

- 1) Write a code in java to display roots of a quadratic equation and its condition

```
import java.util.Scanner;
import java.lang.Math;
class SolveQuad{
    float r1,r2,a,b,c;
    SolveQuad(float x,float y,float z){
        a=x;b=y;c=z;
    }
    void distinct(){
        r1=(-b+(float)Math.sqrt(b*b-4*a*c))/2*a;
        r2=(-b-(float)Math.sqrt(b*b-4*a*c))/2*a;
    }
    void same(){
        r1=-b/(2*a);
        r2=r1;
    }
    void complex(){
        r1=(float)Math.sqrt(4*a*c-b*b)/(2*a);
        r2=-1*r1;
        System.out.println("Roots : \n"+(-b/(2*a))+r1+"i"\n"+(-b/(2*a))+r2+"i");
    }
}
class Quadratic{
    public static void main(String sx[]){
        float a,b,c;
        Scanner s=new Scanner(System.in);
        System.out.println("Enter the coefficients of ax^2+bx+c");
        a=s.nextFloat();
        b=s.nextFloat();
        c=s.nextFloat();
        SolveQuad s1=new SolveQuad(a,b,c);
        float d=b*b-4*a*c;
        if(d>0){
            s1.distinct();
            System.out.println("Roots :\n"+s1.r1+"\n"+s1.r2);
        }
        else if(d<0)
            s1.complex();
        else{
            s1.same();
            System.out.println("Roots :\n"+s1.r1+"\n"+s1.r2);
        }
    }
}
```

cd Desktop

Quadratic program

```
import java.util.Scanner;  
class Quadratic {  
    public static void main(String[] args)  
    {  
        Scanner s1 = new Scanner(System.in);  
        System.out.println("Enter the roots");  
        Double a = s1.nextDouble();  
        Double b = s1.nextDouble();  
        Double c = s1.nextDouble();  
        Double r1, r2, d = b*b - 4*a*c;  
        if (d > 0)  
        {  
            System.out.println("Roots are real and distinct");  
            r1 = (-b + Math.sqrt(d)) / (2*a);  
            r2 = (-b - Math.sqrt(d)) / (2*a);  
            System.out.println("First root: " + r1 + "\nSecond root: " + r2);  
        }  
        else if (d == 0)  
        {  
            System.out.println("Roots are real and equal");  
            r1 = (-b) / (2*a);  
            System.out.println("First and Second Root: " + r1);  
        }  
    }  
}
```

the [

System.out.println ("roots are Imaginary");
int a = (-b) / (2 * n);

$$M_2 = \text{MathSigned}(\text{MathObj}(d) / (2^k a))$$

System, and painter ("First foot: "+ π_1 +"; "+ π_2)).

```
System.out.println("Second road : " + r2 + " - " + r1 + r2);
```

y *is* *a* *real* *and* *well* *known*

3

(~~for the first~~) off my hand.

(Californianus) (L.) (Nels.)

output: Enter the ~~graph~~ name & press Enter: Edges

234 - 1st ab. Sept 10 addit.

roots at Imaginary

$$\text{first root : } -0.75 + j2.3979$$

$$\text{Second root: } \frac{2.39791576 - i2.39791576}{2}$$

$$((\cos(\theta) \cdot (\text{start} + d)) + \text{center})_{12}$$

~~and will take half a fortnight to do so.~~

Output:

```
Microsoft Windows [Version 10.0.22621.3007]
(c) Microsoft Corporation. All rights reserved.

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>javac Quadratic.java

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>java Quadratic
Enter the coefficients of ax^2+bx+c
2
4
6
Roots :
-1.014142135i
-1.0-1.4142135i

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>
```

2)Develop 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 Student.

```
import java.util.Scanner;

class Student {

    String usn,name;
    int credits[]={4,4,4,3,3,2,1,1};
    int marks[]={};
    double sgpa;

    void acc_det(){

        Scanner s=new Scanner(System.in);

        System.out.println("Enter your name and usn");
        this.usn=s.next();
        this.name=s.next();

        System.out.println("Enter your marks in 8 subjects ordered by credits descending");
        for(int i=0;i<8;i++)
            marks[i]=s.nextInt();

    }

    void sgpacal(){

        int sum=0;
        for(int i=0;i<8;i++){
            if(marks[i]==100)
                sum+=credits[i]*(marks[i]/10);
            else
                sum+=credits[i]*((int)(marks[i]/10)+1);
        }
        sgpa=(double)sum/22;
    }

    void display(){

        System.out.printf("Student name:"+name+"\nStudent USN:"+usn+"\nSGPA scored:%.2f",sgpa);
    }

    public String toString() {
```

```
        return "\nSgpa:"+sgpa;
    };
}

class SGPA{
    public static void main(String[] args) {
        Student s1=new Student();
        s1.acc_det();
        s1.sgpacal();
        s1.display();
        System.out.print(s1);
    }
}

Microsoft Windows [Version 10.0.22621.3007]
(c) Microsoft Corporation. All rights reserved.

C:\Users\manoj\OneDrive\Desktop\3rd sem>javac SGPA.java

C:\Users\manoj\OneDrive\Desktop\3rd sem>java SGPA
Enter your name and usn
Manoj
147
Enter your marks in 8 subjects ordered by credits descending
89
90
78
89
78
98
99
100
Student name:147
Student USN:Manoj
SGPA scored:9.05
Sgpa:9.045454545454545
C:\Users\manoj\OneDrive\Desktop\3rd sem>
```

```

import java.util.Scanner;
class Student {
    String USN;
    String name;
    int marks[] = new int[8];
    double SGPA;
    int credits[] = {4, 4, 4, 3, 3, 2, 1, 1};
    void details() {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter your name and USN");
        String name = s.nextLine();
        String USN = s.nextLine();
    }
}

```

```

System.out.println("Enter marks in 8 subjects in descending order");
for (int i=0; i<8; i++) {
    marks[i] = s.nextInt();
}

```

```

void SGPAcalculator() {
    int sum=0;
    for (int i=0; i<8; i++) {
        if (marks[i] == 100)
            sum += credits[i] * (marks[i]/10);
        else
            sum += credits[i] * ((int)marks[i]/10) + 1;
    }
    SGPA = (double)sum/22;
}

```

```

class SGPAde
{
    public static void main (String [ ] args)
    {
        Student s1 = new Student();
        s1. details();
        s1. sgpaCalculator();
        s1. display();
        System.out.println(s1);
    }
}

```

Output :- Enter name & usn
 Manoj Kumar
 10M22CS142

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- 3) Create class Book which contains four members :name ,author, price, num_pages . Include A constructor to set 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 book. Develop Java program to create n books.

```
import java.util.Scanner;
class Book{
    String name,author;
    int price,num_pages;
    Book(String n,String a,int p,int np){
        this.name=n;this.author=a;
        this.price=p;this.num_pages=np;
    }
    public String toString(){
        return "Book name is :" +name +"\nAuthor is:" +author +"\nPrice:" +price +"\nNumber of
pages:" +num_pages;
    }
}
public class BookDetails {
    static Scanner sc=new Scanner(System.in);
    static Book set(){
        sc.nextLine();
        System.out.println("Enter book name");
        String n=sc.nextLine();
        System.out.println("Enter author name");
        String a=sc.nextLine();
        System.out.println("Enter price of book");
        int p=sc.nextInt();
        System.out.println("Enter no of pages");
        int np=sc.nextInt();
        Book b1=new Book(n,a,p,np);
        return b1;
    }
    public static void main(String sx[]){
        int n;
        System.out.println("Enter no of books");
        n=sc.nextInt();
        Book b[]=new Book[n];
        for(int i=0;i<n;i++)
            b[i]=set();
        System.out.println("Details of books entered");
        for(int i=0;i<n;i++)
            System.out.println(b[i]);
    }
}
```

```
C:\Users\manoj\OneDrive\Desktop\3rd sem\java>java BookDetails
Enter no of books
1
Enter book name
Wings of fire
Enter author name
ApjAbdul kalam
Enter price of book
450
Enter no of pages
733
Details of books entered
Book name is :Wings of fire
Author is:ApjAbdul kalam
Price:450
Number of pages:733

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>
```

Book program

8/01/2024 10:00 AM

```
Import java.util.Scanner; // importing Scanner class  
class Book {  
    String name, author;  
    int numPages, price;  
    Book(String n, String a, int np, int p){  
        this.name=n; this.author=a;  
        this.numPages=np; this.price=p;  
    }  
    public String toString(){  
        return "Name : "+name+"\n Author : "+author  
            + "\n Price : "+price+"\n number of pages : "+numPages;  
    }  
}  
class BookSet{  
    static Scanner s=new Scanner(System.in);  
    class Book set(){  
        s.nextLine();  
        System.out.println("Enter Book name");  
        String n=s.nextLine();  
        System.out.println("Enter author name");  
        String a=s.nextLine();  
        System.out.println("Enter price of the book");  
        int p=s.nextInt();  
        if(p<0)  
        {  
            s.out("Invalid price");  
            System.exit(status);  
        }  
    }  
}
```

```

System.out.println("Enter book price");
D(p)
System.out.println("Entered price");
System.exit(0);
}
}
System.out.println("Enter number of pages");
int np = s.nextInt();
if(np <= 0) {
    System.out.println("Invalid number of pages");
    System.exit(1);
}
Book b1 = new Book(n,a,np,p);
return b1;
}
public static void main(String args[])
{
    int n;
    System.out.print("Manoj Kumar] +BN22CSE55");
    System.out.print("Enter no of books");
    n = s.nextInt();
    Book b[] = new Book[n];
    for (int i = 0; i < n; i++) {
        b[i] = set();
    }
    System.out.print("Details of book entered");
    for (int i = 0; i < n; i++) {
        System.out.print(b[i]);
    }
}
}
Output: Enter number of books
2
Enter book name
Hello World
Enter author name
Jan Silber
Enter price of book
300

```

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.

```
import java.util.Scanner;

abstract class Shape{

    int a,b;

    Shape(int x,int y){

        a=x;b=y;

    }

    abstract float printArea();

}

class Circle extends Shape{

    Circle(int r){

        super(r,r);

    }

    float printArea(){

        return (float)3.14*a*b;

    }

}

class Rectangle extends Shape{

    Rectangle(int x,int y){

        super(x,y);

    }

    float printArea(){

        return a*b;

    }

}

class Triangle extends Shape{

    Triangle(int x,int y){

        super(x,y);

    }

}
```

```
float printArea(){
    return (float)0.5*a*b;
}

}

class AreaCAL{
    public static void main(String[] args) {
        Scanner s=new Scanner(System.in);
        int x,y;
        System.out.println("Enter radii:");
        x=s.nextInt();
        Circle c=new Circle(x);
        System.out.println("Enter length breadth of rectangle:");
        x=s.nextInt();
        y=s.nextInt();
        Rectangle r =new Rectangle(x,y);
        System.out.println("Enter base height of triangle:");
        x=s.nextInt();
        y=s.nextInt();
        Triangle t=new Triangle(x,y);
        System.out.println("Area of circle:"+c.printArea());
        System.out.println("Area of rectangle:"+r.printArea());
        System.out.println("Area of triangle:"+t.printArea());
    }
}
```

```
C:\Users\manoj\OneDrive\Desktop\3rd sem\java>javac AreaCAL.java
C:\Users\manoj\OneDrive\Desktop\3rd sem\java>java AreaCAL
Enter radii:
12
Enter length breadth of rectangle:
6
7
Enter base height of triangle:
3
4
Area of circle:452.16
Area of rectangle:42.0
Area of triangle:6.0
C:\Users\manoj\OneDrive\Desktop\3rd sem\java>
```

~~import java.util~~

Q. Java program to create an abstract class named shape that contains two integers

, Import java.util.Scanner;

abstract class Shape {

int a, b;

shape(int x, Inty) {

a=x, b=y;

} abstract float pointArea();

class Circle extends Shape {

Circle(int r) {

super(r, r);

float pointArea() {

float area=(float) 3.14 * a * b;

return area;

super();

class Rectangle extends shape {

Rectangle(int x, int y) {

super(x, y);

} float pointArea() {

float area=a*b;

return area;

Class triangle extends shape

Triangle (x,y), int y){
 shape (x,y);

float printArea();
 float area = (base * a * b) / 2;
 return area;

Class Rectangle

public static void main (String args[]){
 Scanner s = new Scanner (System.in);
 int x, y;

System.out.println ("Enter the radius of circle");

s = s.nextInt();

Circle c = new Circle (s);

System.out.println ("Enter the length & breadth of rectangle");

x = s.nextInt();

y = s.nextInt();

Rectangle r = new Rectangle(x,y);

System.out.println ("Enter the base & height
of triangle");

x = s.nextInt();

y = s.nextInt();

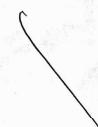
Triangle t = new Triangle(x,y);

System.out.println ("Area of triangle "+ t.printArea());

System.out.println ("Area of rectangle "+ r.printArea());

System.out.println ("Area of Circle: "+ c.printArea());

y



Enter the radius of circle

3
Enter the length and breadth of rectangle
5
6
7
Enter the base and height of triangle

8
9
Area of the triangle : 36.0

Area of rectangle : 30.0

Area of Circle : 28.26

else

System.out.println ("Area of triangle "+ t.printArea());

System.out.println ("Area of rectangle "+ r.printArea());

System.out.println ("Area of Circle: "+ c.printArea());

System.out.println ("Area of triangle "+ t.printArea());

System.out.println ("Area of rectangle "+ r.printArea());

System.out.println ("Area of Circle: "+ c.printArea());

System.out.println ("Area of triangle "+ t.printArea());

System.out.println ("Area of rectangle "+ r.printArea());

System.out.println ("Area of Circle: "+ c.printArea());

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 {

    String customerName;
    int accountNumber;
    String accountType;
    double balance;

    public Account(String name, int accNum, String accType, double initialBalance) {
        customerName = name;
        accountNumber = accNum;
        accountType = accType;
        balance = initialBalance;
    }

    public void deposit(double amount) {
        balance += amount;
        System.out.println("Deposit of $" + amount + " successful.");
    }
}
```

```
public void displayBalance() {
    System.out.println("Account Balance: $" + balance);
}

public void withdraw(double amount) {
    if (balance >= amount) {
        balance -= amount;
        System.out.println("Withdrawal of $" + amount + " successful.");
    } else {
        System.out.println("Insufficient balance.");
    }
}

class SavAcct extends Account {
    double interestRate;

    public SavAcct(String name, int accNum, String accType, double initialBalance, double rate) {
        super(name, accNum, accType, initialBalance);
        interestRate = rate;
    }

    public void depositInterest() {
        double interest = balance * interestRate / 100;
        balance += interest;
        System.out.println("Interest of $" + interest + " deposited.");
    }
}

class CurAcct extends Account {
```

```
double minBalance;  
double serviceCharge;  
  
public CurAcct(String name, int accNum, String accType, double initialBalance, double minBal,  
double charge) {  
    super(name, accNum, accType, initialBalance);  
    minBalance = minBal;  
    serviceCharge = charge;  
}  
  
@Override  
public void withdraw(double amount) {  
    if (balance - amount >= minBalance) {  
        balance -= amount;  
        System.out.println("Withdrawal of $" + amount + " successful.");  
    } else {  
        System.out.println("Insufficient balance. Penalty of $" + serviceCharge + " imposed.");  
        balance -= serviceCharge;  
    }  
}  
}  
  
public class Bank {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
  
        SavAcct savings = new SavAcct("John Doe", 1001, "Savings", 1000, 5);  
        CurAcct current = new CurAcct("Jane Smith", 2001, "Current", 2000, 500, 10);  
  
        savings.deposit(1000);  
        savings.displayBalance();
```

```
savings.depositInterest();
savings.displayBalance();
savings.withdraw(500);
savings.displayBalance();

current.deposit(1500);
current.displayBalance();
current.withdraw(2500);
current.displayBalance();

scanner.close();
}

}

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>javac Bank.java

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>java Bank
Deposit of $1000.0 successful.
Account Balance: $2000.0
Interest of $100.0 deposited.
Account Balance: $2100.0
Withdrawal of $500.0 successful.
Account Balance: $1600.0
Deposit of $1500.0 successful.
Account Balance: $3500.0
Withdrawal of $2500.0 successful.
Account Balance: $1000.0

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>
```

< Bank

```
class Account{  
    protected String accNo;  
    double balance;  
  
    public Account (String accNumber){  
        this.accNo = accNumber;  
        this.balance = 0.0;  
    }  
  
    public void deposit (double amt){  
        balance += amt;  
        System.out.println (amt + " deposited. Current  
        balance : "+balance);  
    }  
  
    public void withdraw (double amt){  
        if (amt <= balance){  
            balance -= amt;  
            System.out.println (amt + " withdrawn. Current  
            balance : "+balance);  
        } else {  
            System.out.println ("Transaction funds. Withdraw  
            denied");  
        }  
    }  
  
}
```

class CurrentAccount extends Account{
 private int numberofCheques;

public CurrentAccount (String accNo, int numberofCheques){
 super(accNo);
 this.numberofCheques = numberofCheques;

public void issueCheque (double amt){
 if (numberofCheques > 0){
 numberofCheques--;
 System.out.println ("Cheque issued for "+amt+
 " cheques left: "+numberofCheques);
 } else {
 System.out.println ("No more cheque left. Cheque
 issuance denied.");
 }
}

```
public class Main {  
    public static void main (String [] args) {  
        SavingAccount saving = new SavingAccount ("SA123", 500);  
        saving.deposit (100);  
        saving.withdraw (200);  
  
        CurrentAccount current = new CurrentAccount ("CA261", 100);  
        current.deposit (500);  
        current.issueCheque (100);  
        current.withdraw (50);  
    }  
}
```

output:
100 deposited. Current balance: 1000.0
200.0 withdrawn. Current balance: 800.0
500.0 deposited. Current balance: 5000.0
Cheque issued for 1000.0, cheques left: 9
Cheque issued for 500.0, cheques left: 8

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.

```
package CIE;
public class Student {
    public String usn,name;
    public int sem;
    public Student(String u,String n,int s){
        usn=u;name=n;sem=s;
    }
}
```

```
package CIE;
public class Internal extends Student{
    public int marks[]=new int[5];
    public Internal(String u,String n,int s,int m[]){
        super(u,n,s);marks=m;
    }
}
```

```
package SEE;
import CIE.*;
public class External extends Student{
    public int marks[]=new int[5];
    public External(String u,String n,int s,int m[]){
        super(u,n,s);marks=m;
    }
}
```

```
import CIE.*;
import SEE.*;
import java.util.Scanner;
class X{
    Internal in;
    External ex;
    X(Internal in,External ex){
        this.in=in;
        this.ex=ex;
    }
}
class StudentDetails{
    static Scanner s1=new Scanner(System.in);
    static X accdet(){
```

```

        System.out.println("Enter your name and usn");
        String n=s1.next();
        String u=s1.next();
        System.out.println("Enter semester");
        int s=s1.nextInt();
        System.out.println("Enter your CIE marks in 5 subs");
        int m1[]=new int[5];
        for(int i=0;i<5;i++){
            m1[i]=s1.nextInt();
        }
        System.out.println("Enter your SEE marks in 5 subs");
        int m2[]=new int[5];
        for(int i=0;i<5;i++){
            m2[i]=s1.nextInt();
        }
        External e1=new External(u,n,s,m2);
        Internal i1=new Internal(u,n,s,m1);
        X x=new X(i1,e1);
        return x;
    }
    public static void main(String[] args) {
        int n;
        System.out.println("Enter number of students");
        n=s1.nextInt();
        X stud[]=new X[n];
        for(int i=0;i<n;i++){
            System.out.println("Student "+(i+1));
            stud[i]=accdet();
        }
        for(int i=0;i<n;i++){
            System.out.println("\nStudent Details");
            System.out.println("Name:"+stud[i].in.name);
            System.out.println("USN:"+stud[i].in.usn);
            System.out.println("SEM:"+stud[i].in.sem);
            System.out.println("CIE marks");
            for(int j=0;j<5;j++)
                System.out.printf("%d\t",stud[i].in.marks[j]);
            System.out.println("\nSEE marks");
            for(int j=0;j<5;j++)
                System.out.printf("%d\t",stud[i].ex.marks[j]);
        }
    }
}

```

Chlorophyll : 310 C.I.

usage *in*
from *public* *class* *introduce* *extreme* *student* {
public *double* *introduction* [J];
public *double* *marks* [J];
 introduction *marks*, *double* [M])

Publ. 1955

thus. in my Σ_m ,

1

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Paleo egg Lie,
public class student

public chgs. rare
int sum,

public student (boys u, girls n, jds) {

This name is given to

۲۷

5

package SEE;
import Cite student;
public class external extends C1
{ double marks [7]; }
}

```

import CIE.student;
public class student {
    public double marks [ ];
    public extends (String u, String n,
    int m) {
        marks [u, n, m];
    }
}

```

```

public class External {
    public static void main(String args) {
        External ext = new External();
        ext.print();
    }
}

class External {
    public void print() {
        System.out.println("External");
    }
}

```

out:

UEN : 18M092674T name: Manoj sum: 3

internal mark 1 : 43.00 internal marks 2 : 45.00

mark 3 : 67.00, mark 4 : 44.00 internal marks 5 : 47

external marks:

external marks : 90.00 external marks 2 : 84.00

marks 3 : 65.00 marks 4 : 98.00

external mark 5 : 43.00

(Total Marks = 487.00. 20% off)

Rs
221120/-

(including 18% VAT)

(including 18% VAT)

(including 18% VAT)

(including 18% VAT)

3 (selected parts) selection of total subjects

{ (1, 2, 3, 5, 6, 8, 10) = [3] domestic subjects }

{ (2, 4, 7, 9, 11, 12) = [3] domestic subjects }

{ 5 (from 1 to 10) = [5] domestic subjects }

{ 5 (from 1 to 10) = [5] domestic subjects }

{ 5 (from 1 to 10) = [5] domestic subjects }

Final Exam 1 marks (part - 1) exam (marks 100%) Total

Final Exam 2 marks (part - 2) exam (marks 100%) Total

7) 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<0. In Son class, implement a constructor that cases both father and son's age and throws an exception if son's age is >=father's age.

```

class MyException extends Exception {
    int detail;
    public MyException(int age, String exe) {
        this.detail=age;
        System.out.println(exe + " given age is: " + age + "
please enter again");
    }
    public String getMessage() {
        return "Exception: " + detail;
    }
}
class Father{
    int age;
    public Father(int age) throws MyException {
        if (age < 0) throw new MyException(age , "Age cannot be
lesser than 0");
        this.age = age ;
    }
}
class Son extends Father{
    int age;
    public Son(int fatherAge, int sonAge) throws MyException{
        super(fatherAge);
        this.age = sonAge;
        if (this.age > super.age) throw new MyException(age ,
"Age of son cannot be more than father");
    }
}
public class father_son {
    public static void main(String[] args) {
        try {
            Father f1 = new Father(-1);
            Son s1 = new Son(30 , 31);
        }
        catch (MyException e) {
            System.out.println("Exception caught: " +
e.getMessage());
        }
    }
}

```

```
Microsoft Windows [Version 10.0.22621.3007]
(c) Microsoft Corporation. All rights reserved.

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>javac father_son.java
```

```
C:\Users\manoj\OneDrive\Desktop\3rd sem\java>java father_son
Age cannot be lesser than 0 given age is: -1 please enter again
Exception caught: Exception: -1
```

```
C:\Users\manoj\OneDrive\Desktop\3rd sem\java>
```

8)Write a program which creates two threads, one thread displaying "BMS College of Engineering" once every ten seconds and another displaying "CSE" once every two seconds.

```
class NewThread implements Runnable{

    NewThread(){

        Thread t=new Thread(this,"Newthread");

        System.out.println("CT:"+t);

        t.start();

    }

    public void run(){

        try{

            for(int i=0;i<3;i++){

                System.out.println("CSE");

                Thread.sleep(2000);

            }

        }

        catch(InterruptedException ie){

            System.out.println("CSE thread interrupted");

        }

        System.out.println("CSE thread quitting");

    }

}
```

```

class ThreadMain{

    public static void main(String sx[]){
        new NewThread();
        try{
            for(int i=0;i<4;i++){
                System.out.println("BMS College Of Engineering");
                Thread.sleep(10000);
            }
        }
        catch(InterruptedException ie){
            System.out.println("BMS thread interrupted");
        }
        System.out.println("BMS thread quitting");
    }
}

```

```

C:\Windows\System32\cmd.e  X  +  ▾
Microsoft Windows [Version 10.0.22621.3007]
(c) Microsoft Corporation. All rights reserved.

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>javac ThreadMain.java

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>java ThreadMain
CT:Thread[#21,Newthread,5,main]
BMS College Of Engineering
CSE
CSE
CSE
CSE
CSE thread quitting
BMS College Of Engineering
BMS College Of Engineering
BMS College Of Engineering
BMS College Of Engineering
BMS thread quitting

C:\Users\manoj\OneDrive\Desktop\3rd sem\java>

```

9) AWT program

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

public class DivisionMain extends Frame implements ActionListener
{
    TextField num1,num2;
    Button dResult;
    Label outResult;
    String out="";
    double resultNum;
    int flag=0;

    public DivisionMain()
    {
        setLayout(new FlowLayout());

        dResult = new Button("RESULT");
        Label number1 = new Label("Number 1:",Label.RIGHT);
        Label number2 = new Label("Number 2:",Label.RIGHT);
        num1=new TextField(5);
        num2=new TextField(5);
        outResult = new Label("Result:",Label.RIGHT);

        add(number1);
        add(num1);
        add(number2);
        add(num2);
        add(dResult);
        add(outResult);

        num1.addActionListener(this);
    }
}
```

```
num2.addActionListener(this);

dResult.addActionListener(this);

addWindowListener(new WindowAdapter()

{

    public void windowClosing(WindowEvent we)

    {

        System.exit(0);

    }

});

}

public void actionPerformed(ActionEvent ae)

{

    double n1,n2;

    try

    {

        if (ae.getSource() == dResult)

        {

            n1=Double.parseDouble(num1.getText());

            n2=Double.parseDouble(num2.getText());



/*if(n2==0)

            throw new ArithmeticException();*/



            out=n1+" "+n2;

            resultNum=n1/n2;

            out+=String.valueOf(resultNum);

            repaint();





    }

}

catch(ArithmeticException e2)
```

```

    {
        flag=1;
        out="Divide by 0 Exception! "+e2;
        repaint();
    }

    catch(NumberFormatException e1)
    {
        flag=1;
        out="Number Format Exception! "+e1;
        repaint();
    }

}

public void paint(Graphics g)
{
    if(flag==0)

        g.drawString(out,outResult.getX()+outResult.getWidth(),outResult.getY()+outResult.getHeight()-8);

    else

        g.drawString(out,100,200);

    flag=0;
}

public static void main(String[] args)
{
    DivisionMain dm=new DivisionMain();
    dm.setSize(new Dimension(800,400));
    dm.setTitle("DivionOfIntegers");
    dm.setVisible(true);
}

```

}