = 0; i < 5; i++)
    {
        if (marks[i] < 0 || marks[i] > 100)
            System.out.println("marks are invalid");
        else
            if (marks[i] >= 90)
                point[i] = 10;
            else if (marks[i] >= 80 && marks[i] < 90)
                point[i] = 9;
            else if (marks[i] >= 70 && marks[i] < 80)
                point[i] = 8;
            else if (marks[i] >= 60 && marks[i] < 70)
                point[i] = 7;
            else if (marks[i] >= 50 && marks[i] < 60)
                point[i] = 6;
            else
                point[i] = 5;
    }
}

```

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else if (marks[i] >= 70 && marks[i] < 80)

{
 point[i] = 8;
}

else if (marks[i] >= 60 && marks[i] < 70)

{
 point[i] = 7;
}

else if (marks[i] >= 50 && marks[i] < 60)

{
 point[i] = 5;
}

else if (marks[i] >= 40 && marks[i] < 50)

{
 point[i] = 4;
}

else {
 point[i] = 0;
}

Sgpa += (point[i] * credits[i]);

{
}

public class Student

{
 public static void main (String[] args)

 student stu1 = new student();

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```
stu1.getStudentData();  
stu1.calGpa();  
stu1.showStudentData();  
y  
y
```

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*stumain.java - Notepad

```

File Edit Format View Help
import java.util.Scanner;
class student{
Scanner sc = new Scanner(System.in);
String USN;
String Name;
int credits[] = new int[3];
double marks[] = new double[3];
int point[] = new int[3];
float SGPA;
int totalCredits = 0;
void getStudentData()
{
System.out.println("Enter the student USN:");
USN = sc.nextLine();
System.out.println("Enter the student Name:");
Name= sc.nextLine();
for(int i=0;i<3;i++)
{
System.out.println("enter the credits of the subject"+(i+1)+":");
credits[i] = sc.nextInt();
totalCredits+=credits[i];
System.out.println("enter the marks of the subject"+(i+1)+":");
marks[i] = sc.nextDouble();
}
}
void showStudentData()
{
System.out.println(" Student USN:\n"+USN);
System.out.println(" Student Name\n:"+Name);
for(int i=0;i<3;i++)
{
System.out.println("subject"+(i+1)+" credits:\n"+credits[i]+"marks:\n"+marks[i]);
}
System.out.println("SGPA of "+ Name +" :"+ (float)(SGPA/totalCredits));
}
void calSgpa()
{
for(int i=0;i<3;i++)
{
if(marks[i]<0 || marks[i]>100)
{
System.out.print("marks are invalid");
return;
}
else if(marks[i]>=90)
{
}
else if(marks[i]>=80 && marks[i]<90)
{
point[i]=10;
}
else if(marks[i]>=70 && marks[i]<80)
{
point[i]=9;
}
else if(marks[i]>=60 && marks[i]<70)
{
point[i]=8;
}
else if(marks[i]>=50 && marks[i]<60)
{
point[i]=7;
}
else if(marks[i]>=40 && marks[i]<50)
{
point[i]=4;
}
else
{
point[i]=0;
}
SGPA+=(point[i]*credits[i]);
}
}
public class Stumain
{
public static void main(String[] args)
{
student stu1 = new student();
stu1.getStudentData();
stu1.calSgpa();
stu1.showStudentData();
}
}

```

C:\Users\Appy\Desktop\java lab>j

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C:\WINDOWS\system32\cmd.exe

```

Enter the student Name:
arnav
enter the credits of the subject1:
4
enter the marks of the subject1:
95
enter the credits of the subject2:
4
enter the marks of the subject2:
92
enter the credits of the subject3:
4
enter the marks of the subject3:
95
Student USN:
1bm19cs025
Student Name
:arnav
subject1credits:
4marks:
95.0
subject2credits:
4marks:
92.0
subject3credits:
4marks:
95.0
SGPA of arnav:10.0
C:\Users\Appy\Desktop\java lab>j

```

Ln 79, Col 3 | 80% | Windows (CRLF) | UTF-8 | ENG | 14:56 | 06-10-2020 | 9

*stumain.java - Notepad

```

File Edit Format View Help
{
    point[i]=10;
}
else if(marks[i]>=80 && marks[i]<90)
{
    point[i]=9;
}
else if(marks[i]>=70 && marks[i]<80)
{
    point[i]=8;
}
else if(marks[i]>=60 && marks[i]<70)
{
    point[i]=7;
}
else if(marks[i]>=50 && marks[i]<60)
{
    point[i]=5;
}
else if(marks[i]>=40 && marks[i]<50)
{
    point[i]=4;
}
else
{
    point[i]=0;
}
SGPA+=(point[i]*credits[i]);
}
}
public class Stumain
{
public static void main(String[] args)
{
student stu1 = new student();
stu1.getStudentData();
stu1.calSgpa();
stu1.showStudentData();
}
}

```

C:\Users\Appy\Desktop\java lab>j

Activate Windows
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C:\WINDOWS\system32\cmd.exe

```

Enter the student Name:
arnav
enter the credits of the subject1:
4
enter the marks of the subject1:
95
enter the credits of the subject2:
4
enter the marks of the subject2:
92
enter the credits of the subject3:
4
enter the marks of the subject3:
95
Student USN:
1bm19cs025
Student Name
:arnav
subject1credits:
4marks:
95.0
subject2credits:
4marks:
92.0
subject3credits:
4marks:
95.0
SGPA of arnav:10.0
C:\Users\Appy\Desktop\java lab>j

```

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*stumain.java - Notepad

```

File Edit Format View Help
{
    point[i]=10;
}
else if(marks[i]>=80 && marks[i]<90)
{
    point[i]=9;
}
else if(marks[i]>=70 && marks[i]<80)
{
    point[i]=8;
}
else if(marks[i]>=60 && marks[i]<70)
{
    point[i]=7;
}
else if(marks[i]>=50 && marks[i]<60)
{
    point[i]=5;
}
else if(marks[i]>=40 && marks[i]<50)
{
    point[i]=4;
}
else
{
    point[i]=0;
}
SGPA+=(point[i]*credits[i]);
}
}
public class Stumain
{
public static void main(String[] args)
{
student stu1 = new student();
stu1.getStudentData();
stu1.calSgpa();
stu1.showStudentData();
}
}

```

C:\Users\Appy\Desktop\java lab>j

Activate Windows
Go to Settings to activate Windows.

C:\WINDOWS\system32\cmd.exe

```

Enter the student Name:
arnav
enter the credits of the subject1:
4
enter the marks of the subject1:
95
enter the credits of the subject2:
4
enter the marks of the subject2:
92
enter the credits of the subject3:
4
enter the marks of the subject3:
95
Student USN:
1bm19cs025
Student Name
:arnav
subject1credits:
4marks:
95.0
subject2credits:
4marks:
92.0
subject3credits:
4marks:
95.0
SGPA of arnav:10.0
C:\Users\Appy\Desktop\java lab>j

```

Ln 79, Col 3 | 80% | Windows (CRLF) | UTF-8 | ENG | 14:56 | 06-10-2020 | 9

LAB PROGRAM-3 (WEEK-5)

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.

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Date

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```
import java.util.Scanner;
class Book {
    public String name;
    public String Author;
    public float price;
    public int num_pages;

    void setDetails() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the name of the book:");
        Name = sc.next();
        System.out.println("Enter the name of author of the book:");
        Author = sc.next();
        System.out.println("Enter the price of the book:");
        price = sc.nextFloat();
        System.out.println("Enter the no. of pages in book:");
        num_pages = sc.nextInt();
    }

    void getDetails() {
        System.out.println("Name:" + Name);
        System.out.println("Author:" + Author);
        System.out.println("price:" + price);
        System.out.println("No. of pages:" + num_pages);
    }

    public String toString() {
```

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Date

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```
return ("Name:" + Name + "Author:" + Author +  
"Price:" + price + "No.of Pages:" + num_pages);  
}  
}
```

```
class BookInfo  
public static void main (String [] args){  
Scanner sc = new Scanner (System.in);  
int n = sc.nextInt();  
Book b[] = new Book [n];  
System.out.println("Enter the no. of books");  
int n = sc.nextInt();  
Book b[] = new Book [n];  
for (int i=0; i<n; i++){  
System.out.println("Enter the details of the book "(i+1));  
b[i] = new Book();  
b[i].setDetails();  
}  
for (int i=0; i<n; i++){  
System.out.println("Book details of book "(i+1) ":" );  
b[i].getDetails();  
}  
System.out.println(b[0]);  
}  
}
```

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C:\Users\Appy>cd desktop
C:\Users\Appy\Desktop>cd java lab
C:\Users\Appy\Desktop\java lab>javac Bmain.java

C:\Users\Appy\Desktop\java lab>java Bmain
enter the no. of book
2
enter the details of the book1:
Enter the name of the book:
science
Enter the name of author of the book:
pradeep
Enter the price of the book:
300
Enter the no.of pages in the book:
500
enter the details of the book2:
Enter the name of the book:
maths
Enter the name of author of the book:
grewal
Enter the price of the book:
250
Enter the no.of pages in the book:
450
Book Details of book1:
Name:science
Author:pradeep
Price:300.0
No. of pages:500
Book Details of book2:
Name:maths
Author:grewal
Price:250.0
No. of pages:450
Name:science
Author:pradeep
Price:300.0
No. of pages:500

Bmain.java - Visual Studio Code

```
1 import java.util.Scanner;
2 class Book{
3     public String Name;
4     public String Author;
5     public float price;
6     public int num_pages;
7
8     void setDetails(){
9         Scanner sc = new Scanner(System.in);
10    System.out.println("Enter the name of the book:");
11    Name = sc.next();
12    System.out.println("Enter the name of author of the book:");
13    Author = sc.next();
14    System.out.println("Enter the price of the book:");
15    price = sc.nextFloat();
16    System.out.println("Enter the no.of pages in the book:");
17    num_pages = sc.nextInt();
18 }
19 void getDetails(){
20     System.out.println("Name:" +Name);
21     System.out.println("Author:" +Author);
22     System.out.println("Price:" +price);
23     System.out.println("No. of pages:" +num_pages);
24 }
25 public String toString(){
26     return("Name:" +Name + "\nAuthor:" +Author + "\nPrice:" +price + "\nNo. of pages:" +num_pages);
27 }
28 }
```

OUTPUT TERMINAL DEBUG CONSOLE PROBLEMS

Tasks Activate Windows
Go to Settings to activate Windows.

Ln 47, Col 30 Spaces: 4 UTF-8 CRLF Java 14:47 13-10-2020

C:\Users\Appy>cd desktop
C:\Users\Appy\Desktop>cd java lab
C:\Users\Appy\Desktop\java lab>javac Bmain.java

C:\Users\Appy\Desktop\java lab>java Bmain
enter the no. of book
2
enter the details of the book1:
Enter the name of the book:
science
Enter the name of author of the book:
pradeep
Enter the price of the book:
300
Enter the no.of pages in the book:
500
enter the details of the book2:
Enter the name of the book:
maths
Enter the name of author of the book:
grewal
Enter the price of the book:
250
Enter the no.of pages in the book:
450
Book Details of book1:
Name:science
Author:pradeep
Price:300.0
No. of pages:500
Book Details of book2:
Name:maths
Author:grewal
Price:250.0
No. of pages:450
Name:science
Author:pradeep
Price:300.0
No. of pages:500

Bmain.java - Visual Studio Code

```
23     System.out.println("enter the no. of pages:" +num_pages);
24 }
25 public String toString(){
26     return("Name:" +Name + "\nAuthor:" +Author + "\nPrice:" +price + "\nNo. of pages:" +num_pages);
27 }
28 }
29 }
30 class Bmain{
31     public static void main(String[] args){
32         Scanner xx = new Scanner(System.in);
33         System.out.println("enter the no. of book");
34         int n = xx.nextInt();
35         Book b[] = new Book[n];
36         for(int i=0;i<n;i++)
37         {
38             System.out.println("enter the details of the book"+(i+1)+":");
39             b[i]=new Book();
40             b[i].setDetails();
41         }
42         for(int i=0;i<n;i++)
43         {
44             System.out.println("Book Details of book"+(i+1)+":");
45             b[i].getDetails();
46         }
47     }
48 }
49 }
```

OUTPUT TERMINAL DEBUG CONSOLE PROBLEMS

Tasks Activate Windows
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Ln 47, Col 30 Spaces: 4 UTF-8 CRLF Java 14:47 13-10-2020

LAB PROGRAM – 4(WEEK-8)

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.

import java.util.Scanner;
abstract class Shape {
 int b, h;

Shape (int b, int h) {

this.b = b;

this.h = h;

abstract void printArea();
}

class Rectangle extends Shape {

Rectangle (int b, int h) {

super(b, h);

void printArea() {

System.out.println("area of the rectangle is:
+ (b*h));

} }

class Triangle extends Shape {

Triangle (int b, int h) {

super(b, h);

}

void printArea() {

System.out.println("area of the triangle is:
+ ((b*h)/2));

} }

class Circle extends Shape {

Circle (int r) {

Teacher's Signature : _____

Super (x, 0);
 }
 void printArea();

System.out.println("area of the circle is:" +
 (3.14 * b * b));
 }
 }

class ShapeMain{
 public static void main (String args []){
 Rectangle R = new Rectangle (10, 20);
 R.printArea();

Triangle T = new Triangle (10, 20);
 T.printArea();
 Circle C = new Circle (10);
 C.printArea();
 }
 }

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File Edit Selection View Go Run Terminal Help

Shapemain.java - Visual Studio Code

C:\> Users > Appy > Desktop > java lab > Shapemain.java

```
1 import java.util.Scanner;
2 abstract class Shape{
3     int b,h;
4     Shape(int b, int h){
5         this.b = b;
6         this.h = h;
7     }
8     abstract void printArea();
9 }
10 class Rectangle extends Shape{
11     Rectangle(int b,int h){
12         super(b,h);
13     }
14     void printArea(){
15         System.out.println("area of the rectangle is:"+ (b*h));
16     }
17 }
18 class Triangle extends Shape{
19     Triangle(int b,int h){
20         super(b,h);
21     }
22     void printArea(){
23         System.out.println("area of the triangle is :" +((b*h)/2));
24     }
25 }
26 class Circle extends Shape{
27     Circle(int r){
28         super(r,0);
29     }
30     void printArea(){
31         System.out.println("area of the c is :" +(3.14*b*b));
32     }
33 }
```

C:\WINDOWS\system32\cmd.exe - java Bankmain

```
C:\Users\Appy\Desktop\java lab>java Shapemain
area of the rectangle is:200
area of the triangle is :100
area of the c is :314.0
```

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Go to Settings to activate Windows.

Ln 12, Col 20 Spaces: 4 UTF-8 CRLF Java

File Edit Selection View Go Run Terminal Help

Shapemain.java - Visual Studio Code

C:\> Users > Appy > Desktop > java lab > Shapemain.java

```
22     void printArea(){
23         System.out.println("area of the triangle is :" +((b*h)/2));
24     }
25 }
26 class Circle extends Shape{
27     Circle(int r){
28         super(r,0);
29     }
30     void printArea(){
31         System.out.println("area of the c is :" +(3.14*b*b));
32     }
33 }
34 class Shapemain{
35     public static void main(String args[]){
36         Rectangle R = new Rectangle(10,20);
37         R.printArea();
38         Triangle T = new Triangle(10,20);
39         T.printArea();
40         Circle C = new Circle(10);
41         C.printArea();
42     }
43 }
```

C:\WINDOWS\system32\cmd.exe - java Bankmain

```
C:\Users\Appy\Desktop\java lab>java Shapemain
area of the rectangle is:200
area of the triangle is :100
area of the c is :314.0
```

Activate Windows
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Ln 12, Col 20 Spaces: 4 UTF-8 CRLF Java

LAB PROGRAM -5(WEEK-8)

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

```

import java.util.Scanner;
class Account{
    String name;
    long acc_no;
    int acc_type;
    double balance;
    Scanner sc = new Scanner(System.in);
    void getData(){
        System.out.println("Enter Name:");
        name = sc.nextInt();
        System.out.println("Enter account number:");
        acc_no = sc.nextLong();
        System.out.println("Enter account type:");
        System.out.println("1. savings 2. current");
        acc_type = sc.nextInt();
    }
    int getacc(){
        return acc_type;
    }
}

```

```

class Savings extends Account{
    Scanner sc = new Scanner (System.in);
    double amount;
    void get savacc bal(){
        System.out.println("Enter the amount to be placed in your saving account:");
        amount = sc.nextDouble();
        balance += amount;
    }
}

```

Teacher's Signature : _____

```

Void display savacc bal() {
    System.out.println("balance:" + balance);
}

Void cal_savacc_interest() {
    System.out.println("Enter the rate of interest
        in %:");
    float rate = sc.nextFloat();
    System.out.println("Enter the time in years:");
    float time = sc.nextFloat();
    float CI = (float)(balance * (Math.pow((1+rate/100),
        time)));
}

```

System.out.println("the CI is:" + (P + balance));
 balance = P;

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

~~class Current extends Account~~
~~Scanner sc = new Scanner(System.in);~~

```

Void withdraw_savacc() {
    System.out.println("Enter the amount to
        be withdrawn:");
    float amount1 = sc.nextFloat();
}

```

balance = balance - amount1;

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

~~class Current extends Account~~
~~Scanner sc = new Scanner(System.in);~~

```

double amount;
final double min_bal = 1000;
void get_curacc_bal(){
    System.out.println("Enter the amount to be placed in your current account:");
    amount = sc.nextDouble();
    balance += amount;
}
void display_curacc_bal(){
    System.out.println("balance:" + balance);
}
void calc_curacc_bal(){
    System.out.println();
}
void calc_curacc_service(){
    if (balance < min_bal){
        System.out.println("Service charge of 250 will be imposed as penalty for having balance below minimum balance.");
        balance -= 250;
    }
    System.out.println("balance:" + balance);
}
}
System.out.println("Minimum balance is maintained");
}
void withdraw_curacc(){
    System.out.println("Enter the amount to be withdrawn:");
    float amount1 = sc.nextFloat();
}

```

Teacher's Signature : _____

balance = balance - amount1;
 System.out.println("balance:" + balance);
 }
 }
 }

```
class Bankmain{
  public static void main (String args [ ]){
    int check, check2;
    Scanner ss = new Scanner (System.in);
    Account A1 = new Account ();
    while (true) {
      A1.getData();
      check = A1.getAcc();
      if (check == 1) {
        System.out.println ("Saving Account");
        Savings S1 = new Savings ();
        S1.get_savacc_bal();
        S1.display_savacc_bal();
        S1.cal_savacc_interest();
        S1.withdrawal_savacc();
      }
    }
  }
}
```

System.out.println ("Press 9 to continue or 2 to
 Exit");
 check2 = ss.nextInt();
 switch (check2) {
 case 1: break;
 case 2: system.exit(0);
 default: break;
 }
}

Date _____

Expt. No. _____

Page No. _____

```
else if (check == 2) {
    System.out.println ("Current Account");
    System.out.println ("cheque book facility
                        available");
    Current C1 = new Current();
    C1.get_curacc_bal();
    C1.display_curacc_bal();
    C1.cal_curacc_savbal();
    C1.withdrawl_curacc();
    C1.cal_curacc_savbal();
    System.out.println ("Press 1 to continue or 2
                        to exit");
    check 2 = ss.nextInt();
    switch (check 2) {
        case 1: break;
        case 2: System.exit(0);
        default: break;
    }
}
```

y
y
y
y

Teacher's Signature : _____

```

cmd C:\WINDOWS\system32\cmd.exe
C:\Users\Appy\Desktop>java lab>java Bankmain
Enter Name:
qwert
Enter account number:
1234
Enter account type:
1.saving
2.current
1
Saving Account
enter the amount to be placed in your saving account:
10000
balance:10000.0
Enter the rate of interest in (%) :
10
Enter the time in years :
2
the CI is:2100.0009765625
balance:2100.0009765625
enter the amount to be withdrawn:
10000
balance:2100.0009765625
Press 1 to Continue or 2 to Exit
1
Enter Name:
wert
Enter account number:
12345
Enter account type:
1.saving
2.current
2
Current Account
checkbook facility available
enter the amount to be placed in your current account:
1500
balance:1500.0
Minimum balance is maintained
enter the amount to be withdrawn:
700
balance:800.0
Service charge of 250 will be imposed as penalty for having balance below minimum balance
balance:500.0
Press 1 to Continue or 2 to Exit

```

Activate Windows
Go to Settings to activate Windows.

16:17 03-11-2020

File Edit Selection View Go Run Terminal Help Bankmain.java - Visual Studio Code

Welcome CircledemoMain.java ActorMain.java clmain.java Matrixmain.java Shapemain.java Bankmain.java

```

1 import java.util.Scanner;
2 class Account{
3     String name;
4     long acc_no;
5     int acc_type;
6     double balance;
7     Scanner sc = new Scanner(System.in);
8     void getData(){
9         System.out.println("Enter Name:");
10        name = sc.nextLine();
11        System.out.println("Enter account number:");
12        acc_no = sc.nextLong();
13        System.out.println("Enter account type:\n1.saving \n2.current");
14        acc_type = sc.nextInt();
15    }
16    int retacc(){
17        return acc_type;
18    }
19 }
20 class Savings extends Account{
21     double amount;
22     Scanner sc = new Scanner(System.in);
23     void get_savacc_bal(){
24         System.out.println("enter the amount to be placed in your saving account:");
25         amount = sc.nextDouble();
26         balance+=amount;
27     }
28     void display_savacc_bal(){
29         System.out.println("balance:"+balance);
30     }
31     void cal_savacc_interest(){
32         System.out.println("Enter the rate of interest in (%) :");
33         float rate = sc.nextFloat();

```

Activate Windows
Go to Settings to activate Windows.

16:18 03-11-2020

File Edit Selection View Go Run Terminal Help Bankmain.java - Visual Studio Code

Welcome CircledemoMain.java ActorMain.java clmain.java Matrixmain.java Shapemain.java Bankmain.java

```

1 import java.util.Scanner;
2 class Account{
3     String name;
4     long acc_no;
5     int acc_type;
6     double balance;
7     Scanner sc = new Scanner(System.in);
8     void getData(){
9         System.out.println("Enter Name:");
10        name = sc.nextLine();
11        System.out.println("Enter account number:");
12        acc_no = sc.nextLong();
13        System.out.println("Enter account type:\n1.saving \n2.current");
14        acc_type = sc.nextInt();
15    }
16    int retacc(){
17        return acc_type;
18    }
19 }
20 class Savings extends Account{
21     double amount;
22     Scanner sc = new Scanner(System.in);
23     void get_savacc_bal(){
24         System.out.println("enter the amount to be placed in your saving account:");
25         amount = sc.nextDouble();
26         balance+=amount;
27     }
28     void display_savacc_bal(){
29         System.out.println("balance:"+balance);
30     }
31     void cal_savacc_interest(){
32         System.out.println("Enter the rate of interest in (%) :");
33         float rate = sc.nextFloat();

```

Ln 123, Col 2 Spaces: 4 UTF-8 CRLF Java

File Edit Selection View Go Run Terminal Help Bankmain.java - Visual Studio Code

Welcome CircledemoMain.java ActorMain.java clmain.java Matrixmain.java Shapemain.java Bankmain.java

```

1 import java.util.Scanner;
2 class Account{
3     String name;
4     long acc_no;
5     int acc_type;
6     double balance;
7     Scanner sc = new Scanner(System.in);
8     void getData(){
9         System.out.println("Enter Name:");
10        name = sc.nextLine();
11        System.out.println("Enter account number:");
12        acc_no = sc.nextLong();
13        System.out.println("Enter account type:\n1.saving \n2.current");
14        acc_type = sc.nextInt();
15    }
16    int retacc(){
17        return acc_type;
18    }
19 }
20 class Savings extends Account{
21     double amount;
22     Scanner sc = new Scanner(System.in);
23     void get_savacc_bal(){
24         System.out.println("enter the amount to be placed in your saving account:");
25         amount = sc.nextDouble();
26         balance+=amount;
27     }
28     void display_savacc_bal(){
29         System.out.println("balance:"+balance);
30     }
31     void cal_savacc_interest(){
32         System.out.println("Enter the rate of interest in (%) :");
33         float rate = sc.nextFloat();

```

Activate Windows
Go to Settings to activate Windows.

16:18 03-11-2020

C:\> Users > Appy > Desktop > java lab > Bankmain.java

```
33     float rate = sc.nextFloat();
34     System.out.println("Enter the time in years :");
35     float time = sc.nextFloat();
36     float CI = (float)(balance*(Math.pow((1+rate/100),time)));
37     System.out.println("the CI is :" +(CI-balance));
38     balance=CI;
39     System.out.println("balance:" +balance);
40 }
41 void withdrawl_savacc(){
42     System.out.println("enter the amount to be withdrawn:");
43     float amount1 = sc.nextFloat();
44     balance= balance-amount1;
45     System.out.println("balance:" +balance);
46 }
47 }
48 class Current extends Account{
49 Scanner sc = new Scanner(System.in);
50 double amount;
51 final double min_bal = 1000;
52 void get_curacc_bal(){
53     System.out.println("enter the amount to be placed in your current account:");
54     amount = sc.nextDouble();
55     balance+=amount;
56 }
57 void display_curacc_bal(){
58     System.out.println("balance:" +balance);
59 }
60 void cal_curacc_service(){
61     if(balance<min_bal){
62         System.out.println("Service charge of 250 will be imposed as penalty for having balance below minimum balance");
63         balance=balance-250;
64     }System.out.println("balance:" +balance);
65 }
```

Activate Windows
Go to Settings to activate Windows.

C:\> Users > Appy > Desktop > java lab > Bankmain.java

```
65     }else{
66         System.out.println("Minimum balance is maintained");
67     }
68 }
69 void withdrawl_curacc(){
70     System.out.println("enter the amount to be withdrawn:");
71     float amount1 = sc.nextFloat();
72     balance= balance-amount1;
73     System.out.println("balance:" +balance);
74 }
75 }
76 class Bankmain{
77     public static void main(String args[]){
78         int check,check2;
79         Scanner ss = new Scanner(System.in);
80         Account A1 = new Account();
81         while(true){
82             A1.getData();
83             check = A1.retacc();
84             if(check==1){

85                 System.out.println("Saving Account");
86                 Savings S1 = new Savings();
87                 S1.get_savacc_bal();
88                 S1.display_savacc_bal();
89                 S1.cal_savacc_interest();
90                 S1.withdrawl_savacc();

91                 System.out.println("Press 1 to Continue or 2 to Exit");
92                 check2 = ss.nextInt();
93                 switch(check2){
94                     case 1: break;
95                     case 2: System.exit(0);
96                 }
97             }
98         }
99     }
100 }
```

Activate Windows
Go to Settings to activate Windows.

The screenshot shows a Visual Studio Code interface with the following details:

- File Menu:** File, Edit, Selection, View, Go, Run, Terminal, Help.
- Title Bar:** Bankmain.java - Visual Studio Code.
- Code Editor:** The main area displays Java code for a bank application. The code includes imports for `java.util.Scanner`, `java.util.*`, and `java.lang.*`. It defines several classes like `Bankmain.java`, `CircledemoMain.java`, `ActorMain.java`, `cimain.java`, `Matrixmain.java`, and `Shapemain.java`. The `Bankmain.java` code handles user input for account selection and provides options for current account services like withdrawal and balance inquiry.
- Sidebar:** Includes icons for file operations (New, Open, Save, Find, Replace, Go To, Find in Path, Go To Definition, Go To Declaration, Go To Type Definition, Go To Implementation, Go To Reference, Go To Symbol, Go To Type Symbol, Go To Implementation, Go To Reference, Go To Symbol, Go To Type Symbol, Go To Implementation, Go To Reference, Go To Symbol, Go To Type Symbol), a search bar, and a status bar.
- Status Bar:** Shows "Activate Windows" with a link to settings, line 123, column 2, spaces: 4, encoding: UTF-8, CRLF, Java, 16:18, ENG, 03-11-2020, and a notifications icon.

LAB PROGRAM -6 (WEEK-9)

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.

```

package CIE;
import java.util.Scanner;
public class Student{
    public String name;
    public String USN;
    public int sem;
    public void Display(){
        Scanner sc = new Scanner (System.in);
        System.out.println("Name:");
        name = sc.next();
        System.out.println ("USN:");
        USN = sc.next();
        System.out.println ("sem:");
        sem = sc.nextInt();
    }
}

```

```

package CIE;
import java.util.Scanner;
public class Internals extends Student{
    public double CIE [];
    public void Display(){
        CIE = new double [5];
        Scanner sc = new Scanner (System.in);
        for(int i=0; i<5; i++){
            System.out.println ("CIE marks (out of 50) for");
            System.out.println ("subject " + (i+1) + ":");
            CIE [i] = sc.nextDouble();
        }
    }
}

```

Teacher's Signature : _____

```

package SEE;
import java.util.Scanner;
import CIE.*;
public class External extends CIE.Student {
    public double SEE[] = new double[5];
    public void Display() {
        Scanner sc = new Scanner(System.in);
        for (int i = 0; i < 5; i++) {
            System.out.println("SEE marks (" + i + ")");
            System.out.print("Subject " + (i + 1) + ": ");
            SEE[i] = sc.nextDouble();
        }
    }
}

```

```

import CIE.*;
import SEE.*;
import java.util.*;
public class Finalmarks {
    public static void main (String args[]) {
        int n;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the no. of students");
        n = sc.nextInt();
        CIE.Student S[] = new CIE.Student[n];
        CIE.Internal I[] = new CIE.Internal[n];
        SEE.External E[] = new SEE.External[n];
        for (int i = 0; i < n; i++) {
            S[i] = new CIE.Student();
        }
    }
}

```

Teacher's Signature : _____

$I[i]$ = new CIE. Internals();

$E[i]$ = new SEE. Externals();

$S[i]$. Display();

$I[i]$. Display();

$E[i]$. Display();

System.out.println("Total marks of student " +
 $S[i].name$ " in subjects are: ");
 for (int j = 0; j < 5; j++) {

System.out.print(($I[i].cie[j]$) +
 $(E[i].see[j])$);

y
y
y
y
y

Teacher's Signature : _____

```
C:\WINDOWS\system32\cmd.exe
C:\Users\Appy\Desktop\java lab\lab6>java Finalmarks
enter the no. of students:
3
Name:
a
USN:
1bm1
Semester:
3
CIE marks(out of 50) for subject1:
45
CIE marks(out of 50) for subject2:
45
CIE marks(out of 50) for subject3:
45
CIE marks(out of 50) for subject4:
45
CIE marks(out of 50) for subject5:
45
SEE marks(out of 100) for subject1:
90
SEE marks(out of 100) for subject2:
90
SEE marks(out of 100) for subject3:
90
SEE marks(out of 100) for subject4:
90
SEE marks(out of 100) for subject5:
90
Total marks of student a      in 5 subjects are :
90.0
90.0
90.0
90.0
90.0
Name:
b
USN:
1bm2
Semester:
5
CIE marks(out of 50) for subject1:
40
CIE marks(out of 50) for subject2:
```

Activate Windows
Go to Settings to activate Windows.



LAB PROGRAM -7 (WEEK-10)

Write a program to demonstrate generics with multiple object parameters.

```
class myGen <A, B> {
    A obj1;
    B obj2;
    myGen (A obj1, B obj2) {
        this.obj1 = obj1;
        this.obj2 = obj2;
    }
}
```

```
void Display() {
    System.out.println(this.obj1.getClass().getSimpleName());
    System.out.println(this.obj2.getClass());
    System.out.println(obj2.getClass().getSimpleName());
    System.out.println(this.obj2);
}
```

```
public class Genericsmain {
    public static void main (String args[]) {
        myGen <String, Integer> myG1 = new myGen<String, Integer> ("John", 20);
        myGen <Character, Double> myG2 = new myGen<Character, Double> ('A', 78.5456);
        myG1.Display();
        myG2.Display();
    }
}
```

Teacher's Signature :

The screenshot shows a Visual Studio Code interface with the following details:

- File Bar:** File, Edit, Selection, View, Go, Run, Terminal, Help.
- Editor:** The main editor window displays the Java code for `Genericsmain.java`. The code defines a class `myGen<A,B>` with methods `myGen` and `Display`. It also contains a `main` method that creates two objects of type `myGen<String, Integer>` and `myGen<Character, Double>`, and calls their `Display` methods.

```
1  class myGen<A,B>{
2      A obj1;
3      B obj2;
4
5      myGen(A obj1, B obj2){
6          this.obj1 = obj1;
7          this.obj2 = obj2;
8      }
9      void Display(){System.out.print(obj1.getClass().getSimpleName() + " ");
10         System.out.println(this.obj1);
11         System.out.print(obj2.getClass().getSimpleName() + " ");
12         System.out.println(this.obj2);
13     }
14 }
15 public class Genericsmain{
16     public static void main(String args[]){
17         myGen<String, Integer>myG1 = new myGen<String, Integer>("john", 20);
18         myGen<Character, Double>myG2 = new myGen<Character, Double>('A', 75.545);
19         myG1.Display();
20         myG2.Display();
21     }
22 }
```
- Terminal:** A terminal window titled "C:\WINDOWS\system32\cmd.exe" shows the command `javac Genericsmain.java` being run, followed by the output of the `Display` method for each object.
- Status Bar:** Shows file paths like "C:\Users\Appy\Desktop\java lab\Genericsmain.java ...", a bin folder icon, and the path "C:\WINDOWS\system...". It also displays status information: Line 12, Column 39, Spaces: 4, UTF-8, CRLF, Java, ENG, 15:27, 24-11-2020, and a notifications icon with 4 notifications.

LAB PROGRAM -8 (WEEK-10)

Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception Wrong Age () when the input age=father's age.

	Week 10	
Expt. No. Lab program 8	Date _____	Page No. _____
<pre> import java.util.Scanner; class WrongAge extends Exception { public WrongAge (String s) { super(s); } } class Father { int fatherAge; int sonAge; Father (int fage, int sage) throws WrongAge { if (fage == sage) throw new WrongAge ("Father's Age is equal to Son's Age"); } this.fatherAge = fage; this.sonAge = sage; } class Son extends Father { Son (int fage, int sage) throws WrongAge { super(fage, sage); if (fage <= sage) throw new WrongAge ("Father's Age is equal to or less than Son's Age"); } } void display() { System.out.println ("Father's Age :" + fatherAge); System.out.println ("Son's Age :" + sonAge); } </pre>	Teacher's Signature : _____	

Date _____

Expt. No. _____

Page No. _____

y y
public class Lab & main
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 son's age");
sAge = sc.nextInt();
try {
Son son = new Son (fAge, sAge);
son.display();
} catch (WrongAge error) {
System.out.println ("Exception" + error);
y
y
y
y}

Teacher's Signature : _____

The screenshot shows a Visual Studio Code interface with the following details:

- File Bar:** File, Edit, Selection, View, Go, Run, Terminal, Help.
- Editor:** The main editor window displays Java code for a class named `lab8main`. The code includes a `main` method that reads two integers from the user (Father's age and Son's age) and creates an instance of a `Son` class. It then calls the `Display` method on the `Son` object. If the Father's age is less than or equal to the Son's age, it throws a `WrongAge` exception with a specific error message.
- Terminal:** A terminal window titled "C:\WINDOWS\system32\cmd.exe" shows the execution of the Java program. It prompts the user for Father's age (45) and Son's age (35). The program prints both ages and then catches the `WrongAge` exception, outputting the error message: "Exception WrongAge: Father's Age is equal to or less than Son's Age".
- Status Bar:** Shows the file path "C:\Users\Appy\Desktop\java lab>lab8main.java", the current line "In 1, Col 1", and other settings like "Spaces: 4", "UTF-8", "CRLF", "Java", and the date/time "24-11-2020 15:20".

Lab Program-9 (week 11)

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

Date _____

Expt. No. Lab Program 09 Page No. _____

```
class NewThread implements Runnable{  
    Thread t;  
    String name;  
    long time;  
    NewThread(String name, long time){  
        this.name = name;  
        this.time = time;  
        t = new Thread(this, "Thread");  
        t.start();  
    }  
    public void run(){  
        try {  
            for (int i = 5; i > 0; i--) {  
                System.out.println(name);  
                t.sleep(time);  
            }  
        } catch (InterruptedException e) {  
            System.out.println("Thread Interrupted");  
        }  
    }  
}  
class LabProg9 {  
    public static void main (String args []){  
        NewThread T1 = new NewThread ("BMS College of  
Engineering", 10000);  
        NewThread T2 = new NewThread ("CSE", 2000);  
    }  
}
```

Teacher's Signature : _____

File Edit Selection View Go Run Terminal Help Labprog9.java - Visual Studio Code

Labprog9.java X

```
C: > Users > Appy > Desktop > java lab > Labprog9.java
 1 class NewThread implements Runnable
 2 {
 3     Thread t;
 4     String name;
 5     long time;
 6
 7     NewThread(String name, long time){
 8         this.name = name;
 9         this.time = time;
10         t = new Thread(this,"Thread");
11         t.start();
12     }
13     public void run(){
14         try{
15             for(int i=5;i>0;i--){
16                 System.out.println(name);
17                 t.sleep(time);
18             }
19         } catch(InterruptedException ie){
20             System.out.println("Thread Interrupted");
21         }
22     }
23 }
24
25 class Labprog9{
26     public static void main(String args[]){
27         NewThread N1 = new NewThread("BMS College of Engineering", 10000);
28         NewThread N2 = new NewThread("CSE",2000);
29     }
30 }
31 }
```

C:\WINDOWS\system32\cmd.exe — X
C:\Users\Appy\Desktop\java lab>javac Labprog9.java
C:\Users\Appy\Desktop\java lab>java Labprog9
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
C:\Users\Appy\Desktop\java lab>java Labprog9
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
C:\Users\Appy\Desktop\java lab>

Activate Windows
Go to Settings to activate Windows.

Ln 2, Col 2 Spaces: 4 UTF-8 CRLF Java ↻ 15:38 08-12-2020

0 0 △ 0

CCleaner is request...

Labprog9.java - Vis...

Meet - spj-foru-yxx...

bin

java lab

C:\WINDOWS\sys...

15:38 08-12-2020

Lab- 10 (week 13)

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.

Week -13		Date
Expt. No. Lab 10		Page No.
<pre>import java.awt.*; import java.awt.event.*; class MyDialog extends Dialog implements ActionListener { Prog1 p; MyDialog(Frame parent, String title){ super(parent, title, false); setLayout(new FlowLayout()); setSize(300, 150); p = (Prog1)parent; Button b = new Button("OK"); Label l = new Label("Error: " + p.error); add(l); add(b); b.addActionListener(this); } public void actionPerformed(ActionEvent ae){ dispose(); } public class Prog1 extends Frame implements ActionListener { TextField Num1, Num2; Button divide = new Button("Divide"); float res = 0; public String error = ""; public Prog1(){ setLayout(new FlowLayout()); Num1 = new TextField(1); } } }</pre>		
Teacher's Signature : _____		

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Num 2 = new TextField(7);
label Num 1L = new Label("Num1:", label.RIGHT);
label Num 2L = new Label("Num2:", label.RIGHT);
add(Num 1L);
add(Num 1L);
add(Num 2L);
add(Num 2L);
add(divide);
divide.addActionListener(this);
addWindowListener(new WindowAdapter());
}

public void actionPerformed(ActionEvent ae){
    if (ae.getSource() == divide){
        try {
            int n1 = Integer.parseInt(Num1.getText());
            int n2 = Integer.parseInt(Num2.getText());
            if (n2 <= 0) {
                throw new ArithmeticException("Error");
            }
            res = (float) n1 / n2;
            repaint();
        } catch (NumberFormatException exception) {
            System.out.println(exception);
            res = 0;
            error = "Entered number is not an integer!";
            repaint();
        } catch (ArithmeticException exception) {
            System.out.println(exception);
            res = 0;
        }
    }
}

```

error = "You tried to divide by zero";
 repaint();

}
 if (ored == 0) {

System.out.println(this.error);

myDialog d = new myDialog(this, "Error");
 d.setVisible(true);

}
 }
 }

public void paint (Graphics g) {
 g.drawString ("Result:" + string.valueof(ored), 20,
 100);

}

public static void main (String [] args) {

Prog1 p = new Prog1();

p.setSize (new Dimension (400, 250));

p.setTitle ("Divide");

p.setVisible (true);

}

class winAdapter extends windowAdapter {

public void windowClosing (WindowEvent we) {
 System.exit (0);

}
 }

