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01) Hello World

```
class Hellaworld {

    public static void main (String [] args)
        { System.out.println ("Hello World");
    }
}
```

02) Addition, Subtraction Division & Multiplication

```
class maths {
public static void main (String [] args) {
    float num1 = 10, num2 = 20;
    float add = num1 + num2, sub = num1 - num2
    System.out.println ("The Sum of the
                        numbers is "+Sum);
    System.out.println ("The Subtraction of
                        the numbers is "+sub
    );
    System.out.println ("The multiplication
                        of two numbers
is  " + mul );
    System.out.println ("The division
                        of numbers is "+div
}}
```

The sum of the numbers is 30
The Subtraction of the Numbers is -10
The multiplication of the numbers is 200
The division of numbers is 0.5

fibonacci series

```
class fibonacci {
    public static void main (String args[]) {
        int n0=5, num1=0, num2=1,
        for (int i=2; i<5; i++) {
            int temp= num1;
            num1 = num1 + num2,
            num2 = temp ;
        }
        System.out.println ("The value of "+n0+
                            "The term is "+num2);
    }
}
```

The value of 5th term is 3

Prime Numbers

```
class Prime {
    public static void main (String [] args) {
        int num=18, prime=0;
        for (int i=2; i<num; i++) {
            if (num%i==0) {
                prime=1;
                System.out.println ("The number is prime");
                break;
            }
        }
        if (prime==0) {
            System.out.println ("The number is not prime");
        }
    }
```

The number is not prime

```
import java.util.scanner;
class Grocery {
    double dal, pulses, sugar;
    Grocery () {
        dal = 1 ;
        pulses = 1 ;
        sugar = 0.5 ;
    }

    Grocery ( double a, double b, double c) {

        dal = a ;
        pulses = b ;
        sugar = c ;
    }

    Grocery (double a) {
        Dal = pulses = sugar = a ;
    }
    Grocery (Grocery obj ) {
        dal = obj.dal ;
        pulses = obj.pulses ;
        Sugar = obj.sugar ;
    }

    void ammount ( ) {
        double amount = ( 150 * dal + 80 * pulses +
                          50 * sugar);
        System.out.println ("Total ammount = " + amount)
    }
}
```

```
class main {

    public static void main (String args[]) {

        Scanner s = new Scanner (System.in);
        System.out.println ("Enter dal Quantity");
        Double dal = s.NextDouble();
        System.out.println ("Enter the Sugar Quantity");
        Double sugar = s.NextDouble();

        Grocery g1 = new Grocery();
        Grocery g2 = new Grocery(dal);
        Grocery g3 = new Grocery(dal, pulse, sugar);
        Grocery g4 = new Grocery(g2)

            g1.Amount();
            g2.Amount();
            g3.Amount();
            g4.Amount();

    }
}
```

o/p Enter dal quantity :
2
Enter pulse quantity :
2
Enter sugar quantity :
2
Total amount = 255
Total amount = 560
Total amount = 400
Total amount = 560

```
import java.util.Scanner;

class Student {

    String USN;
    String name;
    int[] marks = new int[6];

    void acceptDetails() {

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter USN: ");
        USN = scanner.next();

        System.out.print("Enter name: ");
        name = scanner.next();

        System.out.println("Enter Marks of 6 subjects:");

        for (int i = 0; i < 6; i++) {
            System.out.print("Subject " + (i+1) + ": ");
            marks[i] = scanner.nextInt();
        }
    }

    double calculatePercentage() {
        int totalMarks = 0;
        for (int mark : marks) {
            totalMarks += mark;
        }
```

```
        return (double) totalMarks/6;
    }

    void displayDetails() {

        System.out.println("Student Details:");
        System.out.println("USN:" + USN);
        System.out.println("Name:" + name);
        System.out.println("Percentage:" +
                                calculatePercentage());
    }
}

public class Gautam

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the number of
                                students:");
        int numStudents = scanner.nextInt();

        Student[] students = new Student[numStudents];

        for(int i=0; i<numStudents;i++){
            Student[i] = new Student();
            System.out.println("Enter details for
                                Student " + (i+1)+":");
        }
```

```
System.out.println("\n Details of all
                    Students");

for(Student student : students){

    System.displayDetails();
    System.out.println();

}
}
}
```

O/p Enter the number of student 2

Enter Detail for Student 1:
Enter USN : 1BM22CS101
Enter name: Gautam
Enter marks for 6 subject:
Subject 1 : 96
Subject 2 : 95
Subject 3 : 94
Subject 4 : 86
Subject 5 : 95
Subject 6 : 86

Enter details for Student 2
Enter USN: 1BM22CS098
Enter Name: Ganesh
Enter marks for 6 subject:
Subject 1 : 96
Subject 2 : 85
Subject 3 : 96

Subject 4 78
Subject 5 95
Subject 6 00

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Q Declare a abstract class Shape and extend three classes and find area of Rectangle circle triangle?

```
abstract class Shape {
    int x, y;
    abstract void printArea();
}

class Rectangle extends Shape {
    Rectangle(int length, int breadth) {
        this.x = length;
        this.y = breadth;
    }

    void printArea() {
        System.out.println("Area of Rectangle is " + (x * y));
    }
}

class circle extends Shape {
    circle(int radius) {
        this.x = radius;
    }
```

```
void printArea() {
    double area = (double) 22/7 * x * x;
    System.out.println("Area of circle is " + area);
}
}

class Triangle extends Shape {
    Triangle(int length, int height) {
        this.x = length;
        this.y = height;

    void printArea() {
        double area = ((double) x) * (y)/2;
        System.out.println("Area of triangle is " + area);
    }
}
```

```
class RunShape {

    public static void main (String [] args) {

        Circle c1 = new Circle (2.3);
        c1.area ();
        Redangal r1 = new Rectangal (2,3);
        r1.printArea ();
        Triangle t1 = new Triangle (2,2);
        t1.printArea ();
    }
}
```

Output

```
Area of circle is 28.285
Area of Redangal is 6
Area of Triangle is 2.0
```

⑩ Find the Root of Quadratic Equation

```
import java.util.Scanner;

class QuadraticRootCalculator {

    public static void calculateRoots
        (double a, double b,
         double c) {
    double determinate = b*b-4*a*c;
```

```
if ( discriminant == 0 ) {

    double root = -b/(2*a);
    System.out.println("Equal Roots");
    System.out.println("Root1: " +root);
    System.out.println("Root2: " +root);
}

else if ( discriminant > 0 ) {

    double root1 = (-b+Math.sqrt(discriminant)
                                    /(2*a);

    double root2 = (-b-Math.sqrt(discriminant))
                                    /(2*a);

    System.out.println("Root1 " +root1);

    System.out.println("Root2 " +root2);

}

else {

    double realpart = -b/(2*a);
    double imaginarypart = Math.sqrt(-discrim
                                    /(2*a);

    System.out.println("Complex Solution");

    System.out.println("Root1: " +realpart+
                    " + " + imaginarypart
                    + "i");
```

```
            System.out.println("Root2: " + realPart +
                               " - " + imaginaryPart
                               + "i");
        }
    }
}

public class ProgramQuadraticEquation {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter coefficient
                           a: ");
        double a = scanner.nextDouble();
        System.out.println("Enter coefficient
                           b: ");
        double b = scanner.nextDouble();
        System.out.println("Enter coefficient
                           c: ");
        double c = scanner.nextDouble();
        QuadraticRootCalculator.calculateRoots
                           (a, b, c);
    }
}
```

Enter coefficient a: 4
Enter coefficient b: 1
Enter coefficient c: 2

Complex Solution:

Root 1: -0.125+0.69570 i
Root 2: -0.125-0.69570i

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```
import java.util.Scanner;

class Account{

    String customername;
    long accountnumber;
    String accounttype;
    double balance;

    public account(String customa
                   name, long
    accountnumber, String accou
    type){

    this.customername = customerName;
    this.accountnumber = accountnumber;
    this.accounttype = accounttype;
    this.balance = 0.0;
}

public void deposit(double ammount){
    System.out.println("Balance:"+balance
  }
}

class Current extends account{
    double minbalance;
    double servicecharge;
```

```
public CheckingAccount(String n, long a){
    super(n, a, "Current");
    this.minBalance = 1000.0;
    this.serviceCharge = 50.0;
}

private void checkMinBalance(){
    if (balance < minBalance){
        balance -= serviceCharge;
        System.out.println(balance);
    }
}

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

```
    }
  }
}

public class programmeBank {
    public static void main (String [] args) {
        Scanner sc = new Scanner (System.in);
        SavAct savingaccount = new SavAct
                                ("John Doe", 123456789, 10000);
        CurrAct currentaccount = new CurrAct
                                ("Jane Doe", 987654321, 5000);

        savingaccount.deposit(1000);
        savingaccount.displaybalance();

        savingaccount.withdraw(500);
        savingaccount.displaybalance();

        savingaccount.computeanddepositinterest()

        savingaccount.computeanddepositinterest();
        savingaccount.displaybalance();

        currentAccount.deposit(2000);
        currentaccount.displaybalance();

        currentaccount.withdraw(1500);
        currentaccount.displaybalance();
```

withdraw (3000);

Scanner close ();

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Packages

```
package CIE;

public class Student {

    protected String usn;
    protected String name;
    protected int sem;

    public Student (String usn, String name,
                    int sem) {

        this.usn = usn;
        this.name = name;
        this.sem = sem;

    }
}

package CIE

public class Internals extends Student {

    protected int [] internal = new int [5];

    public Internals (String u, String n,
                      int s, int [] m) {

        super (u, n, s);
```

this.internal = internal;

}

}

package SEE;

import CIE.Student;

public class External extends Student {

    protected int[] see = new int[5];

    public External(String n, String
                    int s, int[] see) {

super(u, n, s);
this.see = see;

}

}

import CIE.Internals;
import SEE.Externals;

public class Main {

    public static void main (String[] ar

        int[] internalmarks = {75, 80, 85, 90,

```
int [] sem = { 85, 90, 75, 70, 92 };

int [] internalmarks2 = { 80, 85, 88, 92, 78 };
int [] sem2 = { 90, 85, 92, 87, 80 };

Internals Student1 = new Internals ("USN1",
                                    "JOHN", 3,
                                    internalmarks);

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

    System.out.println ("Enter number of Student");
int n = sc.nextInt();

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

    System.out.println ("Enter Details for Student" +
                        (i+1) + "\n");

    System.out.println ("Enter USN");
    String USN = sc.next();
    System.out.println ("Enter Name");
    String Name = sc.nextLine();
    System.out.println ("Enter Semester");
    int Sem = sc.nextInt();

    for (int j=0; j < 5; j++) {
        System.out.println ("Subject" +
                            (j+1) + "1")
```

```
internalMarks[j] = sc.nextInt();
System.out.println("Enter External
                    Marks for 5
                    Subject");
for(int j=0;j<5;j++){
System.out.println("Subject"+(j+1)+
                   ": ");
externalMarks[j] = sc.nextInt();
internalData[i] = new InternalMarks
                  (USN, name,
                  Sem, internalMarks
                  );
externalData[i] = new ExternalMarks(
                  USN, name, Sem,
                  externalMarks);
for(int i=0;i<n; i++){
System.out.println("\n Student"+
                   (i+1)+":");
System.out.println("Internal Marks
                   "+dateOfBirth
                   (internalData[i].
                   internalMarks);
```

```
System.out.println("External marks: " +
        array to string (externals
        Data[i] . external marks))

System.out.println("total marks ((IE+SEE)"
        ;


calculate totalmarks (internals [i] . internal
        marks , external [i]
. externalmarks ));
}
  Scanner . close() ;
}

private static int calculate total marks
(int [] inter nalmarks , int [] external
marks) {

        int total =0
        for (int i=0, i < internalmarks . length;
            i++ ) {

            total= internalmarks[i] + externalmarks
                [i]);
            }

            return total ;
}
```

```
private static String arrayToString(int[] array
{

    StringBuilder sb = new StringBuilder();
    sb.append("[");

    for(int i=0; i < array.length; i++){

        sb.append(array[i]);

        if(i != array.length-1){

            sb.append(", ");

        }
    }

    sb.append("]");

    return sb.toString();
}
```

Write a program which create two threads displaying "BMS" & "CSE"

```
class BMS extends Thread {
    public void run() {
        while (true) {
            try {
                System.out.println("BMS college of Engineering");
                Thread.sleep(10000);
            }
            catch (Exception e) {
                System.out.println(e);
            }
        }
    }
}

class CSE extends Thread {
    public void run() {
        while (true) {
            try {
                System.out.println("CSE");
                Thread.sleep(2000);
            }
```

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

class Main{

    public static void main (String args[]){

        BMS B= new BMS();
        CSE c = new CSE();
        B.start();
        c.start();

    }
}
```

Output

BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering

```
class Wrongage extends Exception {

    Wrongage (String Hello) {
        super (Hello);
    }
}

class agedifference extends Exception {

    agedifference (String ai) {
        super (ai);
    }
}

class father {
    int age;

    father (int age) throws Wrongage {
        if (age < 0) {
            throw new Wrongage ("age
                                cannot be less
                                than 0");
        }
        else {
            this.age = age;
        }
    }
}
```

```
class Son extends father{
    int sonage;
    Son(int f, int a){throws agedifference
                       wrongage{
    super(f);
    if(a<0){
        throw new wrongage("age cannot
                            be less than 0");
    }
    else if(f<a){
        throw new agedifference("father age
                                 is less than
                                 child");
    }
    else{
        this.sonage=a;
    }
}
}
```

```
class Main {
    public static void main (String[] args) {
        try {
            Father f = new Father (-8);
        }
        catch (Exception e) {
            System.out.println(e)
        }

        try {

            Son s = new Son(1, 7);
        }
        catch (Exception e) {

            System.out.println(e);
        }
    }
}
```

Q 1)

Wrongage: age cannot be less than 0
agedifference: father age is less than sons

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