VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



LAB REPORT on

OBJECT ORIENTED JAVA PROGRAMMING (21CS3PCOOJ)

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
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B. M. S. College of Engineering,

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(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 (21CS3PCDOOJ)" carried out by **Sannidhi M (1BM21CS189)**, 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. The Lab report has been approved as it satisfies the academic requirements in respect of Object Oriented Java Programming (21CS3PCOOJ) work prescribed for the said degree.

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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.

```
import java.util.*;
import java.lang.Math;
class prog1{
  public static void main (String[] args)
     Scanner sc = new Scanner (System.in);
     System.out.println("Enter the values of a,b,c");
     float a = sc.nextFloat();
     float b = sc.nextFloat();
     float c = sc.nextFloat();
     float d = b*b-4*a*c;
     double r1, r2;
     if (a==0) {
       System.out.println("Not a quadratic equation");
     else if (d==0){
       System.out.println("Roots are equal.");
       r1 = r2 = -b/(2*a);
       System.out.println ("Root 1 and Root 2 are: "+r1);
     }
     else if (d>0){
       System.out.println ("Roots are real and distinct.");
       r1 = (-b + Math.sqrt(d))/(2*a);
       r2 = (-b - Math.sqrt(d))/(2*a);
       System.out.println ("Root 1: "+r1);
       System.out.println ("Root 2: " +r2);
```

```
LAB PROGRAM -
Quadratic Equation
Emport java. util. *;
emport java util. Math; class Main {
impost 1
public static void main (String[] args)
  Scanner sc. new Scanner (System.in);
System out printly (" Enter the values of a, b, c.");
   float a = sc. nextfloat();
    float b = sc. nentfloat();
    float c = cc. next float ():
    float d = 6xb-4xaxc;
    double 81, x2°
  : f ( d= = 0) {
System out println l'Not a quadratic equation");
  else if (d= 0) {
  System out printlen ("Roots are quel"),
81 = 82 = -b/(2*a);
System out pointly ( Root I and 2 are" +81)
   else if (d>0)
System out printly ("Roots are real and distinct");
     ~81 = (-b + Math. sqxt(d)) / (2 *a);

x2 = (-b - Math. sqxt(d)) / (2 *a);
System. out. printly ("Root 2 is" +82).
Septem out printer ("Roots are ?maginary");
   81 = (-6/2×a);
    82= (Math. 398t (-d))/ (2xa);
```

```
System out print | "Root 1 is" + 81 + "+?" + 80);

System out print | "Root 2 is" + 81 + "-;" + 80);

3

Output:

Enter the values of a, b, c | 1 - 2 |

Roots are equal

Root 1 and 2 are 1.80

Enter the values of a, b C: 1 | 1 |

Roots are imaginary

Root 1 is - 05 + i 0.8660254

Root 2 is - 5 0.8660254
```

```
Microsoft Windows [Version 10.0.22000.1219]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Admin>cd Document
The system cannot find the path specified.

C:\Users\Admin\Documents>

C:\Users\Admin\Documents>javac Main.java

C:\Users\Admin\Documents>java Main
Enter the values of a,b,c

1 3 4

Root are imaginary
Root 1: -1.5+i1.3228756555322954
Root 2: -1.5-i1.3228756555322954

C:\Users\Admin\Documents>java Main
Enter the values of a,b,c

1 2 1

Roots are equal.
Root 1 and Root 2 are: -1.0

C:\Users\Admin\Documents>java Main
Enter the values of a,b,c

1 -5 6
Root are real and distinct.
Root 1: 3.0

Root 2: 2.0

C:\Users\Admin\Documents>

C:\Users\Admin\Documents>
```

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.

```
import java.util.*;
class Student{
  String USN;
  String name;
  int sub;
  int[] marks = new int[10];
  int[] credits = new int[10];
  int gradepoints[] = new int[10];
  double nume =0;
  double denom=0;
  double SGPA;
  void accept()
     Scanner sc = new Scanner (System.in);
     System.out.println ("Enter USN of student: ");
     USN = sc.nextLine();
     System.out.println("Enter Name of the student: ");
     name = sc.nextLine();
     System.out.println("Enter number of subjects:");
     sub = sc.nextInt();
     for(int i=0; i < sub; i++)
       System.out.println("Enter subject "+(i+1)+" marks: ");
       marks[i] = sc.nextInt();
       System.out.println("Enter subject "+(i+1)+" credits: ");
       credits[i] = sc.nextInt();
```

```
denom += credits[i];
     }
  }
 void calculate()
  {
    for(int i=0; i < sub; i++)
    {
       if(marks[i] >= 90)
       gradepoints[i]=10;
       else if (marks[i] >= 80 \&\& marks[i] < 90)
       gradepoints[i]=9;
       else if (\text{marks}[i] \ge 70 \&\& \text{marks}[i] < 80)
       gradepoints[i]=8;
       else if (marks[i] >= 60 \&\& marks[i] < 70)
       gradepoints[i]=7;
       else if (marks[i] >= 50 \&\& marks[i] < 60)
       gradepoints[i]=6;
       else if (\text{marks}[i] \ge 40 \&\& \text{marks}[i] < 50)
       gradepoints[i]=5;
       else
       gradepoints[i]=0;
    nume += credits[i]*gradepoints[i]; }
SGPA = nume/denom;
  void display()
    System.out.println("The student details are:");
    System.out.println("Name:"+name);
    System.out.println("USN: "+USN);
    System.out.println("SGPA:"+SGPA);
  }
```

```
class prog2{
  public static void main (String args[]) {
    Student s = new Student();
    s.accept();
    s.calculate();
    s.display();
  }
}
```

```
LAB PROGRAM- 2
 Clars Student, Calculate SGPA
Emport java. Wil.x.
Class Student &
   String USN;
   int[] marks = new int[10];
  Ent [] exedits = new Ent [ 10];
  Ent[] gradepoints = new Put [10];
  double denom = 0;
  double SGPA;
 void accept ()
   Scanner sc - new Scanner (System. in):
 Atem out pointly (" Enter USW of student
  Tystein out Printh (" Enter number of subjects:
    sub = Sconenint();
 lox (ent : 50; ix Sub; i++)
    Stope (" Enter Subject" of (1-11) of "mashe:");
       maybes [2] = sc. neat Ent ();
   Sop ("Enter Subject" it (iti) it "credits: ");
      exedis LiT = 800 ment Ent ();
      denom + = exedit [1];
```

```
void calculate (1)
 for lint 120; ik sub; i++)
    :f( masks [9] > 90)
  gradepoint (+) = 10°
de if (masks [:] > = 80 & d. masks (:] (90)
     gradeppints[i] = 9;
  cle if (made [i] > =780 & masks [i] < 86)
      gradepoints [:7.8"
  elle if (marks[?) >= 60 &k marks [1] < 70)
    gradepoint [i] > 7:
  else if (maybes (i) >= 30 &b maybel:] < 60)
       gradepoints [i] 26;
   ele if (quadestil) 2 40) Al marks [i] ( 50)
      gradepoints [:7 - 15;
       gradepoints [1] 20°
    nume + = exedit li ] * gradepoint[:].
   SGPA 2 nume/denom;
 void display ()
    Sop (" The student details are ");
    Sop (" Name: " + name);
    80p ("USNO?" + USN);
    SUP ( SGPA : " + SGPA);
```

```
class Main
Brudent S. new Student();
        so accept();
        3. calculate();
        S. display ();
Enter USD of Student
Enter Name of student?
Langa
Enter 0
    Durber of Subjects
Enter Subject 1 marky: 90
Enter subject 1 credits
Enter Subject 2 marks : 89
Eintle Subject 2 Credity; 3
Enter subject 3 masks: 83
center Subject 3 credit : 3:
Name: Ramya
USN: 2105128
8GPA: 9.333
```

```
Microsoft Windows [Version 10.0.22000.1219]
(c) Microsoft Corporation. All rights reserved.
C:\Users\Sannidhi>cd C:\Users\Sannidhi\OneDrive\Desktop\JAVA
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>javac prog2.java
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog2
Enter USN of student:
1BM21CS145
Enter Name of the student:
Enter number of subjects:
Enter subject 1 marks:
Enter subject 1 credits:
Enter subject 2 marks:
Enter subject 2 credits:
Enter subject 3 marks:
Enter subject 3 credits:
Enter subject 4 marks:
Enter subject 4 credits:
The student details are:
Name:Swara
USN: 1BM21CS145
:\Users\Sannidhi\OneDrive\Desktop\JAVA>_
```

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.

```
import java.io.*;
import java.util.*;
class Book {
       String title, author;
       double price;
       int numPages;
        Book() {
               title="Default";
               author="Default";
               price=0.0;
               numPages=0;
       }
void setTitle(String t) {
        title=t; }
void setAuthor(String a) {
      author=a;}
void setPrice(double p) {
      price=p;}
void setPages(int np) {
     numPages=np;}
public String toString() {
       return title+"\t"+author+"\t"+price+"\t"+numPages+"\n";
       }
}
```

```
class prog3 {
public static void main(String args[]) {
               String t, a;
               double p;
               int np,n;
               Scanner sc = new Scanner(System.in);
               System.out.println("Enter the number of Books");
               n = sc.nextInt();
               Book b[]= new Book[n];
               for(int i=0; i<n;i++) {
                      System.out.println("Enter the Title of the Books");
                      t= sc.next();
                      System.out.println("Enter the Author of the Books");
                      a= sc.next();
                      System.out.println("Enter the Price of the Books");
                      p= sc.nextDouble();
                      System.out.println("Enter the Number of pages of the Books");
                      np= sc.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 Author \t Price \t Pages\n");
               for(int i=0; i<n;i++) {
                      System.out.println(b[i]);
               }
       }
}
```

```
class Book Details ?
 public Static voidmain (String args[ ]) ?
  String t, a;
 double p;
  ent up, n;
 Scanner sc = new Scanner (System. En);
 System out, pointly ("Enter the number of Books");
 M? Sc. nent Int ();
 book b[] = new book[n];
 Por (int := 0; in; i++) {
  System out pointly ("Enter the Title of the Books").
  for sc. nent();
   8 op (" Enter the Author of the Book");
   a. Sc. nent ();
   Sop (" Enter the Price of the Book");
   p > Sc. nent Double ();
  Sop ("Enter the Number of Pages of
   np = Sc. hent Int ();
     b[i] = new book();
    6[i]. Set Title (+);
     b[:). Set Author (a);
     b[?] :setPrice (p);
    b(i), set Pages (ap);
  Sop ("Title It Author It Price Pages In");
for (int i=0; i(n; i++) {
      Sop (B[i]);
```

```
1icrosoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.
C:\Users\Student\Desktop\C$178>javac Details.java
C:\Users\Student\Desktop\CS178>java Details
Enter the no of books:
Enter the title of the book:
Enter the author of the book:
Enter the price of the book:
120
Enter the no of pages of the book:
Enter the title of the book:
Enter the author of the book:
Enter the price of the book:
Enter the no of pages of the book:
Title
         Author
                  Price
                            Pages
abc
                   120.0
                            300
         pqr
                            450
1mn
         def
                   200.0
```

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.

<u>CODE</u>

```
import java.util.Scanner;
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 Square extends Shape
  void printArea()
    int area;
     Scanner s = new Scanner(System.in);
    System.out.println("Enter the side of square: ");
     a = s.nextInt();
     area = a*a;
    System.out.println("\nArea of square: "+area+"\n");
  }
}
class Circle extends Shape{
 void printArea()
     double area;
     Scanner s = new Scanner(System.in);
    System.out.println("Enter the radius of circle: ");
    a = s.nextInt();
     area = Math.PI*a;
    System.out.println("Area of Circle: "+area+"\n");
  }
}
```

```
public class prog4
{
  public static void main(String[] args)
     int choice;
     Scanner s = new Scanner(System.in);
     do
     {
       System.out.println("1. Calculate Area of Rectangle\n2. Calculate Area of Square\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: Square sq = new Square();
              sq.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);
  }
}
```

```
LAB PROGRAM 4. (Asea)
Emport java util Sconnex;
 abstract class Shape
Ent a, b;
abstract void printArcal);
 class Rectangle entends shape
void printAreal)
 ent area;
  Scanner 3 - new 8 canner ( System, in);
  System out pointly " Enter the length and breadth of
       sectangle")
    a sonent Int ();
       b = S. nent Int ();
     area = a x b:
   Sop ("In Asea of Rectangle: "+ axea+"\n");
clas Square entends Shape
Void PrintAcea ()
int area;
Sonner 8 = new Scanner (System.in);
Sop (" Enter the gide of square:");
a = s, nent int();
asla , a x a.
2 Sop ("In Axea of Square: " tarea + "In");
```

	closs livale entends Shape
	1
	void psintAxeac)
+	
-	double area;
+	Scanner s = new Scanner (System.in): Sop("Enter the radius of circle:");
+	sopt enter the radius of axie.
+	a = hearthe
+	axed = Math. Plx axa
1	Ropli Asea of circle: "+area + "\n");
	?
1	
1	public class area
	S S S S S S S S S S S S S S S S S S S
	psvm (String [] args)
	int choice;
	Scannex S- New Scanner (System in);
	for choice; Scanner S = New Scanner (System. in); do
	Sop ("1. Coloulate Axer of Restangle In S. Calculate Axer of Square In 3. Calculate Axer of Circle In 4. Exit the
	of Square in 3. Calculate Area of Cèrcle in 4. Exit he
	100 days
-	Sop ("In Extens the chorce:");
	choice, 8. nent Int ();
	switch (choice)
	2 1. Pertande 8 2 Min Rocta de 1 1'
	(ase 1: Rectangle 8: New Rectangle 1); 8. Print Asea ();
	break,
	My D' Couaxe 39 2 New Square ();
	sq. Print Area (); break;
	bredh;

	Case 3: Cércle C- new Cércle(); C. printAxea ();
	byea Lo
	Case 4: Sopl" Eniting the psogram, "); System. enit(0);
	System, enit (0);
	DX CAR
	defautt: Sop (" In Envaled Choice! In");
30	phile (txue).
2	while (true);
3	
Out	Put!
	alculate Axea of Rectangle
Q. (alculate Axea of Squaxe
	Calculate Asea of Circle
4.	Erit the Program.
	V Committee of the comm
Ent	ex the choice:
1	
Ent	ex the length and breadth of rectangle:
5	6
Are	r of Rectangle: 30
10 0	alculate Axea of Rectangle
2 0	excutate the of square
3. (alculate Asca of Ciscle Enit the Program
4 1	This the program
cuse	The choice:
+	ing the program!

```
C:\Windows\System32\cmd.exe
2. Calculate Area of Square
  Calculate Area of Circle
4. Exit the Program
Enter the choice:
Enter the length and breadth of rectangle:
89
Area of Rectangle: 4005

    Calculate Area of Rectangle

2. Calculate Area of Square
3. Calculate Area of Circle
4. Exit the Program
Enter the choice:
Enter the radius of circle:
Area of Circle: 18.84955592153876

    Calculate Area of Rectangle

2. Calculate Area of Square
3. Calculate Area of Circle
4. Exit the Program
Enter the choice:
Exiting the program!
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>_
```

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.

<u>CODE</u>

```
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);
  float deposit, withdraw, interest;
  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 || bal<withdraw)
       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()
    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 void withdraw()
     System.out.print("\nEnter Amount to withdraw: ");
     withdraw = s.nextFloat();
```

```
if(bal<5000)
       check_Bal();
    else if(bal<withdraw)
       System.out.println("\nInsufficient Balance!!\nBalance: "+bal);
     }
    else
       bal-=withdraw;
       System.out.println("\nAmount Withdrawn: "+withdraw+"\nBalance: "+bal);
     }
  }
  public void chequebook()
    System.out.println("\nCheque Book has been Issued!");
}
public class prog5
  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");
                 }
              }while(true);
       default : System.out.println("\nInvalid Choice");
             break;
       }
  }
```

	LAB-5.
	Emport java, util. Sianues;
	class Account &
	Aving customes name;
	long accno;
	Poat bal;
	Scarner & new Scanner (Bystem. in);
	qublic yord Empute) {
	Sop ("Enter customer name,");
	outomer-name, s, nentline();
	Sop (" Enter account number; ");
	accno = 8, nenthong(),
	lop ("Enter starting amount (Minimum = 500); ");
	bal = encettlibates;
	it (bal < 5000t) {
	log L'A court balance court be less than " + 45000.0)
-	System end (0)
-	
	3
	public void display () &
	Jublic void display () & Jop ("In Customer Dame; " + Customer name);
	Sop (Account Number: +accho).
	Sop (" Amount; " + tal);
	3
	2
	The second secon
	Jours Javengs extends Accounts
	Beanner & new Sanner (Enter in).
	Roat deposit, withdraw, interest;
	pullic void deposit() q
	lop Calm (=nter amount to be depositer); deposit > s.northoat();
	doposit > s.nontPloat();
	bal + 2 deposit;

Sop ("In Balance; " 46al);
3
public boid withdraw () &
Bp ("In Enter amount to be withdrawn");
W. Sh draw > 3, new Aleat ();
Sop (" he may their balance").
Sop ("In ansufficient balance");
else ?
bal - = with ofan:
Sop ("In Amount Withdrawn!" + willdraw +
bal - = with oxaw: Sop ("In Amound : Withdrawn: "+willdraw + "In Balance" + Ball); 3
3
3
public void check-Bal V & it Lbal (5000) & Sop ("In Surafficient belonce !! In Balance;" toll else 3
1+ Lbal (5000) \$
Sop ("In Surafficient balance 11 in Bolance; that
3
else 3
30P (" h Balance; "+bal);
else 3 Sop ("In Balance;" + bal); 3
3
Public void interest () &
interest > (hal *6) /100;
interest > (bal *6) /100; bal + = enterest;
Sopl" Interest "Credited: " + interest +
7/n Balance; " +bal);
3
3
chass Current entends Account ?
float deens; + we the draw sanglity.
Public void aleposit [) {
1 2 2010 agos 11 / 1

. "	/
80 PC In Enter Amount:	
80 P ("In Enter Amount;"); degosit = a. new Ploat();	
8 op ("Balance" + bal);	
800 ("Balance" + bal);	
3	
Public void check Bar () ?	
(bal < 5000)	
penalty = (0.0 f + bal);	
1 - 110 7 - 10 10 10 10 10 10 10 10 10 10 10 10 10	
bal - = penalty;	
Sop ("In Plenetty;" + penatty + "In Account Balance" shad);	
shal);	
3	_
the 3	
System out Printly (" m Balance; " + bal)"	
System out . Println (" m B alance: " - Lal)"	
4	
public void with Sraw () {	_
Sop (" Enter amount: ")",	
with dyaw - S. next float ();	_
if (bol < 5000) {	_
heck-Ball;	_
	_
Ese if (bal & withdraw) E sop(" in an afficient Backance +>bal);	_
2 lop (" in smafficient Backage 476 al):	_
	-
Public void chequebook ()	-
1	_
Sopt'In Cheque Book has been Essuedin);	-
	_
3	-
	_

Public class Bank
Public class Bank
public static void main (string [] axgs)
Scauner 3 = new Scanner (848tem.in); String Ch;
String ch.
Ent no
Savings 10 = new langings ();
Charrent (> New Current(); Sawings (a > New Languags (); Sop (wellster the Account Type (S fox Savings, Ch > Christ();
Justich (ch. toxover(ase())
1
Case 's'? sa. Engut();
do /
System. ow. printle ("Int. Deposit In D. W. Kodraw
In 3. Check Balance in A. Check Interest" In 5. Show
Account Details In 6. Knit Transaction In In Enter
your choice: ");
No s, nentent ();
witch (n)
Care 1; la depositi),
break.
care 2: sa. withdraw ();
break;
(me 3: 1a, chech Ball)
break;
Case 4: la ? Hexat ();
bred;
Care 5: sa. dieplay ();

bx cal;
Case 6: System. out. Isintlul" In Emiting Transaction 19
System east (6);
back:
default: 30 p (" In Envaled Operation");
deflut. of (in mance)
3 while (true);
White Colley
Case "C": Engat();
do i
Sop ("In 1 Deposit In 2 Withdrawal In 3 Check
Balance in at Jisne Cheque Book of Man. Show
Account Details In 6. Frot Transaction in An
Puder your choice; ");
n. s. neotint ();
Swift (n) {
case 1: c, deposit();
bx cak;
case d', c. willidrand);
break;
case 3: c. check Ball;
bxeak;
Case 4. C. Chequebook Cr;
bxeak',
(are 5: c. display 1);
break;
Love 6: Sup [" Eniting Transaction !");
System. enit (6),
10 family 1 - 171 5
System. ent (6); break; gle foult; Sop (" In Small of Operation ");
defant is SOF (" Francis Choice");
break;
4 9

```
Select C:\Windows\System32\cmd.exe - java prog5
Enter the Account Type (S for Savings , C for Current) : S
Enter the Customer Name: suresh
Enter the Account Number: 12378956
Enter the Starting Amount (Minimum Amount = 5000): 40000
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: 20000
Amount Withdrawn: 20000.0
Balance: 20000.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction
Enter your choice: 4
Interest Credited: 1200.0
Balance :21200.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
C:\Windows\System32\cmd.exe
Amount Withdrawn: 20000.0
Balance: 20000.0

    Deposit

2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction
Enter your choice: 4
Interest Credited: 1200.0
Balance :21200.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction
Enter your choice: 5
Customer Name: suresh
Account Number: 12378956
Amount: 21200.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction
Enter your choice: 6
Exiting Transaction!
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>_
```

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.

```
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)
    int c = a/b;
     return c;
}
public class prog6
  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);
  }
}
```

PAGE NO: DATE:
LAB PROGRAM-6
Emport para util Enput Mismatch Enception; Emport java util seanner;
import java util seanner;
interface Z
public ent calc (Enta, Entb);
class 4 implements 2
Public int calc (inta, intb);
int c = 0/6
int c. a/b; setum c; 3
3
3
Public class progb
L Special Control of the second control of t
public Static void main (String [] asgs)
Beannes 82 new Scanner (System in)
y p = new y ();
int num1, num 2.
txy
4
Sop (" Enter two numbers: ");
num 1 = s. neutsut();
num d = 3. nent Int();
int c 2 p. calc (num!, nums);
2 dop (" Quotient: " +c);
1

```
Catch (Arithmetic Enception 1 Supert Mismatch Enception ex.

Sop ("Enception: "+es);

Supert She two numbers;

45

0

Enception; java. larg. Arithmetic Toxcoption: / by year.

Letex the two numbers;

90.78

Enception.
```

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.1455]
(c) Microsoft Corporation. All rights reserved.
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>javac prog6.java
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog6
Enter the two numbers:
10
Quotient: 5
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog6
Enter the two numbers:
Exception: java.lang.ArithmeticException: / by zero
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog6
Enter the two numbers:
7.9
Exception: java.util.InputMismatchException
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>_
```

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=father's age.

```
import java.util.Scanner;
```

```
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());
    try
    if(son>f)
       throw new InvalidAge();
    catch(InvalidAge e3)
       System.out.println(e3.getMessage());
public class prog7
  public static void main(String[] args) throws WrongAge,InvalidAge
    new Son();
}
```

```
LAB PROGRAM-T
import java util scanner,
   Public Ining getMorsage ()
     return Age Cannot Be Negative";
Class Envaled Age entends Encoption
   setum "Son's Ag cannot be greater than father")
 Scanner S= new Scanner (System in);
 father () throws wrong Age
  Sop (" Enter the Pathers Age: ").
  f's si nentrutes;
  I throw new Wrong Age ();
 Catch (WxongAge es)
 Sop (" el, get Message ());
```

System- eni		
7		
9		
chus Inn	entends father	
{		
Ent 801	1	
Son the	ous Wrongetge, Invalidage	2
super ():	
	uter Sonx Age; ");	
	Shert Ent ()	
try		
£ 0		
	m(0)	
three	m new worgfige();	
- 3		
Catch U	wrongfige ed)	
- Cha	(Meg actiliates (N).	
2 201	(" ed. get Message ());	
	Name of the second seco	
toy f		
iflson	>4)	
	ow new EnvaledAqu();	
3		
Catch (&	unlidage e3)	
L		
30p (" e3. get Meusage ()) "	
	V	
3 public clays		

```
psvm (String I J args) hrave Worghge awaledge
hew Son ();
3

Output;
Extex Father's Age: 45
Entex Son's Age: 63
Son's Age cannot be greater than fathers!

Exter Father's Age: 3a
Enter Father's Age: -24
Age Cannot Be Negative.
```

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.1455]
(c) Microsoft Corporation. All rights reserved.
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>javac prog7.java
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog7
Enter the Father's Age: 47
Enter the Son's Age: 78
Son's Age cannot be greater than Father's!
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog7
Enter the Father's Age: -67
Age Cannot Be Negative
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog7
Enter the Father's Age: 56
Enter the Son's Age: -23
Age Cannot Be Negative
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>_
```

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.

```
class Thread_1 extends Thread
  public void run()
    int i = 0;
     while(i<100)
       try
         Thread.sleep(10000);
         System.out.println("BMSCE");
       catch(Exception e)
         System.out.println("Exception: "+e);
       i++;
class Thread_2 extends Thread
  public void run()
    int i = 0;
    while(i<100)
       try
         Thread.sleep(2000);
         System.out.println("CSE");
       catch(Exception e)
         System.out.println("Exception "+e);
       i++;
public class prog8
  public static void main(String[] args)
```

```
Thread t1 = new Thread_1();
    Thread t2 = new Thread_2();
    t1.start();
    t2.start();
}
```

```
LAB PROGRAM-8
edo impost java. util. *;
class Thread 1 endards Thread
    Public wid dur ()
        int 1 = 6;
        while Le (100)
         Thread: sleep (10000);
      Eystem out pointly ("Enception; "+e);
class Thread-2 entends Thread
     Putic void sunc)
         Ent :00;
         1 Thread. Heep (2000);
System. out. Println ("CSE");
```

```
Eatch (Enception e) {
2

System.out.pointln("Enception" +e);
3
        に++;
  public class prog 8
    public static void main (String [] args)
      Thread the new Thread IC;
      Thread to - new Thread-2 ();
        tl. startl);
       ta. stast();
 Output
 CSE
CSE
BMSCE
ISE
CSE
CSE
CSE
BMSCE
```

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.1455]
(c) Microsoft Corporation. All rights reserved.
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>javac prog8.java
C:\Users\Sannidhi\OneDrive\Desktop\JAVA>java prog8
CSE
CSE
CSE
CSE
BMSCE
CSE
CSE
CSE
CSE
CSE
```