LAB RECORD

NAME : Nitish kumar.M

USN : 1BM19CS107

SEM : 3

SECTION : B

SUBJECT : Object Oriented Java Programming (OOJ)

TEST : 1 and 2

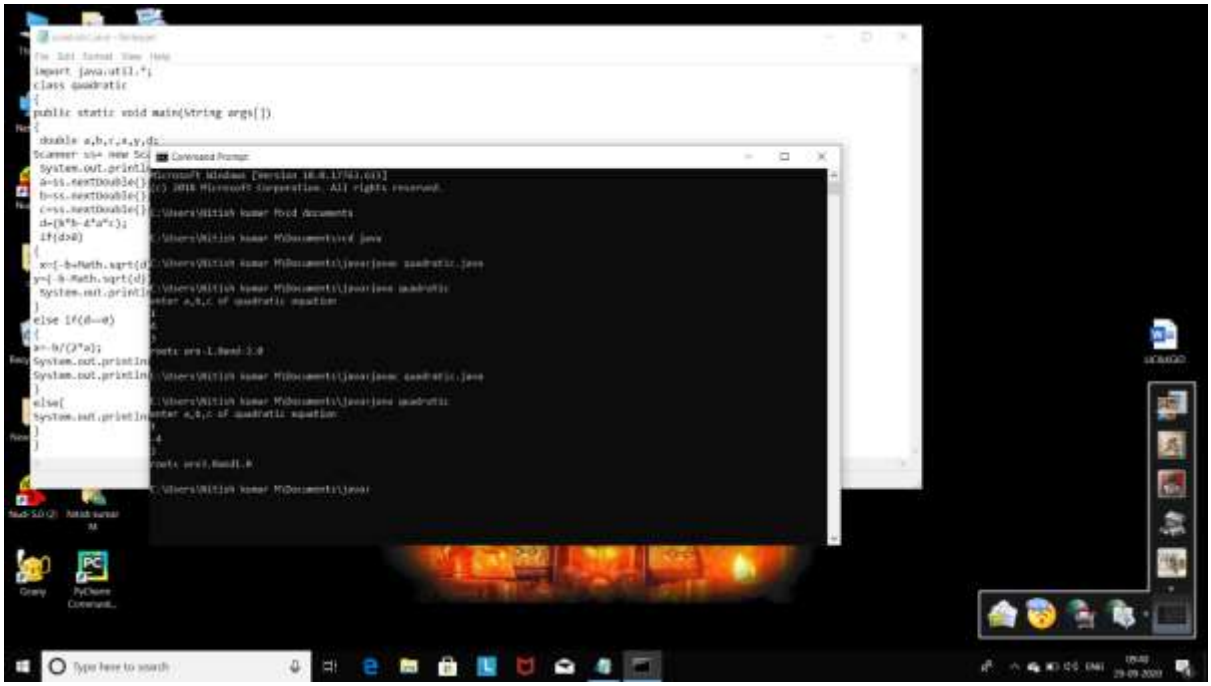
LAB 1:

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.

Quadratic equation

Nitish Kumar.M
1BM19CS107
B3

```
import java.util.*;
class quadratic
{
 public static void main(String args[])
 {
 double a,b,c,x,y,d;
 Scanner ss = new Scanner(System.in);
 System.out.println ("enter a,b,c of quadratic equation");
 a = ss.nextDouble();
 b = ss.nextDouble();
 c = ss.nextDouble();
 d = (b*b - 4*a*c);
 if (d>0)
 {
 x = (-b + Math.sqrt(d))/(2*a);
 y = (-b - Math.sqrt(d))/ (2*a);
 System.out.println("roots are" + x + "and" + y);
 }
 else if(d==0)
 {
 x =-b/(2*a);
 System.out.println("roots are equal");
 System.out.println("roots is" + x);
 }
else {
System.out.println("roots are imaginary"); }
 }
}
```



LAB 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:

```
import java.util.Scanner;
class Student {
  private String name, usn;
  private double marks[] = new double[7]
  private double credits[] = new double [7]
  private double total=0, a=0.0, totalCr=0.0, totalmarks=0.0;

void getdetails(){

Scanner input = new Scanner(System.in);
System.out.println("Enter your USN:");
  usn = input.next();
System.out.println("Enter your name:");
  name = input.next();
 for(int i=0; i<7; i++)
 {
  System.out.println("Enter marks and credits of Subject"+(i+1));
     marks[i] = input.nextDouble();
     Credits[i] = input.nextDouble();
   }
  }

void displaydetails(){
  System.out.println("USN: "+usn);
  System.out.println("Name: "+name);
 }
```

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```
void sgpa(){
  for(int i=0 ; i<7 ; i++)
  {
  total = total + marks[i] ;
  }
  for(int i=0; i<7 ; i++)
  {
   if(marks[i] >=90)
       a=10.0 ;
  else if(marks[i]>=80 && marks[i]<90)
       a= 9.0 ;
  else if(marks[i] >=70 && marks[i]<80)
       a=8.0 ;
  else if(marks[i] >=60 && marks[i] <70)
       a= 7.0 ;
  else if(marks[i] >=50 && marks[i] <60)
       a=6.0 ;
  else if(marks[i] >=40 && marks[i] <50)
       a=5.0 ;
     else
       a=0.0 ;
  }
   for(int i=0 ; i<7 ; i++)
   {
    total += credits[i] ;
    total mc += (marks[i] * credits[i]) ;
   }
  System.out.println(" Your sgpa is " + (totalmc/totalcredits*10)) ;
  }
}
```

Teacher's Signature : _____

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```
class StudentSGPA
{
public static void main(String[]args)
{
  Student s1 = new Student();
    S1.getdetails();
    S1.displaydetails();
     S1.sgpa();
  }
}
```

```
Command Prompt

E:\java\bin>java StudentSGPA
Enter your USN :
1
Enter your Name :
I
Enter the marks and credits of subject1
90
5
Enter the marks and credits of subject2
90
5
Enter the marks and credits of subject3
90
5
Enter the marks and credits of subject4
90
5
Enter the marks and credits of subject5
90
5
Enter the marks and credits of subject6
90
5
Enter the marks and credits of subject7
90
5
USN : 1
NAME : I
Your SGPA is : 9.0

E:\java\bin>
```

LAB 3:

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

(20)

```
import java.util.*;
class book {
  public string
bookid, booktitle, author, publisher;
 public  double price;
public  int no_of_pages, year_of_pub;
 void  AcceptBookDetails() {
  Scanner in= new Scanner(System.in);
 System.out.println("Enter bookid, booktitle, author & publisher
                    of book");
            bookid = in.next();
            booktitle = in.next();
            author = in.next();
            publisher = in.next();
   System.out.println("Enter no_of_pages, year_of_pub &
                       price");
    no_of_pages = in.nextInt();
    year_of_pub = in.nextInt();
     price = in.next Double();
     }
   void DisplayBookDetails() {
    system.out.println(bookid + ": "+booktitle+"; "+author+"; "+
                       publisher+"; "+year_of_pub+"; "+no_of_pages+
                  "+price);
              }
           }
class aboutBook{
    public static void main(String[] args) {
    Scanner in = new Scanner (System.in);
      int c=0;
      book b[] = new book[3];
```

Page No. .....

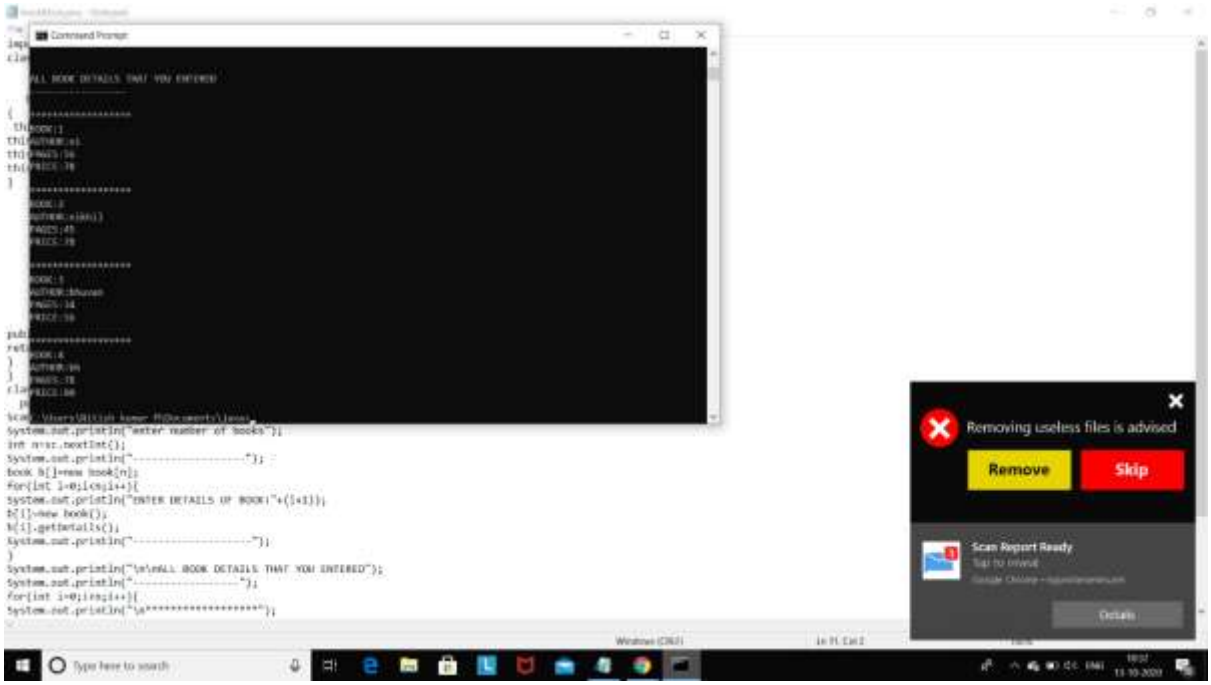
```
for(int i=0; i<3; i++){
  b[i] = new book();
  b[i].AcceptBookDetails();
  }
for(int i=0; i<3; i++){
  b[i].DisplayBookDetails();
}
System.out.println("Enter Author Name");
String aut = in.next();
    for(int i=0; i<3; i++){
  if(b[i].author==aut){
    b[i].DisplayBookDetails();
  }
  }
double price = b[0].price;
for(int i=0; i<3; i++){
  if(b[i].price > price)
    price = b[i].price;
  }
System.out.println("The most expensive price of book is"+price);
  for(int i=0; i<3; i++){
  if(b[i].year_of_pub == 2020)
    c++;
  }
System.out.println("no of books published in year 2020 = "+c);
  int page = b[0].no_of_pages;
  for(int i=0; i<3; i++){
  if(b[i].no_of_pages < page)
  page = b[i].no_of_pages;
}
```

Teacher's Signature : .....

System.out.println("no of pages in book with least number of pages is " + page);

}

}



LAB 4:

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named 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 4

```
import java.util.*;

abstract class shape
{
abstract double printArea();
double a,b;
}

class Triangle extends shape
{
Triangle(double x,double y) {
 a=x;
 b=y;
 }
double printarea()
{
System.out.println("area of triangle ->");
 return a*b;
 }
}
class Rectangle extends shape
{
Rectangle(double x, double y)
 {
 a=x;
 b=y;
 }
 double printArea(){

 System.out.println("area of Rectangle ->");
  return a*b/2;
}
}
```

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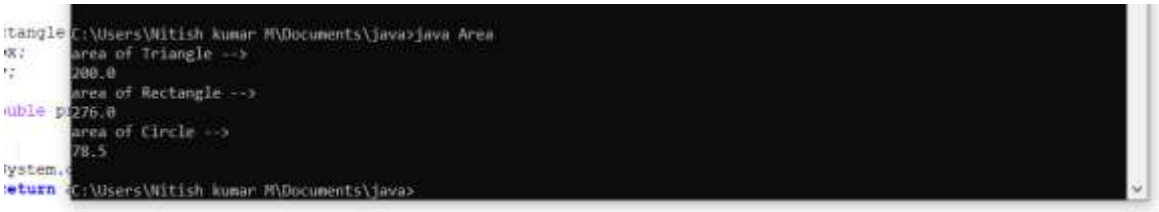
```
class circle extends shape
{
Circle (double x ){
    a=x ;
  }
double printArea ()
{
System.out.println("area of circle --> ");
return 3.14*a*a;
}
}
class Area
{
 public static void main(String[] args)
{
Triangle t = new Triangle (10,20);
Rectangle r = new Rectangle (23,24);
 Circle c = new Circle (5);

System.out.println(t.printArea());
System.out.println(r.printArea());
System.out.println(c.printArea());
}
}
```



LAB 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 5.

```
import java.util.Scanner;
class bank{
    String bankname;
}.

class account extends bank{
Scanner sc = new Scanner (System.in);
String name, acctype;
double accnum;
double saccnum, caccnum;
double ci;
double rate, principal, year;

 void setdC){
     System.out.println("Customer name:");
     name = sc.next();
   System.out.println("Account type:");
   acctype = sc.next();
    System.out.print("Account number:");
    accnum = sc.nextDouble();
    System.out.print("Savings Acc num:");
     saccnum = sc.nextDouble();
     System.out.print("Current Acc num:");
      caccnum = sc.nextDouble();
    System.out.println("enter Principal amount:");
       principle = sc.nextDouble();
       System.out.println("rate % interest:");
        rate = sc.nextDouble();
          }
        }
```

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```
class savings extends account1 {
    Scanner sc = new Scanner(System.in);
    double deposit, withdraw, pbalance1, borrow, lend,
    rate1, years1, rate2, years2, ci;
    double cid, cib;
    void setd1() {
        System.out.println("In ... Savings Account::");
        System.out.print("present Balance:");
        pbalance1 = sc.nextDouble();
        System.out.print("Deposited:");
        deposit = sc.nextDouble();
        System.out.print("withdrawn:");
        withdraw = sc.nextDouble();
        pbalance1 = (pbalance1 + deposit) - (withdraw);
    }

    void compint() {
        System.out.println("In *** Details of lend amount");
        System.out.print("Enter amount Deposited:");
        lend = sc.nextDouble();
        System.out.print("rate of deposition:");
        rate1 = sc.nextDouble();
        System.out.print("no of years deposited:");
        years1 = sc.nextDouble();
        System.out.println("In *** Details of borrowed Amount");
        System.out.println("Enter Amount borrowed:");
        borrow = sc.nextDouble();
        System.out.print("rate of borrowed:");
        rate2 = sc.nextDouble();
```

Teacher's Signature: _____

```
System.out.print("NO of years borrowed : ");
year2 = Sc.nextDouble();
cib = borrow*(Math.pow(1 + (rate2*0.01), year2));
cid = lend * (Math.pow(1 + (rate1 *0.04), years));
if(cid>cib){
ci= cid-cib;
pbalance1 = pbalance1+cid;
System.out.print("\n-- Acc Balance -- " + pbalance1);
}
else if(cib>cid){
ci = cib-cid;
pbalance1 = pbalance1 -cib;
System.out.print("\n --- Acc Balance ---: " + pbalance1);
}
else
System.out.println("comp int is zero and account
balance is :" + pbalance1);
}
}

class Current extends accounts {
Scanner Sc = new Scanner(System.in);
double deposit, withdraw, pbalance2, min;
void setd2() {
System.out.println("\n--- current account ---");
System.out.print("present Balance : ");
pbalance2 = Sc.nextDouble();
System.out.print("Deposited : ");
deposit = Sc.nextDouble();
```

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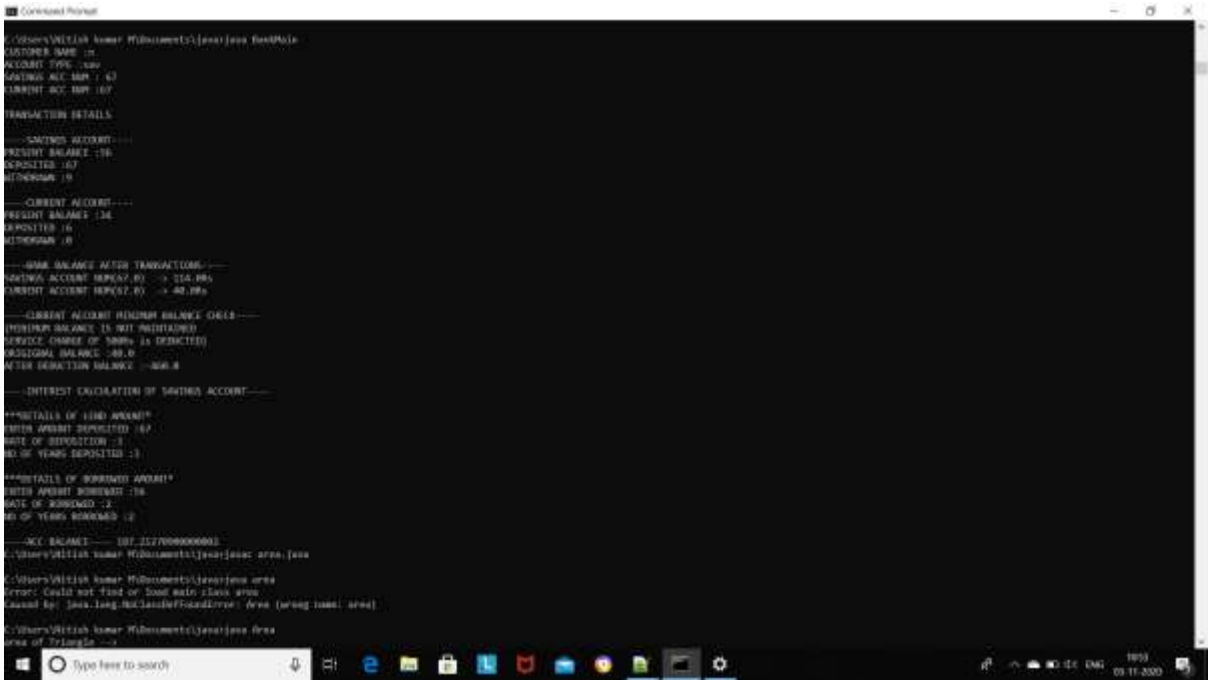
```
System.out.print("withdrawn:");
withdraw = sc.nextDouble();
pbalance2 = (pbalance2 + deposit) - (withdraw);
}
void checkmin(){
    min = 2000;
if(pbalance2 >= 2000){
System.out.println("Minm balance is maintained and acc balance
                    is :" + pbalance2); }.
else if(pbalance2 < 2000){
 System.out.println("minim balance is not maintained");
 System.out.println("Service charge of 500 rs is deducted
 System.out.println("original balance :" + pbalance2);
   pbalance2 = pbalance2 - 500;
 System.out.println("After deduction balance is" + pbalance2);
 }
 else
  System.out.println("invalid amount in bank");
}
}
```

Teacher's Signature : _____

Expt. No. _____ Page No. _____

```
class BankMain{
  public static void main(String ss[]){
  Scanner sc = new Scanner(System.in);
  account a = new account1();
  Savings s = new savings();
  current c = new current();
    a.setd();
  System.out.println("\nTransaction details");
    s.setd1();
  c.setd3();
  System.out.println("\n--- Bank balance after transaction---");
  System.out.println("Savings account num("+a.saccnum+")"+"
                    "+s.pbalance1+"Rs");
  System.out.println("current account num("+a.caccnum+")"+"
                    "+c.pbalance2+"Rs");
  System.out.println("\n--- Want account minimum balance");
    c.checkmain();
  System.out.println("\n--- interest calculation of
                    Savings account.");
    s.compint();
  }
}
```

Teacher's Signature : _____



Lab 6

:Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class Internals has an array that stores the internal marks scored in 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.

(180-185) WK-26

29 JUNE • SATURDAY

MAY 2019

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1BM19CS107

```
package CIE;
import java.util.*;
    public class student {
Scanner in = new Scanner(System.in);
public String name, usn;
    public int sem;
    public void Accept(){
System.out.println("Enter name & usn of
                    a student");
    name = in.nextLine();
     usn = in.next();
System.out.println("Enter Sem of
                    student");
    Sem = in.nextInt();
    }
}
```

30 SUNDAY

2019

"If you're presenting yourself with

```
package CIE;
public class Internals extends Student {
public int cieMarks[] = new int[5];
public void Acceptcie() {
    for(int i=0; i<5; i++) {
System.out.println("Enter cie marks of
                                Subject "+(i+1));
cieMarks[i] = in.nextInt();
    }
}
}
```

2019

```
package SEE;
import CIE.*;
public class externals extends CIE.Student
Scanner in = new Scanner(System.in);
public int Seemar[] = new int[5];
    public void AcceptSee(){
    for(int i=0; i<5; i++)
    System.out.println("Enter SEE marks in
                        Subject "+(i+1));
    Seemar[i] = in.nextInt();
    }
}
}
```

02

```
import CIE.*;
import SEE.*;
import java.util.*;
class totalmarks{
public static void main(String args[]){
Scanner in = new Scanner(System.in);
int n, tot=0;
System.out.println("Enter numbers of Student");
n=in.nextInt();
CIE.internals[] = new CIE.internals[n];
SEE.externals[] = new SEE.externals[n];
for(int i=0;i<n;i++)
{
I[i] = new CIE.internals();
E[i] = new SEE.externals();
I[i].Accept();
I[i].Acceptcie();
E[i].AcceptSee();
}
for(int i=0;i<n;i++){
System.out.println("Student"+(i+1));
System.out.println("Name:"+I[i].name
+"USN:"+I[i].usn+
"Sem:"+I[i].sem);
```

2019

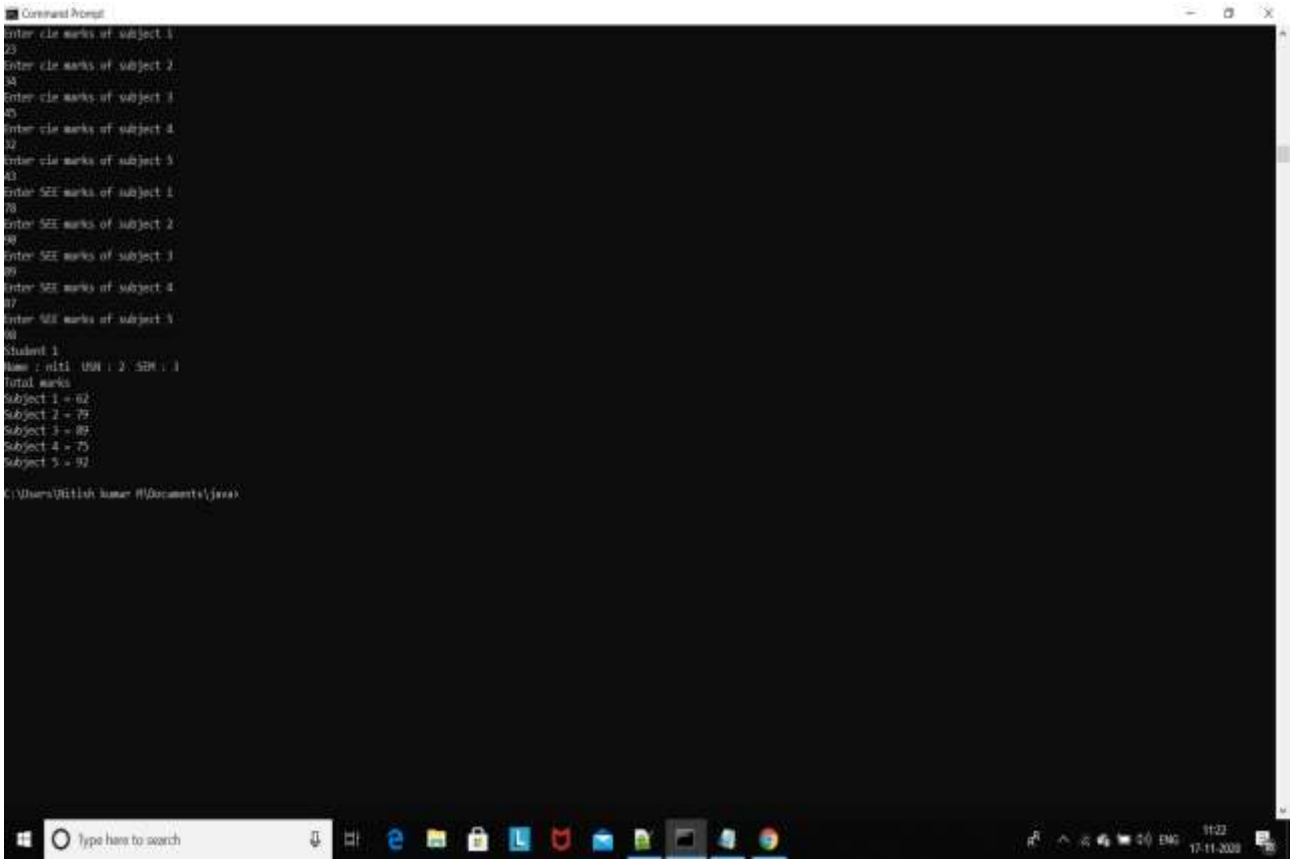
(184-181) WK-27

03 JULY • WEDNESDAY

JUNE 2019

S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

```
System.out.println("Total marks");
for(int j=0; j<5; j++)
    tot = I[i].riemar[j] + (E[i].seemas[j]/2);
System.out.println("Subject "+(j+1)+" "
                   + tot);
}
}
}
```



lab7.

Write a program to demonstrate generics with multiple object parameters.

WEDNESDAY • JUNE 05

WK-23 (156-209)

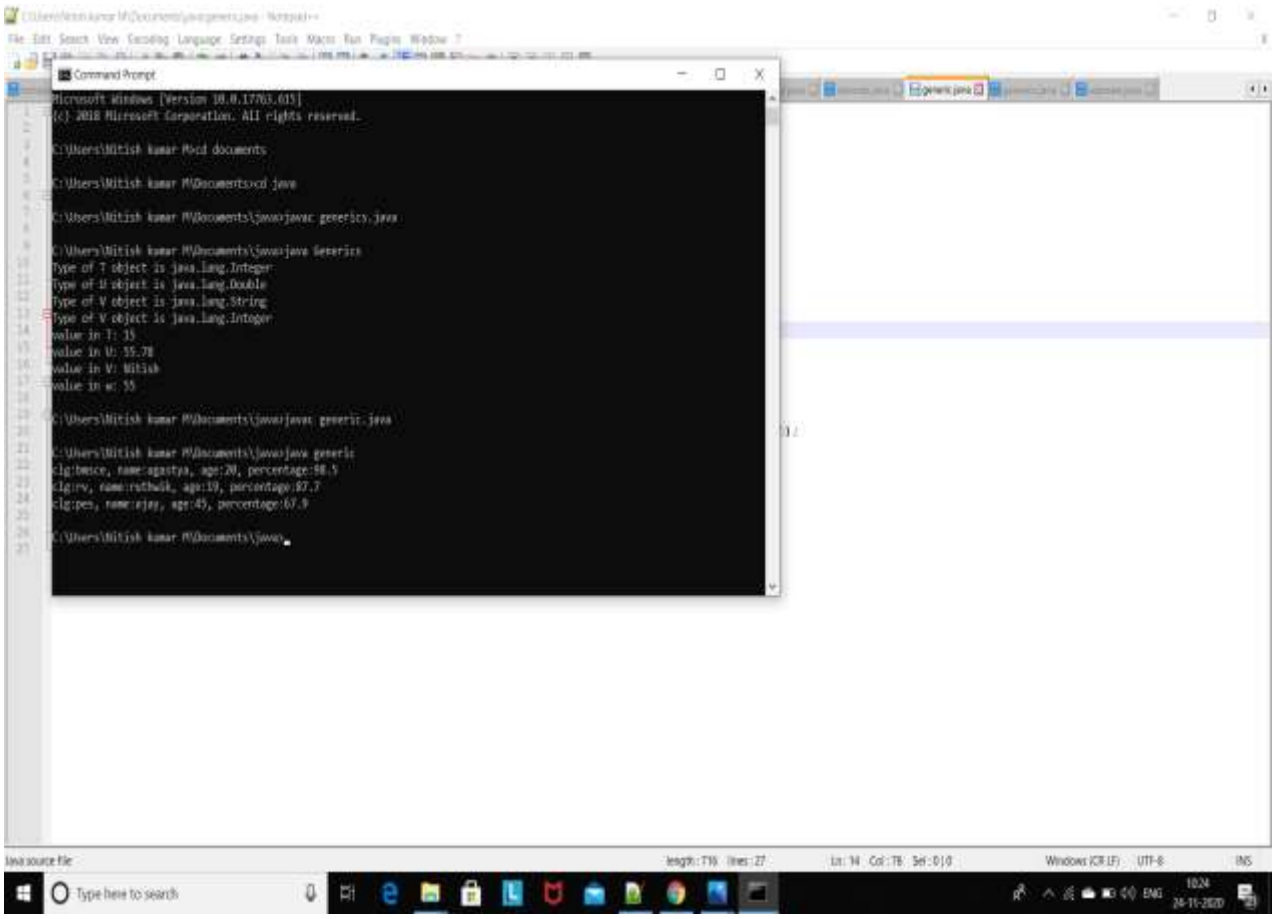
1BM19CS107

```
class Student3<T,S,R,P>{
T x;
S y;
R z;
P u;
Student3(T x, S y, R z, P u){
this.x=x;
this.y=y;
this.z=z;
this.u=u;
}
public void display()
{
System.out.println("clg:"+this.x+", "+
name:"+this.y+u, "+"age:"+this.z+", "
+"percentage:"+this.u);
}
}
Public class generic{
Public static void main(String args[])
{
Student3<String, String, Integer, Double> std1
=new Student3<String, String, Integer, Double>
("bmsce", "ageshya", 2028, 98.5);
```

If you want to make an easy job seem mighty hard, just keep putting off doing it. ~ Olin Miller

06 JUNE • THURSDAY


```
Student3<String, String, Integer, Double> std2
    = new Student3<String, String, Integer,
                   Double>
    ("YV", "ruthwik", 19, 87.7);
Student3<String, String, Integer, Double> std3
    = new Student3<String, String, Integer,
                   Double>
    ("yes", "ajay", 45);

std1.display();
std2.display();
std3.display();
}
}
```



lab8.

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.

25 JUNE • TUESDAY

IBM19CS107


```
import java.util.Scanner;
class Wrongage extends Exception{
    int age;
    Wrongage(int x)
    {
     age=x;
    }
public String toString()
{
return "age of SON = " +age" is Entered incorrecely");
}
}
class father
{
 int a;
 father(int x)
 {
 a=x;
 }
 }
```

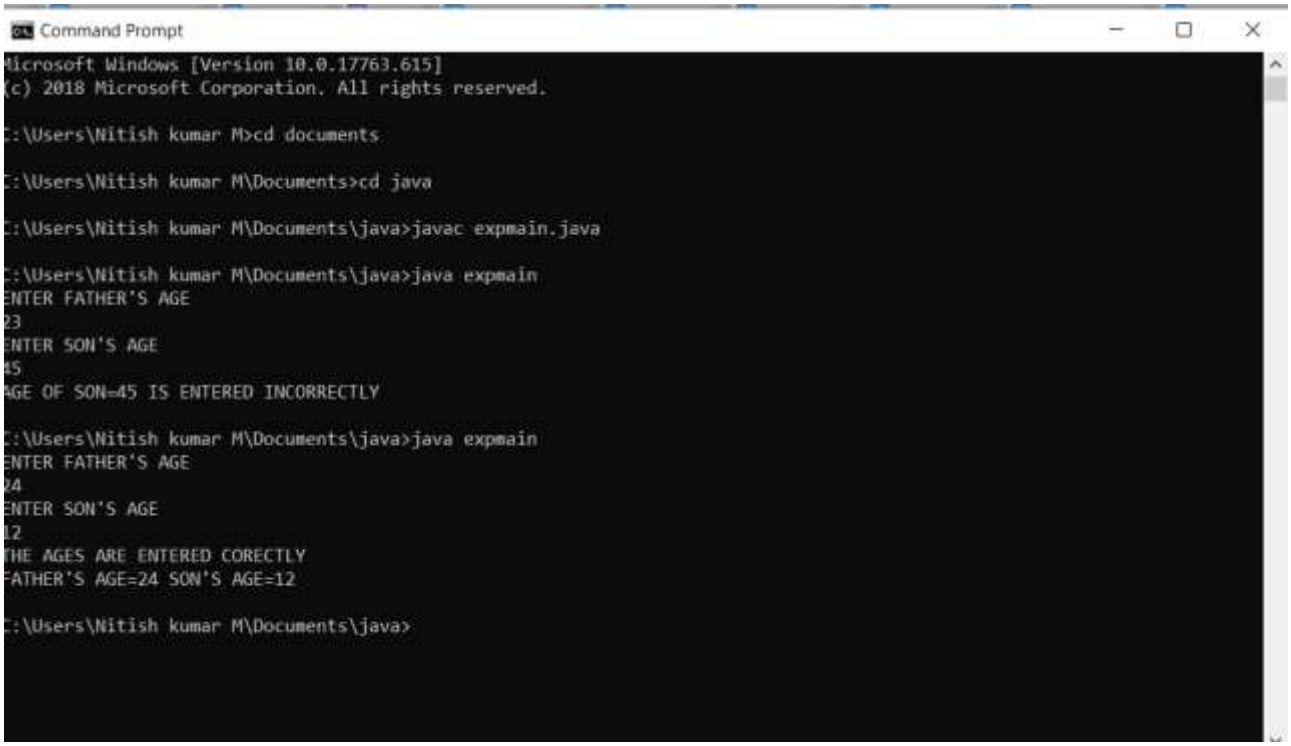

Don't be satisfied with stories, how things have gone with others. Unf... " Rumi

```
class son extends father{
    int age;
    son(int fage, int sage){
    super(fage);
     age = sage;
  }
void compute() throws Wrongage{
   if(age>=a)
   {
    throw new WrongAge(age);
  }
else{
   System.out.println("The ages are entered
                                  correctly");
System.out.println("Father's age="+"
                  "+"son's age="+age);
  }
}
}
```

27 JUNE • THURSDAY

```
class expmain
    public static void main (String args[])
{
Scanner s = new Scanner(System.in);
System.out.println("Enter Father's age");
    int f = s.nextINT();
System.out.println("Enter Son's age");
    int so = s.nextINT();
Son ss = new son (f, so);
    try {
      ss.compute();
    }
    catch (Wrongage e)
      {
      System.out.println(e);
      }
  }
}
```


The deepest feeling always shows its



Lab 9

Write a program which creates two threads, one thread displaying “BMS College of

Engineering” once every ten seconds and another displaying “CSE” once every two seconds.

22 | Thread

1BM19CS107.

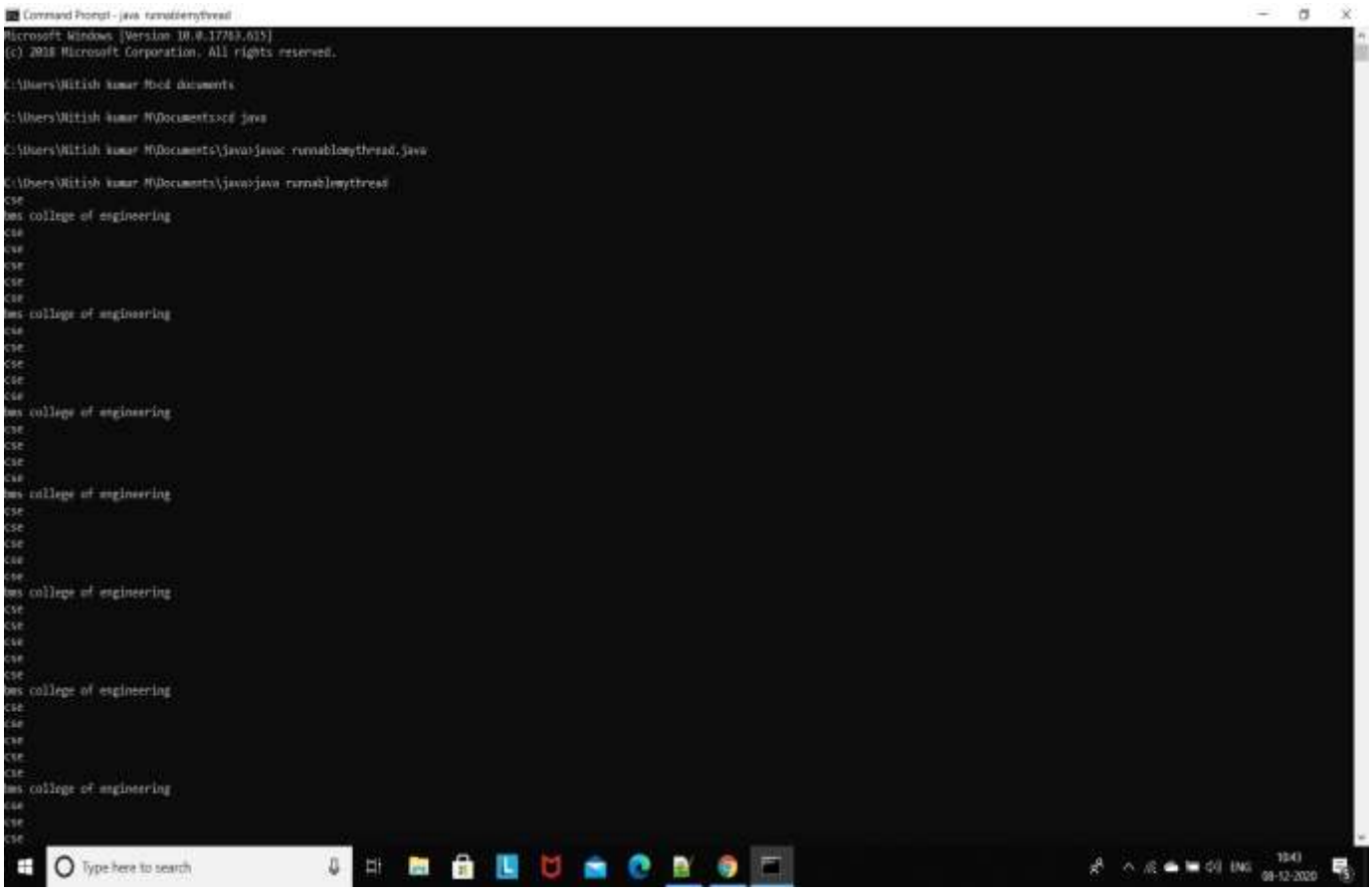
```
9  class bmsce implements Runnable
   {
10 public void run()
   {
11 while (true)
   {
12 System.out.println("bms college of enginerg");
   try{
1  Thread.sleep(1000);
   }
2  catch (Exception e)
   {}
3  }
   }
4  }
   class runnablemythread{
5  public static void main (String args[])
   {
6  bmsce b1 = new bmsce();
   Thread t1 = new Thread(b1);
   while (true)
   {
   System.out.println("cse");
```

2019

"I attribute my success to this: I never gave or took any excuse." – Florence Nightingale

FRIDAY • AUGUST 23

```
try {
    Thread.sleep(row);
  }
catch (Exception e) {}
  }
  }
  }
t1.start();
}
```



Lab 10:

Write a program that creates a user interface to perform integer divisions. The user enters two

numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the

Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program

would throw a NumberFormatException. If Num2 were Zero, the program would throw an

Arithmetic Exception Display the exception in a message dialog box.

01 APRIL • MONDAY

1BM19CS109

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

public class DivisionExample extends
    Frame implements ActionListener {
    String msg;
    TextField num1, num2, res;
    Label l1, l2, l3;
    Button div;

    public DivisionExample() {
        setLayout(new FlowLayout());
        l1 = new Label("Number1");
        l2 = new Label("Number2");
        l3 = new Label("Result");
        num1 = new TextField(10);
        num2 = new TextField(10);
        res = new TextField(10);
        div = new Button("Divide");
```

2019

```
add(l1);
add(num1);
add(l2)
add(num2);
add(l3);
add(res);
   add(div);
      div.addActionListener(this);

addWindowListener(new WindowAdapter(){
public void WindowClosing(WindowEvent we){
   System.exit(0);
  }
  });
}

public void ActionPerformed(ActionEvent ae)
  {
  String arg = ae.getActionCommand();
  double num1=0, num2=0;
if(arg.equals("Clicl"))
  if(this.num1.getText().isEmpty() &&
    this.num2.getText().isEmpty())
```

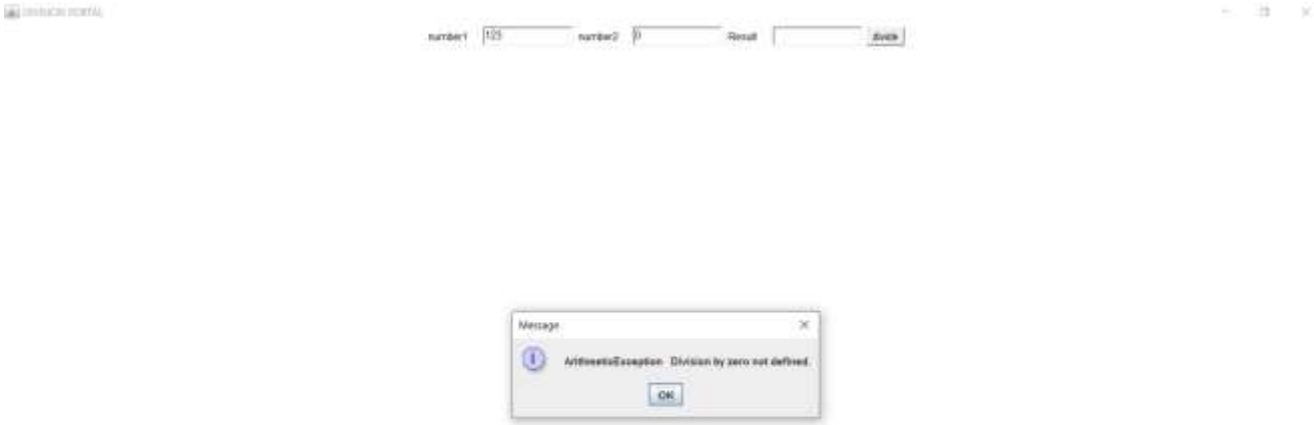
```
{ msg = "Enter a valid number!!";
  repaint();
}
else {
try {
num1 = Double.parseDouble(this.num1.getText());
num2 = Double.parseDouble(this.num2.getText());
try {
  if(num2==0)
  {
    int a=12/0;
  }
  double num3 = num1 / num2;
res.setText(String.valueOf(num3));
msg = "operation Successful(!!)";
repaint();
}
catch (ArithmeticException e) {
System.out.println("Can't be divided by zero");
res.setText("");
msg = "Can't divided by zero";
repaint();
}
}
catch (NumberFormatException ex)
```

```
        {
        System.out.println(ex);
          res.setText(" ");
           msg = "Number Format Exception - Non Numeric";
          repaint();
        }
      }
    }
  }

public void paint(Graphics g) {
    g.drawString(msg, 30, 30);
  }

public static void main(String args[])
{
DivisionExample a = new DivisionExample();
  a.setSize(new Dimension(250,150));
   a.setTitle("Division portal");
   a.setVisible(true);
  }
}
```

2019

Innovation distinguishes between a leader and a follower. --Steve Jobs


DIVISION PORTAL
number1
123
number2
10
Result
12
divide
operation done


number1
number2
Result
divide
Message
OK


number1
number2
Result
divide
Can't be divided by Zero
Message
OK

*******THE END*******