VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



LAB REPORT on

Object Oriented Java Programming

Submitted by

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in partial fulfillment for the award of the degree of BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
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B. M. S. College of Engineering,

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Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled "Object Oriented Java Programming" carried out by Nithin S(1BM21CS120), who is bonafide student of B. M. S. College of Engineering. It is in partial fulfillment for the award of Bachelor of Engineering in Computer Science and Engineering of the Visvesvaraya Technological University, Belgaum during the year 2022-23. The Lab report has been approved as it satisfies the academic requirements in respect of Data Structures Lab - (21CS3PCOOJ) work prescribed for the said degree.

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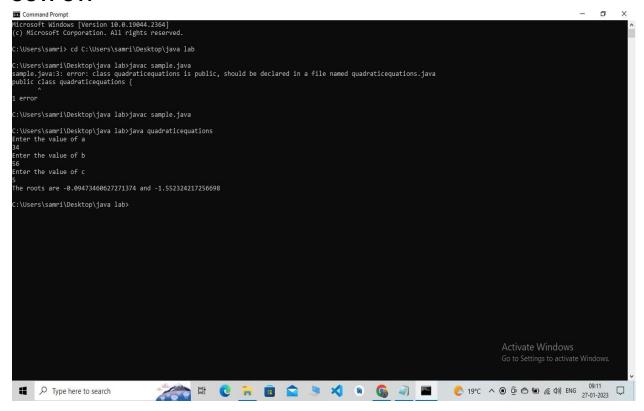
Course Outcome

CO1	Apply the knowledge of Java concepts to find the solution for a given problem.
CO2	Analyse the given Java application for correctness/functionalities.
CO3	Develop Java programs / applications for a given requirement.
CO4	Conduct practical experiments for demonstrating features of Java.

PROGRAM 1

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.
Java. util. Scanner;
Class Quadric Equation &
Public Static Yord main (String [] Strings) &
Scanner Sc = New Scanner (System in)
Scystem. out. println ("Enter the Nalue of a");
     int a = Sc. nextInt ();
 System. out. println (" Enter the Value of 6");
    Sugstam. out println (" Enter the Value of 6"); int b = Sc. nent Int ();
  System out println ("Enter the Value of (");
     int C = Sc. nentInt();
 double d = 6+6-4*a*c;
 2(0<b) 41
  double 81 = (-5+ Moth-pow (d, 0.5)) (6.0 +a);
  double 72 = (-6+ Math. Pow(d, 0.5)) (2.0+a);
  System. out. print (" The roots are "+81 + "and"+82);
 else if (d==0.0) [
      double 81 = -4/ (2.0*1),
     System-out. prixtln(" The root is" + x1);
      System out printly ("Rosts are not Real");
```



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.

MIEEK-2

Deletop a Java program to create a class Student with members USA, name, an array credits and array marks. Include methods to accept and display details and a method to calculate 56PA of a Student impost java util. Scanner

public class Student &

public class Static Void main (Stong args [7) [

Scanner Sc= mew Scanner (System. In);

int credit [] = new int [so];
int mark [] = new int [sj;
int vsn;

String name;

int hotal credit = 0;

double Sgpa = 0;

System.out. println ("Enter the details of the Student In"); System out. println ("Enter the Villetails of the Shotalla"); USn = Sc. next Int ();

for (int c=0; (<5; i++) {

System.oul-println ("Faler the Marks of the "+ (i+1)+"

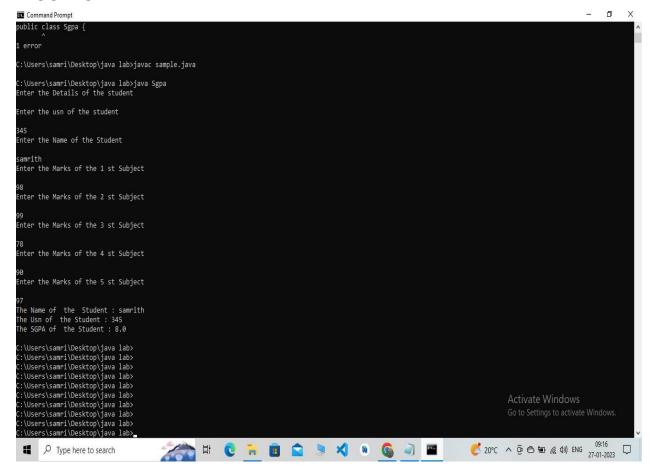
St Subject (n");

Mark [i] = Sc. nent Int ();

Sgpa = Sgpa + (fold (red); System out println (" The Name of the Student: "+ man System.out. println ("The VSN of the Student: "to System out prists ("The SGIPA of the Student: "4 Owpet: The Enley the details of the Student Enter the USN of the Student 185 Enter the Name of the Student Samith Enter the Marks of 1st Subject the Marks of the 2st Subject Enler 98 Marks of the 3rd Subject the Enter 92 Marks of the 4 rd Subject the Enter Marks of the 5rd Subject

7

The Name of the Student's Samnith The USN of the Student: 34 The total SGIPA of the Student: 9.0

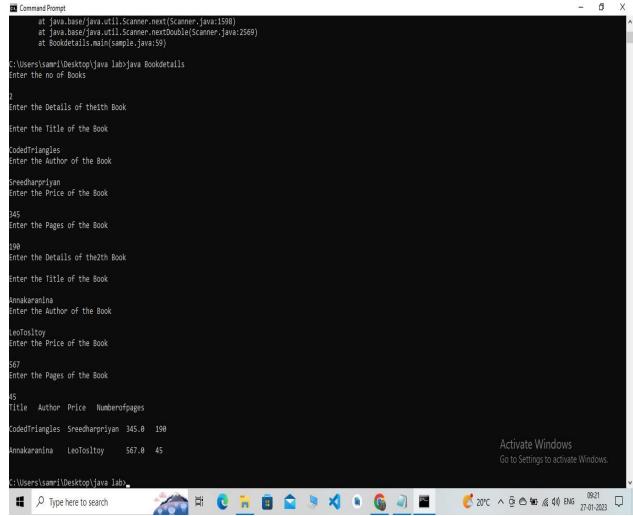


PROGRAM 3

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

dans Book (String title, author; double price; int numpages; Book () [tilte = " Default "; author = " befault "; price =0.0; humpages = 0') Void Set Title (String +) & this. file = ti3 Void Set Author (String 5) & this author = S; } Void SetPrice (double P) [this. price = p; 3 Void Strages (int pa) & this . numpages z (20; 3 Public String to String () & volum tille +" It "+ author+" It" price +" It" + rumpages +" (") }

```
dan Book delails S
             Public Static Void main (String args[ ]) [
              Scarner Sc = new Scarmer (System. in);
            System out printer ("Enter the no of Books In");
                int n = Sc next Int():
             Book book[]= new Book[n];
           Ax (id i=0; ( x n', i++) [
             System out print to ("Exter the delads of the + 3 ( it) +"th
                                  Book (n")1
             System out printer ("Enter the Title of the Bookla");
             String t=sc.nent();
            System. out . printle (" Enler the Author of the Bookin");
              String S = & neut ();
           System out printer ( 'Ther the price of the Book (u);
               double 12 = Sc. next Double ();
           System-out print lu ("Enter the pages of the Booklu");
             ind bu = Sc next Int ();
            hook[i] - new Book();
             hook[i]. Set Title (t);
              book[i]. Set Author(S);
             book [i] Botpice (p);
11/4 1/7
              book[i] · Set Pages (pa);
```



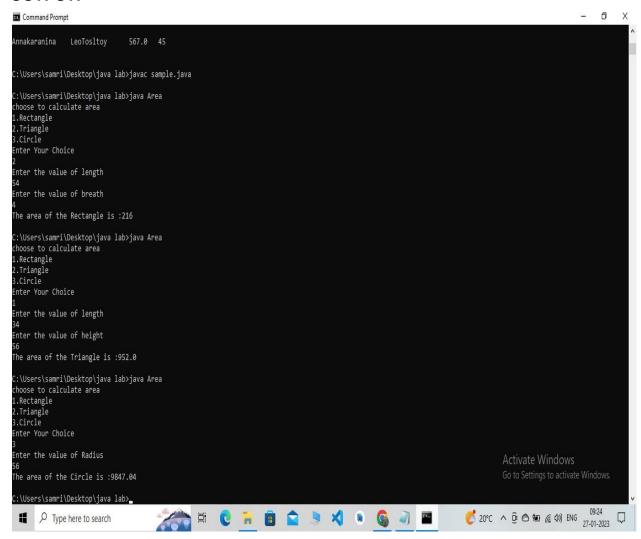
PROGRAM 4

Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

hoer of shapes alstoad Clan Shape & abstract void print Amen(); 3 Committed to the same of the same down kedangle extends Shape & public Word print Anea () & Scanner Sc= new Scanner (System.in); System out printly ("Inter the Value of length"). a = Sc nend Int(); Systam. out. printle ("toler the Value of breath"); b= sc.nextIn(); ind (= a x b; System. out. print ho 14 The area of the Rectargle is: "+c); Clan triangle extends shape I Public void printArea () [Scanner Sc = now Scanner (System. in); System out printh (" Falu the Value of Ergth"), System out prints (" Enter the Value of trength") clouble C = (a 6 b) + 0.5; System. out. println ("The areary Trionghiss" to b = Sc. hent Int ();

```
Clars Circle extends Shape S.
        public void So prilAneal) [
    Stanner Sc = new Stanner ( System . in);
      System. out-println ("Enter the Value of Radia");
        a = sc. nentsot();
                                                             Edgrid ?
      double c = (3.14*a *a);
       System out println ("The area of the Circle is: "te);
                                                                Choos
Clan Anea S.
     Public States void main (string argue 3) }
                                                                Enlev
              Scanner Sc = new Scanner (Syden in);
                                                                 1
           triangle t = new Triangle ();
                                                                (-nler
                Redaugh Y = new le changle ()
                                                                 23
                Circle c = new arde();
                                                                Enter
   System and printh (" Choose to Calculate area ");
                                                                 The
      System.od. printler ("I. trectargle ");
      System out printer ("2. Triangle ");
        Sydem of printh (13. arch 1);
        System. out : printh ( 4 Enfor Your Choice 4 to.
          int Choice = Scined Int();
     if (choice = = 1) 8.
         t-frinkAnea();
     One if ( Choice == 2) 2
          7. print Area();
    ( chaire = 23) ( cprint Anca (); 3
```

System out printer (" wrong choia "); Edpud o Choose to Calculate Area 1. Pectangle 2. Triangle 3. arcle Enler Your Choice Ender the Value of length Enter she value of height 45 The one of the Triagles is: 517-5. (1) Amount (which with us) (" beloogh at of trans set who!") within

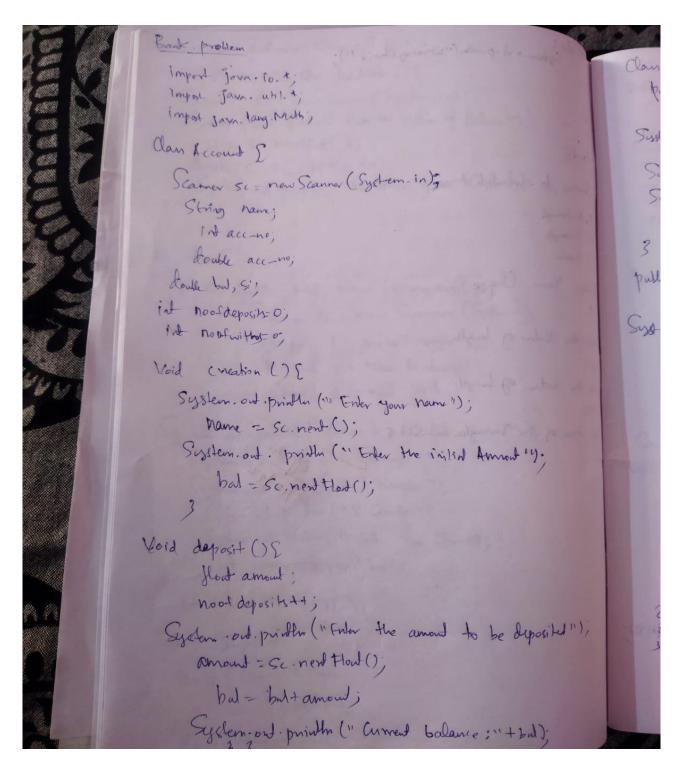


PROGRAM 5

Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class Account that stores customer name, account number and type of account. From this derive the classes Cur-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.

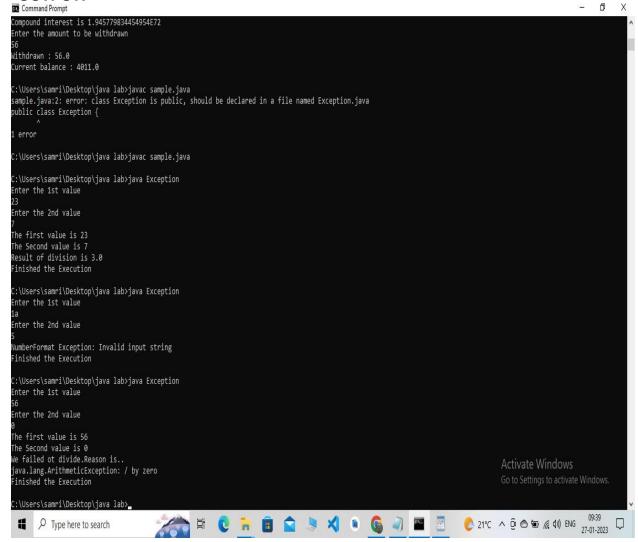
b) Display the balance. c) Compute and deposit interest d) Permit withdrawal and update the balance Check for the minimum balance, impose penalty if necessary and update the balance.



Class Terment Askout entends Account [public void Cheepersook ()[bul = bal -50; System out printh (" sons has been beduded from the bulance for the Chame book Entry"); System rout printle ("No of Deposity: "throf Deposits); System and printly (" No of withdrawd: &" noot with); System out . printle (" Balance: "+ noot-deposits); pullic Void withhrand () ? Shoot and ; System. and . prith ("Files the amount to be withdrawn"): and = Sc netthat (); If (and >but) System. ort prish (18 dance timpfice+11), dus bal-bal-and) 1f(bal < 1000) { System out printly ("sons is taken as Service fee") System. out protter (" withdrawn: " tout); System out. prittin (" Current balance: +" but);

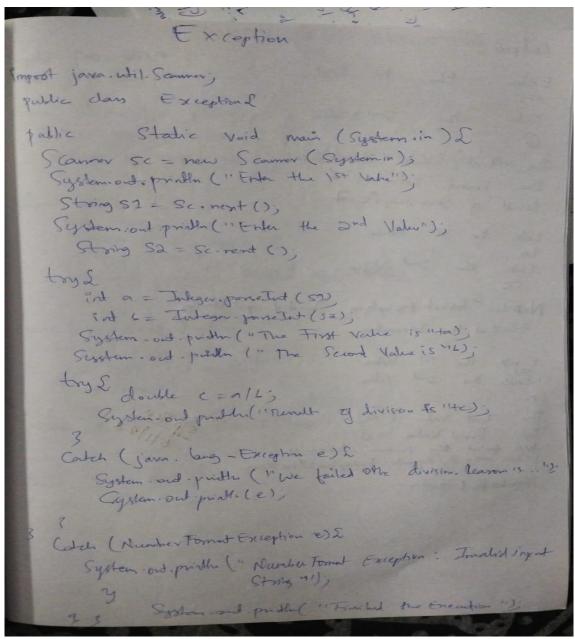
Savings Accord enlands Account [dar Public Vaid withdrawd OD publi Host and; System out printh (" Finder the amount to be withdrawn"). ant = senent Hout (); "if (ant >bal) System out print In ("Balance sumfricent"). else but = but - and; System out printin (" withdrawn: " + and; System. out println (" Current bulance : "+bol); public levid intrest()[System and print he l'Enter the rate of intreset "). double 8=0.06; System. out. println ("Enter the number of times intrent applied applied per time period") 1 N = Sc. new Tw (); System. p.d. printly (" Enler the time classed "). Port t= Sc. new In(); S1: hal* (1+ (v/n)) System. out : println (" Compant Entrent 15 "4 (Math. you (Si, MH)

Output 1. Savings account 2. Current account Emp Enler your Name I have Samith. Enler the Initial Amount 6000. Name: Samuith Balance: 6000.0 Eater the amount to be deposited 100 Cerrent balance: 6100.0 Enler the rate of Introst Erler the Number of times Intrest applied per line period Enter the line clayered. Compound intrest is A. 1809 15GET Enter the amount to be withdrawn Current balance: 5600.0.

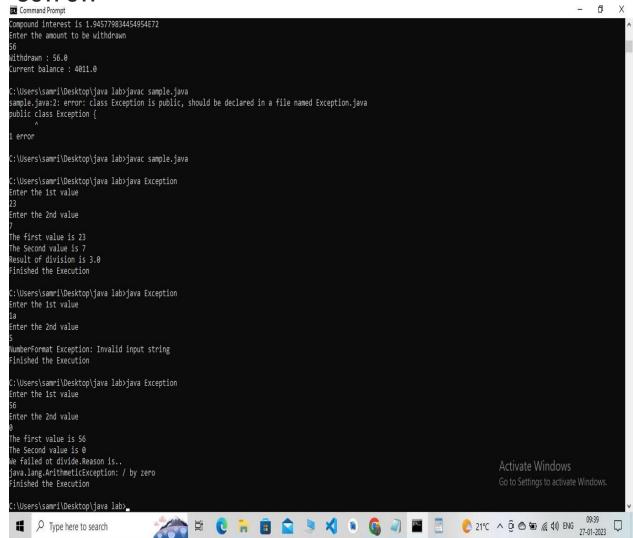


PROGRAM 6

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.



Output : 157 Value the impo Empo the 2rd Value Enler 6 da First Value is 45 The Second Value is 6 Result of division is 7 Enter the 157 Value 10 Ehler the 2nd Value 55 Number Format Exception: Invalid upod string. Finished the Freentish. do Enla the 1st Value Enter the 2nd Value 0 The First Value is 23 The Sword Value is O We failed the Division Meanon 15 ... java- wer. An themelic Exception; / by Zen. Firstled the Frenchion.

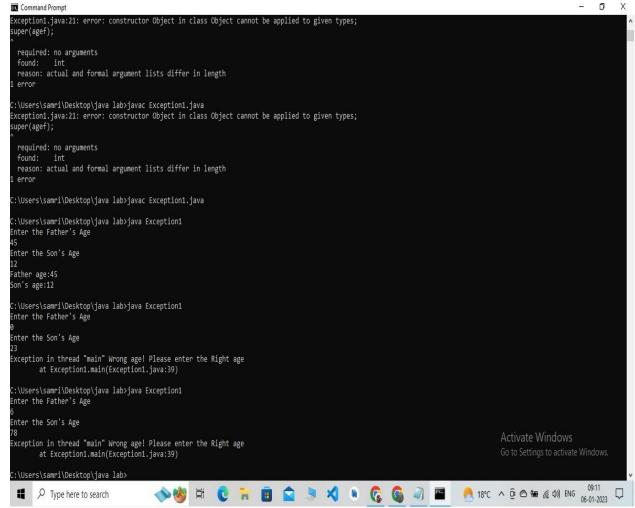


PROGRAM 7

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.

WRONG AGE EXECEPTION Empost java. util-to; Emport jarea lang. Exception; class Wrong Age extends Exception L pullic String tostong () (setum " wrong age! Please enter the Right age"; } class Father S Ent age; Father (int aget) & age = agef System.out. println ("Fatha age:" 1-ge); dans Son extends Father S int age; Son (int aget, int ages) L Super (aget); age = ages Tytem out . println ("Son's age : "tage); Clan Exception 15 Public State void main (String args (3) throws Wrongtese (Scanner Se = new Scarner (System. in) System out printle ("Finter the Father's Age") int aget = sc. newInt(); System. out - purtly (" Enter the Son's Age"); int agy = sc. next hat ();

Clan Enception 2 C public Static void main (Strong arms () throws Wrongly Scamme Sc: new Scame (System:in); Clan System aut. printly ("Enter the Father's Asse") String int aget = sc neutlntl); Threa System out pridly (" Enter The Son's Auge"); Sample 9 w ages - Sc-new hot () j of (aget xollagers > aget) [Honor how Wrong Aage (); pullic else Son s=new Son (auget ages)) if Output ; the output Father's Age Enke the Son's tage ? f (take age: 45 Son's age: 12 Forther age: 45 Son's age : 12 END The Father's Age Ende he Con's Aage Age! place Enforthe Kight Age



PROGRAM 8

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

17 Ulti the reading Ared Class Sample thread implements Runnable & String mersage, trane; Thread + ; Sample thread (String msg, String hame) & t = new Thread (this, name); message - msg; t. Start(); Pullic void run () L trys Ad (int i=5; i>0; i--)2 if (t.get Name (). equals Ignore (ase ("Thread 2")) & System out porton (message); Thread . sleep (10000); if (to get Name ()). equals gnove (an ("Thread 2")) (System. out. proble (newsage); Thread . Sleep (2000); (atch (Interrupted Exception e) [3 System.out.pmth (" Thread was interrupted"); System and public ("Tri lity threed " + t-get Name ())"

Class Display hread L public static read main (String [Jargs)[Sample thread S1: new Sample thread ("BMS LOLLEGE DF ENGINE FING", "Thread 24). Same thread Sa: new Sample thread ("CSE", "Thread ?"). 6 whent BMS COLLEGE OF ENGINEERING CSE CSE CSE Exiting thread: Thread 2. BMS COLLEGE OF ENGEFRANCE BMS COLLEGE OF ENGENEERING BMS COLLEGE OF ENGENEERING. Exiting thread " Thread I.

