

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY**  
“JnanaSangama”, Belgaum -590014, Karnataka.



**LAB REPORT**  
**on**

**OBJECT ORIENTED JAVA PROGRAMMING**

*Submitted by*

**PRAJWAL R(1BM21CS135)**

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



**B.M.S. COLLEGE OF ENGINEERING**

(Autonomous Institution under VTU)

**BENGALURU-560019**

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**B. M. S. College of Engineering,**

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**" carried out by **PRAJWAL R(1BM21CS135)**, who is a 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- **(22CS3PCOOJ )**work prescribed for the said degree.

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### Course Outcome

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

## 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);
}
}
}
```

Source Code:

```
import java.util.Scanner;
import java.lang.Math;
public class Main {
    public static void main (String[] args){
        Scanner s = new Scanner (System.in);
        System.out.println ("Enter coefficients: \n");
        float a = s.nextFloat();
        float b = s.nextFloat();
        float c = s.nextFloat();
        float d = (b*b) - (4.0f * a*c);
        double r1, r2;
        if (d > 0) {
            r1 = (-b - Math.sqrt(d)) / (2.0*a);
            r2 = (-b + Math.sqrt(d)) / (2.0*a);
            System.out.println (" Roots are real and distinct");
            System.out.println (" Root1: " + r1 + " Root2: " + r2);
        }
        else if (d == 0) {
            r1 = r2 = (-b) / (2.0*a);
            System.out.println (" Roots are real and equal");
            System.out.println (" Roots are : " + r1);
        }
        else
            System.out.println (" Imaginary Roots");
    }
}
```

```
cmd 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:
1 6 9
Roots are equal and real
Roots are:-3.0

C:\Users\student\Desktop>
```

## 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);

}

}

```

SGPA

```

import java.util.Scanner;
class Student
{
    String USN;
    String Name;
    int[] credits = new int[20];
    int[] marks = new int[20];
    public void input(int n)
    {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter Student USN");
        USN = s.nextLine();
        System.out.println("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();
        }
    }

    public float calculate (int n)
    {
        int sum = 0;
        float result = 0.0f;
        for (int i=0; i<n; i++)
        {
            sum = credits[i] * marks[i];
            result += sum;
        }
        calculate grade point (marks[i] == -1)
        return result;
    }
}

```

```

grade = point (sum / credits);
}
return (result / sum - ob_credits);
}

public 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;
    else
        return -1;
}

```

```

public void display (int n, float result) {
    System.out.println ("n");
    System.out.println ("Student Details");
    System.out.println ("--");
    System.out.println ("Student UCN " + ucn);
    System.out.println ("Student Name " + name);
    System.out.println ("Student Marks and credits");
    for (int i = 0; i < n; i++) {

```

```

{
Scanner s = new Scanner (System.in);
Student s1 = new Student ();
System.out.println ("Enter the no. 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");
System.out.println ("GPA cannot be calculated");
System.exit (0);
}
s1.display (n, result);
}
}

```

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61PSE

```

C:\Windows\system32\cmd.exe
Microsoft Windows [version 10.0.22000.2250]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmscece\Desktop>java SGR.java

C:\Users\bmscece\Desktop>java SGR.java
Enter the number of subjects: 5
Enter Student USN: 10021CS100
Enter Student Name: ABCXYZ
Enter the Subject 1 marks and credits respectively: 98 4
Enter the Subject 2 marks and credits respectively: 91 3
Enter the Subject 3 marks and credits respectively: 93 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: 10021CS100
Student Name: ABCXYZ
Student Marks and Credits
Subject 1 --> Marks: 98 Credits: 4
Subject 2 --> Marks: 91 Credits: 3
Subject 3 --> Marks: 93 Credits: 2
Subject 4 --> Marks: 81 Credits: 1
Subject 5 --> Marks: 78 Credits: 1
Serial: 9.727273

C:\Users\bmscece\Desktop>

```

## 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\t"+author+"\t\t"+price+"\t\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]);
}
}
```

```

import java.util.*;
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 setPage(int np) {
        numPages = np;
    }
    public String toString() {
        return title + " " + author + " " + price + " " +
            " " + numPages + "\n";
    }
}

class BookDetails {
    public static void main(String args[]) {
        String a;
        double b;
        int n, m;
    }
}

```

```

Scanner sc = new Scanner (System.in);
System.out.println ("Enter the no. 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 book");
    t = sc.next();
    System.out.println ("Enter the author of the book");
    a = sc.next();
    System.out.println ("Enter the price of Books");
    p = sc.nextDouble();
    System.out.println ("Enter the no. of pages of Books");
    np = sc.nextInt();
    b[i] = new Book (1);
    b[i].setTitle (t);
    b[i].setAuthor (a);
    b[i].setPrice (p);
    b[i].setPage (np);
}
System.out.println ("Title + Author + price + page in");
for (int i = 0; i < n; i++) {
    System.out.println (b[i]);
}

```

21/2/2020  
O/P

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmscece\Desktop

C:\Users\bmscece\Desktop>javac Bookdetails.java

C:\Users\bmscece\Desktop>java Bookdetails
Enter the number of Books: 3

Enter the book name: Eldest
Enter the author name: Christopher_Paolini
Enter the book price: 250
Enter the number of pages: 358

Enter the book name: Brisingr
Enter the author name: Christopher_Paolini
Enter the book price: 400
Enter the number of pages: 448

Enter the book name: Inheritance
Enter the author name: Christopher_Paolini
Enter the book price: 450
Enter the number of pages: 499

Title      Author      Price    Pages
Eldest    Christopher_Paolini    250.0     358
Brisingr  Christopher_Paolini    400.0     448
Inheritance Christopher_Paolini    450.0     499

C:\Users\bmscece\Desktop
```

## LAB 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");

    }

}
```

## Abstract Demo

```
import java.util.*;  
abstract class Shape {  
    int x, y;  
    abstract void area(double x, double y);  
}  
class Rectangle extends Shape {  
    void area(double x, double y) {  
        System.out.println("Area of rectangle is : " + (x * y));  
    }  
}  
class Circle extends Shape {  
    void area(double x, double y) {  
        System.out.println("Area of circle is : " + (3.14 * x *  
            y));  
    }  
}  
class Triangle extends Shape {  
    void area(double x, double y) {  
        System.out.println("Area of triangle is : " + (0.5 * x *  
            y));  
    }  
}
```

```

public class AbstractDemo {
    public static void main( String [ ] args ) {
        Rectangle r = new Rectangle( );
        r . area( 7 , 5 );
        Circle c = new Circle( );
        c . area( 5 , 5 );
        Triangle t = new Triangle( );
        t . area( 2 , 5 );
    }
}

```

Output

1. ( ) calculate area = area - 3 mm² of sun 3/12/2022

Area of rectangle is  $\approx 35.0$

Area of circle is  $\approx 78.5$

Area of triangle is  $\approx 5.0$

2. ( ) calculate area = area - 3 mm²

(  $0.0002 > \text{last}$  )

```
ca Command Prompt
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
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 breath 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 Traingle
3.Area of Circle
Enter your choice : 3
Enter radius for area of circle :
20
Area of Circle is 1257.1428

C:\Users\student\Desktop>
```

## 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();
                    }
                } while(ch.equals("s"));
        }
    }
}
```

```
        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;
}

}
```

Bank Program

```
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("Enter customer name : ");
        customer_name = s.nextLine();
        System.out.print("Enter the Account No : ");
        acc_no = s.nextLong();
        System.out.print("Enter the Starting Amount (min. amount = 5000) : ");
        bal = s.nextFloat();

        if (bal < 5000.0f) {
            System.out.println("Account balance cannot be less than 5000.0");
            bal = s.nextFloat();
        }
        if (bal < 5000.0f) {
            System.out.println("Account balance cannot be less than 5000.0");
            System.exit(0);
        }
    }
}
```

```

        {
            if (bal < 5000)
                System.out.println ("Insufficient balance: " + bal);
            else
                System.out.println ("In Balance: " + bal);
        }
    }

public void interest()
{
    interest = (bal * 6) / 100;
    bal += interest;
    System.out.println ("Interest Credited: " + interest);
    System.out.println ("In Balance: " + bal);
}

class Current extends Account
{
    float deposit, withdraw, penalty;
    public void deposit()
    {
        System.out.print ("Enter Amount to be deposited");
        deposit = S.nextInt();
        bal += deposit;
        System.out.println ("Balance: " + bal);
    }
}

```

Public void withdraw()

{

System.out.print("User Enter Amount To withdraw")

withdraw = s.nextDouble();

If (checkBal - > withdraw)

{ bal = bal - withdraw; }

bal = withdraw;

System.out.println("User Account withdraw")

+ withdraw + " User Balance" + bal);

} // User withdraw amount to account

}

Public void chequbook()

{

System.out.println("Cheque Book has been  
Issued !")

} // cheque book issued side

}

Public class BankP

{

Public static void main(String[] args)

{

Scanner s = new Scanner(System.in);

String ch;

int chn;

current c = new Current();

Savings sa = new Savings();

```

}

System.out.println("Customer name: " + customer_name);
System.out.println("Account number: " + acc_no);
System.out.println("Amount: " + bal);
}

class Saving extends Account
{
    Scanner s = new Scanner(System.in);
    float deposit, withdraw, interest;
    public void deposit()
    {
        System.out.println("Enter the amount to be deposited");
        deposit = s.nextFloat();
        bal += deposit;
        System.out.println("Balance: " + bal);
    }

    public void withdraw()
    {
        System.out.print("Enter the amount to be withdrawn");
        withdraw = s.nextFloat();
        if ((bal < 500))
        {
            System.out.println("Insufficient Balance");
        }
        else
        {
            bal -= withdraw;
            System.out.println("Amount withdrawn: " + withdraw);
        }
    }
}

```

```

    print ("In Enter Account type (S for Savings,
           C for Current ) : ");
    ch = S or C;
    Switch (ch)
    {
        case 'S' : Sa . input ();
        do
            System.out.print ("In 1. Deposit In 2. withdrawal In 3.
                               check Balance In 4. check interest " + In 5. Show
                               Account Details In 6. Exit Transaction In In Enter.
            Your choice = ");
            n = S or C + Int ();
            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 ("In Exit 1/");
                System.exit (0);
                break;
                default : System.out.println ("In Invalid
                                         operation");
            }
        }
    }
}

```

```

code 2 : c.withdraw();
break;

code 3 : c.check_Bal();
break;

code 4 : c.chequebook();
break;

code 5 : c.display();
break;

```

```

C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.19044.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\student>cd desktop
C:\Users\student\Desktop>javac Bank.java
C:\Users\student\Desktop>java Bank.java

Enter the Account Type (S for Savings , C for Current) : s
Enter the Customer Name: Rashtri km
Enter the Account Number: 12345678
Enter the Starting Amount (Minimum Amount = 5000): 5500
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 1000
Invalid Operation
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction

Enter your choice: 1
Enter the amount to be deposited: 1000
Balance: 6500.0
1. Deposit
2. Withdrawal
3. Check Balance

```

```
C:\> C:\Windows\system32\cmd.exe
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
```

```
C:\> C:\Windows\system32\cmd.exe
Insufficient Balance!!
Balance: 4500.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction
Enter your choice: 4
Interest Credited: 270.0
Balance :4770.0
1. Deposit
2. Withdrawal
3. Check Balance
4. Check Interest
5. Show Account Details
6. Exit Transaction
Enter your choice: 5
Customer Name: Rashtri km
Account Number: 12345678
Amount: 4770.0
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\student\Desktop>java Bank.java
Enter the Account Type (S for Savings , C for Current) : c
Enter the Customer Name: rashtri km
```

```
0x C:\Windows\system32\cmd.exe
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 Withdrawn: 5000.0
Balance: 7000.0

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

```
0x C:\Windows\system32\cmd.exe
1. Deposit
2. Withdrawal
3. Check Balance
4. Issue Cheque Book
5. Show Account Details
6. Exit Transaction

Enter your choice: 3
Balance: 7000.0

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

Enter your choice: 4
Cheque Book has been Issued!

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

Enter your choice: 5
Customer Name: rashtri km
Account Number: 123456789
Amount: 7000.0

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

Enter your choice: 6
```

## 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)
    {
        int c = a/b;
        return c;
    }
}

public class Divintf
{
    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(ArithmaticException | InputMismatchException e1)
        {
            System.out.println("Exception: "+e1);
        }
    }
}
```

```

import java.util.Scanner;
import java.util.ArrayList;
public class Anchor {
    public static void main (String [] args) {
        Scanner scanner = new Scanner (System.in);
        int choice;
        System.out.print ("1. Undergraduate student\n");
        System.out.print ("2. Graduate student\n");
        System.out.print ("Enter your choice : ");
        choice = scanner.nextInt ();
        scanner.nextLine ();
        switch (choice) {
            case 1:
                System.out.print ("Enter the student name : ");
                String name = scanner.nextLine ();
                System.out.print ("Enter the subject name : ");
                String subject = scanner.nextLine ();
                System.out.print ("Enter the subject marks : ");
                int marks = scanner.nextInt ();
                System.out.println ("Total marks : " + marks);
                break;
            default:
                System.out.println ("Invalid choice");
        }
    }
}

interface A {
    void getTestResult ();
}

class B implements A {
    public void getTestResult () {
        System.out.println ("Enter the subject name : ");
        String subject = scanner.nextLine ();
        System.out.println ("Enter the subject marks : ");
        int marks = scanner.nextInt ();
        System.out.println ("Total marks : " + marks);
    }
}

```

```
Microsoft Windows [Version 10.0.22621.1105]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>javac Integer_Division.java

C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>java Divide
Enter the two numbers:
18
9
Division Result: 2

C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>java Divide
Enter the two numbers:
18
0
Exception: java.lang.ArithmaticException: / by zero

C:\Users\Acer\Desktop\Notes (2nd Year)\java practice programs>java Divide
Enter the two numbers:
0.15
Exception in thread "main" java.util.InputMismatchException
        at java.base/java.util.Scanner.throwFor(Scanner.java:939)
        at java.base/java.util.Scanner.next(Scanner.java:1594)
        at java.base/java.util.Scanner.nextInt(Scanner.java:2258)
        at java.base/java.util.Scanner.nextInt(Scanner.java:2212)
        at Divide.main(Integer_Division.java:33)
```

## 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");
}

}
```

```

Scanner s = new Scanner(System.in);
int f;
father();
throws wrongAge;
System.out.print("Enter the father's age:");
f = g.nextInt();
try {
    if (f < 0)
        throw new wrongAge();
    catch (wrongAge e) {
        System.out.println("The age must be positive");
        System.exit(0);
    }
}
else
    InvalidAge extends Exception;
public String getName() {
    return "Son";
}
int g;
Scanner();
throws wrongAge, InvalidAge;
father();

```

```
try {
    if (son < 0)
        throw new wrongAge();
}
catch (wrongAge e2) {
    System.out.println(e2.getMessage());
    System.exit(0);
}

try {
    if (son >= 18)
        throw new InvalidAge();
}
catch (InvalidAge e3) {
    System.out.println(e3.getMessage());
    System.exit(0);
}

System.out.println("Age are appropriate")
```

```
C:\Windows\system32\cmd.exe
C:\Users\bmsccecse>javac Age.java
error: file not found: Age.java
Usage: javac <options> <source files>
use --help for a list of possible options
C:\Users\bmsccecse>cd Desktop
C:\Users\bmsccecse\Desktop>javac Age.java
C:\Users\bmsccecse\Desktop>java Age.java
Enter the Father's Age: 40
Enter the Son's Age: 20
Ages are appropriate

C:\Users\bmsccecse\Desktop>java Age.java
Enter the Father's Age: 30
Enter the Son's Age: 50
Son's Age cannot be greater than Father's!

C:\Users\bmsccecse\Desktop>java Age.java
Enter the Father's Age: -1
Age Cannot Be Negative

C:\Users\bmsccecse\Desktop>java Age.java
Enter the Father's Age: 50
Enter the Son's Age: -1
Age Cannot Be Negative

C:\Users\bmsccecse\Desktop>
```

## 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 ThreadRunner
```

```
{
```

```
    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");
    }

}
```

write a program which creates two threads, one displaying "BMS college of Engineering" once every second & another displaying "CSE" every two seconds.

```
public class Main {
    public static void main (String [] args) {
        Thread t1 = new Thread (new Runnable() {
            public void run() {
                while (true) {
                    System.out.println ("BMS college of
Engineering");
                    try {
                        Thread.sleep (1000);
                    } catch (InterruptedException e) {
                        e.printStackTrace ();
                    }
                }
            }
        });
        Thread t2 = new Thread (new Runnable() {
            public void run() {
                while (true) {
                    System.out.println ("CSE");
                    try {
                        Thread.sleep (2000);
                    } catch (InterruptedException e) {
                        e.printStackTrace ();
                    }
                }
            }
        });
    }
}
```

```
Command Prompt  
C:\Users\PRAJWAL\Desktop\safwan output>javac Main.java  
C:\Users\PRAJWAL\Desktop\safwan output>java Main  
CSE  
BMS  
CSE  
CSE  
CSE  
CSE  
BMS  
CSE  
CSE  
CSE  
CSE  
CSE  
BMS  
C:\Users\PRAJWAL\Desktop\safwan output>
```