Lab Program 1

Develop a Java program that prints all real solutions to the quadratic equation ax2 + bx + c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.

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habot	Develop a fava phogram that points all real solves of a x2+b x+c-o. head a, b, c those are no head dolors. I mostage if
	public class quadratic & public state void main (String args [])
	double so, disc, equal, 11 = 0, 920; Sustem, out pointly ("Enter conflicient of x 20;
	double b: in next Double (); Suttern out pointly ("Enter the constant:"); double (: in next Double (); disc: (n * h) = (10.
	disc (disc); (disc < 0) E system out println (arere are no real Solutions);
	g (dist == 0) E equal = -b (2 * a); Sujetem. out. println ("The hood are equal, 31: hg: " + equal)
	9 tequal) else {
	3 3 System. out printly (" hooks are " + 914" and "+ 42); 3

```
import java.util.*;
class javapg1
{
public static void main (String args[])
double a,b,c,d,r1,r2;
System.out.println("Enter the values of a, b and c:");
Scanner sc =new Scanner(System.in);
a=sc.nextDouble();
b=sc.nextDouble();
c=sc.nextDouble();
d=(b*b)-(4*a*c);
r1=((-b)+Math.sqrt(d))/(2*a);
r2=((-b)-Math.sqrt(d))/(2*a);
if (d>0)
{
System.out.println("root 1="+r1+"root 2="+r2);
}
else if (d == 0)
System.out.println("root 1=root2="+r1);
}
else
        System.out.println("There are no real solutions for the quadratic equation");
}
}
```

```
Microsoft Windows [Version 10.0.18362.1139]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\Aruna Ravi>javac javapg1.java
C:\Users\Aruna Ravi>java javapg1
Enter the values of a, b and c:
There are no real solutions for the quadratic equation
C:\Users\Aruna Ravi>java javapg1
Enter the values of a, b and c:
There are no real solutions for the quadratic equation
C:\Users\Aruna Ravi>java javapg1
Enter the values of a, b and c:
root 1=root2=-1.0
C:\Users\Aruna Ravi>
```

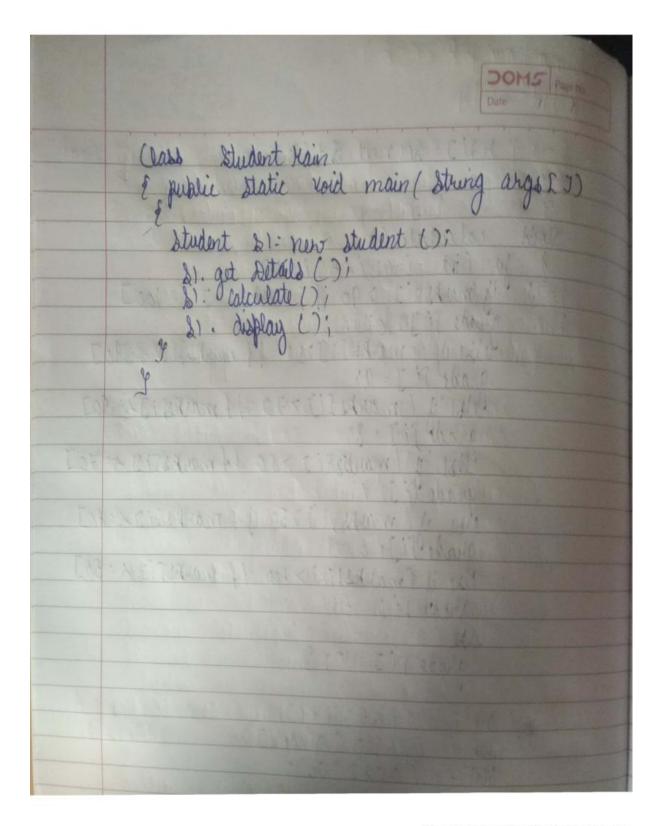
Lab Program 2:

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

	Ameria Ravi Kh (COB)
	18419 E SOIA
*Aproal	Sava program to create a class student with morning user, name an array credits a marks . Suchede methods to accept the display details a method to find so get a
	import javak. util. *;
	Class Student & plade hJ;
188	E plinate int grade hJ; plinate string name; private string usn; private int markshJ;
100	plinate int or 5. J; plinate double bum=0.0; private double total 0.0;
	private int Cr. new int [5]; private int grade: new int [7]; private int marks: new int [5];
	phinate int marks: new ort [5]; phinate double sapa; void get Autails ()
Dest	
	System out printly ("Enter the Student details:"); Sustem out printly ("Enter noon: "); name: See hert ();
Charles .	System. out println (" ll N: "); van: &c next O; lot (int i=0; i s; (++)
	& System act printly 1" Enter the should for hilly"
1900 W.	marks [i] = Sc . next sist (); System. out phintln (" Credits of duby "+(i+1)+")
Bell.	Scanned with CamScanner

```
July M. rest Set ();
                             calculate ()
World
                      No (int 1:0; 125; 1+4)
                             (marketis > 90 44 marks tis & 100)
                           greade [1] 101
                          2020 y (marks 113780 44 marks 113 × 907
                               Wes of [marks [i] 770 44 marks 134 80]
                                   grade [i] : 8;
                                grade ti J: 7;
                                 the il marssil 750 ft marks (17x 60)
                                  grade TiJ: 6%
                                   Mas is (markeli I > 400 44 marker is 4 50)
                                   grade li 7: 5;
                               elke
                                      grade [i] = 0; 3°
  $\left( \text{ ont } i=0 ; i \times ; i \tim
           2000 = ( ( Jum / total ) * 10);
    unid display ()
       System out printle (" hyl A of + name + " nich eur" + 2 SN+ " is "+ sapa);
```

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```
import java.util.*;
class Student
{
 String name;
 String USN;
 int[] credits;
 int[] marks;
 Student(String yourName, String yourUSN, int[] yourCredits, int[] yourMarks )
  this.name = yourName;
  this.USN = yourUSN;
  this.credits = yourCredits;
  this.marks = yourMarks;
 public int[] getGradePoints(int[] marksArray){
  int[] gradePoints = new int[marksArray.length];
  for(int i=0;i<marksArray.length;i++){</pre>
   if (marksArray[i]>=90){
    gradePoints[i] = 10;
   else if (marksArray[i]>=80){
    gradePoints[i] = 9;
   else if (marksArray[i]>=70){
    gradePoints[i] = 8;
   else if (marksArray[i]>=60){
    gradePoints[i] = 7;
   }
```

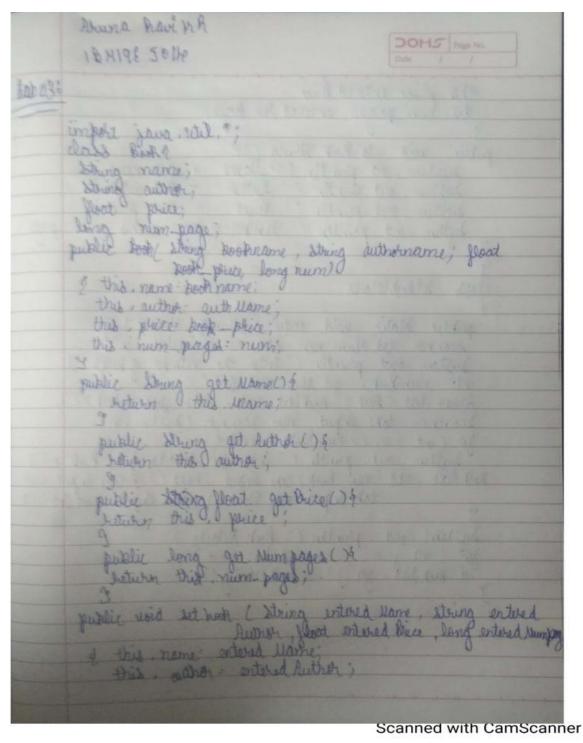
```
else if (marksArray[i]>=50){
   gradePoints[i] = 6;
  }
  else if (marksArray[i]>=40){
   gradePoints[i] = 5;
  }
  else{
   gradePoints[i] = 0;
  }
 }
 return gradePoints;
}
public float calcArraySum(int[] anyArray){
 float sum = 0;
 for(int j=0;j<anyArray.length;j++){</pre>
  sum += anyArray[j];
 }
 return sum;
}
public float calcCGPA(int[] creditsArray, int[] marksArray){
 int[] totalGradePoints = new int[marksArray.length];
 int[] gradePointsArray = getGradePoints(marksArray);
 for(int k=0;k<marksArray.length;k++){</pre>
  totalGradePoints[k] = creditsArray[k] * gradePointsArray[k];
 }
 float sumGradePoints = calcArraySum(totalGradePoints);
 float totalCredits = calcArraySum(creditsArray);
 float CGPA = sumGradePoints/totalCredits;
 return CGPA;
```

```
}
 public void dispDetails(){
  System.out.println("Name: " + this.name);
  System.out.println("USN: " + this.USN);
  System.out.println("Credits: " + Arrays.toString(this.credits));
  System.out.println("Marks: " + Arrays.toString(this.marks));
  System.out.println("CGPA: " + calcCGPA(this.credits, this.marks));
 }
}
class SGPA{
 public static int[] getArrayFromString(String stringedArray){
   String[] stringValues = stringedArray.split(",");
   int[] arrayFromString = new int[stringValues.length];
   for(int i=0;i<stringValues.length;i++){</pre>
    arrayFromString[i] = Integer.parseInt(stringValues[i]);
   }
   return arrayFromString;
 }
 public static void main(String[] args){
  Scanner getData = new Scanner(System.in);
  System.out.println("Enter the number of Students and number of Subjects: ");
  int numStudents = getData.nextInt();
  int numSubjects = getData.nextInt();
  Student studentList[] = new Student[numStudents];
  Scanner getDetails = new Scanner(System.in);
  for(int k=0;k<numStudents;k++){</pre>
   System.out.println("Enter the details of student " + k + ": ");
```

```
studentList[k] = new
Student(getDetails.next(),getDetails.next(),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDetails.next()),getArrayFromString(getDe
g(getDetails.next()));
          }
          System.out.println("\n***** STUDENT DETAILS with CGPA *****\n");
          for(int h=0;h<studentList.length;h++){</pre>
               studentList[h].dispDetails();
              System.out.println("\n");
          }
    }
}
   Enter the details of student 0:
    xyz
   1bm19cs040
   Enter the details of student 1:
   1bm19cs105
   ***** STUDENT DETAILS with CGPA *****
   Name: xyz
   USN: 1bm19cs040
    Credits: [4]
   Marks: [84]
    CGPA: 9.0
   Name: abc
   USN: 1bm19cs105
   Credits: [4]
   Marks: [91]
   CGPA: 10.0
      C:\Users\Aruna Ravi>
```

Lab Program - 3

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



this place entered buce; this, hum pages: entered him lager; public void to both string () of System, out phintln (" Shame" + this name);
System out paintln (" Author" + this author);
System out println (" Duce" + this phice);
System out println (" buce" + this phice); class Sthoppatails public static void main (string args []) System out printly ("Enter the number of books"); into number : get Alum, next sort (); Alray Just & Book > Booklest = new Ahrenglist & Book 7 (); Scarmen take Snowt: new Scanner (System in), for (int io; ix humbooks; itt)? System out printly (" both the details of the Book "+ i) both dist, and (new book (take Enjury, next (), take Enjury, must take Input (next Deat () toke Input , next Int ()); System out printer (" Book Retails); for (ind ; 0;) xrum books; j++) E book dist. At (). to book string ();

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```
import java.util.*;
class Book{
String name;
String author;
float price;
long num_pages;
 public Book(String bookName, String authName, float book_price, long num){
  this.name = bookName;
  this.author = authName;
  this.price = book_price;
  this.num_pages = num;
 public String getName(){
  return this.name;
 public String getAuthor(){
  return this.author;
 public float getPrice(){
  return this.price
public long getNumPages(){
  return this.num_pages;
public void setBook(String enteredName, String enteredAuthor, float enteredPrice, long
enteredNumPages){
  this.name = enteredName;
  this.author = enteredAuthor;
  this.price = enteredPrice;
```

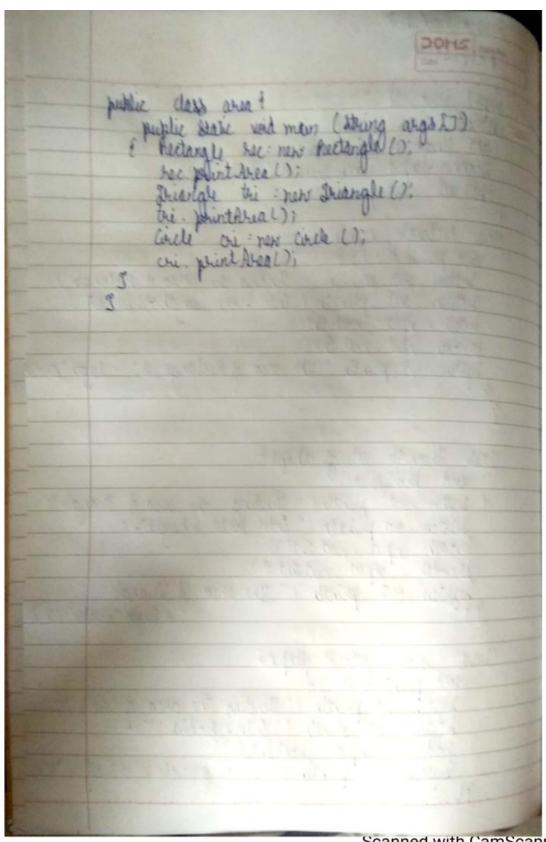
```
this.num_pages = enteredNumPages;
 }
 public void toBookString(){
  System.out.println("Name : " + this.name);
  System.out.println("Author: " + this.author);
  System.out.println("Price : " + this.price);
  System.out.println("Number of Pages : " + this.num_pages);
  System.out.println("\n");
 }
}
class SetBookDetails{
 public static void main(String[] args){
  Scanner getNum = new Scanner(System.in);
  System.out.println("Enter the number of books: ");
  int numBooks = getNum.nextInt();
  ArrayList<Book> bookList = new ArrayList<Book>();
  Scanner takeInput = new Scanner(System.in);
  for(int i=0;i<numBooks;i++){</pre>
   System.out.println("Enter the details of the book " + i + ": ");
   bookList.add(new
Book(takeInput.next(),takeInput.next(),takeInput.nextFloat(),takeInput.nextInt()));
  }
  System.out.println("\n***** BOOK DETAILS *****\n");
  for(int j=0;j<numBooks;j++){</pre>
   bookList.get(j).toBookString();
  }
 }
}
```

```
C:\Users\Aruna Ravi>java SetBookDetails
Enter the number of books:
Enter the details of the book 0:
xyz
rtg
500
650
Enter the details of the book 1:
dsc
200
300
***** BOOK DETAILS *****
Name : xyz
Author : rtg
Price : 500.0
Number of Pages : 650
Name : abc
Author : dsc
Price : 200.0
Number of Pages : 300
C:\Users\Aruna Ravi>
```

Lab Exercises – 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.

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top let	import java etal . "; abstract class shape ?	20 - 100		
	abstract class shape f	12 1114		
	unt anoth, bheath, hadies.	Taraca Caraca		
	Scannes input : nero scanner (bystom	·in);		
	abstract low print Area ();	The state of the s		
	3	NAME AND DESCRIPTION OF THE PARTY OF THE PAR		
	class rectargle extends shape f	1510		
	usid pount Ama () &	Charles and the second		
	System out println (" Sinding th	e also of hectargle");		
	System, out println ("later" the	length " (breath ");		
	length - input, rest Intl);	V		
	breddin input next Int ();			
	system out printer ("The area of fuctange is: "+ Leight break			
	4	V		
	class Thingle extends shape &			
	used Auffet Alua () of			
	& Sustem out println(" Finding the ones of triangle);			
	E system out println (" Sinding the area of triangle);			
	with mout not Intly			
	bloodith - inhit wast got ()			
	System out printly (" The are	a of Triangle:		
	13.	a of Triangle: " + lugth - wradth)/2);		
		U		
	Class anche extends stope?			
	Void phint Aria() &			
	System out phintle (" Finding the area of Circle);			
	radius input, next ont ();	nama ,		
	Customent must (" 1000	1 11 all 1 1 1 2 11 1 1 2 1 1		
1	System and printly (" Asea	y wille. Is. Wy or no		
	14			



Scanned with CamScanner

```
Source Code:
import java.util.*;
abstract class Shape {
      int length, breadth, radius;
      Scanner input = new Scanner(System.in);
      abstract void printArea();
}
class Rectangle extends Shape {
      void printArea() {
            System.out.println("*** Finding the Area of Rectangle ***");
            System.out.print("Enter length and breadth: ");
            length = input.nextInt();
            breadth = input.nextInt();
            System.out.println("The area of Rectangle is: " + length *
breadth);
      }
}
class Triangle extends Shape {
      void printArea() {
            System.out.println("\n*** Finding the Area of Triangle ***");
            System.out.print("Enter Base And Height: ");
            length = input.nextInt();
```

```
breadth = input.nextInt();
             System.out.println("The area of Triangle is: " + (length * breadth)
/ 2);
      }
}
class Cricle extends Shape {
      void printArea() {
             System.out.println("\n*** Finding the Area of Cricle ***");
             System.out.print("Enter Radius: ");
             radius = input.nextInt();
             System.out.println("The area of Cricle is: " + 3.14f * radius *
radius);
      }
}
public class area {
      public static void main(String[] args) {
             Rectangle rec = new Rectangle();
             rec.printArea();
             Triangle tri = new Triangle();
             tri.printArea();
             Cricle cri = new Cricle();
             cri.printArea();
      }
}
```

```
Microsoft Windows [Version 10.0.18362.1139]
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C:\Users\Aruna Ravi>javac area.java

C:\Users\Aruna Ravi>java area

*** Finding the Area of Rectangle ***
Enter length and breadth: 1

2
The area of Rectangle is: 2

*** Finding the Area of Triangle ***
Enter Base And Height: 34

3
The area of Triangle is: 51

*** Finding the Area of Cricle ***
Enter Radius:
23
The area of Cricle is: 1661.06

C:\Users\Aruna Ravi>
```

Lab Exercises -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

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	class Actual E		
	Searner in new Searner (System in);		
	thing outlemen name, type of accent;		
	lone o second number;		
	devide halance = 9000.0;		
	wid heapt () \$		
	System sit phirth ("Erder customer non	re");	
	customer name in neutline);		
	System but phirtle ("both Account number	");	
	alcust_number = in , next long();		
	3		
	und diseasts) f		
	stat dep;		
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	dy : in mot Sit ();	Contract Con	
	holder + = Orb;		
	System out phintln ("Bolance: "+ bolance)		
	3	814 300	
	wid withdrawal () ?		
	int worder		
	Instan out phirth (" Eith the withdraw	omeunt");	
	winder : in next Set ();		
	balance - withha:	Markey .	
	Justim out phintle ("Balance: "+ ba	lance);	
	40	4	
	Te		

```
DOMS IN
 class Colorful extends Recourt &
 usid penalty (1)
 y (balance 21000)4
  Balance -= 100;
 System out println ("Balance " + balance);
 close son Act extends Account &
  xoid intrest () 4
 i= palong *0.02;
  Dalance +: i:
System, out printly ("Intrest: "+1);
System, out printly ("Total balance: "+ balance);
class banks
 public static void main ( String Ongo ( ) ) ?
"Scanner in - new Scanner (System, in)
 Curr Act c: new Cuhn Act ();
 Saw Ad d= new Saw Act ();
 System out phintly 1" Enter your choice In 17 saving account
                   In A. Current accupit ");
 int choice : in next Sint ();
if (china == 2) 4
 c. Accept ();
Lystem. out printer ("Enter your choice in " Deposit in
```

DOMS Page No. int n: in rest Sort () i case 1:5 c. deposit(); bheah i y case 2: 1 6. hethdraval (); C. penatty (); default: dijetem. out. printer ("plrong choice"); if (chile = 1) t S. Accept CX System out printly ("both your chair, In 1. Deposit In 2. Wandrans" int n in nutsito; bhitch (n) ? h. deposit (); a intrust (); bush: 9 s. withdraval (); bunh3 default: System out printly (" Whoma choice");

```
import java.util.*;
class Account
Scanner in=new Scanner(System.in);
String customer_name,type_of_account;
long account_number;
double balance=9000;
void Accept(){
System.out.println("Enter customer name");
customer_name=in.next();
System.out.println("Enter Account number");
account_number=in.nextLong();
}
void deposit()
{
int dep;
System.out.println("Enter the amount to be be deposited");
dep=in.nextInt();
balance+=dep;
System.out.println("Balance="+balance);
}
void withdrawal()
{
int witdra;
System.out.println("Enter the amount to be withdra");
witdra=in.nextInt();
```

```
balance-=witdra;
System.out.println("Balance="+balance);
}
}
class CurrAct extends Account{
void penalty(){
if(balance<2000){
balance-=100;
System.out.println("Penalty for maintaining less balance");
System.out.println("Balance="+balance);
}
}
}
class SavAct extends Account{
       void intrest(){
double i;
i=balance*0.02;
balance+=i;
System.out.println("Intrest="+i);
System.out.println("Total Balance="+balance);
}
}
class Bank{
public static void main (String args[]){
Scanner in=new Scanner(System.in);
CurrAct c=new CurrAct();
SavAct s=new SavAct();
System.out.println("Enter your choice\n1.Saving account\n2.current account");
int choice=in.nextInt();
```

```
if(choice==2){
c.Accept();
System.out.println("Enter your choice\n1. Deposite\n2.Withdrawl");
int n=in.nextInt();
switch(n){
case 1:{
c.deposit();
break;}
case 2:{
c.withdrawal();
c.penalty();
break;}
default : System.out.println("Wrong Option");
}
}
if(choice==1){
s.Accept();
System.out.println("Enter your choice\n1. Deposite\n2. Withdraw");
int n=in.nextInt();
switch (n){
case 1:{
s.deposit();
s.intrest();
break;}
case 2:{
s.withdrawal();
break;}
default : System.out.println("Wrong option");
}
}
}
```

```
}
```

```
Enter your choice

    Deposite

2. Withdraw
Enter the amount to be be deposited 2500
Balance=11500.0
Intrest=230.0
Total Balance=11730.0
C:\Users\Aruna Ravi>java Bank
Enter your choice
1.Saving account
2.current account
Enter customer name
mj
Enter Account number
27888863331
Enter your choice
1. Deposite
2.Withdrawl
Enter the amount to be withdra
8540
Balance=460.0
Penalty for maintaining less balance
Balance=360.0
C:\Users\Aruna Ravi>_
```

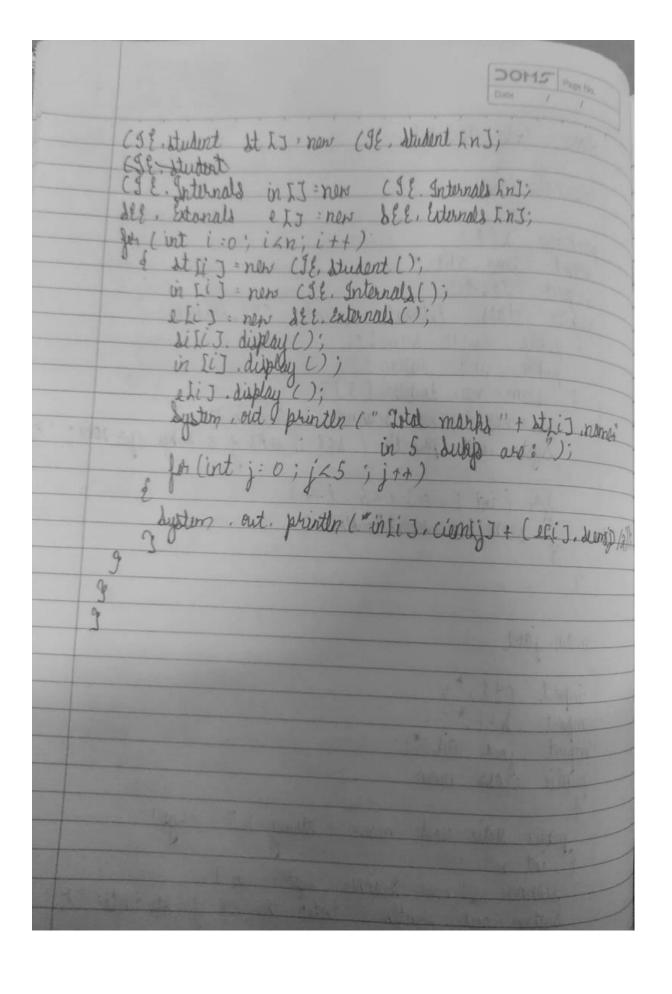
Lab Program 6

Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class Internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.

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	Student java	The state of the s
	package CSE;	30642
	public class student	V. State
	& public string name;	O louistic.
	public String rusn;	10 10001
	public int O sun;	has material at a
	a public and display ()?	non (hustom in).
) altriver, tuo, metage	" Name: ");
1	nome = s.noxt();	(! 01 \ A10 !/ 1 ·
-6.	Justem out println	(UBN 8 /)
-Court	System, out phirtle ("	Sem");
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-	d.1	of V. Wagel . I
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	import java, util *:	108 360
-	Internals, jours package (IE; import java, util, *; public class Internals extends	Adulent (
	of public double cienty;	
	- USM: NEW OMAN 15 7:	1 1 1
	aconno t: new scannon	bustom is ?
	after our phinter (98	Cours for 5 subjection 50%
	ciem Si J: t. next souble C	1;
	33	
Con months		

DOMS PRENS motion standard states Externals, java public class Externals extends CSE student public double been LJ; public used display ()
{ Seem = new double ([5]; Scanner & new scanner (System, in); System, out printly ("see marks of 5 subjection;"); for (int i = 0; i25; i++)

g serm[i] = & northouble(); main, java public static void main (String I I args) Learner s: new Scanner (Lystem in)
Lystem out printle ("Enter the no of students: ");
n: S. next Int ();



Command Prompt

```
C:\Users\Aruna Ravi\pack>java main
Enter the number of students:
Name:
mr
USN:
1bm19cs023
Semester:
CIE Marks for 5 subjects(out of 50):
45
46
47
48
49
SEE Marks for 5 subjects(out of 100):
80
89
87
79
95
Total marks of student mr in 5 subjects are:
85.0
90.5
90.5
87.5
96.5
C:\Users\Aruna Ravi\pack>
```

Lab Programs-7

Write a program to demonstrate generics with multiple object parameters.

```
Auura havi Hh
        18 H19 8 9 014 (COB)
       import java . util . ";
HOUSE
        class years cr. u, V7
          g e417:
          El attendance;
          your spai
Junes 5 Tn, Va, Vc)
          attendance: ai
        System, out printly (" 2 & N: " + 24n);
System, out printly (" Attendance; " + attendance);
System, out printly (" Attendance; " + attendance);
           public static void mais (string args h.T)
Learner in new Scarner ( System, in);
            Supplier out printer ("Enter the risk of the student: ")
             System, out pluntle ("Enter the attendance "to of the std:");
             Laystem, out, pointly ("Enter CyPA:");
```

```
Jener & String, South > Ob: new years & string ob. display (); 33
```

```
Source Code:
import java.util.*;
class Gener<T,U,V>
{
        T usn;
        U attendance;
        V cgpa;
        Gener(T n,U a,V c)
        {
            usn = n;
            attendance = a;
            cgpa = c;
        }
        void display()
        {
```

```
System.out.println("========");
           System.out.println("USN of student: "+usn);
           System.out.println("Attendance = "+attendance);
           System.out.println("CGPA = "+cgpa);
     }
}
class Lab07
{
      public static void main(String args[])
     {
           Scanner in = new Scanner(System.in);
           String USN;
           int attd;
           double cg;
           System.out.println("Enter the USN of the student:");
            USN = in.next();
           System.out.println("Enter the attendance % of the student:");
            attd = in.nextInt();
           System.out.println("Enter the CGPA of the student:");
           cg = in.nextDouble();
            Gener<String, Integer, Double> ob = new Gener<String, Integer,
Double>(USN, attd, cg);
           ob.display();
     }
}
```

Command Prompt

Week 10: Lab Programs- 8:

Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class

called "Father" and derived class called "Son" which extends the base class. In Father class,

implement a constructor which takes the age and throws the exception Wrong Age() when the input

age=father's age.

Awra Ravi K. R DOMS Page No. 1841985014 (208) MARCIS: import jour setil "

class the strongstye extends exception of

int age and

public string tooling OE

public string tooling OE notion "Age of sone"+ age + " Is invalid"; class Father & int ai Fother (int x) {
a=x; 3 Q 20 class son extends Father & Son (in face, int sage) & y lage >= a) & throng Age & theor new wrong Agel age); System. out, printly ("Ages are valid"); System. out, printly ("Fathers age: "+ at" It" + " son's age= "+ age";

you per report sept of class leseption of

public static void man (string args (3)) of

scarner & new dearnor (system d. in);

supplies and printly ("better fathers age:");

int 1 & next sort ();

supplies out printly ("better son's age:");

out so & rest sort (); try & Sh. compute(); g bystem, out phintln (e);

```
Source Code:
import java.util.Scanner;
class WrongAge extends Exception {
  int age;
  WrongAge(int x) {
    age = x;
  }
  public String toString() {
    return "AGE OF SON=" + age + " IS INVALID";
  }
}
class Father {
  int a;
  Father(int x) {
    a = x;
  }
}
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 VALID");
      System.out.println("FATHER'S AGE=" + a + "\t" + "SON'S AGE=" + age);
    }
  }
}
class Exception {
  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);
    }
  }
}
```

```
Microsoft Windows [Version 10.0.18363.1198]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\Aruna Ravi>javac FatherSon.java

C:\Users\Aruna Ravi>java FatherSon
Enter the Father's age:
50
Enter the Son's age:
18
The entered ages are appropriate

C:\Users\Aruna Ravi>java FatherSon
Enter the Father's age:
40
Enter the Son's age:
42
Age of the Son is greater than the Father
The age difference is -2

C:\Users\Aruna Ravi>__
```

LAB PROGRAM-09:

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.

Avera Ravi KR 18419 ES OTH (COB) 1009: import java . rdil , *; class Newtheread implements thereas Prenable of Thread t; Library name; ist o time; Mes-Thread (String nm, ind tim)

{ name: nm;
time: tm;
t: new Thread (this, nm); public void hun () Joh List n: 20; n70; n--);

Lystem out printle (name);

Thread blup (time); colon (Interorupted Exception is)

* System. out. phonths ("Instead Interrupted"); class Heekil & public static void main (String args []) " { New Broad Embre: new New Thread ("BM&CE" 1000) New Thread use: new New Thread ("CSE", 2000); binsie t. street (); coletestant ();

```
Source Code:
class NewThread implements Runnable
{
     Thread t;
      String name;
     int time;
      NewThread(String nm,int tm)
     {
            name = nm;
            time = tm;
           t=new Thread(this, nm);
     }
 public void run()
 {
       try
       {
             for(int n=20;n>0;n--)
             {
                  System.out.println(name);
                  Thread.sleep(time);
             }
       }
       catch(InterruptedException ie)
       {
             System.out.println("Thread Interrupted");
       }
```

```
}
}
class Lab09
{
     public static void main(String ss[])
     {
           NewThread bmsce=new NewThread("BMS College of
Engineering",10000);
           NewThread cse=new NewThread("CSE",2000);
           bmsce.t.start();
           cse.t.start();
     }
}
Command Prompt - java Lab09
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\Aruna Ravi>javac Lab09.java
C:\Users\Aruna Ravi>java Lab09
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
```

Lab Program-10:

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

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

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

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

Arithmetic Exception Display the exception in a message dialog box.

Aluna Pravi Kh 18419 89014 (COB) hab ID: import java ant word import java swing trans class integerdivision Literas Frame implements Actionalista & Feat Fills n1, nh, see, Lakel In1, Ind, Ind) public integer division () 2 public integer division ()?

set happed (new Blow happed ());

habel let: new habel ("Number 2", hopel, hight);

habel let: new habel ("Pedult", hopel, hight);

habel let: new habel ("Pedult", hopel, hight); na: new Just Field (8); n1: new Text Field (12); hu: new Lest Field, (10); b. new Button (Divide"); add (ln1); add (ni); odd (ma); add (na); add (les); add Ninder Listener (this);
add Ninder Listener (new Ninder Adapter (C)); add (his); y (al. get bource () == b)

DOMS Page No. int num: Integer, parise Int (h. get Seat ());
int num: Integer, parise Int (na. got Ject ());
int num: num: num: num: (na. got Ject ());
int num: Num: num: ();
lus. Set Jeat (Allring, value of Ar (num: 3)); Jotion lane. Show Hessage Dialoge (this, ne, "Ever", Jeption lane. Jostion lane. Show Message Disably (this, a, "Elihop" Jostion lane. Ehhop Missage Disable (this a, "Elihop" Jostion lane. public static rold main (string aras);

§ interrhabision i new virtualdivision ();

i. set sis (new Dimersion (200, 400));

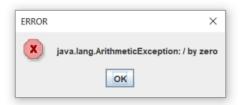
i. set visible ("Integra Division of a numbers");

i. set visible (true); closs Window Adapter) stands Hindow Adapter & public void window Closing (Hindow Everal W) & System. exit (0);

```
Source Code:
import java.awt.*;
import java.awt.event.*;
import javax.swing.*;
class integerdivision extends Frame implements ActionListener{
  TextField n1,n2,res;
  Label In1,In2,Ires;
  Button b;
  public integerdivision(){
    setLayout(new FlowLayout());
    Label In1=new Label("NUMBER 1",Label.RIGHT);
    Label In2=new Label("NUMBER 2",Label.RIGHT);
    Label Ires=new Label("RESULT",Label.RIGHT);
    n1=new TextField(12);
    n2=new TextField(8);
    res=new TextField(10);
    b=new Button("DIVIDE");
    add(ln1);
    add(n1);
    add(ln2);
    add(n2);
    add(b);
    add(Ires);
    add(res);
    b.addActionListener(this);
 addWindowListener(new WindowAdapter1());
```

```
}
public void actionPerformed(ActionEvent ae)
{
  if(ae.getSource()==b)
 {
    try{
    int num1=Integer.parseInt(n1.getText());
    int num2=Integer.parseInt(n2.getText());
    int num3=num1/num2;
    res.setText(String.valueOf(num3));
  }catch(NumberFormatException ne ){
    JOptionPane.showMessageDialog(this,ne,"ERROR",
JOptionPane.ERROR_MESSAGE);
  }
  catch(ArithmeticException a){
    JOptionPane.showMessageDialog(this,a,"ERROR",
JOptionPane.ERROR_MESSAGE);
 }
}
public static void main(String args[])
{
  integerdivision i=new integerdivision();
  i.setSize(new Dimension(400,400));
  i.setTitle("INTEGER DIVISION OF TWO NUMBERS");
  i.setVisible(true);
}
```





NUMBER 1 12.3 NUMBER 2 2 DIVIDE RESULT

