VARSHA.S

**1BM19CS179**
**'3D'BATCH-1**

# OOJ LAB PROGRAMS

## 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

**WRITEUP:-**

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OOJ Lab-1

```
import java.util.Scanner;
import java.lang.*;
class Quadratic
{
public static void main(String[] args)
{ double a,b,c, r1, r2, d;

  Scanner scan = new Scanner(System.in);
System.out.println("enter the coefficients of
                    the quadratic equation a,b & c\n");
    a = scan.nextDouble();
    b = scan.nextDouble();
    c = scan.nextDouble();

  d = b*b - (4*a*c);
  if (d<0)
{ System.out.println("There are no real
        solutions for this quadratic equation\n");
  System.exit(0); }
r1 = (-b + Math.sqrt(d))/(2*a);
r2 = (-b - Math.sqrt(d)/(2*a);
if (d==0)
{System.out.println("The solutions are real
                    and equal to" + r1);
}
else
{ System.out.println("The real solutions
                    are\n" +r1 + "and " +r2;}

}

}
```

**OUTPUT:-**


# 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

**WRITEUP:-**

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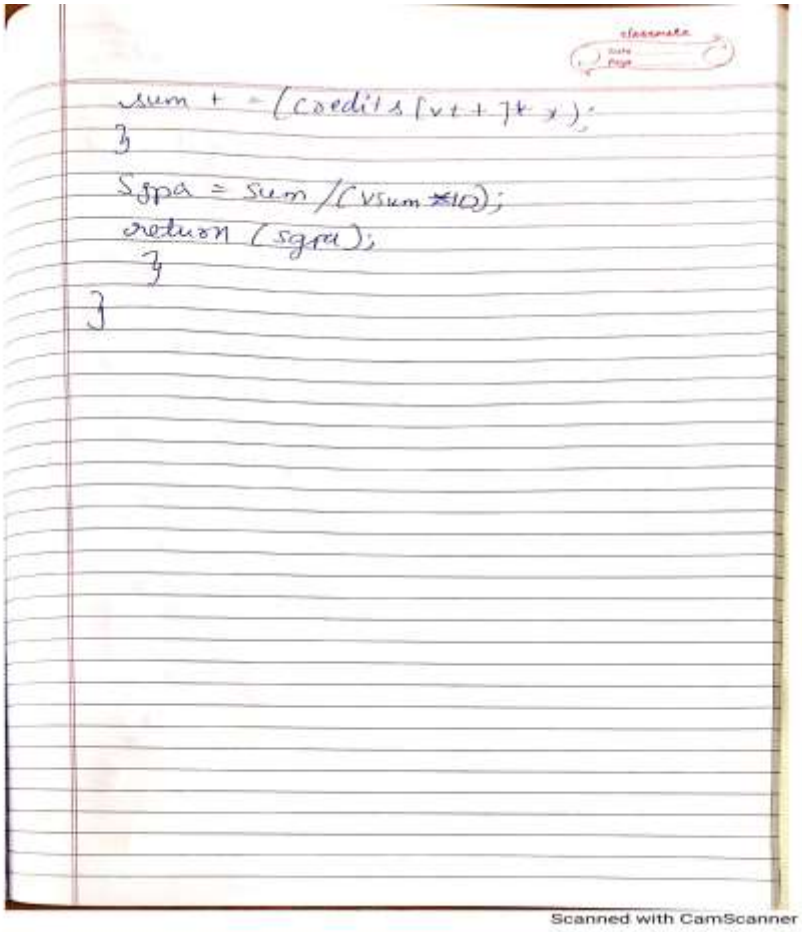
Lab - 2

```
import java.util.*;
public class student {
        public static void main(String args[]){
            int usn, n;
            int sgpa, sum = 0, msum = 0;
            int [] credits;
            int [] marks;
            String name;
        Scanner sc = new Scanner(System.in);
System.out.println("Enter the number of subjects");
 n = sc.nextInt();
 credits = new int[n];
 marks = new int[n];
System.out.println("Enter the name of the student");
 name = sc.next();

System.out.println("Enter the USN of the student");
   USN = sc.nextInt();
for(int i=0; i<n; i++)
{
system.out.println("Enter the credits and marks of the subject"+(i+1));
credits[i] = sc.nextInt();
 marks[i] = sc.nextInt();
}
 Student1 S1 = new Student1();
 for(int x : credits {
       Sum += x;}
```

```
for (int y : marks){
    msum += y;}

S1.accept(usn, credits, marks, name);
Sgpa = S1.findSgpa(sum);
S1.display(msum, Sgpa);

    }

}
Class Student1{

    int usn;
    int[] credits = new int[100];
    int[] marks = new int[100];
    String name;
void accept(int usn, int[] credits, int[] marks,
                                    String name){

    this.usn = usn;
    this.credits = credits;
    this.marks = marks;
    this.name = name;
}
void display(double tot, int Sgpa){

System.out.println("\nName: "+name+" USN:"
"1"+usn+"\nTotalmarks: "+tot+"\nSgpa: "+Sgpa);
}
int findSgpa(int v sum){
int sgpa; int sum=0, v=0;
for(int x : marks){
```



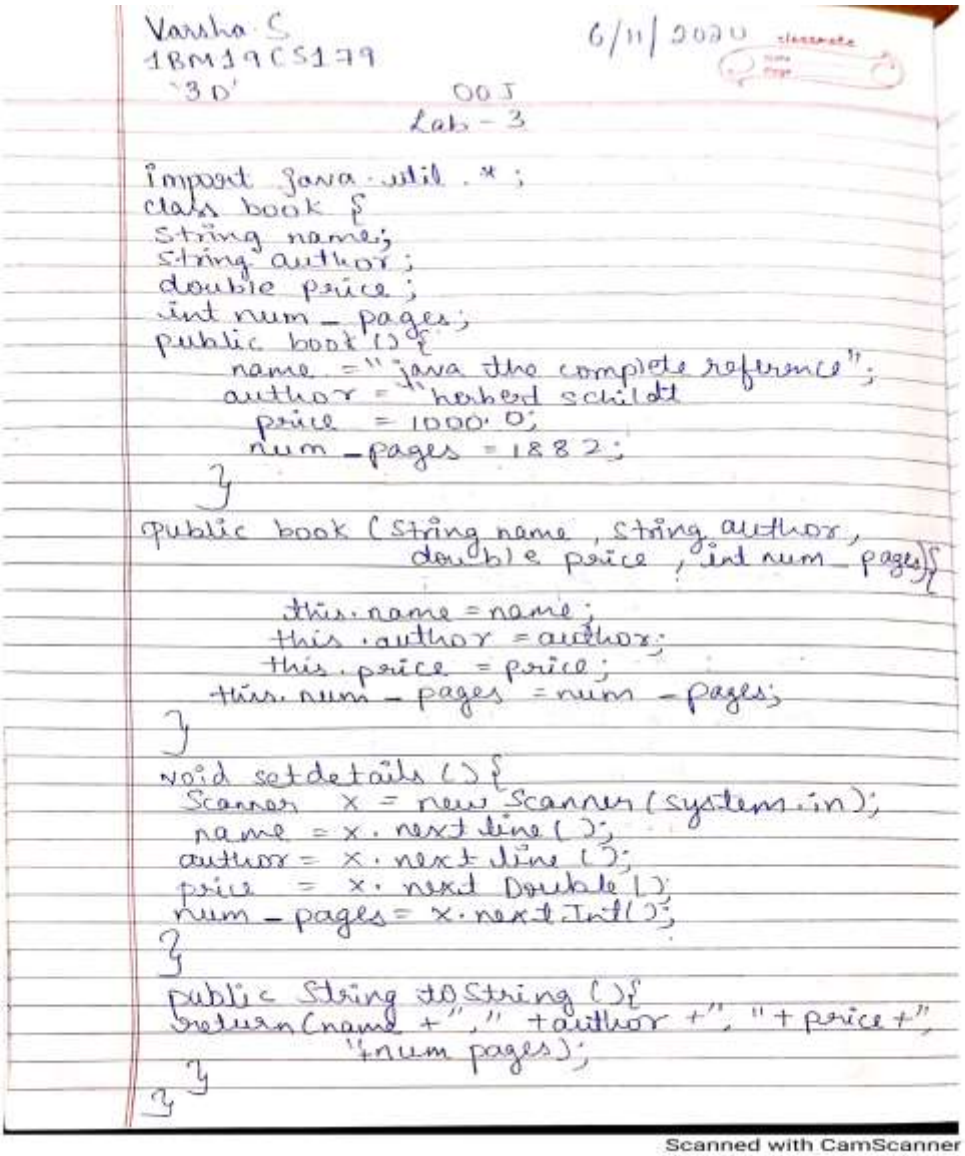

**OUTPUT:**

```
E:\>cd java

E:\Java>javac abs.java

E:\Java>java abs
The area of rectangle is: 12
The area of triangle is: 6
The area of circle is: 28

E:\Java>
```

# 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.

**WRITEUP:-**



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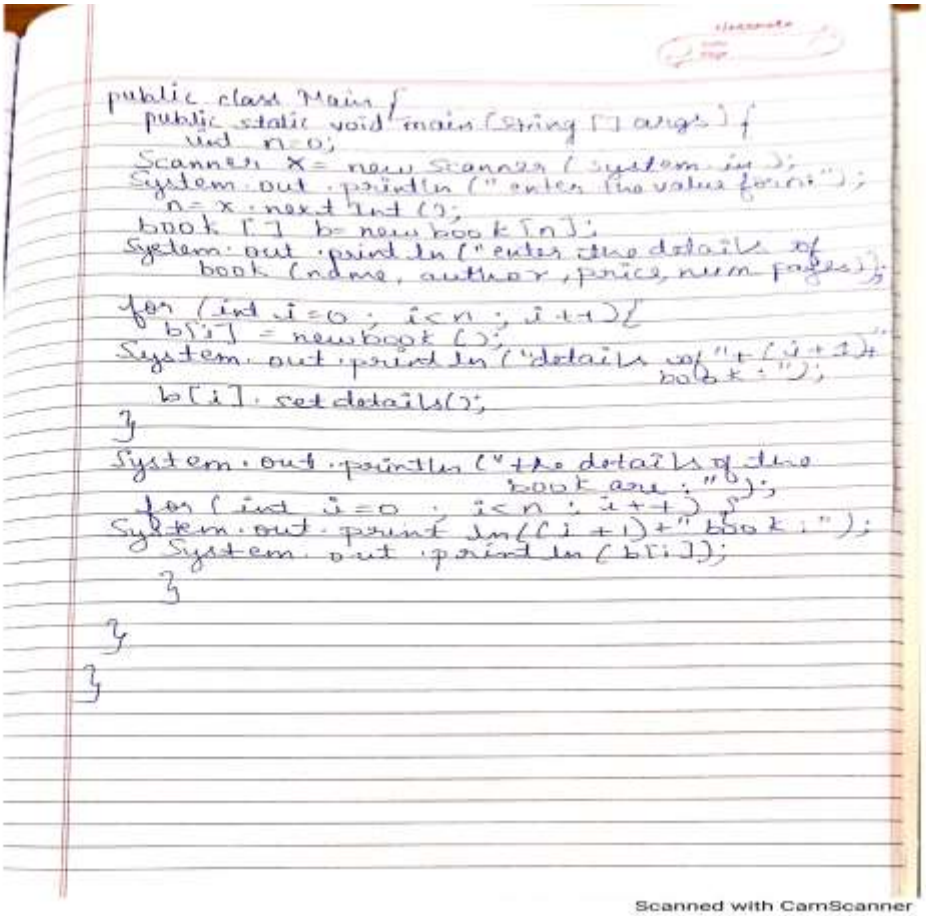
Lab - 3

```
import java.util.*;
class book {
String name;
String author;
double price;
int num_pages;
public book(){
    name = "java the complete reference";
    author = "herbert schildt
    price = 1000.0;
    num_pages = 1882;
}
public book(String name, String author,
                double price, int num_pages){
    this.name = name;
    this.author = author;
    this.price = price;
    this.num_pages = num_pages;
}
void setdetails(){
Scanner x = new Scanner(System.in);
name = x.nextline();
author = x.nextline();
price = x.nextDouble();
num_pages = x.nextInt();
}
public String toString(){
return(name + "," + author + "," + price + ","
        "+num pages);
}
}
```



```
public class Main {
    public static void main(String [] args) {
        int n=0;
        Scanner x= new Scanner (System.in);
        System.out.println("enter the value for n:");
        n= x.nextInt();
        book [] b= new book[n];
        System.out.println("enter the details of
            book (name, author, price, num_pages)");
        for (int i=0; i<n; i++){
            b[i] = new book();
            System.out.println("details of "+(i+1)+
                                    "book:");
            b[i].setdetails();
        }
        System.out.println("the details of the
                                    books are:");
        for (int i=0; i<n; i++) {
            System.out.println((i+1)+"book:");
            System.out.println(b[i]);
        }
    }
}
```

Scanned with CamScanner

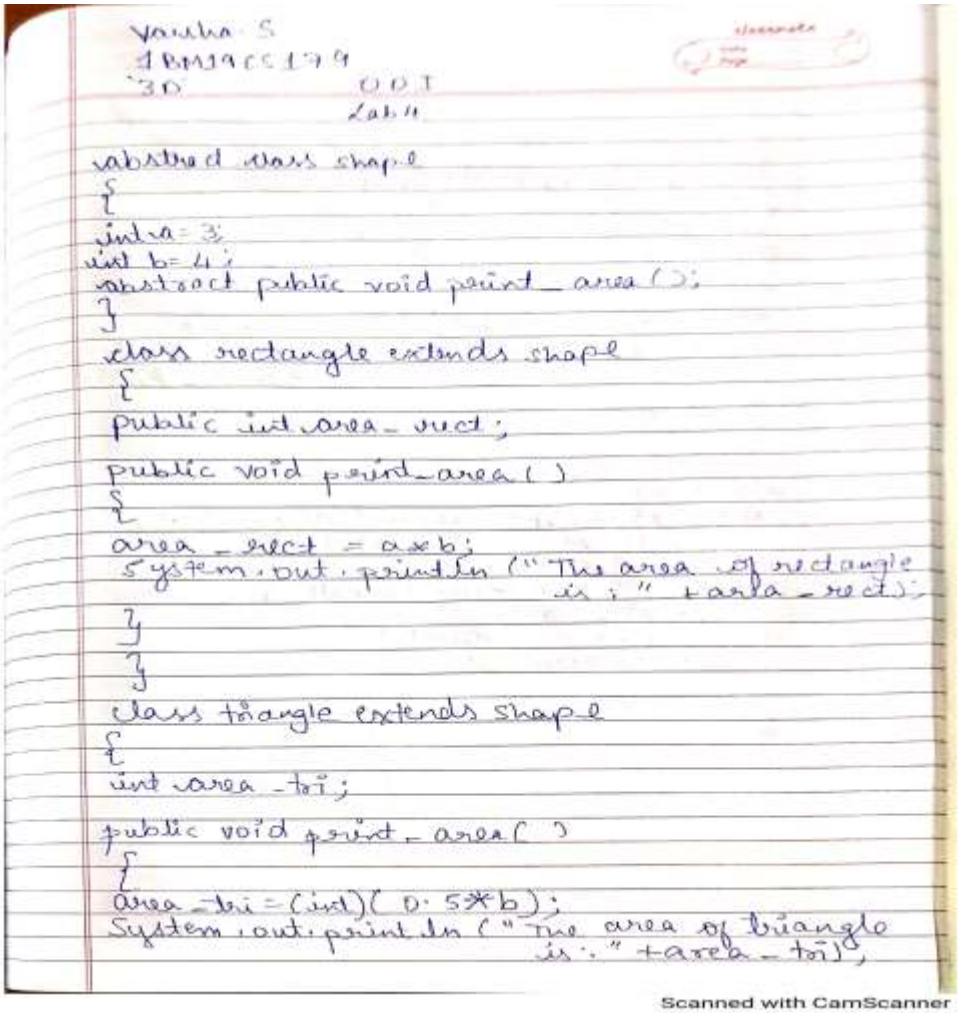
**OUTPUT:-**

```
E:\Java>java Main
enter the value for n:2
enter the details of book(name,author,price,num_pages)
details of 1 book:
java the complete reference
herbert schildt
1000
1882
details of 2 book:
introduction to java programming
y daniel liang
999
1446
the details of the books are:
1 book:
java the complete reference,herbert schildt,1000.0,1882
2 book:
introduction to java programming,y daniel liang,999.0,1446
```

# 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.

**WRITEUP:-**



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Lab 11

```
abstract class shape
{
int a = 3;
int b = 4;
abstract public void print_area();
}
class rectangle extends shape
{
public int area_rect;
public void print_area()
{
area_rect = a*b;
System.out.println("The area of rectangle
                    is : " +area_rect);
}
}
class triangle extends shape
{
int area_tri;
public void print_area()
{
area_tri = (int)(0.5*b);
System.out.println("The area of triangle
                    is : " +area_tri);
```

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

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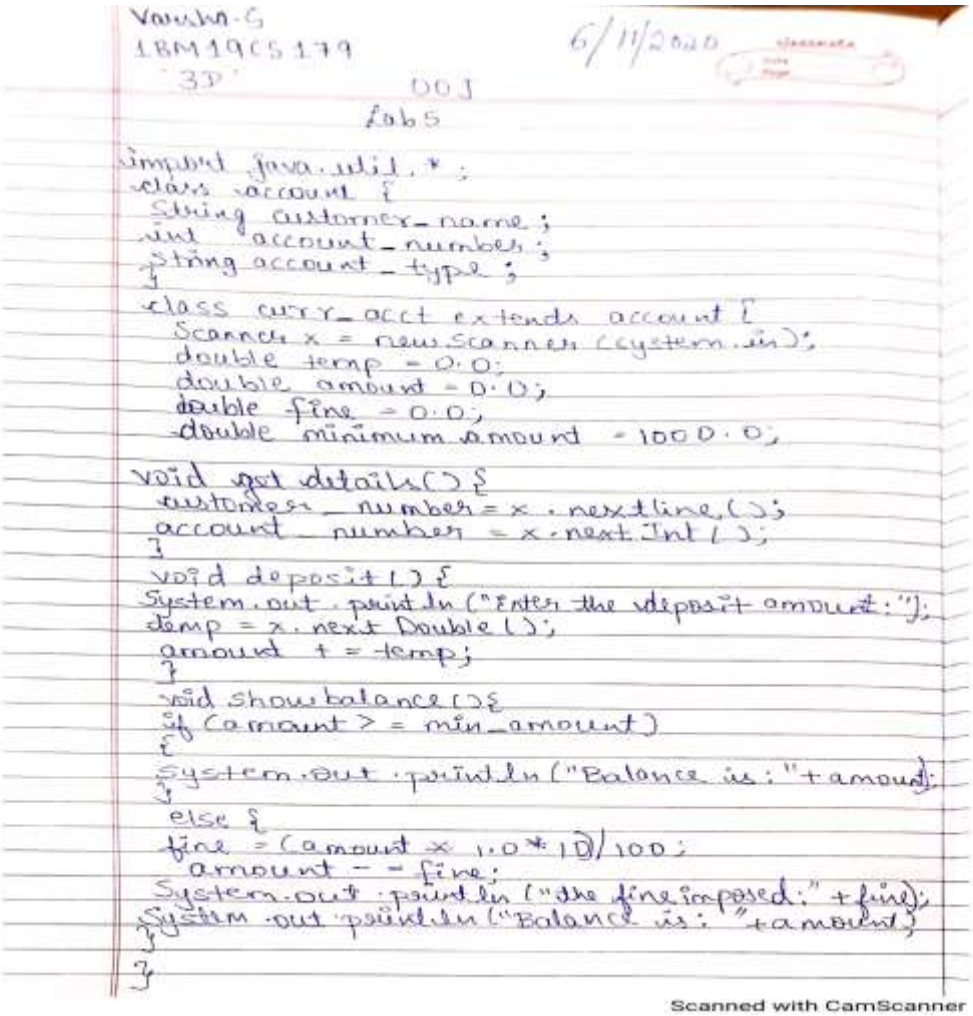
# LAB 5

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

**WRITEUP:-**



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Lab 5

```
import java.util.*;
class account {
  String customer_name;
  int account_number;
  String account_type;
}
class curr_acct extends account {
  Scanner x = new Scanner(System.in);
  double temp = 0.0;
  double amount = 0.0;
  double fine = 0.0;
  double minimum_amount = 1000.0;

void get details() {
  customer_number = x.nextline();
  account_number = x.nextInt();
}
  void deposit() {
  System.out.println("Enter the deposit amount:");
  temp = x.nextDouble();
  amount += temp;
  }
  void showbalance() {
  if (amount >= min_amount)
  {
  System.out.println("Balance is:" + amount);
  }
   else {
  fine = (amount * 1.0 * 10)/100;
    amount -= fine;
  System.out.println("the fine imposed:" + fine);
  System.out.println("Balance is:" + amount);
  }
}
```

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```
void withdrawal(){
System.out.println("Enter the withdrawal amount:");
temp = x.nextDouble();
amount -= temp;
}
}
class Sav_acct extends account {
Scanner x = new Scanner(System.in);
double temp = 0.0;
double amount = 0.0;
double internet = 0.0;
void get details(){
customer_name = x.nextline();
account_number = x.nextInt();
}
void showbalance(){
System.out.println("Balance is: "+ amount);
}
void withdrawal(){
System.out.println("Enter the withdrawal amount:");
temp = x.nextDouble();
amount = temp;
}
void interest(){
interest = (amount * 1.0*3)/100;
amount += interest;
System.out.println("interest added:"+interest);
System.out.println("Balance is:"+ amount);
}
}
```

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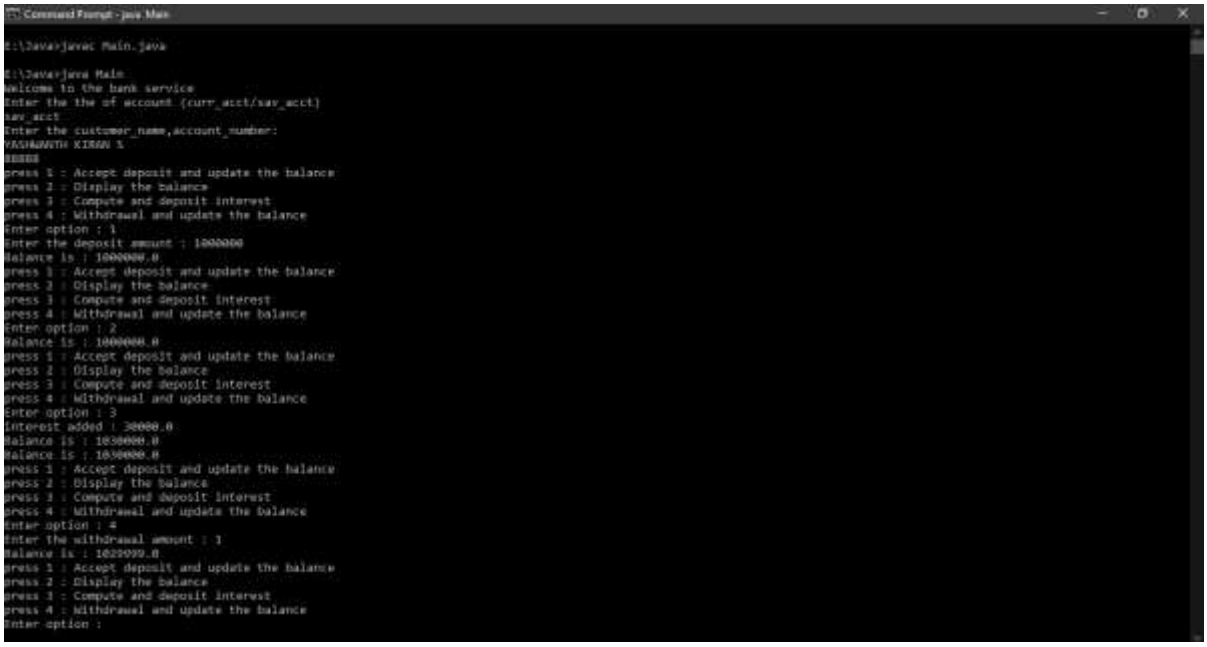
```
public class Main {
public static void main(String[] args){
  int opt = 0;
  String type = null;
Scanner x = new Scanner(System.in);
System.out.println("Welcome to the bank service");
System.out.println("Enter the type of account
                    (curr_acct/sav_acct)");
type = x.nextline();
if (type equals("curr_acct")) {
   curr_acct a = new curr_acct();
System.out.println("Enter the customer_name,
                    account_number:");
  a.getdetails();
  while (true) {
System.out.println("press 1: Accept deposit and
                    update the balance");
System.out.println("press 2: Display the balance");
System.out.println("press 3: Withdrawal and
                    update the balance");
System.out.println("Enter option:");
opt = x.nextInt();
switch (opt) {
case 1: a.deposit();
        a.Showbalance();
        break;
case 2: a.showbalance();
        break;
case 3: a.withdrawal();
        a.showbalance();
        break;
    }
  }
}
```

6/11/2020

```
if (type.equals ("sav_acct")) {
  sav_acct a = new sav_acct ();
System.out.println ("Enter the customer_name,
                     account_number:");
a.getdetails ();
while (true) {
System.out.println ("press 1: Accept details and
                     update the balance");
System.out.println ("press 2: Display the amount");
System.out.println ("press 3: Compute and deposit
                     interest");
System.out.println ("press 4: Withdrawal and
                     update the balance");
System.out.println ("Enter option:");
  opt = sc.nextline ();
switch (opt) {

  case 1: a.deposit ();
          a.showbalance ();
          break;
  case 2; a.showbalance ();
          break;
  case 3: a.interest ();
          a.showbalance ();
          break;
  case 4: a.withdrawal ();
          a.showbalance ();
          break;
    }
  }
 }
}
```

**OUTPUT:-**




# 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.

**WRITEUP:-**

1BM19CS179 3D Batch - 2 Date 26/11/2020

Expt. No. Lab - 6 Page No.

```
package CIE;
import java.util.*;
public class personal
{
public string name;
public int sem;
public string usn;

public void read()
{
scanner sc = new
scanner (system.in);
System.out.println("Enter the semester");
sem = sc.nextInt();
System.out.println("Enter the USN");
    usn = sc.next();
}
public void display()
{
System.out.println("student details:");
System.out.println("Name:"+name+"\n
USN:" + usn + "\n sem: " + sem);
}
```

Teacher's Signature :

```
package SEE;
import java.util.*;
import CIE.*;
Public class externals extends personal
{
public double see[];
public void get()
{
see = new double[5];
scanner sc= new
scanner (system.in);
for (int i=0 ; i<5 ; i++)
{
System.out.println("SEE mark for course"
                    +(i+1)+":");
 See[i] = sc.nextDouble();
 }
}

}
```

```
package CIE;
import java.util.*;
public class internals extends personal
```

Date

Expt. No. Page No.

```
{
public double cie[];
public void accept()
{
cie = new double[5];
Scanner sc = new
Scanner(System.in);
for(int i=0; i<5; i++)
{
System.out.println("CIE mark for course"
                   +(i+1)+":");
 cie[i] = sc.nextDouble();
}
}
}
import CIE.*;
import SEE.*;
import.java.util.*;

class Main
{
```

Teacher's Signature :

```
public static void main(String arg[])
{
Scanner sx = new Scanner(System.in);
System.out.println("Enter the number of
                    Students");
  int n = sx.nextInt();
  CIE.internals in[] = new
  CIE.internals[n];
  SEE.externals en[] = new
  SEE.externals[n];

  int i, j;
  for(i=0; i<n; i++)
  {
  System.out.println("Student" + (i+1));
   int[i] = new CIE.internals();
   en[i] = new SEE.externals();
   in[i].read();

  System.out.println("CIE marks:");
    in[i].accept();
  System.out.println("SEE MARKS:");
    en[i].get();
  System.out.println();
   int[i].display();
  for(j=0; j<5; j++)
```

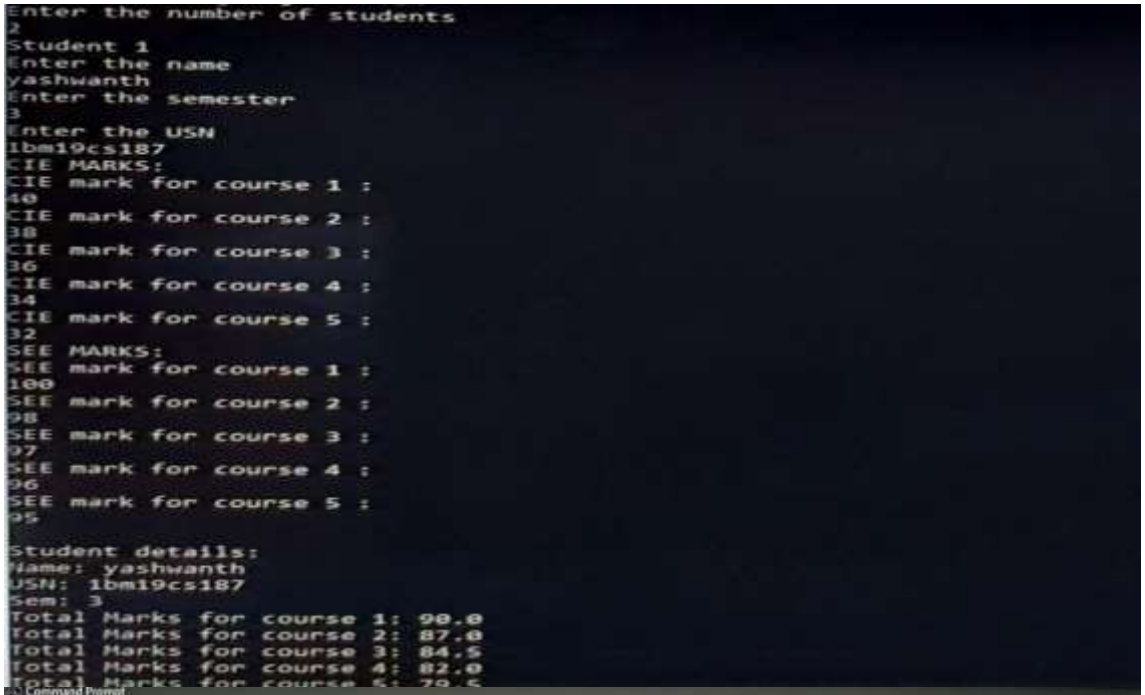
Date

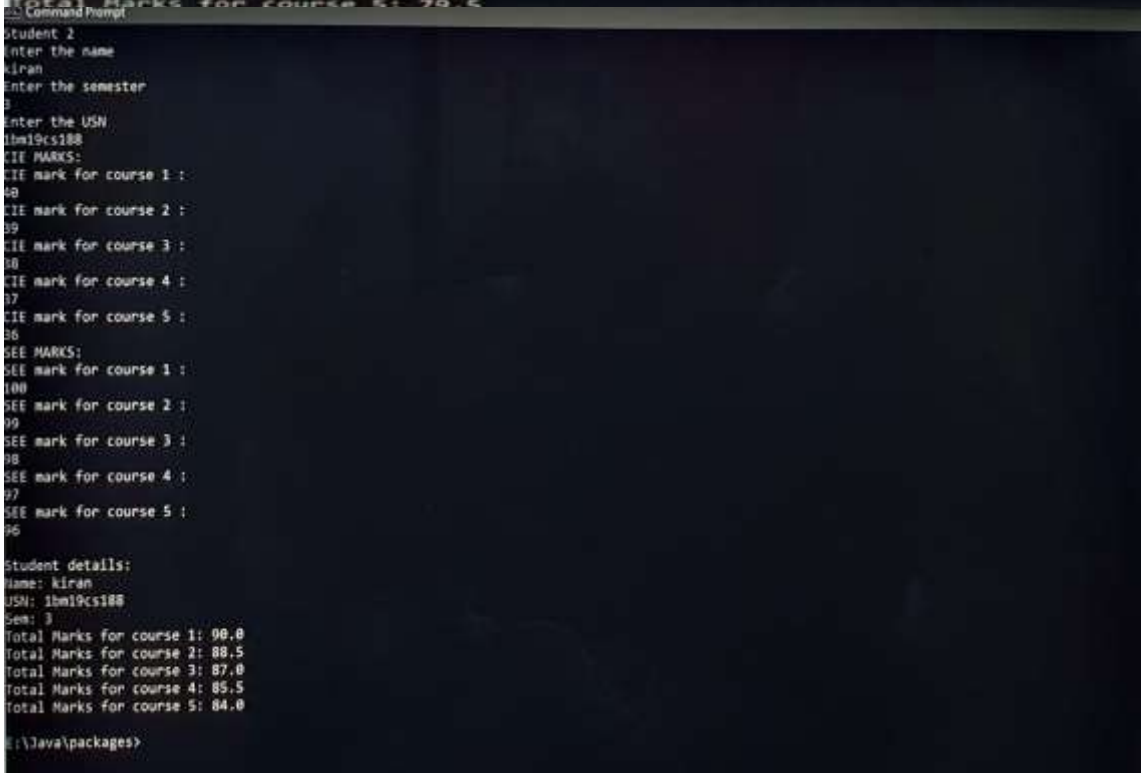
Expt. No. Page No.

```
System.out.println("Total Marks for course"
    +(j+1)+" :"+(in[i].cie[j]+(en[i]
    see[j]/2)));
}
}
}
```

Teacher's Signature :

**OUTPUT -**

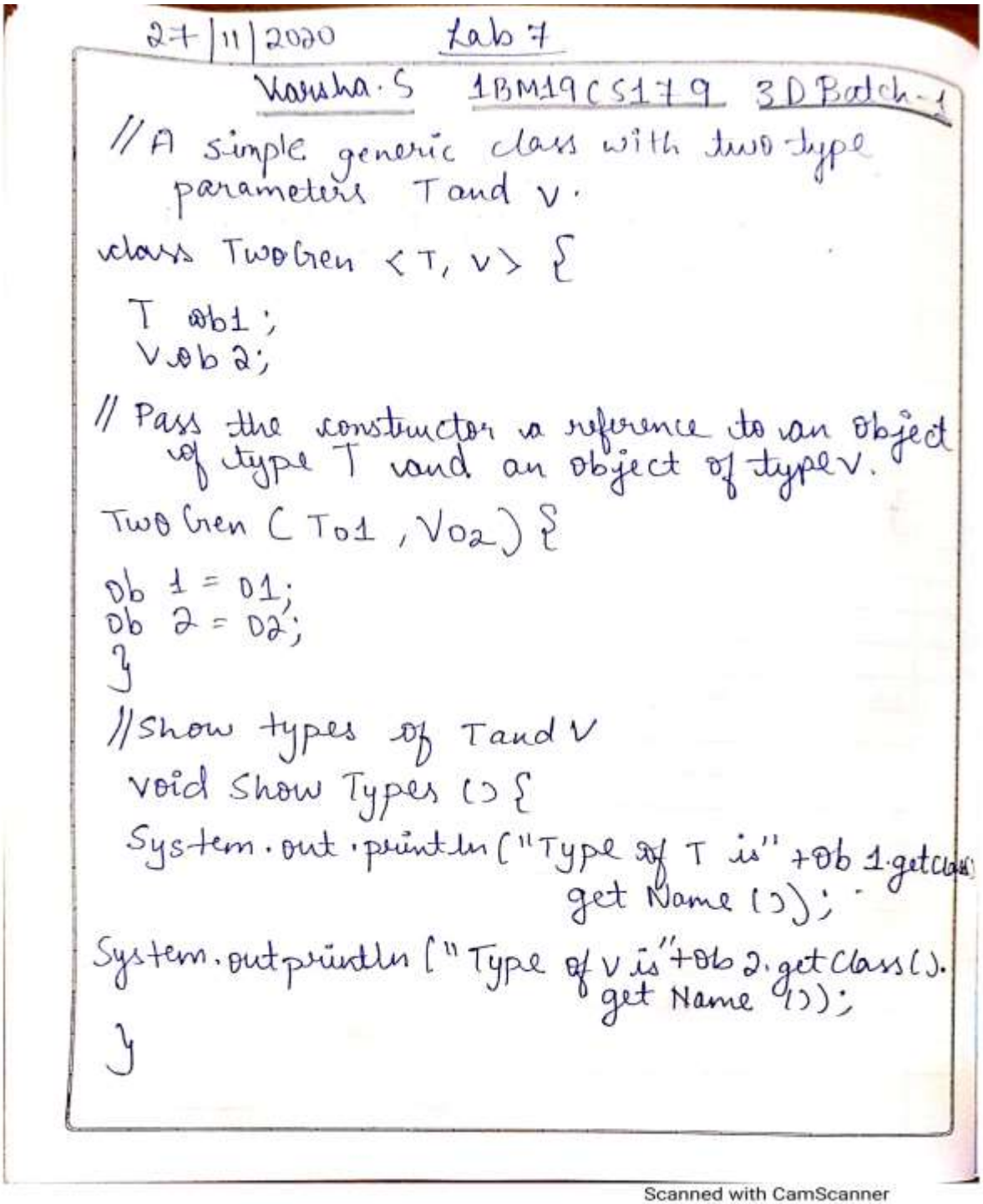

Enter the number of students
2
Student 1
Enter the name
yashwanth
Enter the semester
3
Enter the USN
1bm19cs187
CIE MARKS:
CIE mark for course 1 :
40
CIE mark for course 2 :
38
CIE mark for course 3 :
36
CIE mark for course 4 :
34
CIE mark for course 5 :
32
SEE MARKS:
SEE mark for course 1 :
100
SEE mark for course 2 :
98
SEE mark for course 3 :
97
SEE mark for course 4 :
96
SEE mark for course 5 :
95
Student details:
Name: yashwanth
USN: 1bm19cs187
Sem: 3
Total Marks for course 1: 90.0
Total Marks for course 2: 87.0
Total Marks for course 3: 84.5
Total Marks for course 4: 82.0


Command Prompt
Student 2
Enter the name
kiran
Enter the semester
3
Enter the USN
1bm19cs188
CIE MARKS:
CIE mark for course 1 :
40
CIE mark for course 2 :
39
CIE mark for course 3 :
38
CIE mark for course 4 :
37
CIE mark for course 5 :
36
SEE MARKS:
SEE mark for course 1 :
100
SEE mark for course 2 :
99
SEE mark for course 3 :
98
SEE mark for course 4 :
97
SEE mark for course 5 :
96
Student details:
Name: kiran
USN: 1bm19cs188
Sem: 3
Total Marks for course 1: 90.0
Total Marks for course 2: 88.5
Total Marks for course 3: 87.0
Total Marks for course 4: 85.5
Total Marks for course 5: 84.0
E:\Java\packages>

# LAB-7

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

**WRITEUP:-**



27/11/2020 Lab 7

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```
// A simple generic class with two type
   parameters T and V.
class TwoGen <T, V> {
  T ob1;
  V ob2;
// Pass the constructor a reference to an object
   of type T and an object of type V.
TwoGen (T o1, V o2) {
ob 1 = o1;
ob 2 = o2;
}
//Show types of T and V
 void ShowTypes () {
 System.out.println("Type of T is" +ob 1.getClass()
                                    getName());
System.out.println("Type of V is" +ob 2.getClass().
                                    getName());
}
```

Date

Expt. No. Page No.

```
T get ob1 () {
return ob1 ;
}
V get ob2 () {
return ob2 ;
}
}
// Demonstrate TwoGen
class SimpGen {
public static void main(String args[]) {
TwoGen <Integer, String> tgObj =
new TwoGen <Integer, String>(88, "Generics");
// Show the types
tgObj.showTypes();
```

Teacher's Signature :

```
//Obtain and show values.
int v = tg.Obj.getOb1();
System.out.println("value :" +v);
String str = tg Obj.getob2();
System.out.println("value :"+str);
}
}
```

**OUTPUT :-**

```
Type of T is java.lang.Integer
Type of V is java.lang.String
value: 88
value: Generics
```

# LAB-8

**Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge( ) when the input age<0. In Son class, implement a constructor that cases both father and son's age and throws an exception if son's age is >=father's age.**

**WRITEUP:-**

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Expt. No. 3D Batch - 1 Page No.

Lab 8

```
import java.util.*;
class Wrong Age extends Exception {
int f, s;
Wrong Age (int fage, int sage) {
    f = fage;
    s = sage;
}

public String toString(){
return "Please enter the correct ages as father's age
    can't be less than or equal to the son's
    age.";
}}

class Negative Age extends Exception {
 int x;
Negative Age (int fage) {
x = fage;
}

public String toString. () {
return "Age can't be a negative value.";

}}
```

Teacher's Signature :

```
class Father
{
 int fage;
 Scanner in= new Scanner(system.in);
 Father () throws Negative Age.
 {
 System.Out.println("Enter the father's age:");
 fage = in.next Int();
 if (fage < 0) {
 throw new NegativeAge (fage);
}}}
class Son extends Father.
{
 int Sage;
 Scanner in = new Scanner(system.in);
 Son () throws Negative Age, Wrong Age {
 super();
 System.out.println("Enter the son's age:");
 Sage = in.next Int();
```

Date

Expt. No. Page No.

```
if (sage < 0)
{
throw new NegativeAge (sage);
}
if (sage >= fage) {
throw new WrongAge (fage, sage);
}

}}
class AgeDisplay {
public static void main (String args[]) {
  try {
  Son s = new Son ();
  }
  catch (NegativeAge n) {
  System.out.println(" Exception: "+n);
  }
```

Teacher's Signature :

```
catch ( WrongAge w ){
System.out.println("Exception: " + w);
  }
}
```



**OUTPUT :-**

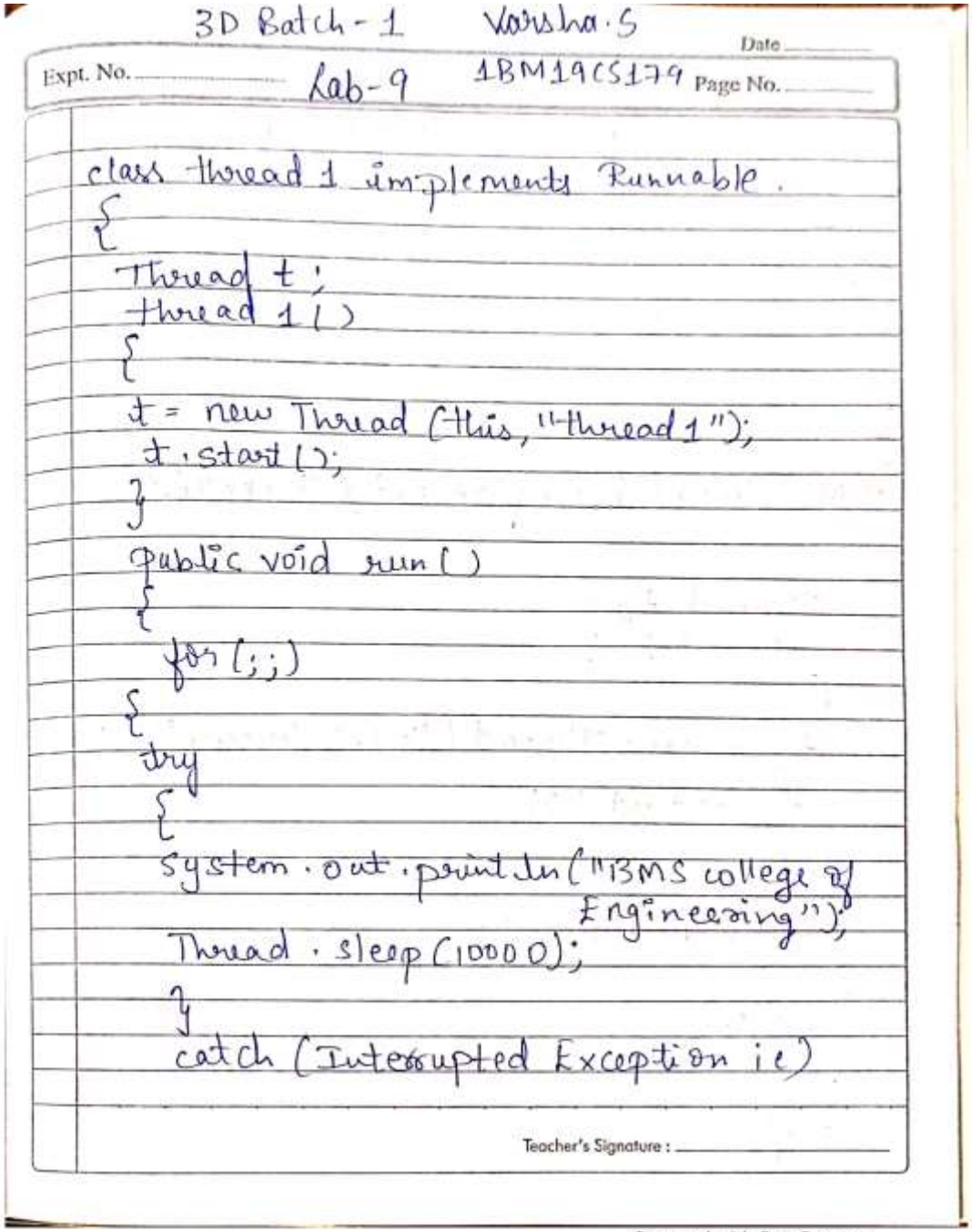
```
Enter the father's age
25
Enter the son's age
60
Exception arised:   Age of son and father cannot be less than 0 as well Age of t
he Son cannot be more than age of father or illegal marriage


------------------
(program exited with code: 0)
Press return to continue
```

# 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.**

**WRITEUP:-**



3D Batch - 1 Varsha.S

Expt. No. Lab-9 1BM19CS179 Page No. Date

```
class thread1 implements Runnable.
{
 Thread t;
 thread1()
 {
 t = new Thread (this, "thread1");
 t.start();
 }
 public void run()
 {
   for(;;)
 {
 try
  {
  System.out.println("BMS college of
                      Engineering");
  Thread.sleep(10000);
  }
  catch (InterruptedException ie)
```

Teacher's Signature :

```
    {
     System.out.println(" Interrupted ");
    }
  }
 }
}
class thread2 implements Runnable
 {
  Thread t2;
  thread2()
  {
   t2 = new Thread(this, "Thread 2");
   t2.start();
  }
  public void run()
  {
   for(;;)
  {
   try
```

Date

Expt. No. Page No.

```
{
System.out.println("CSE");
Thread.sleep(2000);
}
catch (InterruptedException ie)
{
System.out.println("Interrupted");
}
}
}
}
class thread_main
{
public static void main(String args[])
{
System.out.println("Enter CONTROL+C to stop");
thread1 t1 = new thread1();
thread2 t2 = new thread2();
}
}
```

Teacher's Signature :

**OUTPUT :-**


Enter CONTROL+C to stop
BMS College Of Engineering
CSE
CSE
CSE
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BMS College Of Engineering
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