

# VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



## LAB REPORT

on

## Object Oriented Java Programming

*Submitted by*

**SUSHANTH(1BM21CS227)**

*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)

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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 **SUSHANTH(1BM21CS227)**, who is bonafide student of **B. M. S. College of Engineering**. It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2022-23. The Lab report has been approved as it satisfies the academic requirements in respect of Object Oriented Java Lab - **(21CS3PCOOJ)** work prescribed for the said degree.

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### Course Outcome

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

### **LAB PROGRAM 1:**

**Develop a Java program that prints all real solutions to the quadratic equation  $ax^2+bx+c = 0$ . Read in a, b, c and use the quadratic formula. If the discriminate  $b^2 - 4ac$  is negative, display a message stating that there are no real solutions.**

```
import java.util.Scanner;
import java.lang.Math;
class quadratic
{
double d,val;
void find(double a,double b,double c)
{
if(a==0)
{
System.out.println("a cannot be zero");
return;
}
else
{
d=(b*b)-(4*a*c);
}
if(d>0)
{
System.out.println("The roots are real and unique");
System.out.println((-b+Math.sqrt(d))/(2*a)+"\n"+(-b-Math.sqrt(d))/(2*a));
}
else if(d==0)
{
System.out.println("the roots are real and equal");
System.out.println(-b/(2*a));
}
else
```

```
{
System.out.println("there is no real root");
double img=Math.sqrt(-d)/(2*a);
double realpart=-b/(2*a);
System.out.println("real part is "+realpart+" imaginary part is "+img);
}
}
}
class Main
{
public static void main(String args[])
{
quadratic ob1=new quadratic();
System.out.println("enter the value of a,b and c");
Scanner sc=new Scanner(System.in);
double a1=sc.nextDouble();
double b1=sc.nextDouble();
double c1=sc.nextDouble();
ob1.find(a1,b1,c1);
}
}
```

## Observation:

```

1*) Develop a Java program that prints all real solutions to
the quadratic equation  $ax^2+bx+c=0$ . Read in a, b, c
and use the quadratic formula. If the discriminant
 $b^2-4ac$  is negative, display a message stating that
there are no real solutions.

import java.util.Scanner;
import java.lang.Math;
class Quadratic {
    double d, val;
    void find (double a, double b, double c)
    {
        if (a==0)
        {
            System.out.println("a cannot be zero");
            return;
        }
        else
        {
            d = b*b - 4*a*c;
            val = Math.sqrt(Math.abs(d));
            if (d > 0)
            {
                System.out.println("The roots are real and unique");
                System.out.println("(-b+val)/(2*a)");
            }
            else if (d == 0)
            {
                System.out.println("The roots are real and equal");
                System.out.println(-b/(2*a));
            }
        }
    }
}

```

```

else
{
    System.out.println("There is no real solution");
}
}

class Main
{
    public static void main (String args[])
    {
        Quadratic obj = new Quadratic();
        System.out.println("Enter the value of a, b and c");
        Scanner sc = new Scanner(System.in);
        double a = sc.nextDouble();
        double b = sc.nextDouble();
        double c = sc.nextDouble();
        obj.find(a, b, c);
    }
}

Output:
Enter the value of a, b and c
2
-11
14
The roots are real and unique
root1 = 3.5 root2 = 0.0
Enter the value of a, b and c
1
3
7
There is no real root
root1 = -1.5+2.17i root2 = -1.5-2.17i

```

```


Enter the value of a, b and c
2
-11
14
The roots are real and equal
root1 = 0.5 root2 = 0.5

```

17/11/22



## Output:

 Select Command Prompt

```
C:\Users\BMSCECSE\Desktop>java Main
enter the value of a,b and c
2
-11
14
The roots are real and unique
3.5
2.0

C:\Users\BMSCECSE\Desktop>java Main
enter the value of a,b and c
1
3
7
there is no real root
real part is -1.5 imaginary part is 2.179449471770337

C:\Users\BMSCECSE\Desktop>java Main
enter the value of a,b and c
4
-4
1
the roots are real and equal
0.5

C:\Users\BMSCECSE\Desktop>_
```

## **LAB PROGRAM 2:**

**Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.**

```
import java.util.Scanner; class student
{ float total;
  Scanner sc=new Scanner(System.in); int marks[]=new int[10]; int credit[]=new
int[10]; void display()
{ int i;
float sumofcredit=0;
System.out.println("Enter the name of the student:");
String name= sc.nextLine();
System.out.println("Enter the usn of the student:");
String usn=sc.nextLine();
System.out.println("Enter the credits for 5 subjects sequentially:");
for(i=0;i<5;i++)
{
  credit[i]=sc.nextInt();
}
System.out.println("Enter the marks for 5 subjects sequentially:");
for(i=0;i<5;i++)
{
  marks[i]=sc.nextInt();
}
for(i=0;i<5;i++)
{
total=total+credit[i];
}
for(i=0;i<5;i++)
{
if(marks[i]==100)
{
  sumofcredit+=(10*credit[i]);
}
else sumofcredit+=((marks[i]/10)+1)*credit[i];
}
}
```

```
System.out.println("name="+name);
System.out.println("usn="+usn);
System.out.println("the sgpa of student is "+(sumofcredit/total));
}
}
class Main
{
public static void main(String args[])
{

student st=new student();

st.display();
}
}
```

**Observation:**

Week-2

DATE: 24/11/22

```
2) Develop a java program to create a class student with
    number usn, name an array credits. Calculate SGPA.
    import java.util.Scanner;
    class Student
    { float total;
      Scanner sc = new Scanner(System.in);
      int marks[] = new int[10];
      int credit[] = new int[10];

      void display()
      {
        int sumofcredit = 0, i;
        System.out.println("Enter the name of the student:");
        String name = sc.nextLine();
        System.out.println("Enter the usn of student:");
        String usn = sc.nextLine();
        System.out.println("Enter credits for 5 subjects:");
        for (i=0; i<5; i++)
        {
          credit[i] = sc.nextInt();
        }
        System.out.println("Enter marks for 5 subjects:");
        for (i=0; i<5; i++)
        {
          marks[i] = sc.nextInt();
        }
        for (i=0; i<5; i++)
        {
          total = total + credit[i] * marks[i];
        }
        for (i=0; i<5; i++)
        {
          if (marks[i] == 100)

```

```

          sumofcredit = sumofcredit + (10 * credit[i]);
        }
      }
      else
      {
        sumofcredit += ((marks[i]/10)+1) * credit[i];
      }
      System.out.println("Name = " + name + " " + "USN = " + usn +
        " The SGPA = " + (sumofcredit / total));
    }
  }
}
class Main
{
  public static void main(String args[])
  {
    Student st = new Student();
    st.display();
  }
}

```

Output:

Enter the name of student

Sushanth

Enter the usn

IBM21CS227

Enter the marks for 5 subject

93 84 80 90 80

Enter the credits for 5 subject

4 3 4 3 2 1

name: Sushanth

USN: IBM21CS227

SGPA: 9.44

## Output:

```
C:\Users\Admin\Desktop>java Main
Enter the name of the student:
sushanth
Enter the usn of the student:
227
Enter the credits for 5 subjects sequentially:
3
4
4
3
1
Enter the marks for 5 subjects sequentially:
90
89
90
90
80
name=sushanth
usn=227
the sgpa of student is 9.666667
C:\Users\Admin\Desktop>_
```

### **LAB PROGRAM-3:**

**Create a class Book which contains four members: name, author, price, num\_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString( ) method that could display the complete details of the book. Develop a Java program to create n book objects.**

```
import java.util.Scanner;
class books {
int k,l;
String name,author;
Scanner sc=new Scanner(System.in);
int price;
int numpages;

books()
{
price=0;
numpages=0;
}

void get()
{
System.out.println("Enter the name of the book:");
name=sc.nextLine();
System.out.println("Enter the name of the author:");
author=sc.nextLine();
System.out.println("Enter the price of the book:");
price=sc.nextInt();
System.out.println("Enter the no of pages of the book:");
numpages=sc.nextInt();

}
```

```

public String toString()
{

return name+"\n"+author + "\n"+price+"\n"+numpages+"\n";

/*System.out.println(" name of the boook:");
System.out.println(name);
System.out.println(" name of the author:");
System.out.println(author);
System.out.println("price of book:");
System.out.println(price);
System.out.println("pages of book");
System.out.println(numpages);*/
}
}

class book
{
public static void main(String args[])
{
Scanner sc = new Scanner(System.in);
int i,n;
System.out.println(" enter number of books:");
n=sc.nextInt();
books[] arr=new books[n];
books ident=new books();
for(i=0;i<n;i++) {
arr[i]=new books();
arr[i].get();
}
for(i=0;i<n;i++)
{
    System.out.println("\nThe details of book "+(i+1));

System.out.println(arr[i]);
System.out.println();

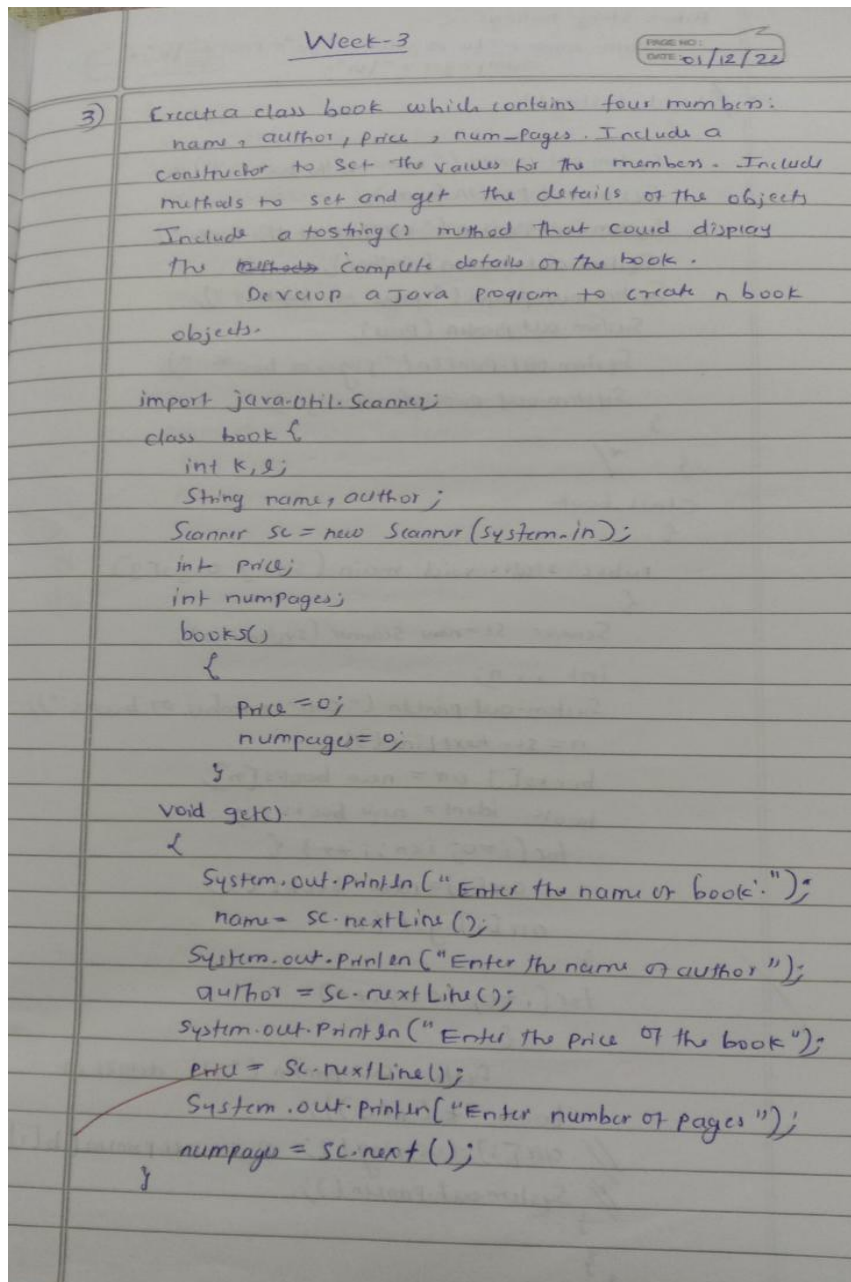
```

}

}

}

### Observation:





```

public String toString() {
    return name + " | " + author + " | " + price + " | " + numPages;
}

```

// void testing()

```

{
    System.out.println("name of the book : ");
    System.out.println(name);
    System.out.println("author of the book : ");
    System.out.println(author);
    System.out.println("price of book : ");
    System.out.println(price);
    System.out.println("pages of book : ");
    System.out.println(numPages);
}
}

```

class book

```

{
    public static void main (String args[])
    {
        Scanner sc = new Scanner (System.in);
        int i, n;
        System.out.println("Enter number of books:");
        n = sc.nextInt();
        books[] arr = new books[n];
        book idnt = new books();
        for(i=0; i<n; i++) {
            arr[i] = new books();
            arr[i].get();
        }
        for(i=0; i<n; i++)
        {
            System.out.println("The details of book " + (i+1));
            // arr[i].toString(); System.out.println(b[i]);
            // System.out.println();
        }
    }
}

```

Output:

Enter the number of books

1

Enter name of book: Taranga

Enter the name author: Sushant

Enter the price: 100

Enter number of pages: 117

Details of book 1:

Name of book: Taranga

Name of author: Sushant

Price: 100

Number of pages: 117

N  
1/8/22

## Output:

```
C:\Users\Admin\Desktop>java book
enter number of books:
2
Enter the name of the book:
wings of fire
Enter the name of the author:
kalam
Enter the price of the book:
322
Enter the no of pages of the book:
223
Enter the name of the book:
nannna kathe
Enter the name of the author:
unknown
Enter the price of the book:
234
Enter the no of pages of the book:
434

The details of book 1
wings of fire
kalam
322
223

The details of book 2
nannna kathe
unknown
234
434
```

### **LAB 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**

```
abstract class figure
{
    int x,y;
    figure(int a,int b){
        x=a;
        y=b;
    }
    abstract double area();
}
```

```
class rectangle extends figure{
    rectangle(int a,int b){
        super(a,b);}
    double area(){
        return x*y;
    }
}
```

```
class triangle extends figure{
    triangle(int a, int b){
        super(a,b);}
    double area(){
        return 0.5*x*y;
    }
}
```

```
class circle extends figure{
    circle(int a){
```

```
    super(a,a);}
    double area(){
        return 3.14*x*x;
    }
}
```

```
class abst{
    public static void main(String args[]){
        rectangle r=new rectangle(10,20);
        triangle t=new triangle(4,5);
        circle c=new circle(3);

        figure f;

        f=r;
        double a1=f.area();
        System.out.println("area of rectangle:"+a1);

        f=t;
        double a2=f.area();
        System.out.println("area of triangle:"+a2);

        f=c;
        double a3=f.area();
        System.out.println("area of circle:"+a3);

    }
}
```

## Observation:

WEEK-4  
DATE: 8/12

1. Develop a java program to create an abstract class named Shape/Figure that contains two integers and an empty method named printarea(). Provide three classes rectangle, triangle, circle, include printarea.

```
abstract class figure {
    int x; int y;
    figure(int a, int b) {
        x = a;
        y = b;
    }
    abstract double printarea();
}
```

```
class rectangle extends figure {
    rectangle(int a, int b) {
        super(a, b);
    }
    double printarea() {
        return x * y;
    }
}
```

```
class triangle extends figure {
    triangle(int a, int b) {
        super(a, b);
    }
    double printarea() {
        return 0.5 * x * y;
    }
}
```

```
class circle extends figure {
    circle(int a, int b) {
        super(a, b);
    }
    double printarea() {
        return 3.14 * x * y;
    }
}
```

```
class main {
    public static void main(String args[]) {
        rectangle r = new rectangle(10, 20);
        triangle t = new triangle(2, 5);
        circle c = new circle(7, 7);

        f = r;
        double a1 = f.printarea();
        s.o.p("area of rectangle = " + a1);

        f = t;
        double a2 = f.printarea();
        s.o.p("area of triangle = " + a2);

        f = c;
        double a3 = f.printarea();
        s.o.p("area of circle = " + a3);
    }
}
```

Output:

```
area of rectangle: 200.0
area of triangle: 10.0
area of circle: 28.59
```

## Output:

```
C:\Users\Admin>set path="C:\Program Files\Java\jdk-19\bin"
C:\Users\Admin>cd "Desktop"
C:\Users\Admin\Desktop>javac abst.java
C:\Users\Admin\Desktop>java abst
area of rectangle:200.0
area of triangle:10.0
area of circle:28.259999999999998
C:\Users\Admin\Desktop>
```

## **LAB 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.**

```
import java.util.Scanner; class account{
Scanner sc=new Scanner(System.in); String name; int acct_no; int balance,deposit; // String
type;
void deposit()
{
System.out.println("Enter amount for deposit\n"); int amount=sc.nextInt(); balance+=amount;
System.out.println("deposite is successfull\n do you want to check your balance");
System.out.println("1.YES\n2.NO"); int choice=sc.nextInt(); check_balance();
}
void details()
{
System.out.println("Name: "+name);
System.out.println("account_no: "+acct_no);
System.out.println("balance :"+balance);
}
void check_balance()
{
System.out.println("Balance is "+balance);
}
}
class savings extends account
{
double intrest=0; double rate=0.3;
```

```

savings(String n,int a,int d)
{
name=n; acct_no=a; deposit=d; balance=deposit;
}
void details()
{
System.out.println("Account_type: Savings"); super.details();
}
void withdrawal()
{
System.out.println("Enter amount for withdrawal\n"); int amount=sc.nextInt();
if(balance<amount)
System.out.println("You can withdraw the amount less than "+balance); else
{
balance=balance-amount;
System.out.println("withdrawal is successfull..!!!!!! \nparty leda "+name);
System.out.println("\nDo you want check your balance\n"); System.out.println("1.YES\n2.NO");
int choice=sc.nextInt(); if(choice==1) check_balance(); return;
}
}
void get_intrest(int month)
{
month/=3;
intrest=(balance*rate*month/4);
System.out.println("Previous balance: "+balance+"\nIntrest: "+intrest+"\nCurrent balance:
"+(balance+intrest)); balance+=intrest;
}
}
class current extends account
{
int cheque_no;
current(String n,int a,int d)
{
name=n; acct_no=a; deposit=d; balance=deposit;
}
void details()
{
System.out.println("Account_type: Current"); super.details();
}
void withdrawal()
{
System.out.println("Do you have cheque"); System.out.println("1.YES\n2.NO"); int
choice1=sc.nextInt(); if(choice1==1)
{
System.out.println("enter check number"); cheque_no=sc.nextInt();
}
}
}

```

```

}
System.out.println("Enter amount for withdrawal\n"); int amount=sc.nextInt();
if(balance<amount)
System.out.println("You can withdraw the amount less than "+balance); else
{
balance=balance-amount;
System.out.println("withdrawal is successfull..!!!!!! \nparty leda "+name);
System.out.println("Do you want check your balance\n");
System.out.println("1.YES\n2.NO"); int choice=sc.nextInt(); if(choice==1) check_balance();
return;
}
}
}
class Main
{ public static void main(String[] args)
{
Scanner sc=new Scanner(System.in); String name; int acct_no; int deposit; int choice;
System.out.println("Enter your name\n"); name=sc.nextLine();
System.out.println("Type of account\n"); System.out.println("1.current\n2.Savings");
choice=sc.nextInt(); if(choice==2)
{
System.out.println("Enter amount for deposition and minimum amount 1000 rupees\n"); int
x=sc.nextInt(); if(x<1000){
System.out.println("cant deposit less tahn 1000");
} else { deposit=x;
}
System.out.println("Create account number \n"); acct_no=sc.nextInt(); savings s=new
savings(name,acct_no,deposit); while(true)
{
System.out.println("\nEnter your choice\n1.deposit\n2.withdrawal\n3.Details of
account\n4.Intrest Calculate\n5.exit\n");
int ch=sc.nextInt(); if(ch==1)
s.deposit(); else if(ch==2)
{
s.withdrawal();
} else if(ch==3)
{
s.details(); }
else if(ch==4)
{ int m;
System.out.println("Enter duration for intrest calculate\n"); m=sc.nextInt();
s.get_intrest(m);
}
else if(ch==5)
break;
}
}
}

```



```

else
{
System.out.println("Invalid Choice..!!!!\n"); }
}
}
else
{
System.out.println("Enter amount for deposition\n"); deposit=sc.nextInt();
System.out.println("Create account number \n"); acct_no=sc.nextInt(); current c=new
current(name,acct_no,deposit); while(true)
{
System.out.println("\nEnter your choice\n1.depost\n2.withdrawal\n3.Details of
account\n4.exit"); int ch=sc.nextInt(); if(ch==1)
c.deposit(); else if(ch==2)
{
c.withdrawal();
}else if(ch==3)
{
c.details(); }
else if(ch==4)
break;
else
{
System.out.println("Invalid Choice..!!!!\n"); }
}
}
}
}
}

```

### **Observation:**

## WEEK-5

Create a class account that stores customer name, account number and type of account. From this derive the classes cur-acc and sav-acc. Further make specific to their requirements. Include the necessary methods in order to achieve the following tasks.

- Account deposit from customer and update the balance.

b) Display the balance

c) Compute and deposit interest

d) Permit withdrawal and update the balance

check the for the minimum balance, impose penalty if necessary and update the balance.

```
import java.util.Scanner;

class account {
    Scanner sc = new Scanner(System.in);

    String name;
    int acct-no;
    int balance, deposit;

    void deposit() {
        System.out.println("Enter amount for deposit");
        int amount = sc.nextInt();
        balance += amount;
        System.out.println("Deposit is successful\n do you want to check your balance");
        System.out.println("1. Yes\n 2. No");
        Scanner sc1 = new Scanner(System.in);
        int ch = sc1.nextInt();
        if (ch == 1) checkBalance();
    }

    void details() {
        System.out.println("Name: " + name);
    }
}
```

```
System.out.println("account-no: " + acct-no);
```

```
System.out.println("balance: " + balance);
```

```
}

void checkBalance() {
```

```
    System.out.println("Balance is " + balance);
```

```
}

class Savings extends account {
```

```
    int interest = 0; double rate = 0.03;
```

```
    Savings(String n, int a, int d) {
```

```
        name = n;
```

```
        acct-no = a;
```

```
        deposit = d;
```

```
        balance = deposit;
```

```
    }

    void details() {
```

```
        System.out.println("Account type: Savings");
```

```
        super.details();
```

```
    }

    void withdraw() {
```

```
        System.out.println("Enter amount for withdrawal");
```

```
        int amount = sc.nextInt();
```

```
        if (balance < amount)
```

```
            System.out.println("You can withdraw the amount less than " + balance);
```

```
        else
```



```

L-2 void serviceCharge(double amount)
{
    double charge = 0;
    System.out.println("Service charge 6 % is  

    applied because of low balance (lt)");
    charge = 0.06 * (minBalance - (balance - amount));
    System.out.println("Service charge: " + charge);
    balance -= charge;
    return;
}

```

### Output:

Enter your name

Sushanth

TYPE OF ACCOUNT

1. Current 2. Savings

1

Enter amount for deposition

10000

create your account number

301987

Enter your choice

1. deposit

2. withdraw

3. details

4. Exit

3.

Sushanth

10000

Current

N  
5/1/23

## Output:

```
Account_type: Current
Name: sushanth
account_no: 22233
balance :214

Enter your choice
1.depost
2.withdrawal
3.Details of account
4.exit
4

C:\Users\Admin\Desktop>java Bank
Enter your name

sushanth
Type of account

1.current
2.Savings
1
Enter amount for deposition

122
Create account number

12

Enter your choice
1.depost
2.withdrawal
3.Details of account
4.exit
4
```

## **LAB PROGRAM-6:**

**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.*; class father extends Exception{
    int f_age;    father(int a)
    {
        f_age=a;
    }
    public String toString()
    {
        return "Age : "+f_age+"\n Wrong age Input\nage should be greater than 0";
    }
}
class son extends father{    int s_age;    son(int f,int s)
    {
        super(f);    s_age=s;
    }
    public String toString()
    {
        return "\nson age:"+s_age+"\n"+"father age:"+f_age+"\n"+"Son age should be
less than father age";
    }
}
class MyException
{
    static void WrongAge(int f_age,int s_age) throws son,father
    {
        if(f_age<=0 || s_age<=0)    throw new father(f_age);    else
if(s_age>=f_age)    throw new son(f_age,s_age);
    }
    static void WrongAge(int age) throws father{
        if(age<=0)
            throw new father(age);
    }
}
```

```

    }
    public static void main(String []args)
    {
        int f_age,s_age;
        Scanner sc=new Scanner(System.in);

        try{
            System.out.println("Enter father age\n");
            f_age=sc.nextInt();
            WrongAge(f_age);
            System.out.println("Enter son age\n");
            s_age=sc.nextInt();
            WrongAge(s_age);
            WrongAge(f_age,s_age);
            System.out.println("No error occurred\n"+"son age:"+s_age+"\n"+"father
age:"+f_age);
        }
        catch(son s)
        {
            System.out.println("\nError caught\n"+s);
        }
        catch(father f)
        {
            System.out.println("\nError caught\n"+f);
        }
    }
}

```

### **Observation:**



- 1) Write a program that demonstrates handling of Exceptions in inheritance tree. Create base class called "Father" and derived class "Son" which extends base class.

In father class, implement a constructor which takes the age and throws the exception wrongAge() when the input age  $< 0$ . In Son class, implement a constructor that takes both father and son's age and throws an exception if son's age  $> =$  father's age.

```
import java.util.*;
```

```
class Father extends Exception {
```

```
    int f_age;
```

```
    Father(int a)
```

```
    {
```

```
        f_age = a;
```

```
    }
```

```
    public String toString()
```

```
    {
        return "Age: " + f_age + "In wrong age input should be greater than 0";
    }
```

```
}
```

```
class Son extends Father {
```

```
    int s_age;
```

```
    Son(int f, int s)
```

```
    {
        s_age = s; super(f);
```

```
        s_age = s;
```

```
    }
```

```
    public String toString()
```

```
    {
```

```
        return "In son age " + s_age + "In father
```

```
age: " + f_age + "In father age should be greater than son";
    }
```

```
}
```

```
}
```



```

class MyException
{
    public void wrongAge(int f-age, int s-age)
    throws Son, father
    {
        if (f-age <= 0 || s-age <= 0)
            throw new father(f-age);
        else if (s-age >= f-age)
            throw new Son(f-age, s-age);
    }
}

```

```

static void wrongAge(int age) throws father
{
    if (age < 0)
        throw new father(age);
}

```

```

public static void main(String arg[])
{
    int f-age, s-age;
    Scanner sc = new Scanner(System.in);

    try {
        System.out.println("Enter father age");
        f-age = sc.nextInt();
        wrongAge(f-age);

        System.out.println("Enter son age");
        s-age = sc.nextInt();
        wrongAge(s-age);
        wrongAge(f-age, s-age);

        System.out.println("No error occurred  
father age: " + f-age + " | son age: " + s-age);
    }
}

```

```

catch (Son s)
{
}

```

```

System.out.println("error caught | " + s);

```

```

System.out.println("Error caught");

```

output:

Enter father age

50

Enter son age

70

Error caught

Son Age: 70

father Age: 50

son age should be less than father

Enter father Age

0

Error caught

wrong age input

Age should be greater than 0

Enter father Age

12

Enter son Age

-1

Error caught

wrong Age input

Age should be greater than 0

Enter father Age

50

Enter son Age

## Output:

```
C:\Users\HP\Desktop>java MyException
Enter father age

50
Enter son age

78

Error caught

son age:78
father age:50
Son age should be less than father age

C:\Users\HP\Desktop>java MyException
Enter father age

0

Error caught
Age : 0
Wrong age Input
age should be greater than 0

C:\Users\HP\Desktop>java MyException
Enter father age

12
Enter son age

-1

Error caught
Age : -1
Wrong age Input
age should be greater than 0
```

## **LAB PROGRAM -7:**

**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 one extends Thread{
public void run(){
    try{
for(int i=0;i<5;i++){
System.out.println("\nBMS College of Engineering\n");
Thread.sleep(10000);
}
}
catch(InterruptedException e){
System.out.println("sleep exception\n");
}
}
}

class two extends Thread{ public void run(){ try{
for(int i=0;i<5;i++){
System.out.println("\nCSE\n");
Thread.sleep(2000);
}
}
catch(InterruptedException e){
System.out.println("sleep exception\n");
}
}
}

class Main{ public static void main(String args[]){
    System.out.println("\nin main class\n");
new one().start();
new two().start();
}
}
```

## Observation:

- 1] write a program which creates two threads one thread displaying "BMS college of Engineering" and every ten seconds and another displaying "CSE" and every two seconds.

```
class one extends Thread {  
    public void run() {  
        try {  
            for (int i = 0; i < 3; i++) {  
                System.out.println("BMS college of  
Engineering");  
                Thread.sleep(10000);  
            }  
        }  
    }  
}
```

```
catch (Exception e) {  
    System.out.println("Sleep Exception");  
}  
}
```

```
class two extends Thread {  
    public void run() {  
        try {  
            for (int i = 0; i < 3; i++) {  
                System.out.println("CSE");  
                Thread.sleep(2000);  
            }  
        }  
        catch (Exception e) {  
            System.out.println("Sleep Exception");  
        }  
    }  
}
```

class main {

```
    public static void main (String args[]) {  
        one t1 = new one();  
        two t2 = new two();  
        t1.start();  
        t2.start();  
    }  
}
```

Output:

```
BMS college of Engineering  
BMS college of Engineering  
BMS college of Engineering  
CSE  
CSE  
CSE
```

## **Output:**

```
in main class  
  
BMS College of Engineering  
  
CSE  
  
CSE  
  
CSE  
  
CSE  
  
CSE  
  
BMS College of Engineering  
  
BMS College of Engineering  
  
BMS College of Engineering  
  
BMS College of Engineering
```

## **OPEN ENDED PROGRAM -8:**

**Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.**

```
package cie;
public class Internals {
    public int internal[]=new int[5];
}
package cie;

public class Student {
    public String name;
    public int usn;
    public int sem;
}
package see;
import cie.Internals;
public class External extends Student {
    public int external[]=new int[5];
}

import java.util.Scanner;

import cie.Internals;
import see.External;
public class Marks {

    public static void main(String[] args) {
        int n;
        Scanner sc=new Scanner(System.in);
        System.out.println("enter number of students");
        n=sc.nextInt();
        External student[]=new External[n];
        Internals internal[]=new Internals[n];
```

```

int final_marks[][]=new int[n][5];
for(int i=0;i<n;i++)
{
    student[i]=new External();
    internal[i]=new Internals();
    System.out.println("Enter Student "+(i+1)+" name and usn and
sem respectively");
    student[i].name=sc.next();
    student[i].usn=sc.next();
    student[i].sem=sc.nextInt();
    System.out.println("Enter Internal marks of 5 subject in respective
order");
    for(int j=0;j<5;j++)
    {
        internal[i].internal_marks[j]=sc.nextInt();
    }
    System.out.println("Enter external marks of 5 subject in respective
order");
    for(int k=0;k<5;k++)
    {
        student[i].external[k]=sc.nextInt();
    }
}
for(int i=0;i<n;i++)
{
    for(int j=0;j<5;j++)

final_marks[i][j]=internal[i].internal_marks[j]+(int)(student[i].external[j]/2);
}
for(int i=0;i<n;i++)
{
    System.out.println("Name: "+student[i].name);
    System.out.println("USN: "+student[i].usn);
    System.out.println("Sem: "+student[i].sem);
    System.out.println("Marks of the student "+(i+1)+" is");
    for(int j=0;j<5;j++)
    {
        System.out.println(final_marks[i][j]);
    }
}
}
}

```

## Observation:

WEEK-8

Creates a package CFE and which has two classes - student and Internals. The class personnel has members like user, name, sem. The class internals has an array that stores the internal marks scored in five subjects on a student. Create another package SEE, which has the class External which is derived class of student. This class has an array that stores the SEE marks scored in five courses of the student of the current semester. Import the two packages in a file that declares the final marks of the n students in all five courses.

Package CFE;

```
public class Internals {  
    public int internal[] = new int[5];  
}
```

```
public class student {  
    public String name;  
    public int user;  
    public int sem;  
}
```

package SEE;

import CFE.\*;

```
public class External extends student {  
    public int external[] = new int[5];  
}
```

```
import java.util.Scanner;  
import CFE.*;  
import SEE.*;
```

public class marks {

```
    public static void main(String args[]) {  
        int n;  
        Scanner sc = new Scanner(System.in);  
        System.out.println("Enter number of student");  
        n = sc.nextInt();
```

```
        External student[] = new External[n];  
        student details[] = new student[n];  
        int final marks[][] = new int[n][5];
```

```
        for (int i = 0; i < n; i++) {
```

```
            student[i] = new External();  
            details[i] = new student();
```

```
            System.out.println("Enter student user and sem");
```

```
            details[i].user = sc.nextInt();  
            details[i].sem = sc.nextInt();
```

```
            System.out.println("Enter Internal marks of 5 subject  
            respectively");
```

```
            for (int j = 0; j < 5; j++) {  
                student[i].internal[j] = sc.nextInt();
```

```
            }  
            System.out.println("Enter External marks 5 subject");
```

```
            for (int k = 0; k < 5; k++) {
```

```
                student[i].external[k] = sc.nextInt();
```



<pre> for(int i=0; i&lt;N; i++) {     for(int j=0; j&lt;5; j++)     {         final_marks[i][j] = (student[i].internal[j] +         (int) student[i].external[j] / 2);     } } for(int i=0; i&lt;N; i++) {     System.out.println("USN: " + details[i].usn);     System.out.println("sem: " + details[i].sem);     System.out.println("marks of the student");     for(int j=0; j&lt;5; j++)     {         System.out.println("final_marks[i][j]");     } } } } </pre>	<pre> Enter Student usn and sem 226 3 Enter Internal marks of 5 subjects 30 28 34 40 43 Enter External marks of 5 subjects 89 87 76 65 34 USN: 227 Sem: 3 Marks of Student is 56 66 75 77 79 USN: 226 Sem: 3 Marks of Student is 74 71 72 72 70 </pre>
<p><u>Output:</u></p> <p>Enter number of students 2</p> <p>Enter Student usn and sem 227 3</p> <p>Enter Internal marks of 5 Subjects 34 33 32 28 40</p> <p>Enter External marks of 5 Subjects 45 67 87</p>	<p>Enter Student usn and sem 226 3</p> <p>Enter Internal marks of 5 subjects 30 28 34 40 43</p> <p>Enter External marks of 5 subjects 89 87 76 65 34</p> <p>USN: 227 Sem: 3</p> <p>Marks of Student is 56 66 75 77 79</p> <p>USN: 226 Sem: 3</p> <p>Marks of Student is 74 71 72 72 70</p>

## Output:

```
C:\Users\sushanth\OneDrive\Desktop\Java Notepad>java Marks
enter number of students
1
Enter Student 1 name and usn and sem respectively
Subhash
cs221
2
Enter Internal marks of 5 subject in respective order
23
34
45
43
32
Enter external marks of 5 subject in respective order
56
67
78
89
90
Name: Subhash
USN: cs221
Sem: 2
Marks of the student 1 is
51
67
84
87
77
```