

12/29/2020

# OOJ LAB REPORT

Lab programs(1-10)

Akash  
1BM18CS008

### 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 discriminant  $b^2 - 4ac$  is negative, display a message stating that there are no real solutions

```
import java.util.Scanner;
class quadearn
{
    public static void main (String args[])
    {
        double a, b, c, d;
        double r1, r2;
        Scanner get = new Scanner(System.in);
        System.out.println(" Enter the three coefficients according
to decreasing power of x : ");
        a = get.nextDouble();
        b = get.nextDouble();
        c = get.nextDouble();
        System.out.println(" a = " + a + " b = " + b + " c = " + c);
        d = b*b - 4*a*c;
        if (d >= 0)
        {
            System.out.println(" Roots are real and unequal ");
            r1 = (-b + Math.sqrt(d))/(2*a);
            r2 = (-b - Math.sqrt(d))/(2*a);
            System.out.println(" \n r1 = " + r1 + " r2 = " + r2 );
        }
        else
        {
            if (d == 0)
            {
                System.out.println(" Roots are equal and real ");
                r1 = (-b)/(2*a);
                System.out.println(" \n r = " + r1);
            }
            else if (d < 0)
            {
                System.out.println(" Roots are imaginary ");
            }
        }
    }
}
```

Code and output:-

D:\Java\jdk1.8.0\_261\bin\prog\quadeqn.java - Notepad++

```

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
quadeqn.java [Java file] X
quadeqn.java [Java file] X
1 import java.util.Scanner;
2 import java.lang.Math;
3 class quadeqn
4 { public static void main(String args[])
5 { double a,b,c,d;
6     double r1,r2;
7     Scanner s=new Scanner(System.in);
8     System.out.println("Enter the three coefficients according to decreasing power of x:\n");
9     a=s.nextDouble();
10    b=s.nextDouble();
11    c=s.nextDouble();
12
13    System.out.println("a="+a+" b="+b+" c="+c);
14    d=b*b-4*a*c;
15    if(d>0)
16    { System.out.println("Roots are real and unequal");
17      r1=(-b+Math.sqrt(d))/(2*a);
18      r2=(-b-Math.sqrt(d))/(2*a);
19      System.out.println("\nr1= "+r1+" r2= "+r2);
20    }
21    else
22    {if(d==0)
23     {System.out.println("Roots are real and equal");
24      r1=(-b)/(2*a);
25      System.out.println("\nr= "+r1);
26    }
27    else
28    {if(d<0)
29     {System.out.println("Roots are imaginary");
30    }
31  }
32}
33

```

Java source file length: 826 lines:33 Ln:6 Col:16 Sel:0|0 Windows (CR LF) UTF-8 INS

Windows Command Prompt

```

Microsoft Windows [Version 10.0.18363.1002]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\standd:

D:\>cd D:\Java\jdk1.8.0_261\bin\prog
D:\Java\jdk1.8.0_261\bin\prog>set path="D:\Java\jdk1.8.0_261\bin"
D:\Java\jdk1.8.0_261\bin\prog>java quadeqn.java

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decreasing power of x:
1
1
1
a=1.0 b=1.0 c=1.0
Roots are imaginary

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decreasing power of x:
1
2
1
a=1.0 b=2.0 c=1.0
Roots are real and equal
r= 1.0

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decreasing power of x:
1
-3.2
2.56
a=1.0 b=-3.2 c=2.56
Roots are real and unequal
r1= 1.6000000210734244 r2=-1.5999999789265757

D:\Java\jdk1.8.0_261\bin\prog>

```

Windows Taskbar length: 826 lines:33 Ln:6 Col:16 Sel:0|0 Windows (CR LF) UTF-8 INS

## 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.

Writeup:-

```
import java.util.Scanner;
class Student {
    private String usn;
    private String name;
    private double sgpa;
    private int credits[];
    private int marks[];

    void getDetails(int n) {
        System.out.println("Enter student's details : ");
        Scanner get = new Scanner(System.in);
        System.out.print("USN : ");
        usn = get.nextLine();
        System.out.print("Name : ");
        name = get.nextLine();
        marks = new int[n];
        credits = new int[n];
        System.out.print("Enter marks and credit respectively : ");
        for (int i=0; i<n; i++) {
            System.out.print("in Subject " + (i+1));
            marks[i] = get.nextInt();
            credits[i] = get.nextInt();
        }
    }

    void calculateSGPA() {
        double sum=0, sgpa, sumc=0;
        for (int i=0; i<n; i++) {
            sum += marks[i]/(i+1) * credits[i] + sum;
            sumc += credits[i];
        }
        sgpa = sum/sumc;
        System.out.println("SGPA : " + sgpa);
    }
}
```

Teacher's Signature : \_\_\_\_\_

```
void printDetails(int n)
{
    System.out.println("ID : " + id);
    System.out.println("NAME : " + name);
    System.out.println("Marks & credits");
    for (int i = 0; i < n; i++)
    {
        System.out.println("marks[i] : " + marks[i] + " credits[i] : ");
        calculateGPA();
    }
}
```

```
class StudentMain
{
    public static void main(String args[])
    {
        int n;
        System.out.println("Enter the no. of subjects : ");
        Scanner get = new Scanner(System.in);
        n = get.nextInt();
        Student st = new Student();
        st.getDetails();
        st.printDetails();
    }
}
```

Teacher's Signature : \_\_\_\_\_

Code and output:-

```
* D:\Java\jdk1.8.0_261\bin\prog\StudentMain.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
StudentMain.java [student.java]
1 import java.util.Scanner;
2 class Student
3 {
4     private String usn;
5     private String name;
6     private int credits[];
7     private int marks[];
8     private double ssgpa;
9
10    void getDetails(int n)
11    {
12        System.out.println("Enter Students details:\n");
13        Scanner get=new Scanner(System.in);
14        System.out.println("USN:");
15        usn=get.nextLine();
16        System.out.println("Name:");
17        name=get.nextLine();
18        marks=new int[n];
19        credits=new int[n];
20        System.out.println("Enter marks and credits respectively:");
21        for( int i=0;i<n;i++)
22        {
23            System.out.println("\nSubject "+(i+1));
24            marks[i]=get.nextInt();
25            credits[i]=get.nextInt();
26            if(marks[i]==100 || credits[i]>5 || marks[i]<0 || credits[i]<0)
27            {
28                System.out.println("Enter correct values:\n");
29                marks[i]=get.nextInt();
30                credits[i]=get.nextInt();
31            }
32        }
33    void calcssgpa(int n)
34    {
35        double sum=0,ssgpa,sumc=0;
36
37        for(int i=0;i<n;i++)
38        {
39            sum=(marks[i]/(float)) * credits[i] + sum;
40            sumc+=credits[i];
41        }
42    }
43    void printDetails(int n)
44    {
45        System.out.println("\nUSN:"+ usn);
46        System.out.println("NAME:"+name);
47        System.out.println("MARKS\tCREDITS");
48
49        for(int i=0;i<n;i++)
50        {
51            System.out.println(marks[i]+\t+\t+credits[i]);
52            calcssgpa(n);
53        }
54    }
55    class StudentMain
56    {
57        public static void main(String args[])
58        {
59            int n;
60            System.out.println("Enter the no of subjects:");
61            Scanner get=new Scanner(System.in);
62            n=get.nextInt();
63            Student sl= new Student();
64            sl.getDetails(n);
65
66            sl.printDetails(n);
67        }
68    }
}
Java source file length : 1,644 lines : 69 Ln : 28 Col : 36 Sel : 0 | 0 Windows (CR LF) UTF-8 INS
15:28 06-10-2020
```

```
* D:\Java\jdk1.8.0_261\bin\prog\StudentMain.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
StudentMain.java [student.java]
32 void calcssgpa(int n)
33 {
34     double sum=0,ssgpa,sumc=0;
35
36     for(int i=0;i<n;i++)
37     {
38         sum=(marks[i]/(float)) * credits[i] + sum;
39         sumc+=credits[i];
40     }
41     ssgpa=sum/sumc;
42     System.out.printf("SSGPA :%f",ssgpa);
43 }
44 void printDetails(int n)
45 {
46     System.out.println("\nUSN:"+ usn);
47     System.out.println("NAME:"+name);
48     System.out.println("MARKS\tCREDITS");
49
50     for(int i=0;i<n;i++)
51     {
52         System.out.println(marks[i]+\t+\t+credits[i]);
53         calcssgpa(n);
54     }
55 }
56 class StudentMain
57 {
58     public static void main(String args[])
59     {
60         int n;
61         System.out.println("Enter the no of subjects:");
62         Scanner get=new Scanner(System.in);
63         n=get.nextInt();
64         Student sl= new Student();
65         sl.getDetails(n);
66
67         sl.printDetails(n);
68     }
}
Java source file length : 1,644 lines : 69 Ln : 28 Col : 36 Sel : 0 | 0 Windows (CR LF) UTF-8 INS
15:29 06-10-2020
```

```
Command Prompt
Subject 1
95
97
Enter correct values:
76
4
Subject 2
98
4
Subject 3
65
2
Subject 4
76
3
SGPA : 8.461538461538462
D:\Java\jdk1.8.0_261\bin\prog>
```

### 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.

Writeup:-

```
import java.util.Scanner;
class Book
{
    String name, author;
    int price, num_pages;
    void book()
    {
        name = "";
        author = "";
        price = 0;
        num_pages = 0;
    }
    void get()
    {
        Scanner get = new Scanner(System.in);
        System.out.println("Enter the name : ");
        name = get.nextLine();
        System.out.println("Enter the author : ");
        author = get.nextLine();
        System.out.println("Enter the no of pages : ");
        num_pages = get.nextInt();
        System.out.println("Enter the price : ");
        price = get.nextInt();
    }
    void out()
    {
        System.out.println("NAME : " + name);
        System.out.println("AUTHOR : " + author);
        System.out.println("PRICE : " + price);
        System.out.println("PAGES : " + num_pages);
    }
}
```

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```

public class book {
    public String toString() {
        return "NAME: " + name + " AUTHOR: " + author + " PRICE: " + price +
            " IN PAGES: " + numPages;
    }
}

class book2 {
    public static void main(String args[]) {
        Scanner get = new Scanner(System.in);
        int n;
        System.out.println("Enter the no. of books to be entered:");
        n = get.nextInt();
        book b[] = new book[n];
        for (int i=0; i<n; i++) {
            b[i] = new book();
            b[i].get();
            System.out.println("Display in function method in String method");
            System.out.println("in [int] char: ");
            ch = get.next();
            switch(ch) {
                case '1': for (int i=0; i<n; i++)
                    b[i].out();
                    break;
                case '2': for (int i=0; i<n; i++)
                    System.out.println(b[i]);
                    break;
                default: System.out.println("Enter valid number");
            }
        }
    }
}

```

Teacher's Signature : \_\_\_\_\_

Code and output:-

```
book2Main - Notepad
File Edit Format View Help
import java.util.Scanner;

class book
{
    String name,author;
    int price,num_pages;
}

void book()
{
    name="NA";
    author="NA";
    price=0;
    num_pages=0;
}

void get()
{
    Scanner get=new Scanner(System.in);
    System.out.println("Enter the name:");
    name=get.nextLine();
    System.out.println("Enter the author:");
    author=get.nextLine();
    System.out.println("Enter the price:");
    price=get.nextInt();
    System.out.println("Enter the no of pages:");
    price=get.nextInt();
}

void out()
{
    System.out.println("NAME: "+name);
    System.out.println("AUTHOR: "+author);
    System.out.println("PRICE: "+price);
    System.out.println("PAGES: "+num_pages);
}

public String toString()
{
    return ("\nNAME: "+name+"\nAUTHOR: "+author+"\nPRICE: "+price+"\nPAGES :"+num_pages);
}
}

class book2Main
{
    public static void main(String args[])
    {
        Scanner get=new Scanner(System.in);
        int n,chi;
        System.out.println("Enter the no of books to be entered:");
        n=get.nextInt();
        book b[] = new book[n];
    }
}
```

```
book2Main - Notepad
File Edit Format View Help
int n,i;
System.out.println("Enter the no of pages:");
price=get.nextInt();

void out()
{
    System.out.println("NAME: "+name);
    System.out.println("AUTHOR: "+author);
    System.out.println("PRICE: "+price);
    System.out.println("PAGES: "+num_pages);
}

public String toString()
{
    return ("\nNAME: "+name+"\nAUTHOR: "+author+"\nPRICE: "+price+"\nPAGES :"+num_pages);
}

class book2Main
{
    public static void main(String args[])
    {
        Scanner get=new Scanner(System.in);
        int n,chi;
        System.out.println("Enter the no of books to be entered:");
        n=get.nextInt();
        book b[] = new book[n];
        for(int i=0;i<n;i++)
        {
            b[i]=new book();
            b[i].get();
        }
        System.out.println("Display\n1.Function Method\n2.String method\nEnter choice:");
        chi=get.nextInt();
        switch(ch)
        {
            case 1: for(int i=0;i<n;i++)
            {
                System.out.println("Book "+i);
                b[i].out();
            }
            break;
            case 2: for(int i=0;i<n;i++)
            {
                System.out.println("Book "+i);
                System.out.println(b[i]);
            }
            break;
            default:System.out.println("Enter valid number");
        }
    }
}
```

```
D:\Java\jdk1.8.0_261\bin\prog>java book2Main
Enter the no of books to be entered:
2
Enter the name:
faluda
Enter the author:
ray
Enter the price:
200
Enter the no of pages:
500
Enter the name:
poirot
Enter the author:
agatha
Enter the price:
300
Enter the no of pages:
300
Display
1.Function Method
2.String method
Enter choice:
2
Book 0
NAME: faluda
AUTHOR: ray
PRICE: 200
PAGES :0
Book 1
NAME: poirot
AUTHOR: agatha
PRICE: 300
PAGES :0
D:\Java\jdk1.8.0_261\bin\prog>
```

#### 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.

Writeup:-

```
import java.util.Scanner;
abstract class Shape
{ int d1, d2;
  abstract void printArea();
  class rectangle extends Shape
  { void printArea()
  { System.out.println("Area: "+(d1*d2)); }
  class triangle extends Shape
  { void printArea()
  { System.out.println("Area: "+(d1*d2/2)); }
  class circle extends Shape
  { void printArea()
  { System.out.println("Area: "+(3.14159*d1*d2)); }
  class ShapeMain
  { public static void main(String args[])
  { int ch;
    triangle t = new triangle();
    circle c = new circle();
    rectangle r = new rectangle();
    System.out.println("1.Rectangle\n2.Triangle\n3.Circle");
    System.out.print("Enter the no. of choice");
    ch = ger.nextInt();
    switch(ch)
    {
```

Teacher's Signature : \_\_\_\_\_

```
{ case 1 : System.out.println("Enter height and width");
    h.d1 = get.nextInt();
    r.d2 = get.nextInt();
    r.printArea();
    break;
case 2 : System.out.println("Enter altitude and base:");
    h.d1 = get.nextInt();
    t.d2 = get.nextInt();
    break;
case 3 : System.out.println("Enter the radius:");
    c.d1 = get.nextInt();
    c.printArea();
    break;
default : System.out.println("Invalid Input");
}
```

Teacher's Signature : \_\_\_\_\_

Code and output:-

```
Command Prompt
Microsoft Windows [Version 10.0.18363.1139]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\stand>d:
D:> cd
D:\

D:>cd D:\Java\jdk1.8.0_261\bin\prog
D:\Java\jdk1.8.0_261\bin\prog>set path="D:\Java\jdk1.8.0_261\bin"
D:\Java\jdk1.8.0_261\bin\prog>javac ShapeMain.java
D:\Java\jdk1.8.0_261\bin\prog>java ShapeMain
1. Rectangle
2. Triangle
3. Circle

Enter the no of choice:
3
Enter the radius :
4

Area: 50.264

D:\Java\jdk1.8.0_261\bin\prog>
```

```
1 import java.util.Scanner;
2
3 abstract class shape
4 { int d1,d2;
5   abstract void printarea();
6 }
7
8 class rectangle extends shape
9 { void printarea()
10   { System.out.println("\nArea: "+(d1*d2));}
11 }
12
13 class triangle extends shape
14 { void printarea()
15   { System.out.println("\nArea: "+(d1*d2/2)); }
16 }
17
18 class circle extends shape
19 { void printarea()
20   { System.out.println("\nArea: "+ (3.1415*d1*d1)); }
21 }
22
23 class ShapeMain
24 { public static void main(String args[])
25   { Scanner get=new Scanner(System.in);
26     int ch;
27     triangle t=new triangle();
28     rectangle r=new rectangle();
29     circle c=new circle();
30     System.out.println("1. Rectangle\n2. Triangle\n3. Circle");
31     System.out.println("\nEnter the no of choice: ");
32     ch=get.nextInt();
33     switch(ch)
34     {
35       case 1 : System.out.println("\nEnter height and width:");
36       r.d1= get.nextInt();
37       r.d2= get.nextInt();
38       r.printarea();
39       break;
40
41       case 2 : System.out.println("\nEnter altitude and base:");
42       t.d1= get.nextInt();
43       t.d2= get.nextInt();
44       t.printarea();
45       break;
46
47       case 3 : System.out.println("Enter the radius :");
48       c.d1= get.nextInt();
49       c.printarea();
50       break;
51
52       default : System.out.println("Invali Input");
53     }
54   }
55 }
```

length:1349 lines:54 Ln:51 Col:51 Sel:0|0 Windows (CR LF) UTF-8 14:19 03-11-2020 INS

```
23 class ShapeMain
24 { public static void main(String args[])
25   { Scanner get=new Scanner(System.in);
26     int ch;
27     triangle t=new triangle();
28     rectangle r=new rectangle();
29     circle c=new circle();
30     System.out.println("1. Rectangle\n2. Triangle\n3. Circle");
31     System.out.println("\nEnter the no of choice: ");
32     ch=get.nextInt();
33     switch(ch)
34     {
35       case 1 : System.out.println("\nEnter height and width:");
36       r.d1= get.nextInt();
37       r.d2= get.nextInt();
38       r.printarea();
39       break;
40
41       case 2 : System.out.println("\nEnter altitude and base:");
42       t.d1= get.nextInt();
43       t.d2= get.nextInt();
44       t.printarea();
45       break;
46
47       case 3 : System.out.println("Enter the radius :");
48       c.d1= get.nextInt();
49       c.printarea();
50       break;
51
52       default : System.out.println("Invali Input");
53     }
54 }
```

length:1349 lines:54 Ln:51 Col:51 Sel:0|0 Windows (CR LF) UTF-8 14:20 03-11-2020 INS

### 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 Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

- Accept deposit from customer and update the balance.
- Display the balance.
- Compute and deposit interest
- Permit withdrawal and update the balance
- Check for the minimum balance, impose penalty if necessary and update the balance

Writeup:-

```
import java.util.Scanner;
import java.lang.Math;
class Account
{
    String name, type, acno;
    double balance;
    void deposit()
    {
        Scanner get = new Scanner(System.in);
        double depo;
        System.out.println("Enter the deposit");
        depo = get.nextDouble();
        balance = balance + depo;
    }
    void withdraw()
    {
        Scanner get = new Scanner(System.in);
        double withdraw;
        System.out.println("Enter the amount to withdraw: (" + balance + ")");
        withdraw = get.nextDouble();
        balance = balance - withdraw;
        System.out.println("Balance : " + balance);
    }
}
class Curr_acct extends Account
{
    boolean cheque = true; double min = 1;
    void display() { System.out.println("Balance : " + balance); }
    void create()
    {
        Scanner get = new Scanner(System.in);
        System.out.print("Name : ");
        name = get.nextLine();
        type = "Current";
        System.out.print("Account No : "); acno = get.nextInt();
    }
}
```

Teacher's Signature: \_\_\_\_\_

```

System.out.println("Balance : "); balance = scanner.nextDouble();
}

void calcInt()
{
    double interest; int time;
    Scanner get = new Scanner(System.in);
    System.out.println("Input Time: ");
    time = get.nextInt();
    interest = balance * Math.pow((1 + interest/100), time) - balance;
    System.out.println("Interest: " + interest);
    balance = balance + interest;
    System.out.println("Balance : " + balance);
}

void check()
{
    System.out.println("Minimum Balance: " + 5000);
    if (balance < 5000)
    {
        System.out.println("Penalty is imposed please deposit minimum");
        System.out.println("5000 - balance + 200, i.e. INR 200 is service charge");
        deposit();
        balance = balance - 200;
    }
    else
    {
        System.out.println("Balance : " + balance + " safe");
    }
}

class Savs extends Account
{
    double min = 7;
    boolean cheque = false;
    void deposit() { System.out.println("Balance : " + balance); }
    void withdraw()
    {
        Scanner get = new Scanner(System.in);
    }
}

```

Prachi's Signature:

```

System.out.println("Name : ");
name = get.next();
type = savings();
System.out.println("Balance : "); balance = get.nextDouble();
System.out.println("Account No."); account = get.nextInt();
}

void calcInterest()
{
    double interest; int time;
    Scanner get = new Scanner(System.in);
    System.out.println("Enter the time"); time = get.nextInt();
    interest = balance * Math.pow((1 + interestRate), time) - balance;
    System.out.println("Interest : " + interest);
    balance = balance + interest;
    System.out.println("Balance : " + balance);
}

class Bank
{
    public static void main(String args[])
    {
        Scanner get = new Scanner(System.in);
        String type;
        SavAcc acc = new SavAcc();
        curr Acc acc = new currAcc();
        System.out.println("Enter type of account : current/savings");
        type = get.nextLine();
        if (type.equals("savings"))
            acc.create();
        else if (type.equals("current"))
            acc.create();
    }
}

```

Teacher's Signature: \_\_\_\_\_

```

int ch;
do
{
    System.out.println("1. Deposit 2. Display Balance 3. Deposit
Interest 4. Withdrawal 5. Check 6. ChequeBook (Under development)
7. Exit"); ch = get.nextInt();
switch (ch)
{
    case 1: if (type.equals("savings"))
                acc.deposit();
            else
                acc.deposit();
            break;
    case 2: if (type.equals("savings")) { acc.acc.dep();
            } else { acc.acc.dep(); }
            break;
    case 3: if (type.equals("savings")) { acc.withdraw();
            } System.out.println("This account does not have permission");
            break;
    case 4: if (type.equals("savings"))
                System.out.println("acc.withdraw()");
            else { acc.withdraw(); }
            break;
    case 5: if (type.equals("savings"))
                System.out.println("This account does not have this privilege");
            else { acc.cheque(); }
            break;
}
}

```

```
case 6: if (type.equals("saving"))
    {System.out.println("The account not have provision");
    else
        System.out.println("The account has provision");
    break;
default: if (ch!=7)
    {System.out.println("Enter valid option");
    }
    while (ch!=7);
}
}
```

Code and output:-

```
D:\Java\jdk1.8.0_261\bin\prog\Bank.java - Notepad+
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Bank.java [Bank.java] [StopwatchManager.java]
1 import java.util.Scanner;
2 import java.lang.Math;
3
4 class Account
5 { String name,type,accno;
6 double balance;
7
8 void deposit()
9 { Scanner get=new Scanner(System.in);
10 double depo;
11 System.out.println("Enter the deposit : ");
12 depo=get.nextDouble();
13 balance=balance+depo;
14 }
15 void withdraw()
16 { Scanner get=new Scanner(System.in);
17 double withdraw;
18 System.out.println("Enter the amount to withdraw: (<"+balance+"")");
19 withdraw=get.nextDouble();
20 balance=balance-withdraw;
21 System.out.println("Balance : "+balance);
22 }
23 }
24
25 class Curr_acct extends Account
26 { int intr=5;
27 boolean cheque=true;
28 void dispblnc()
29 { System.out.println("Balance : "+balance);
30 }
31 void create()
32 { Scanner get=new Scanner(System.in);
33
34 void create()
35 { Scanner get=new Scanner(System.in);
36 System.out.println("Name :");
37 name=get.next();
38 accno="current";
39 System.out.println("Account No :");
40 accno=get.next();
41 System.out.println("Balance :");
42 balance=get.nextDouble();
43
44 void check()
45 { System.out.println("\nMinimum Balance : "+5000);
46 if(balance<5000)
47 { System.out.println("Penalty is imposed please deposit minimum " + (5000-balance+200)+"Rs\nRs 200 Service charge");
48 deposit();
49 balance=balance-200;
50 }
51 else
52 { System.out.println("Balance : "+balance +"Safe"); }
53 }
54
55 class Sav_acct extends Account
56 { double intr=7;
57 boolean cheque=false;
58 void dispblnc()
59 { System.out.println("Balance : "+balance);
60 }
61 void create()
62 { Scanner get=new Scanner(System.in);
63
64 void create()
65 { Scanner get=new Scanner(System.in);
66 System.out.println("Name :");
67 name=get.next();
68 accno="saving";
69 System.out.println("Account No :");
70 accno=get.next();
71 System.out.println("Balance : ");
72 balance=get.nextDouble();
73
74 void check()
75 { System.out.println("\nMinimum Balance : "+5000);
76 if(balance<5000)
77 { System.out.println("Penalty is imposed please deposit minimum " + (5000-balance+200)+"Rs\nRs 200 Service charge");
78 deposit();
79 balance=balance-200;
80 }
81 else
82 { System.out.println("Balance : "+balance +"Safe"); }
83 }
84
85 class Admin
86 { void display()
87 { System.out.println("Welcome to the ATM");
88 }
89 void withdraw()
90 { System.out.println("Enter the amount to withdraw: (<"+balance+"")");
91 withdraw=get.nextDouble();
92 balance=balance-withdraw;
93 System.out.println("Balance : "+balance);
94 }
95 void deposit()
96 { Scanner get=new Scanner(System.in);
97 System.out.println("Enter the deposit : ");
98 depo=get.nextDouble();
99 balance=balance+depo;
100 System.out.println("Balance : "+balance);
101 }
102 }
103
104 void main()
105 { Admin obj=new Admin();
106 obj.display();
107 obj.withdraw();
108 obj.deposit();
109 }
110 }
111
112 length: 3,841 lines: 140 Ln: 39 Col: 30 Sel: 0 | 0 Windows (CR LF) UTF-8 15:23 03-11-2020 INS
Java source file
D:\Java\jdk1.8.0_261\bin\prog\Bank.java - Notepad+
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Bank.java [Bank.java] [StopwatchManager.java]
31 void create()
32 { Scanner get=new Scanner(System.in);
33 System.out.println("Name :");
34 name=get.next();
35 accno="current";
36 System.out.println("Account No :");
37 accno=get.next();
38 System.out.println("Balance :");
39 balance=get.nextDouble();
40
41
42 void check()
43 { System.out.println("\nMinimum Balance : "+5000);
44 if(balance<5000)
45 { System.out.println("Penalty is imposed please deposit minimum " + (5000-balance+200)+"Rs\nRs 200 Service charge");
46 deposit();
47 balance=balance-200;
48 }
49 else
50 { System.out.println("Balance : "+balance +"Safe"); }
51
52 }
53
54
55 class Sav_acct extends Account
56 { double intr=7;
57 boolean cheque=false;
58 void dispblnc()
59 { System.out.println("Balance : "+balance);
60 }
61 void create()
62 { Scanner get=new Scanner(System.in);
63
64 void create()
65 { Scanner get=new Scanner(System.in);
66 System.out.println("Name :");
67 name=get.next();
68 accno="saving";
69 System.out.println("Account No :");
70 accno=get.next();
71 System.out.println("Balance : ");
72 balance=get.nextDouble();
73
74 void check()
75 { System.out.println("\nMinimum Balance : "+5000);
76 if(balance<5000)
77 { System.out.println("Penalty is imposed please deposit minimum " + (5000-balance+200)+"Rs\nRs 200 Service charge");
78 deposit();
79 balance=balance-200;
80 }
81 else
82 { System.out.println("Balance : "+balance +"Safe"); }
83 }
84
85 class Admin
86 { void display()
87 { System.out.println("Welcome to the ATM");
88 }
89 void withdraw()
90 { System.out.println("Enter the amount to withdraw: (<"+balance+"")");
91 withdraw=get.nextDouble();
92 balance=balance-withdraw;
93 System.out.println("Balance : "+balance);
94 }
95 void deposit()
96 { Scanner get=new Scanner(System.in);
97 System.out.println("Enter the deposit : ");
98 depo=get.nextDouble();
99 balance=balance+depo;
100 System.out.println("Balance : "+balance);
101 }
102 }
103
104 void main()
105 { Admin obj=new Admin();
106 obj.display();
107 obj.withdraw();
108 obj.deposit();
109 }
110 }
111
112 length: 3,841 lines: 140 Ln: 39 Col: 30 Sel: 0 | 0 Windows (CR LF) UTF-8 15:24 03-11-2020 INS
Java source file
```



```
ps Command Prompt -java Bank
0
Interest : 2700.5160000000014
Balance : 14700.516000000001

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.

Enter the amount to withdraw: (<14700.516000000001)
2000
Balance : 12700.516000000001

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.

This account does not have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.

This account does not have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.

D:\Java\jdk1.8.0_261\bin\prog>java Bank
Enter type of account: (current/savings)
current
Name :
Rohit
Account No. :
1234567890
Balance :

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.

Enter the deposit :
8000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.

Balance : 13000.0

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.

This account does not have this provision

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawl
5.Check
6.Cheque Book(under developemnt)
7.Exit
8.
```

D:\Java\jdk1.8.0\_261\bin\prog\Bank.java - Notepad++

```

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Bank.java ShapeMain.java
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
<
    accs.dispbLnc();
    else
        accr.dispbLnc();

    break;
case 3 : if(type.equals("savings"))
    accs.calcInt();
else
    System.out.println("This account does not have this provision");
break;
case 4 : if(type.equals("savings"))
    accs.withdraw();
else
    accr.withdraw();
break;
case 5 : if(type.equals("savings"))
    System.out.println("This account does not have this provision");
else
    accr.check();
break;
case 6 : if(type.equals("savings"))
    System.out.println("This account does not have this provision");
else
    System.out.println("This account does have this provision");
break;
default : if(ch!=7)
    System.out.println("Enter valid option");
}
}while(ch!=7);
}
}

```

Java source file

length: 3,641 lines: 140 Ln: 39 Col: 30 Sel: 0 | 0 Windows (CR LF) | UTF-8 INS

Command Prompt - java Bank

```

D:\Java\jdk1.8.0_261\bin\prog>javac Bank.java
D:\Java\jdk1.8.0_261\bin\prog>java Bank
Enter type of account: (current/savings)
savings
Name :
I
Account No :
18765
Balance :
10000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdraw
5.Check
6.Cheque Book(under development)
7.Exit

Enter the deposit :
2000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdraw
5.Check
6.Cheque Book(under development)
7.Exit
2
Balance : 12000.0

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdraw
5.Check
6.Cheque Book(under development)
7.Exit
3
Enter time:
3
Interest : 2700.5160000000014
Balance : 14700.516000000001

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdraw

```

15:28 03-11-2020

15:33 03-11-2020

```

C:\ Command Prompt - java Bank
1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
4
Enter the amount to withdraw: (<13000.0)
100
Balance : 12900.0

1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
5
Minimum Balance : 5000
Balance : 12900.05afe

1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
5
This account does have this provision

1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
5
Enter the amount to withdraw: (<12900.0)
10000
Balance : 2900.0

1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
5
C:\ Command Prompt - java Bank
1.Withdrawl
2.Check
3.Cheque Boook(under developemnt)
4.Exit
4
Enter the amount to withdraw: (<12900.0)
10000
Balance : 2900.0

1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
5
Minimum Balance : 5000
Penalty is imposed please deposit minimum 2300.0Rs
Rs 200 Service charge
Enter the deposit :
2500

1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit
7
Balance : 5200.0

1.Deposit
2.Display Balance
3.Display Interest
4.Withdrawl
5.Check
6.Cheque Boook(under developemnt)
7.Exit

```

## Lab Program 6:

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.

Writeup:-

```
package CIE;
import java.util.Scanner;
public class Internals extends Student
{
    int cie[]; //new int[5];
    public void display()
    {
        System.out.println("USN : "+usn);
        System.out.println("NAME : "+name);
        System.out.println("SEMESTER : "+sem);
        System.out.println("CIE : ");
        for(int i=0; i<5; i++)
        {
            System.out.print(cie[i] + " ");
        }
        Scanner ger = new Scanner(System.in);
    }

    void geti()
    {
        System.out.println("Enter Details : ");
        System.out.println("USN - ");
        usn = ger.nextInt();
        System.out.println("NAME - ");
        name = ger.next();
        System.out.println("SEMESTER - ");
        sem = ger.nextInt();
        System.out.println("Enter CIE marks : ");
        for(int i=0; i<5; i++)
        {
            System.out.print(" Subject : " +(i+1));
            cie[i] = ger.nextInt();
        }
    }
}
```

Teacher's Signature : \_\_\_\_\_

```
package CEE;

import java.util.Scanner;
import CIE.*;

class CEE extends CIE
{
    Scanner ger=new Scanner(System.in);
    public void germit()
    {
        for(int i=0;i<5;i++)
        {
            System.out.printf("Subject:"+(i+1));
            arr[i]=ger.nextInt();
        }
    }
    public void dispeme()
    {
        for(int i=0;i<5;i++) System.out.print("%d\t",arr[i]);
    }
}

package CIE;

public class Student
{
    public String venName;
    public int sem;
```

```

import java.util.Scanner;
import CIE.*;
import SEE.*;

class TotalMarks
{
    public static void main(String args[])
    {
        Scanner get = new Scanner(System.in);
        int n;
        System.out.println("Enter the no of students: ");
        n = get.nextInt();
        CIE.Internal[] int[] = new CIE.Internal[n];
        SEE.External[] ext[] = new SEE.External[n];
        for(int i=0; i<n; i++)
        {
            int[i] = new CIE.Internal();
            ext[i] = new SEE.External();
            int[i].get();
            System.out.println(" SEE MARKS: ");
            ext[i].get();
        }
        for(int i=0; i<n; i++)
        {
            int[i].display();
            int total = 0;
            ext[i].display();
            for(int j=0; j<1; j++)
            {
                total = total + int[i].CIE(j) + ext[i].SEE(j);
            }
            System.out.println("TOTAL MARKS: " + total);
        }
    }
}

```

Teacher's Signature : \_\_\_\_\_

Code and output:-

```

package SEE;

import java.util.Scanner;

public class Externals extends CIE.Student
{
    public int see[] = new int[5];
    Scanner get = new Scanner(System.in);

    public void getm()
    {
        for(int i=0;i<5;i++)
        {
            System.out.println("Subject "+(1+i));
            see[i] = get.nextInt();
        }
    }

    public void dispdm()
    {
        for(int i=0;i<5;i++)
        {
            System.out.printf("%d\t",see[i]);
        }
    }
}

import java.util.Scanner;
import CIE.*;
import SEE.*;

class TotalMarks
{
    public static void main(String args[])
    {
        Scanner get = new Scanner(System.in);
        int n;
        System.out.println("Enter the no of students: ");
        n = get.nextInt();
        CIE.Internals ints[] = new CIE.Internals[n];
        SEE.Externals exts[] = new SEE.Externals[n];
        for(int i=0;i<n;i++)
        {
            ints[i] = new CIE.Internals();
            exts[i] = new SEE.Externals();
            ints[i].geti();
        }
    }
}

```

```

package CIE;
public class Student
{ public String usn,name;
  public int sem;
}

package CIE;
import java.util.Scanner;

public class Internals extends Student
{ public int cie[]=new int[5];
  Scanner get=new Scanner(System.in);
  public void geti()
  { System.out.println("Enter Details: ");
    System.out.println("USN :");
    usn = get.nextInt();
    System.out.println("NAME :");
    name =get.next();
    System.out.println("SEMESTER :");
    sem =get.nextInt();
    System.out.println("CIE MARKS :");
    for(int i=0;i<5;i++)
    { System.out.println("Subject "+(1+i));
      cie[i]=get.nextInt(); }
  }
  public void dispI()
  { System.out.println("\nUSN :" +usn);
    System.out.println("NAME :" +name);
    System.out.println("SEMESTER :" +sem);
    System.out.println("CIE :");
    for(int i=0;i<5;i++)
    { System.out.printf("%d\t",cie[i]); }
    System.out.println("\nSEE :");
  }
}

```

```
System.out.println("SEE MARKS :");
exts[i].getm();
}
for(int i=0;i<n;i++)
{ ints[i].dispi();
int total=0;
exts[i].dispsm();
for(int j=0;j<5;j++)
{ total=total+ints[i].cie[j]+exts[i].see[j];}
System.out.println("\nTOTAL MARKS :" +total);
}
}
```

```
Command Prompt
D:\Java\jdk1.8.0_261\bin\prog\week9>java TotalMarks
Enter the no of students:
2
Enter Details:
USN :
1bms1a
NAME :
abhay
SEMESTER :
2
CIE MARKS :
Subject 1
1
Subject 2
2
Subject 3
3
Subject 4
4
Subject 5
5
SEE MARKS :
Subject 1
1
Subject 2
2
Subject 3
3
Subject 4
4
Subject 5
5
Enter Details:
USN :
1bmsb2
NAME :
bhav
SEMESTER :
10
CIE MARKS :
Subject 1
20
Subject 2
30
Subject 3
30
Subject 4
10
Subject 5
40
SEE MARKS :
Subject 1
12
Subject 2
23
Subject 3
24
Subject 4
13
Subject 5
24

USN :1bms1a
NAME :abhay
SEMESTER :2
CIE :
1      2      3      4      5
SEE :
1      2      3      4      5
TOTAL MARKS : 30
1555 17-11-2020
```

```
Command Prompt
Enter Details:
USN :
1bmsb2
NAME :
bhav
SEMESTER :
10
CIE MARKS :
Subject 1
20
Subject 2
30
Subject 3
30
Subject 4
10
Subject 5
40
SEE MARKS :
Subject 1
12
Subject 2
23
Subject 3
24
Subject 4
13
Subject 5
24

USN :1bmsb2
NAME :bhav
SEMESTER :10
CIE :
20      30      30      10      40
SEE :
12      23      24      13      24
TOTAL MARKS : 127
1556 17-11-2020
```

```
 Command Prompt
Subject 1
12
Subject 2
23
Subject 3
34
Subject 4
13
Subject 5
24

USN :1bms1a
NAME :abhay
SEMESTER :2
CIE :
1      2      3      4      5
SEE :
1      2      3      4      5
TOTAL MARKS : 30

USN :1bmsb2
NAME :bhav
SEMESTER :10
CIE :
20      30      30      10      40
SEE :
12      23      34      13      24
TOTAL MARKS : 236

D:\Java\jdk1.8.0_261\bin\prog\week9>
```



## Lab Program 7:

Write a program to demonstrate generics with multiple object parameters.

Writeup:-

```
class Gen<I,F,D>
    I iob; F obj; D dob;
    Gen(I io, F oo, D do)
        iob = io;
        obj = oo;
        dob = do;
    I getobj()
        return iob;
    S getobj()
        return obj;
    T getdob()
        return dob;
    void showTypes()
        System.out.println("Types are "+ iob.getClass() .getName() +
            " "+ obj.getClass().getName() + " "+ dob.getClass().get-
            Name());
```

3

```
class GenDemo
    public static void main(String args[])
    {
        Gen<Integer, String, Double> Gob = new Gen<Integer,
            String, Double>(1, "Hello", 3.14159);
        Gob.showTypes();
        int i = Gob.getobj();
        String str = Gob.getobj();
        Double d = Gob.getdob();
        System.out.println();
    }
}
```

Teacher's Signature : \_\_\_\_\_

```
System.out.println("Integers: ");
System.out.println("Value: "+ i);
System.out.println("String: ");
System.out.println("Value: "+ str);
System.out.println("Double: ");
System.out.println("Value: "+ d);
```

3

Code and output-

```

class Gen<I,S,D>
{
    I iob; S strob; D dob;
    Gen(I io,S so,D doj)
    {
        iob = io;
        strob = so;
        dob= doj;
    }

    I getiob()
    {
        return iob;
    }

    S getstrob()
    {
        return strob;
    }

    D getdob()
    {
        return dob;
    }

    void showType()
    {
        System.out.println("Types are\n1." + iob.getClass().getName() + "\n2." + strob.getClass().getName() +
"\n3." + dob.getClass().getName());
    }
}

class GenDemo
{
    public static void main(String args[])
    {
        Gen<Integer,String,Double> GOb = new Gen<Integer,String,Double>(100,"Hello",3.14159);
        GOb.showType();
        int i = GOb.getiob();
        String str = GOb.getstrob();
        double d = GOb.getdob();
        System.out.println();
        System.out.println("Integer: ");
        System.out.println("value: " + i);
        System.out.println("String: ");
        System.out.println("value: " + str);
        System.out.println("Double: ");
        System.out.println("value: " + d);

    }
}

```

A screenshot of a Windows Command Prompt window titled "Command Prompt". The window shows the following command and its output:

```
D:\Java\jdk1.8.0_261\bin\prog>javac GenDemo.java
D:\Java\jdk1.8.0_261\bin\prog>java GenDemo
Types are
1.java.lang.Integer
2.java.lang.String
3.java.lang.Double
Integer:
value: 100
String:
value: Hello
Double:
value: 3.14159
D:\Java\jdk1.8.0_261\bin\prog>
```

The window has a dark theme. The taskbar at the bottom shows various pinned icons, and the system tray indicates the date as 24-11-2020 and the time as 16:29.

### Lab Program 8:

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 Wrong Age( ) when the input age=father's age.

Writeup:-

```
import java.util.Scanner;
class AgeException extends Exception
{
    private int a, fa;
    AgeException(int a, int b)
    {
        a = a;
        fa = b;
    }
    public String toString()
    {
        return "Age.Exception.Inappropriate age"; 
    }
}
class AgeException2 extends Exception
{
    private int a, fa;
    AgeException2(int a, int b)
    {
        a = a;
        fa = b;
    }
    public String toString()
    {
        return "Age.Exception.Age<0"; 
    }
}
class Father
{
    int Fage;
}
class Son extends Father
{
    int Sage;
    String Sname;
    Son(String name, int age, int fage) throws AgeException,
    AgeException2
    {
        Sage = age;
        Sname = name;
        Fage = fage;
        System.out.println("Son Name: " + Sname);
        System.out.println("Son age: " + Sage);
        System.out.println("Father age: " + Fage);
    }
}
```

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```

if (sage < 0 || fage < 0)
    throw new AgeException2(sage, fage);
if (sage >= fage)
    throw new AgeException1(sage, fage);

class ageExceptionDemo
{
    public static void main(String args[])
    {
        int so, fa; String name;
        Scanner get = new Scanner(System.in);
        System.out.println("Enter Son Name: ");
        name = get.nextLine();
        System.out.println("Enter Son Age : ");
        so = get.nextInt();
        System.out.println("Enter Father Age: ");
        fa = get.nextInt();
        try
        {
            son s = new son(name, so, fa);
        }
        catch (AgeException1 e)
        {
            System.out.println("Caught " + e);
        }
        catch (AgeException2 e)
        {
            System.out.println("Caught " + e);
        }
    }
}

```

Code and output:-

```

import java.util.Scanner;

class AgeException1 extends Exception
{
    private int sa,fa;
    AgeException1(int a,int b)
    {
        sa = a;
        fa = b;
    }
    public String toString()
    {
        return "age.Exception.Inappropriate_age";
    }
}

class AgeException2 extends Exception
{
    private int sa,fa;
    AgeException2(int a,int b)
    {
        sa = a;
        fa = b;
    }
    public String toString()
    {
        return "age.Exception.Age(<0)";
    }
}

class Father
{
    int Fage;
}

class Son extends Father
{
    int Sage;
    String Sname;

    Son(String name,int age,int fage) throws AgeException1, AgeException2
    {
        Sage=age;
        Sname=name;
        Fage=fage;
        System.out.println("Son Name: " + Sname);
        System.out.println("Son age: " + Sage);
        System.out.println("Father age " + Fage);

        if(Sage<0 || Fage<0)
            throw new AgeException2(age,fage);
        if(age>=fage)
            throw new AgeException1(age,fage);
    }
}

```

```

class ageExceptionDemo
{
    public static void main(String args[])
    {
        int sa,fa; String name;
        Scanner get=new Scanner(System.in);
        System.out.println("Enter Son Name: ");
        name=get.nextLine();
        System.out.println("Enter Son age: ");
        sa=get.nextInt();
        System.out.println("Enter Father age ");
        fa=get.nextInt();
        try
        {
            Son s=new Son(name,sa,fa);
        }
        catch (AgeException1 e)
        {
            System.out.println("Caught " + e);
        }
        catch (AgeException2 e)
        {
            System.out.println("Caught " + e);
        }
    }
}

```

```

D:\Java\jdk1.8.0_261\bin\prog>javac ageExceptionDemo.java
D:\Java\jdk1.8.0_261\bin\prog>java ageExceptionDemo
Enter Son Name:
Dere
Enter Son age:
-1
Enter Father age
28
Son Name: Dere
Son age: -1
Father age 28
Caught age.Exception.Age(<0)
D:\Java\jdk1.8.0_261\bin\prog>

```

### Lab Program 9:

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.

Writeup:-

```
class NewThread implements Runnable
{
    String name, print;
    int delay, loop;
    Thread t;
    NewThread (String threadname, String lprint, int d, int n)
    {
        name = threadname;
        print = lprint;
        delay = d;
        loop = n;
        t = new Thread (this, name);
        System.out.println ("New Thread: " + t);
        t.start ();
    }
    public void run()
    {
        try
        {
            for (int i = loop; i > 0; i--)
            {
                System.out.println (print);
                Thread.sleep (delay);
            }
        }
        catch (InterruptedException e)
        {
            System.out.println (name + " Interrupted");
            System.out.println (name + " exiting");
        }
    }
}
class multiThread
{
    public static void main (String args[])
    {
        new NewThread ("Thread_1", "BMS College of Engineering", 10000, 3);
        new NewThread ("Thread_2", "CSE", 2000, 1);
    }
}
```

Teacher's Signature : \_\_\_\_\_

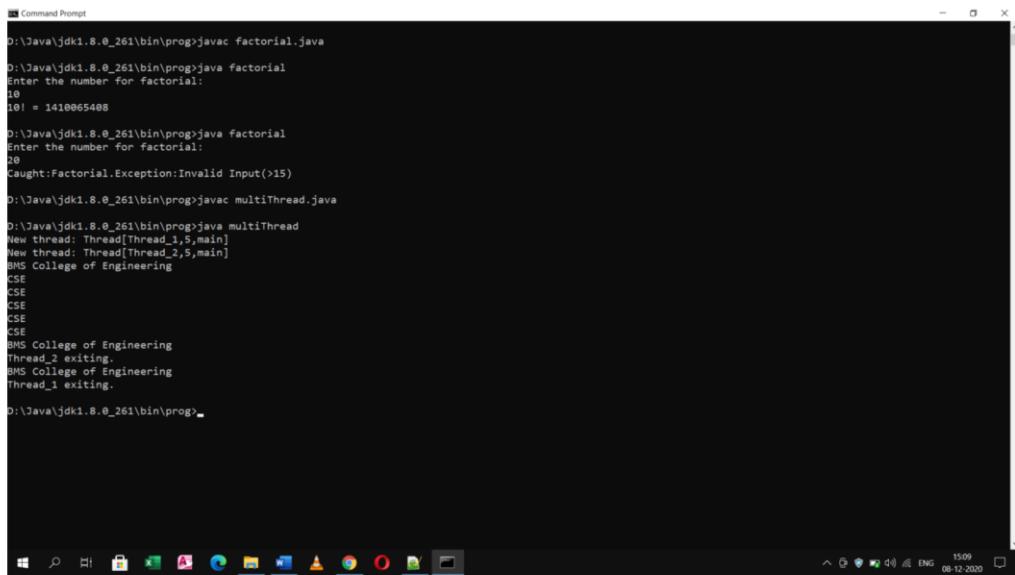
Code and writeup:

```

class NewThread implements Runnable
{
    String name,print;
    int delay,loop;
    Thread t;
    NewThread(String threadname,String toprint,int d,int n)
    {
        name = threadname;
        print=toprint;
        delay=d;
        loop=n;
        t = new Thread(this, name);
        System.out.println("New thread: " + t);
        t.start();
    }
    public void run()
    {
        try
        {
            for(int i = loop; i > 0; i--)
            {
                System.out.println(print);
                Thread.sleep(delay);
            }
        }
        catch (InterruptedException e)
        {
            System.out.println(name + "Interrupted");
        }
        System.out.println(name + " exiting.");
    }
}

class multiThread
{
    public static void main(String args[])
    {
        new NewThread("Thread_1","BMS College of Engineering",10000,3); // start threads
        new NewThread("Thread_2","CSE",2000,5);
    }
}

```



D:\Java\jdk1.8.0\_261\bin\prog>javac factorial.java  
D:\Java\jdk1.8.0\_261\bin\prog>java factorial  
Enter the number for factorial:  
10  
10! = 1410065408  
D:\Java\jdk1.8.0\_261\bin\prog>java factorial  
Enter the number for factorial:  
20  
Caught:Factorial.Exception:Invalid Input(>15)  
D:\Java\jdk1.8.0\_261\bin\prog>javac multiThread.java  
D:\Java\jdk1.8.0\_261\bin\prog>java multiThread  
New thread: Thread[Thread\_1,5,main]  
New thread: Thread[Thread\_2,5,main]  
BMS College of Engineering  
CSE  
CSE  
CSE  
CSE  
BMS College of Engineering  
Thread\_2 exiting.  
BMS College of Engineering  
Thread\_1 exiting.  
D:\Java\jdk1.8.0\_261\bin\prog>

## Lab Program 10:

Write a program that creates a user interface to perform integer divisions. The user enters two

numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

Writeup:-

```
import java.awt.*;
import java.awt.event.*;

class SampleDialogBox extends Dialog implements ActionListener
{ IntDivUp idu;
  DialogBox(Frame parent, String title)
  { super(parent, title, false);
    idu = (IntDivUp) parent;
    setLayout(new FlowLayout());
    setSize(100, 100);
    add(new Label("idu.answ"));
    Button b;
    add(b = new Button("OK"));
    b.addActionListener(this);
  }
  public void actionPerformed(ActionEvent ae)
  { dispose(); }

public class IntDivUp extends Frame implements ActionListener
{ JTextField Num1, Num2, Result;
  Button Divide;
  String ansdig = "...";
  public IntDivUp()
  { setLayout(new FlowLayout());
    Divide = new Button("Divide");
    Label Num1p = new Label("Num1:", Label.RIGHT);
    Label Num2p = new Label("Num2:", Label.RIGHT);
    Num1 = new TextField(10);
```

```

Num2 = new JTextField(10); Result = new JTextField(10);
add(Num1p);
add(Num1);
add(Num2p);
add(Num2);
add(Divide); add(Result);
Divide.addActionListener(this);
addWindowListener(new WindowAdapter() {
    public void windowClosing(WindowEvent we)
    { System.exit(0); }
});
}

public void actionPerformed(ActionEvent ae)
{ int a=0, b=1, r=0;
try
{ a = Integer.parseInt(Num1.getText());
    b = Integer.parseInt(Num2.getText()); }
catch(NumberFormatException e)
{ errmsg = "Caught : "+e;
    SampleDialog d = new SampleDialog(this, "Dialog");
    d.setVisible(true); }
try { r = a/b; }
catch(ArithmeticException e)
{ errmsg = "Caught: "+e+" Num2= "+b;
    SampleDialog d = new SampleDialog(this, "Dialog");
    d.setVisible(true); }
Result.setText(" "+r); }
}

```

Teacher's Signature : .....

```

public static void main(String args[])
{ IntDivUp appwin = new IntDivUp();
appwin.setSize(new Dimension(200, 150));
appwin.setTitle("Integer Division");
appwin.setVisible(true); }
}

```

Code and output:-

```
Num1 = new TextField(10);
Num2 = new TextField(10);
Result = new TextField(10);
add(Num1p);
add(Num1);
add(Num2p);
add(Num2);
add(Divide);
add(Result);

Divide.addActionListener(this);

addWindowListener(new WindowAdapter(){
public void windowClosing(WindowEvent we)
{ System.exit(0); }
});

}

public void actionPerformed(ActionEvent ae)
{
int a=0,b=1,r=0;
try
{a = Integer.parseInt(Num1.getText());
b = Integer.parseInt(Num2.getText());}
catch(NumberFormatException e)
{ errmsg= "Caught: "+e;
SampleDialog d = new SampleDialog(this, "Dialog");
d.setVisible(true); }

try
{ r=a/b; }
catch(ArithmeticException e)
```

```
import java.awt.*;
import java.awt.event.*;

class SampleDialog extends Dialog implements ActionListener
{ IntDivUp idu;
SampleDialog(Frame parent, String title)
{ super(parent, title, false);
idu=(IntDivUp)parent;
setLayout(new FlowLayout());
setSize(500, 200);
add(new Label(iduerrmsg));
Button b;
add(b = new Button("OK"));
b.addActionListener(this);
}
public void actionPerformed(ActionEvent ae)
{ dispose(); }

}

public class IntDivUp extends Frame implements ActionListener
{ TextField Num1, Num2,Result;
Button Divide;
String errmsg="";

public IntDivUp()
{ setLayout(new FlowLayout());
Divide = new Button("Divide");

Label Num1p = new Label("Num1: ", Label.RIGHT);
Label Num2p = new Label("Num2: ", Label.RIGHT);
```

```
{ errmsg= "Caught: "+e+ " Num2= "+ b;
SampleDialog d = new SampleDialog(this, "Dialog");
d.setVisible(true); }
Result.setText(" "+r);
}

public static void main(String args[])
{ IntDivUp appwin = new IntDivUp();
appwin.setSize(new Dimension(700,700));
appwin.setTitle("Integer Division");
appwin.setVisible(true);
}
}

D:\Java\jdk1.8.0_261\bin\prog>javac IntDivUp.java
D:\Java\jdk1.8.0_261\bin\prog>java IntDivUp
D:\Java\jdk1.8.0_261\bin\prog>javac IntDivUp.java
D:\Java\jdk1.8.0_261\bin\prog>java IntDivUp
```

