VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



LAB REPORT on

OBJECT ORIENTED JAVA PROGRAMMING

Submitted by KATARAJU M (1BM21CS088)

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 Oct 2022-Feb 2023

B. M. S. College of Engineering, Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum) **Department of Computer Science and Engineering**



CERTIFICATE

This is to certify that the Lab work entitled "Object oriented java programming lab" carried out by <u>KATARAJU M(1BM21CS088)</u>, 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 Object oriented java programming Lab - (21CS3PCOOJ) work prescribed for the said degree.

Basavaraj Jakalli		Dr. Jyothi S Nayak
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Course Outcome

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

LAB PROGRAM 1: QUADRATIC EQUATIONS

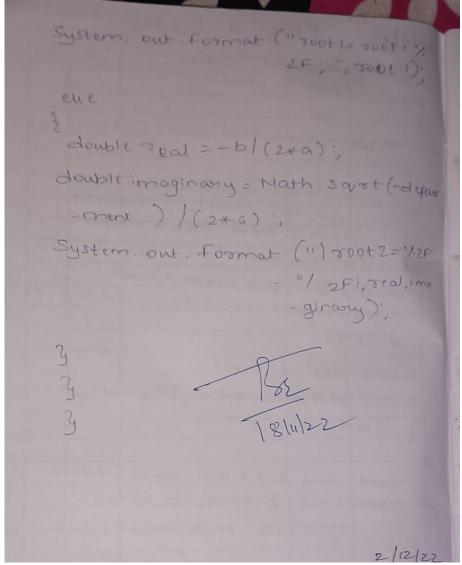
CODE:

```
Scanner s = new
                                Scanner(System.in);
       System.out.println("Enter the coefficients: ");
       float a = s.nextFloat(); float b = s.nextFloat();
       float c = s.nextFloat(); double r1,r2; float d =
       (b*b)-(4.0f*a*c); if (d>0)
       \{ r1=(-b+Math.sqrt(d))/(2*a); r2=(-b-a)
         Math.sqrt(d))/(2*a);
         System.out.println("Roots are Real");
         System.out.println("Root 1: "+r1+" Root 2: "+r2);
                 else
       if(d==0)
         r1=(-b)/(2*a);
         System.out.println("Roots are Equal");
         System.out.println("Root is: "+r1);
    else
                   e = (-b)/(2.0f*a);
         double
                                          double
                                                   f
          =(Math.sqrt(-d))/(2*a);
          System.out.println("Roots are imaginary");
         System.out.println("Root 1: "+e+"i+"+f);
         System.out.println("Root 2: "+e+"i-"+f);
}
```

```
C:\Users\student\Desktop>java Quad.java
enter the coefficients a,b,c:
1 1 1
Imaginary roots
Root 1: -0.5i+0.8660254037844386
Root 2: -0.5i-0.8660254037844386
C:\Users\student\Desktop> 1 4 2
'1' is not recognized as an internal or external command,
operable program or batch file.
C:\Users\student\Desktop> java Quad.java
enter the coefficients a,b,c:
1 4 2
Roots are real and distinct
Root 1:-3.414213562373095 root 2:-0.5857864376269049
C:\Users\student\Desktop>java Quad.java
enter the coefficients a,b,c:
169
Roots are equal and real
Roots are:-3.0
C:\Users\student\Desktop>_
```

Observation Book:

```
18/11/22 ROOT OF QUADRATIC EQUATION
impost java . until Scarner;
Public class Quadratic
   Public Static Void main (Stringarge [])
   Scanner input new Scanner ( System in)
   system. out point In ("Enter a:")
   double a = input next Double ();
   System. out. pount In ("Enter b= ");
   double b = input . next Double ();
   System. out pount In ("Enter & (= ")
   double (= input roext Double ();
 double root I, root ",
 double determinant = b*b-4*a*c.
  if (determinat >0)
 { root 1 = (-b+ Math sqrot (determinant))
    root 2 = (- b. Math - So 1(2 * a) ",
    Toot 2 = (-b-Math. Sarot (determinant)
                    1 (2 + a) -
 system out format ("root 1= % 2f and
            Toot 2 = % 2 F ", ooot 1,
           200+2);
  To be palgored selegation of property
-else ( bull and bull and
 { determinant = = 0) { (exa);
```



LAB PROGRAM 2: SGPA CALCULATION

CODE:

```
import java.util.Scanner; class
Student
{
```

String USN; String name;

int[] credits = new int[20];

```
int[] marks = new int[20];
           void input(int n)
           Scanner s = new Scanner(System.in);
           System.out.print("Enter Student USN: ");
           USN = s.nextLine();
           System.out.print("Enter Student Name: "); name
           = s.nextLine();
           for(int i=0;i<n;i++)
           System.out.print("Enter the Subject "+(i+1)+" marks and credits
    respectively: "); marks[i] = s.nextInt();
           credits[i] = s.nextInt();
float calculate(int n)
           {
           int sum_of_credits = 0;
           float
                      result=0.0f;
           for(int i=0;i<n;i++)
           sum_of_credits+=credits[i];
```

```
if(calculate_grade_point(marks[i])==-1)
      return -1.0f;
else
{
      result = result +(float) (calculate_grade_point(marks[i])*credits[i]);
}
return (result/sum_of_credits);
}
int calculate_grade_point(int marks)
if(marks > = 90)
return 10;
else if ((marks>=80)&&(marks<90))
return 9;
else if ((marks>=70)&&(marks<80))
return 8;
else if ((marks>=60)&&(marks<70))
return 7;
```

```
else if ((marks>=50)&&(marks<60))
return 6;
else if ((marks>=40)&&(marks<50))
return 5;
return -1;
}
void display(int n,float result)
System.out.println("\n");
System.out.println("Student Details");
System.out.println();
System.out.println("Student USN: "+USN);
System.out.println("Student Name: "+name);
System.out.println("Student Marks and Credits");
for(int i=0;i<n;i++)
System.out.println("Subject 1 -->\tMarks: "+marks[i]+" Credits: "+credits[i]);
}
System.out.println("SGPA: "+result);
}
```

```
public class Lab_02_SGPA
           public static void main(String[] args)
           Scanner s = new Scanner(System.in);
           Student s1 = new Student();
           System.out.print("Enter the number of subjects: "); int
           n = s.nextInt();
           s1.input(n);
           float result = s1.calculate(n); if(result
           == -1.0f)
           System.out.println();
           System.out.println("The Student has failed in a subject. SGPA cannot be
    calculated!");
           System.exit(0);
s1.display(n,result);
```

}

Output:

```
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmscecsexCD DESKTOP

C:\Users\bmscecsexCD DESKTOP

C:\Users\bmscecsex\Desktop>javac SGPA.java

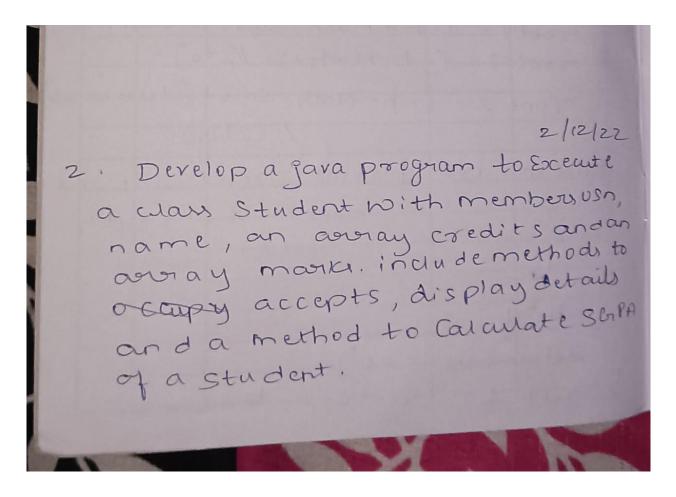
C:\Users\bmscecsex\Desktop>java SGPA
Enter the number of subjects: 5
Enter Student USN: 18N2ICS188
Enter Student Name: ABCXYZ
Enter the Subject 1 marks and credits respectively: 99 4
Enter the Subject 1 marks and credits respectively: 91 3
Enter the Subject 3 marks and credits respectively: 92 2
Enter the Subject 4 marks and credits respectively: 81 1
Enter the Subject 5 marks and credits respectively: 78 1

Student Details

Student USN: 18N2ICS188

Student Name: ABCXYZ
Student Name: ABCXYZ
Student Names and Credits
Subject 1 --> Marks: 90 Credits: 4
Subject 1 --> Marks: 91 Credits: 3
Subject 1 --> Marks: 92 Credits: 2
Subject 1 --> Marks: 81 Credits: 1
Subject 1 --> Marks: 81 Credits: 1
Subject 1 --> Marks: 81 Credits: 1
Subject 1 --> Marks: 87 Credits: 1
```

Observation Book:



```
STUDENT NAME , INFO
impost java . Util scannes ,
Clau Student
 String use, name;
int credits [] = new int [25];
  int marks [] = new int [25];
int cie [] = new int [25], See [] = new int
  String & Subject []= new String [19];
  Void accept.()
   System. out. pountin (" Enter the usn, Name
 number of Subjects int the Semester:")
  USn = S. mext()",
  name = S. next ().
   n= s. meset int ()",
System. out. porintin ("Enter the CTE MADE
                  out of 50
  name of the Subjects and Credits
   respectively");
     for (Int 1=0; 12n; 1+4)
      2 Subjects [i] = s. next();
       (redits Li) = s. mextint ();
```

```
System. out. pointln ("Enter the CIEMONE
      out of so for Each Subject :").
  for (int 1=0 , icn ; it)
   Cie [i]=s. mex Int (),
System. out. pointln ("Enter the SEEMOUN
   obtained in Each Subject out of 100: 1)
 for (int i=0; icn; i++)
  2 (redits [i]=1. new ()
  System. out, pointin ("Enter the (1)
 For (Pot i=0; icn; i++)
   Cie [i] = S. meach Int ()",
  System. out . printin (" Enter theses
  masks obtained in Each subject and glid
  for (int i=0, icm, i++)
    Cie [i] = S. next int ().
 System. out. pointin ("Enter the SRE more obtained in Each subject out
```

```
of 100: 11).
For (int 1=0, icn; i++)
  See [i] = S. next Int (),
  marks [i]= (see [i]/2)+(ie [i];
 double Calculate ()
 int total (redit = 0',
 double sgpa, Sum=0',
 for (inti=0, icm, i++)
Sum = Sum+grade (marks Ci), (ieli),
See [i])* Credits[i];
total credit = total credit + credits[i
Sapa = sum / total Credit;
    return Sapa,
3
int grade Cintmank, int (ie, intsee)
 octoon ozij (Cie (20)
   Tetwo D'
```

```
Islese if (see (40)
  if (mank (=100) De (mank ) 490)
return 10°,
Else if ((mark ) = 80) 22 (mark (90))
Deturn 8,
Elseif ((mank)=70) && (mank (80))
 roeturn 8°,
Elseif ((mank >= 60) & & (mank (20))
{ return 7°,
 Else if ((mank>=55) 22(mankli)
 ret win 6 ,
```

```
21se if ((marks )= 55) &2 (marked 601)
  setwin6;
 else if ((mark) >= 50) 22 (mark (50))
  return 5,
 Else if ((mark) >=40) &2(marklis)
  S return 4.
   2150
     retword',
  void display ()
  double Sapai,
System. out Pointln ("USN: "+USN +"1)
                  Name: "+ name
System. out. println (" subject /+ (redi
       Itmanus 1 + Giade points ):
```

```
for (int i=0; i (m; i++)
   System. out. println (subject [i]+
   " |+ "+ credits [i]+" | t"+ marks [i]t" |t"
   + grade (manks [i], cie [i], see [i])).
   Sgpa = (dellate ().
   System. out. prointin ("SGPA="+sgra
                          Sgpa);
    Class main
      Public Static Voidmain (Stringary)
      Louble Sapa,
     Student SI=new Student ().
         SI. accept();
         S2. display ().
of the most of mount altered to a cons
White It softe may be to make the
  · Comma stone + 1 reports
```

LAB PROGRAM 3: IMPLEMENTING ARRAY OF OBJECTS

CODE

```
import java.util.*; import
    java.io.*;
    class Book
    String title, author; float
    price;
    int num_pages;
    Book()
    title = "Default Value";
    author = "Default Value";
    price = 0.0f; num_pages =
    0;
void setTitle(String title)
    this.title=title;
```

```
void setAuthor(String author)
    this.author=author;
void setPrice(float price)
    { this.price=price;
void setPages(int num_pages)
    this.num\_pages = num\_pages;
public String toString()
    {
    return\ title+"\t'+author+"\t'+price+"\t'+num\_pages+"\n";
    public class BookDetails
```

```
public static void main(String args[])
String t, a;
float p; int
np,n;
Scanner
                             Scanner(System.in);
                     new
System.out.print("Enter the number of Books: ");
n = s.nextInt();
Book[] b = new Book[n]; for(int
i=0;i< n;i++)
System.out.println();
System.out.print("Enter the book name: ");
t = s.next();
System.out.print("Enter the author name: "); a
= s.next();
System.out.print("Enter the book price: "); p
= s.nextFloat();
System.out.print("Enter the number of pages: "); np
= s.nextInt();
```

```
b[i] = new Book();
b[i].setTitle(t);
b[i].setAuthor(a);
b[i].setPrice(p);
b[i].setPages(np);
}
System.out.println("Title \t\t Author \t\t Price \t\t Pages\n"); for(int i=0; i<n;i++)
{
System.out.println(b[i]);
}
}</pre>
```

Output:

```
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmsccsse\Desktop

C:\Users\bmsccsse\Desktop>javac BookDetails.java

C:\Users\bmsccsse\Desktop>javac BookDetails.java

C:\Users\bmsccsse\Desktop>javac BookDetails
Enter the number of Books: 3

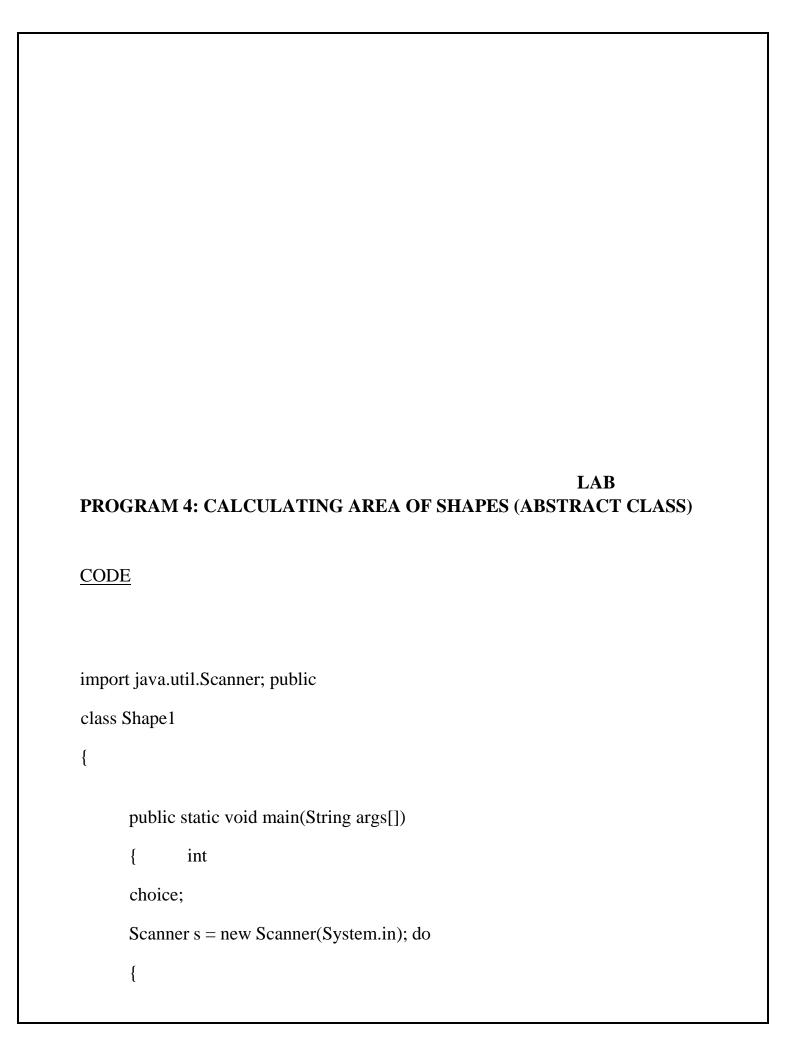
Enter the book name: Eldest
Enter the book price: 350
Enter the number of pages: 350
Enter the number of pages: 350
Enter the houthor name: Christopher_Paolini
Enter the book price: 400
Enter the book name: Inheritance
Enter the book price: 400
Enter the number of pages: 440
Enter the number of pages: 440
Enter the number of pages: 490
Enter the author name: Christopher_Paolini
Enter the book price: 450
Enter the number of pages: 490
Enter the nu
```

Observation Book:		

```
Create a Class Book which Contains
 four members name, authors, poire
 num-pages Include a Constructorsto
 Set the value of for the members. Include
methods
 Eimport java . Util + ;
 import java. lang. * ", scanner",
  Class Book
      String name, author;
       int porce, num-pager,
       Void getval ()
      Scanner Sc=new Scanner (System.in)
      System. out. pointin ("Enter booknami;
       name = sc. nextline().
  System: Out. println ("Enter authors
   author = Sc. next line();
  System. out point in ("Enter the point
     Price = Sc. next Int ().
   System. out. proint In (" Enter No. of
         num-pages = S(. new-Ind ().
```

```
Void display ()
     System. out. pointin ("Details of the
                         book: ")
 System. out. printin ("mare of the book
 system. out. pointin ("author of boot.
                       "+author).
   System. out. print In ("bookprine:
    System. out. point in l'inventer q
                pages: "+ numpages)
  Clau Main
    Public Static Void main (String
                            angs[])
     int mo,
     Scanner Sc=new Scanner (system
                                 ·in)
System. out. print In ("Enter the number
                          of books:"
     n= sc. next int ().
      pook op[] = new pook[].
     for ( int i=0; icn; i++)
```





```
System.out.println("1. Calculate Area of Rectangle\n2. Calculate Area of
Triangle\n3. Calculate Area of " +
             "Circle\n4. Exit the Program\n\nEnter the choice: ");
      choice = s.nextInt(); switch(choice)
      {
            case 1: Rectangle r = new Rectangle();
             r.printArea(); break;
            case 2: Triangle t = new Triangle();
             t.printArea(); break;
             case 3: Circle c = new Circle();
             c.printArea(); break;
             case 4: System.out.println("Exiting the
             program!"); System.exit(0); break;
             default: System.out.println("\nInvalid Choice!\n");
      }
      }while(true);
abstract class Shape
      int a,b;
```

```
abstract void printArea();
}
class Rectangle extends Shape
      void printArea()
           int
      area;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter the length and breadth of rectangle: ");
      a = s.nextInt(); b = s.nextInt(); area = a*b;
      System.out.println("\nArea of Rectangle: "+area+"\n");
}
class Triangle extends Shape
      void printArea()
            float
      area;
      Scanner s = new Scanner(System.in);
```

```
System.out.println("Enter the base and height of triangle: ");
      a = s.nextInt(); b = s.nextInt(); area = 0.5f*a*b;
      System.out.println("\nArea of triangle: "+area+"\n");
}
class Circle extends Shape
{
      void printArea()
            double
      area;
                                   Scanner(System.in);
      Scanner
                           new
      System.out.println("Enter the radius of circle: ");
      a = s.nextInt(); area = Math.PI*a;
      System.out.println("Area of Circle: "+area+"\n");
      }
```

Output:

```
Microsoft Windows [Version 10.0.19044.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\student>cd desktop

C:\Users\student\Desktop>javac AreaOfShapes.java

C:\Users\student\Desktop>java AreaOfShapes.

Menu

1.Area of Rectangle
2.Area of Traingle
3.Area of Circle
Enter your choice : 1
Enter length and breadth for area of rectangle : 30 2

C:\Users\student\Desktop>java AreaOfShapes

Menu

1.Area of Rectangle is 60.0

C:\Users\student\Desktop>java AreaOfShapes

Menu

1.Area of Rectangle
2.Area of Traingle
3.Area of Circle
Enter your choice : 2
Enter bredth and height for area of traingle : 15 35
Area of Triangle is 262.5

C:\Users\student\Desktop>java AreaOfShapes

Menu

1.Area of Rectangle
2.Area of Triangle
3.Area of Triangle is 262.5

C:\Users\student\Desktop>java AreaOfShapes

Menu

1.Area of Rectangle
2.Area of Triangle
3.Area of Circle is 1257.1428
```

Observation Book:

```
5) Abstract clay
   Code:-
       import gara. Wil. Scorner;
      abstract class shape ?
            double a,b",
           abstract void point Areal);
  Class restongle Extends Shape &
           void get Data (doublen, doubley)
              ast
              b= y .
           Yold Proint Area () {
              doublex=a+b;
          System. out point (14rea = 11+2).
   Class trangle Schends Shape &
              Void get data (doublex, doubley)
                  风二丈"
                  D= 4.
           3 voi d Point Area () {
                  double x = ax b 5:
                 Syet emout print (" The asur is
```

```
" x )", " "
clare h &
  Public Static Void main ( string Array ()) {
     scanner se = new scanner (system.in);
    rectangle == new rectangle
     triangle to new trainingle;
System. out. point ("Select in) Rectangle in2)
    tringle In");
  Choice = sc. next Int ()",
   case 1; System. out. print (" Entorthe
  Switch (Chaice) &
      length and breadth ")",
 double br = SC-next Double().
      double le = Sc. next Double ().
           To get Pata (leibre),
           T. pountarea (le, brs).
           break "
 Case 2: System. out-point ("Enter the
                base and hight ")"
       double Da = Sc. negr Double
       double he = Sc. next Double
                t. get Data ( ba, he).
               t, proint Arrea (ba, ho
```

default: Sytem Exit(0).

LAB PROGRAM 5: BANK PROGRAM

CODE

```
import java.util.Scanner; class
Account
  String
  customer_name; long
  acc_no; float bal;
  Scanner s = new Scanner(System.in); public
  void input()
  {
    System.out.print("\nEnter the Customer Name: ");
    customer_name = s.nextLine();
    System.out.print("\nEnter the Account Number: ");
    acc_no = s.nextLong();
    System.out.print("\nEnter the Starting Amount (Minimum Amount = 5000):
");
    bal = s.nextFloat(); if(bal < 5000f)
       System.out.println("\nAccount Balance cannot be less than 5000.0 \n");
       System.exit(0);
```

```
public void display()
     System.out.println("\nCustomer Name: "+customer_name);
     System.out.println("Account Number: "+acc_no);
     System.out.println("Amount: "+bal);
class Savings extends Account
  Scanner s = new Scanner(System.in);
             deposit, withdraw, interest;
  float
  public void deposit()
     System.out.print("\nEnter the amount to be deposited: ");
     deposit = s.nextFloat(); bal+=deposit;
     System.out.println("\nBalance: "+bal);
         public
                    void
  withdraw()
     System.out.print("\nEnter the amount to be withdrawn: ");
     withdraw = s.nextFloat(); if(bal<5000)
       System.out.println("\nInsufficient Balance");
```

```
else
bal-=withdraw;
           System.out.println("\nAmount Withdrawn: "+withdraw+"\nBalance:
    "+bal);
       }
       public void check_Bal()
       { if(bal<5000)
         {
            System.out.println("\nInsufficient Balance!!\nBalance: "+bal);
         } else
            System.out.println("\nBalance: "+bal);
       } } public void interest()
       { interest=(bal*6)/100;
         bal+=interest;
         System.out.println("\nInterest Credited: "+interest+"\nBalance:"+bal);
       }
class Current extends Account
    { float deposit, withdraw, penalty;
       public void deposit()
```

```
System.out.print("\nEnter Amount to be deposited: ");
     deposit = s.nextFloat(); bal += deposit;
     System.out.println("Balance: " + bal);
  }
  public void check_Bal()
  \{ \text{ if (bal} < 5000) \}
     { penalty = (0.1f * bal);
       System.out.println("\nInitial Account Balance: "+bal); bal
       = bal-penalty;
       System.out.println("\nLow balance!\nPenalty Amount: " + penalty +
"\nAccount balance: " + bal);
     else
       System.out.println("\n Balance: " + bal); }
  }
  public boolean check_Bal_part_2()
  \{ \text{ if (bal} < 5000) \}
     { penalty = (0.1f * bal);
       System.out.println("\nInitial Account Balance: "+bal); bal
       = bal-penalty;
       System.out.println("\nLow Balance!\nPenalty Amount: " + penalty +
"\nAccount balance: " + bal); return false;
```

```
return
  true;
public void withdraw()
  System.out.print("\nEnter Amount to withdraw: ");
  withdraw = s.nextFloat(); if(check_Bal_part_2())
  { bal-=withdraw;
    System.out.pri
    ntln("\nAmoun
    t Withdrawn:
    "+withdraw+"\
    nBalance:
    "+bal);
public void chequebook()
  System.out.println("\nCheque Book has been Issued!"); }
```

public class Bank

}

```
{ public static void main(String[] args)
     Scanner s = new Scanner(System.in);
     String ch;
     int n;
     Current c = new Current();
     Savings sa = new Savings();
     System.out.print("\nEnter the Account Type (S for Savings, C for Current):
"); ch = s.next();
     switch(ch.toLowerCase())
       case "s" : sa.input(); do
               {
                 System.out.print("\n1. Deposit \n2. Withdrawal \n3. Check
Balance \n4. Check Interest"
                      +"\n5. Show Account Details \n6. Exit Transaction\n\nEnter
your choice: "); n = s.nextInt();
                 switch(n)
                  { case 1 : sa.deposit();
                    break;
                    case 2 : sa.withdraw(); break;
                    case 3 : sa.check_Bal(); break;
                    case 4 : sa.interest(); break;
                    case 5 : sa.display(); break;
```

```
case 6 : System.out.println("\nExiting
                         Transaction!"); System.exit(0); break;
                    default : System.out.println("\nInvalid Operation");
               }while(true)
       ; case "c" : c.input();
       do {
                 System.out.print("\n1. Deposit \n2. Withdrawal \n3. Check
Balance \n4. Issue Cheque Book"
                      + "\n5. Show Account Details \n6. Exit Transaction\n\nEnter
your choice: "); n = s.nextInt();
                switch (n) {
                 case 1:
                      c.deposit(); break;
                   case 2:
                      c.withdraw(); break;
                   case 3:
                      c.check_Bal(); break;
                   case 4:
                      c.chequebook(); break;
                   case 5:
                      c.display(); break;
                   case 6:
                      System.out.println("\nExiting Transaction!");
           System.exit(0); break;
                   default:
                      System.out.println("\nInvalid Operation"); }
```

```
Exiting Transaction!

C:\Users\student\Desktop>java Bank.java

Enter the Account Type (S for Savings , C for Current) : c

Enter the Customer Name: rashtri km

Enter the Account Number: 123456789

Enter the Starting Amount (Minimum Amount = 5000): 6000

1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction

Enter your choice: 1

Enter Amount to be deposited: 6000

Balance: 12000.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction

Enter your choice: 2

Enter Amount to withdraw: 5000

Amount Withdrawar: 5000.0

Balance: 7000.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction

Enter your choice: 2

Enter Amount to withdraw: 5000

Balance: 7000.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
5. Show Account Details
```

Observation Book:

```
Enter the amount to be deposited: 1000

Balance: 6500.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 2000

Invalid Operation
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 2

Enter the amount to be withdrawn: 2000

Amount Withdrawn: 2000.0

Balance: 4500.0

1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 3

Insufficient Balance!
Balance: 4500.0

1. Deposit
2. Withdrawal
3. Insufficient Balance!
Balance: 4500.0

1. Deposit
2. Withdrawal
```

& Develop a Java Program to Quatea Class Bank that maintains two tinds of account for the its Customer, one Called Savenge account and the other current account. The Saving, a count Provides compound intrest and with -derand jacklitie but no cheque book facility! I he current account polder should also maintain a minimum balance and if the balance falls below this level, a servece charge isminposed Create a Class account that Stores Customer name, account number and type of account. From this desirethe Classes curract and sav-act to make them more specific to their requirements. Include the necessary methods en order to achieve the following tasks: a) Accept deposit from customer and update the balance b) Display the balance. c) (ompute and deposit interest

d) Permit withdraw I and update the balance

Check for the minimum balance, in penalty if necessary and update the balance.

System. out. pountle ("In cutoment Name: "+ Customer-nom System. Out. pountin ("Account Numb System. out, print In ("Amourd: "+ bal) Class Savings toctends Account Scanner S- new Scanner (Systeming Float deposit, withdraw, interest. Public void deposit() System. Out . print ("Infatorthe amoun to be deposited: ")", deposit = S. next Float (). bal + = deposit , System. Out. println ("In Balon · "+ bal). Public Void with draw () System. Out. pount ("Infortenthy amount to be withduran; ")

```
Withdraw s. next-float (),
           ic (bal & 5000)
         System : out . Print In ("In Insuffi
                   -cient Balance").
       SUSE
          bal - = withdraw.
       System. out. print In ("In Amount
             withdraw: "+withdraw+"In
           Balance: "+ bal).
    Public Vord Check bal ()
          Pf (ba) (5000)
oun
             System. out. pointin["In
              Insufficient Balance! InBalan
          System. out. print In ("In Balan
           Public void intrest ()
```

```
System. out · point in [" In Initial Account
         Balance: "+bal)",
   bal = bal - penatty",
 System. out. point in ("In Low Balance!)
     n penalty Amount: "+ penalty+" In Acco
   -unt balance: " +bal).
    return false ",
   roetum true,
  Public Vord withdraw()
    System. Out. Proint F ("In Enter Amount
  to withdraw: ").
    with donaw = s. next float ().
      if (Check - Bal - past 2())
    bal - = withdraw ,
   System. out. println ("In Checque Boot
                   has Essened!).
    clay Bonk
         Public Statec roid main
                 ( Stryng ( ) angs)
```

```
"inderest = (balt 6)/100.
     bal + = interest
    System. out. print 'n (" In Intered
    Credited: "+interest+" | h Balance
            : "+bal).
Class Chowent Extends Account
  - Float deposit, withdraw, penalty.
  Public void deposit ()
    System. Out. Proint ("In the Amound
      to be deposited: ").
     deposit = 5. merufloat ();
        bal + = deposit"
      System. out. printin ["Balany
                       " + bal).
   24
Public Yord Check-Bal ()
   { (bal (5000)
      2
Pen alt y= (0.1++bal);
```

```
Scanner S = new scanner (system.in)
 Storng Ch.
  ind no,
  Chovent (= new answert ().
Savings sa= new savengs ().
System. out. Pour ("In Enter the Account
      Type (Stor Savings, (forwer)
    3 11 ) 0
Ch = S. mod ().
 Switch (ch. to Lower Case (1)
    Case "S": Sa. Proput().
    System. out. print ("In1. Deposit
In2. withdrawl In3. Check Balance
 In4. Check Interest" + "Ins. Show
Account Details Int. Excit & Transacti
  In In Enter your Choice;").
   m= s. menct Int ().
      Switch (m)
      Case 2: Sa. deposit ();
               break
     carez: sa. withdrawl)
```



```
break ,
Case 3: Sa. Check-Bal ().
         break,
 (ase4: Sa. interest ();
  cases: Sa. display ().
 Caseb: System: but point in
     ("Intaiting Transaction)").
     System. Excit (0).
         break ,
 default : System. Out. Proint In ["In Invalid
               Openation").
  Justile (tom);
Course "C': (. I input ().
      System. Out. Print ("In1. Deposit
   In2. Withdraw I In3. Checkbarance In4.
  Issue Cheque Book"+ Ins. Show
Account Details In 6. Exit transaction
  In Interter your choice; ").
    n= S. next Int ().
    Switch (n) {
    Carel'o
         C. depos 1+ ();
            break '
```

```
Care 2 :
      C. withdraw().
          PRECK .
  Care 3:0
       C. Check-Ball).
        break ,
   Care 4:
   C. Cheque book ().
        break ,
   Care 6:
      System. out. println ["Intaiting
          Transacton!").
    System Exit(0).
        break,
   default:
    System. Out. println ("Intinvalid
                    Operation").
 3 while (tom).
default : System. out. Proint In ("In
        Invalid & Choice").
            break,
```

LAB PROGRAM 6: NUMBER OPERATIONS - EXCEPTION HANDLING

CODE

```
import java.util.InputMismatchException; import
    java.util.Scanner;
interface Z
    { public int calc(int a,int b);
    }
    class Y implements Z
    { public int calc(int a, int b)
       \{ \text{ int } c = a/b; 
         return c;
       }
    public class Try_1
    { public static void main(String[] args)
         Scanner s = new Scanner(System.in);
         Y o = new Y(); int
         num1,num2;
```

```
try
{
    System.out.println("Enter the two numbers: ");
    num1 = s.nextInt(); num2 = s.nextInt(); int c =
    o.calc(num1,num2);
    System.out.println("Quotient: "+c);
} catch(ArithmeticException | InputMismatchException
e1)
{
    System.out.println("Exception: "+e1);
}
}
```

```
:\Users\PRAJWAL\Desktop\safwan output>java Try_1
Enter the two numbers:
Exception: java.lang.ArithmeticException: / by zero
:\Users\PRAJWAL\Desktop\safwan output>java Try_1
Enter the two numbers:
3 200
:\Users\PRAJWAL\Desktop\safwan output>java Try_1
Enter the two numbers:
 300
Quotient: 0
:\Users\PRAJWAL\Desktop\safwan output>java Try_1
nter the two numbers:
Quotient: 0
C:\Users\PRAJWAL\Desktop\safwan output>java Try_1
Enter the two numbers:
Quotient: 2
```

Observation Book:

LAB PROGRAM 7: AGE EVALUATION - EXCEPTION HANDLING

CODE

```
import java.util.Scanner;
public class Age
    {
          public static void main(String[] args) throws WrongAge,InvalidAge
                new
          Son();
    class WrongAge extends Exception
    {
          public String getMessage()
          return "Age Cannot Be Negative";
```

```
}
class InvalidAge extends Exception
{ public String getMessage()
      {
      return "Son's Age cannot be greater than Father's!"; }
}
class Father
      Scanner s = new Scanner(System.in);
      int f;
      Father() throws WrongAge
      System.out.print("Enter the Father's Age:
      "); f = s.nextInt(); try { if(f<0) throw new
      WrongAge();
          catch(WrongAge
      e1)
       System.out.println(e1.getMessage());\\
      System.exit(0);
```

```
}
class Son extends Father
{
      int son;
      Son() throws WrongAge,InvalidAge
      { super();
      System.out.print("Enter the Son's Age:
      "); son = s.nextInt(); try { if(son<0)
      throw new WrongAge();
          catch(WrongAge
      e2)
       System.out.println(e2.getMessage());
        System.exit(0);
      } try { if(son>f) throw
      new InvalidAge();
         catch(InvalidAge
      e3)
```

```
System.out.println(e3.getMessage());
System.exit(0);
}
System.out.println("Ages are appropriate");
}
```

```
C:\Users\bmscecse>javac Age.java
error: file not found: Age.java
Usage: javac (options) <a href="color: solid total tota
```

Observation Book:

USER DEFINED EXCEPTION

```
import gava . util . scanner.
Class Father extends Exceptions
 int fage .
father (int x)
{ fage=*;
 Public String to String ()}
 "Tetwer " father's age "swrong";
 Class Son Extends faither }
       Port Sage",
  Son ( Pot x, Porty)
   Super (x)
   Sage= yo
    Public String to String () {
  return " Son's age Ps greator than
   08 Equal to father ".
   Class Wrongage }
      Static int Y, y .
      Static Void Pathorage (intrithrows)
                   father
```

```
System. out. posintin ("Called Fatheragel"+x+")"
 16 (x (0)
 thouse new father (x);
System. out. printin ( called fatherage is
              ("+x+")")=
  the ("Normal Excit Father 'sage 18"+x);
  state void sonage (intx, inty) throws son
 System. out. println (" called son age ("+ Y+"))
    if ( A>= X).
   throw new son (x, y).
    System. out. println ("Normal Exit Son's age is "+y).
public Static void main (String ang) [])
  Scanner input = new Scanner (system.in)
   System. out. print In ("Enter Fatherag)
   X=input. neat Int ()",
   System. out. pointin ("Enter Sonage
       Y= input. next Int ()",
          toy }
   father age (x);
    Coutch (father ()
```

```
System.out. printinge).
Sonage (x,y).,

Z

Catch (sone)
 System. out. pointince
```

LAB PROGRAM 8: MULTI-THREADING

CODE

```
class MyThread extends Thread
{ long time;
    private volatile boolean running = true;
    MyThread(){
```

```
System.out.println("Default"); }
MyThread(String name, long time)
{ super(name);
      this.time = time;
    public
              void
pause()
{ running = false;
   public void
run()
      try
            while(running)
                   System.out.println(this.getName());\\
                   Thread.sleep(time*1000);
          catch (Interrupted Exception\\
      ie)
            System.out.println("Exception caught in method");
```

```
class Main
{ public static void main(String [] args)
      {
            MyThread mt1 = new MyThread("BMS",
            10); MyThread mt2 = new MyThread("CSE",
            2); mt1.start(); mt2.start();
            Try
                  Thread.sleep(20*1000);
                  mt1.pause();
                  mt2.pause();
            catch(InterruptedException ie)
                  System.out.println("Exception caught in main"); }
      }
}
```

Observation Book:	

```
Multitreading
Program!
 Clay Q ?
          inten "
        boolean Value Sct = False ",
        Sychologised int get () {
            while (: Valuset)
          try 5
                wait (?;
          Catch (Interrupted Exceptione);
           Scout ("Interrupted Exception
                       & caught + "):
       Stow Sout ("Got;"+n).
              Value Set = False .
              notiby ().
              return.
     Sychmonized void put (entr) &
      nohi'll (value set)
          try &
            wait().
       3 contact ( Interrupted tocception e) {
```

```
Sout (" Interupted").
      443.0EU.
      Value Set : true",
        Sout ("Put: "+n).
        nothly ();
  3
Class producer implimits Rurrable &
          Q 9.
     Produced (Qq) E
        this g=q.
  new thouad (this, " Produced"). Start();
   Public void sun() {
          int 1=0°,
          while (tru) {
                 9. put ( i++):
Class Consumer implements Rumable?
           Q ay
      Consumer (Qq) &
           this . q = q.
```

```
new thread (this, "Consumer"). staro().
    Public vord oun () 5
         white (true) & ?
     q. get [);
Class pifroced {
       Psvm (string ang) []) }
             Qq=newQ[].
          new producer (ar) ",
           new Consumor (a).
          Sout ("Press Control Cto Stop").
```