VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.



LAB REPORT on

OBJECT ORIENTED JAVA PROGRAMMING

Submitted by J Hanuma Kaushik (1BM21CS078)

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>J Hanuma Kaushik (1BM21CS078)</u>, who is bonafide student of B.M. S. College of Engineering. It is in partial fulfillment for the award of Bachelorof 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.

Vikranth BM

Assistant Professor Department of CSE BMSCE, Bengaluru **Dr. Jyothi S Nayak**Professor and Head
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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

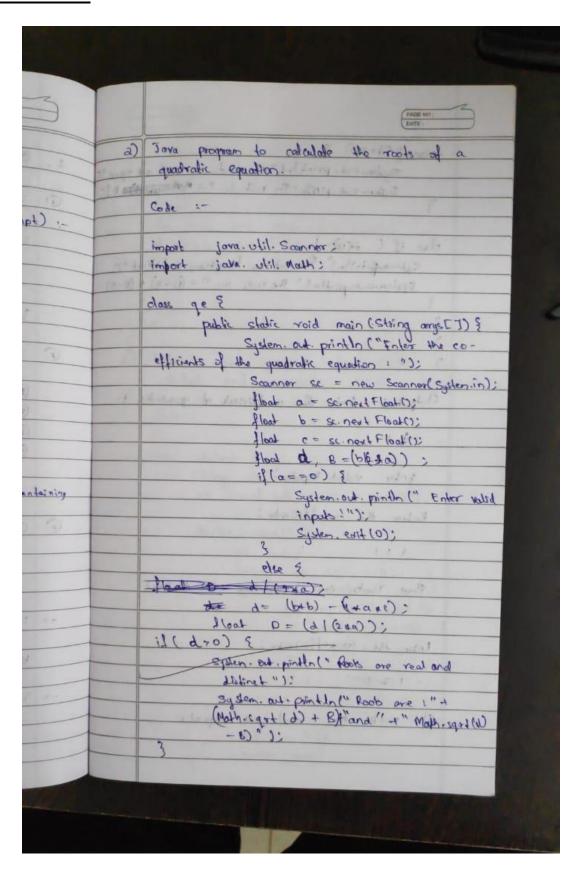
CODE:

```
import java.util.Scanner;
import java.lang.Math;
public class Trial
  public static void main(String[] args)
     {
       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-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
```

```
double e =(-b)/(2.0f*a);
  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);
}
}
```

Select Command Prompt

```
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>_
```



\$ (0==6) fi do System out println " The was are real as equally System out of Min 1 The root is " a thorough the !! dr if (260) 8. Sylonasprially " The tast one transferry & distinct "); Systemout-println(" The roots one " + (0+8) + (0-8)) it indust it ites it I don'the Output; forter the conditions of quadratic :-Collins of the talor volid inpub? Enter the weefficients; 111 The rook are imagining and district Inter the co-efficients 121 The rook are real and oquals

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\bmscccse\CD EEKTOP

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

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

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

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

C:\Users\bmscccse\Desktop>javac SGPA.

Enter the muber of subjects: 5

Enter Student USN: 18W2ICS188

Enter Student USN: 18W2ICS188

Enter the Subject 1 marks and credits respectively: 99 4

Enter the Subject 2 marks and credits respectively: 91 3

Enter the Subject 2 marks and credits respectively: 92 2

Enter the Subject 3 marks and credits respectively: 81 1

Enter the Subject 5 marks and credits respectively: 78 1

Student Details

Student USN: 18M2ICS188

Student USN: 18M2ICS188

Student Name: ABCXYZ

Student Marks and Credits

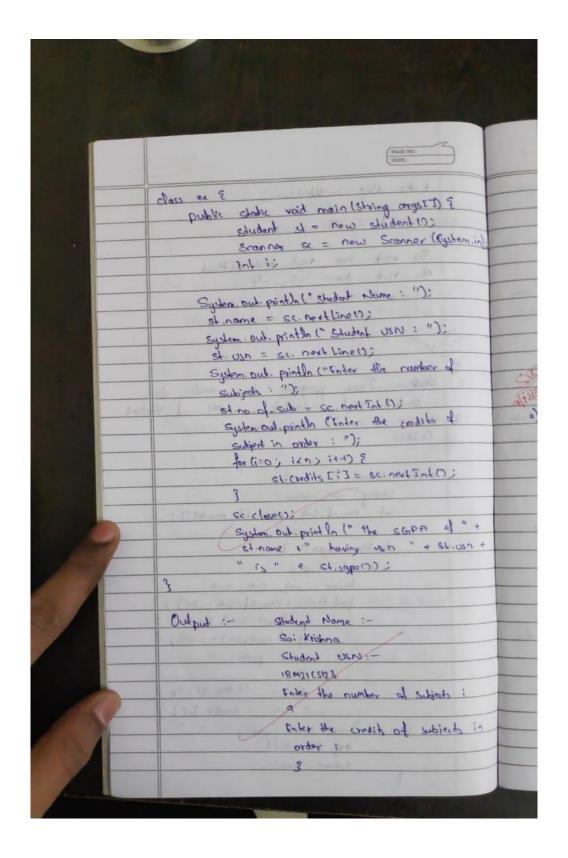
Subject 1 --> Marks: 90 Credits: 4

Subject 1 --> Marks: 90 Credits: 2

Subject 1 --> Marks: 91 Credits: 1

Subject 1 --> Marks: 91 Credits: 1
```

	3)	there. Java program to create class
		student to mass statustes but trebute
1-	->	Miller at will allow houselest
		Code:-
		The State Coast of the State
		class student ?
		String uso, name;
		int no_of_sub matitists, markets;
	- 1	19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		double sgpa() {
		int i,p;
		double and, C=0, S=0;
		} (n+;; duz-fo-onxi;;o=i) sof
		p= (marks I 1 1 10 + 1);
		3 (coi== [1] 24ram) fi
		p=10;
		3
		S += Cradik Filtp;
		c += credits [i];
		3
		avg = slc;
		telom avg;
		5
		THE RESIDENCE OF THE PARTY OF T



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 s = new Scanner(System.in);
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]);
```

Output:

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

C:\Users\bmscecse\Cd desktop

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

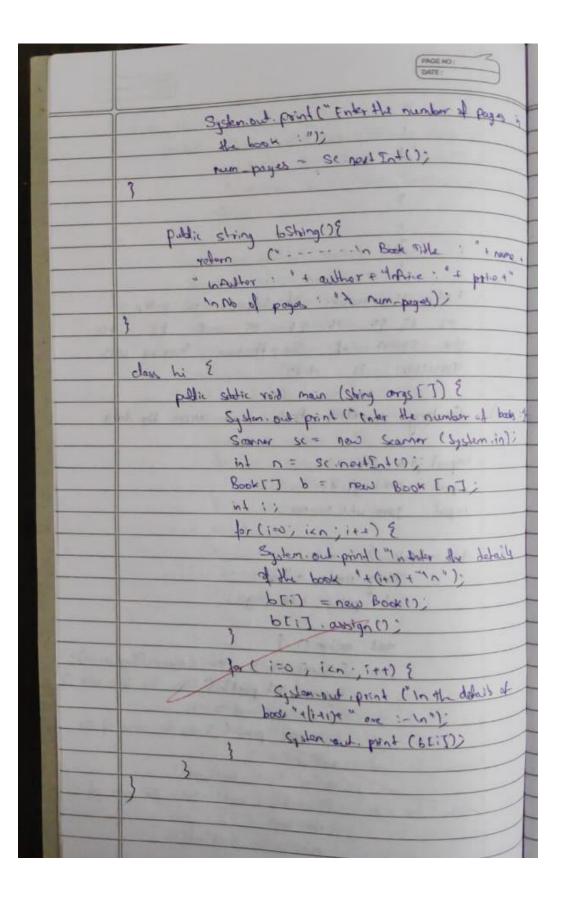
C:\Users\bmscecse\Desktop>javac BookDetails

Enter the number of Books: 3

Enter the book name: Eldest
Enter the author name: Christopher_Paolini
Enter the book price: 350
Enter the number of pages: 350

Enter the book name: Brising
Enter the author name: Christopher_Paolini
Enter the book price: 400
Enter the number of pages: 440
Enter the book name: Inheritance
Enter the book name: Christopher_Paolini
Enter the book name: Christopher_Paolini
Enter the book price: 430
Enter the book price: 400
Enter the number of pages: 400
Enter the book price: 400
Enter the price: 400
Enter the book price:
```

	(0	Creating a class book and access the data.
		impost java util. #:
		import java-lang. 4:
		import jara. util-scanner;
+		day Book ?
+		String name, author;
		int price, num-pages;
		York ausign (1) §
		Scanner Sc = new Scanners (Syden in);
	100	System Out printly (" Fater the Book title ");
		name = sc next Line();
		System and print to tenter the name of the
		author : ");
		author = sc. northine();
2		System out print (" totar the price of
		He book "):
		price = sc nexting()?
14		



	CHARLE MED DATE:
-	Output =
-	- Con 1100
	Enter the number of books : 3
	toler the debails of book a
	talor Book tible: a
	they bok author 5
	the price : 12
	taker number of pages: 34
	Golor the debals of book 2
	They the book stille . C
	Entr the book author i d
	take price 34
	take marker of pages: 28
	toper details of book 3
	Enter Book wille : e
	Enter book without t
	tyler pice 21
	take nuber of pages 39
	The state of the s
	the delasts of book a one :-
	name · a
	Author b
	price: 12
	member of pages: 34
	The debails of book 2 are:
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	(print : 34
	number of pages 18
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PROGRAM 4: CALCULATING AREA OF SHAPES (ABSTRACT CLASS)

CODE

```
import java.util.Scanner;
public class Shape1
      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
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 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");
      }
```

Output:

```
Microsoft Windows [Version 18.8.19044.2251]

(c) Microsoft Corporation. All rights reserved.

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

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

C:\Users\student\Oesktop>javac 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
Area of Gectangle is 60.0

C:\Users\student\Oesktop>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 Circle
Enter your choice :2
Enter bredth and height for area of traingle :
1.Area of Rectangle
2.Area of Traingle is 262.5

C:\Users\student\Oesktop>java AreaOfShapes

Menu

1.Area of Circle
Enter your choice :3
Enter your choice :3
Enter points of Rectangle
2.Area of Traingle is 262.5

Enter your choice :3
Enter points you choice :3
Enter points you choice :3
Enter points you choice :3
Enter points your choice :2
Enter pour choice :3
Enter padius for area of circle :
20
Area of Circle is 1257.1428
```

	PAGE NO.
	0 1 1 1
5)	Abstract diss
	(ade:-
	impost java. util. Scanner;
	1 1064
	abstract class shape &
	Jalla a h:
	abotract void printAra ();
	3
	The state of the s
	dass redargle extends chape &
	void get Data (double on, double y) {
	a=x;
	6=9 /
)
	void print Area () {
	double n = a+b;
	Systemout print (" Pona = "in);
	3
	5
	dows briangle extends shape &
	void gotData (double x, double y) {
	a-X;
	b-y;
	Void another () 5
	The state of the s
	Sustem out print (" the area is "IN);
	3 System out print (" the area is "In)
	3
	class hi &

	Public stake wold man (String Args [7]) { Sonner St = now Sanner (System.in); Alectongle r = now rechangle; trongle t = now triangle; System out print ("Sheet in 1) Redangle in 2) triangle in choice = St. next Int (); switch (choice) {
	strongle r = now rechangle; trongle t = now triangle; System out print ("Sheet in 1) Rechangle in 2) triangle in 1) Choice = Sc. next Int ();
	System and print ("Sheet In 1) Redengte In 2) (ring le In") choice = Sc. next Int ();
	System and print ("Sheet In 1) Redengte In 2) (ring le In") choice = Sc. next Int ();
	System and print ("Sheet In 1) Recharge In 2) triangle In" choice = Sc. next Int ();
	choice = Sc. next Int();
	cose s , System out print ("Enter the length and
	bread th ").
	double by = sr-new Double();
	double le = sc next Double 172
	r. golPala (lo, br);
	T. printara (lo, br);
	brook;
	case 2: System.out. print (" Enter the boxe
	and height "")
	double be = Sc now Double();
	double he = St now Double ();
	(gestal (ba, he);
	t. print Area (bo, he);
	break
	default : System exit(0);
	1
1	Examples and a
	Out put: - Menu
	1. Radongle
	2 Triangle
	110019
0	Knby gove choice: 1
	tolor long and Steadth: 12 34
	The ara is : 408.00

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);
  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)
     {
       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 boolean check_Bal_part_2()
    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.println("\nAmount 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");
}
while(true);
default: System.out.println("\nInvalid Choice");
break;
}
}
```

```
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. Withdrawarl
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction

Enter your choice: 2

Enter Amount to withdraw: 5000

Amount Withdrawarl
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Show Account Details
```

```
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: 2

Enter the amount to be withdrawn: 2000

Amount Withdrawn: 2000.0

Balance: 4500.0

1. Deposit
5. Show Account Details
6. Exit Transaction

Enter your choice: 3

Insufficient Balance!!
Balance: 4500.0

1. Deposit
2. Withdrawal
```

impost jora.util.+; class Account & Soing name, type, acc. num; Account (String n, String t, String a) & name = n; type = t; acc. num = a; } class Savings extends Account & double balance = 0, r = 0.02, n = 2, t, compound update, withdraw; Savings (String n, String t, Ching a) & super(n, t, e); roid update() &	6)	Book Account Database
class Account & String name, type, acc_num; Account (String n, String t, String a) & name = n; type = t; acc-num = a; } class Savings extends Account & double balance = 0, r = 0.02, n = 2, t, compound update, withdraw; Savings (String n, String t, Chiny a) & super (n, t, o); void update() &		
class Account & String name, type, ace num; Account (String n, String t, String a) & Name = n; type = t; acc-num = a; } class Savings extends Account & doubte balance = 0, r = 0.02, n = 2, t, compound update, withdraw; Savings (String n, String t, Chiny a) & super (n, t, e); void update() &		impost java util +;
Soing name, type, ace num; Account (String o, String t, String a) { name = n; type = t; ace-num = a; } class Savings extends Account { double balance = 0, r = 0.02, n = 2, t, compound update, withdraw; Savings (String o, String t, String a) { Super(n, t, o); roid update() {		
Account (String o, String t, String a) { name = n; type = t; acc-num = a; } class Savings extends Account { double balance = 0, \(\tau = 0.02\), \(n = 2\), t, compound update, withdraw; Savings (String or, String t, Ching a) { super (n, t, o); you'd update() {		class Account &
type = t; acc-num = a; class Savings extends Account ? double balance = 0, r = 0.02, n = 2, t, compound update, withdraw; Savings (String or, String 1, Ching a) ? Super (n, t, o); yord update () ?		Hongy name, type, ace num:
class Savings extends Account ? double balance = 0, r=0.02, n=2, t, compound update, withdraw; Savings (String or String 1, Ching a)? Super (n, t, e); roid update 1) ?		Account (String o, String t, String a) {
class Savings extende Account ? double balance = 0, r = 0.02, n = 2, t, compound update, withdraw: Savings (Slowing or, Storing 1, Ctring a) { super (n, t, o); you'd update() {		type = t;
Savings (String or String 1, String a) { Super(n, 1,0); you'd update() {		1 all-num = a;
Savings (String or, String 1, String a) { Super(n, +, 0); Void update() {		3
Savings (String or, String 1, String a) { Super(n, +, 0); Void update() {		
Savings (String or, String 1, String a) { Super(n, +, 0); Void update() {		class Savings extends Account &
Savings (String or, String 1, String a) { Super (n, +, 0); void update 1) {	4	double balance = 0 7=000 0=2 + commend
void update () {	+	update, withdraw:
void update () {		Savings (String or String 1, String a) {
Sconner in some San Can 1 32		3
Sconner in some San Can 1 : 2:	1	
Sconner in some Con Continue	-	void upade 1) 8
	+	Scanner in = new Scanner (System.in);

System out print "Enter out to be added : ") update = in next Double (); balance + = update; Sout (" updated balance : " + balance); void withdraws & Scanner out = new Scanner (System.in); sout (" Enter cont to withdraw : ") withdraw = out nort Double (); balance -= withdraw: Sout ("Updated bolance: "+ bolance); void display of ? South Acc holder : " + name +" In Acc no: "+ are num + "In Acc type : " + type); Sout ("Balance : " + balance)> void cule-corpound 1) ? Scarner sc = now Scanner (System.in); soul (" Finder time period Lik which you (111: teacher thece allow t= sc. new1Double 1); compound = believe + (most pour (HTIn, no 1); bilance += compound Shot (" updated balance: " + balance):

current extends Account { does private double min = 5000, penalty = 1000; double deque in chaque out, balance =0, uplate with Agow; (amorand (String n, String +, String o) & Super (n,t,a) void update 08 Scarnerin= new Scarner (Systemin): soul ("Finter the amount to add "); update = in. next Opuble 1); balance += update; Sout (" Optobed Balance : " + balance); if (balance knin) & soul (" your bolonce is less shan min balance required, parally will be levied ">> void displaying Sout ("Ace holder: " + name + "1/2 Aceno: "+ account" In Ace type + type + " In Balance : " + balance) withdrawal 1) 5 court: "+ balance in your

Output	the state of the
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2. Withdraw	
3. Interest	
4. Display	
5. Exix	and and the
Yand Park	
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Updated bolonce	K: 50000
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1. Sandy 2. Central 2. More - 1. Updato 2. Withdraw 3. Chacque-In 4. Chacque-Out 5. Osplay	Total I

LAB PROGRAM 6: NUMBER OPERATIONS - EXCEPTION HANDLING

CODE

```
import\ java.util. Input Mismatch Exception;
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 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);
}
}
```

7.	Exception Handling in Java.		
	import java. util. Sommer:		
	class main &		
	psvm (String 17 args) {		
	Scanner Sc = new Scurner (System.in);		
	try (
	Sout (" Dividerd : ");		
4	int num1 = Enlager parse Int (sc. next 0)		
	Sout (" Divisor (");		
-	int run 2 = Integer parse Int (Sc next)		
_	double roul = (double) num2 num2;		
	Sout (" Qualient: "+ result);		
-	S Contention and		
	Sout(" I did! "te);		
	3		
ī	Cotch (Arithmetic Frequence) &		
	Coff. I gid 1, +63		
	3		
	sc.alage()>		
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	1		
	- Adams -		
	Output -		
	and the second s		
	Ovidend: 5		
	Divisor : 1		
	PluoHert: 5.0		
	Dividend: obc		
	I did! Number Format Energhion!		

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 cource files)
use --help for a list of possible options
C:\Users\bmscecse\Coektop

C:\Users\bmscecse\Coektop

C:\Users\bmscecse\Desktop\javac Age.java

C:\Users\bmscecse\Desktop\javac Age.java
Enter the Father's Age: 40
Ages are appropriate
C:\Users\bmscecse\Usektop\java Age.java
Enter the Father's Age: 30
Enter the Son's Age: 30
Enter the Father's Age: 31
Enter the Father's Age: 32
Enter the Father's Age: 33
Enter the Father's Age: 34
Enter the Father's Age: 35
Enter the Father's Age: 36
Enter the Father's Age: 37
Enter the Father's Age: 38
Enter the Father's Age: 30
Enter the Son's Age: 31
Age Cannot Be Hegative
```

8.	Wer Defined exception in Java.
	close Father extends Exception &
	int dage:
	Fallor (int w) {
	fage = x;
	3
	public string tostolog () §
	public string "Father's age cound be nagative!"
	3
	class son extends Feather !
	int sage;
	Son (nt n, inty) {
ī	Super (n);
	Sage = 12
	1
	public Shing to Shing () &
	Cons dole is greater than or equa
	to Julier! "8;
	4

class Wrongage?
Static int My (And a) throws Son ?
sout (" Normal ent, son's age: +4)
Sout (" Normal Ent , 35")
psym (String 17 ons) & Scarny (Systemin):
CC IVAL
Sout ("Father's age: ")
m = Sc. next Int ():
Sout ("Son's cope: ");
y= sc-nox1[nd()'
lay ?
Fathrage (n):
1 outch (Father e) ?
7001(6);
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
try (Cara):
Sonage (M,y):
colch (Sone) &
sate);
1 200
3
Output :
toder Colfer age -1
toler son age -1
called Fatherage (-1)
Cather's and its word
called benonge (3)

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(InterruptedException 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();
```

66	Malli-horoding
	Execute package CIE which has 2 classes -
10.	Student and Internals. The dass personal
	has members like uso, name, yen.
->	ALICS A PRINCES
	Program :-
	class Q E
	int ox
	boolean value Set = false :
	synchronized int get() {
	while (! ralue Set)
	try E
	wait ();
	} catch (Intersupted Exception e) {
	sout ("Interoryted Exception caught")
	3
	sout ("Got:"+n);
	valueSet = false:
	notify ();
	return no
	3 store to the state
	18 - Louis 1 42,00
	synchronized void put (int n) ?
	while (value Set)
	troy &
	waito;
	} Goatch (Interrupted Exception e) {
	sout (" Intermyted ");
	}
	this. n = n >
	valueset = true;
1	sout (" Put : "+n):
	notify();
	}
POCO	

DATE: Producer implements Runnable { class 0 9; Produced (D. a) { this q = q; new thread (this "Produced"). Start() public void runc) & int i= 0; while (true) & q. put(in+): class Consumer implements Runnable { R q ; Consumer (Qq) { this.q = q; new thread (this, "(onsumer"), steat(); public woid runc) { while Ctrue) . { q.get()) class PCFixed { psym (String args [7) { Q q = new B(); now Product (a) New Consumer (a); Sout p" Press control e to stop ")

Output :-	endro electo
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Bms	
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ese	2 93
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