**Assignment solutions Dinesh Kulkarni**

1. Write a program to print Hello World. [Compile and run](https://youtu.be/Idqa30mZbko) it using command prompt.

**class ASS1**

**{**

**public static void main(String args[])**

**{**

**System.out.println("Hello World");**

**}**

**}**

1. Write a [program to declare a variable](https://youtu.be/PVJwfMH_hxc) named rollNo of integer type. Assign it a value (let say 100) to it and print the following statement **roll no = 100** .

**class ASS2**

**{**

**public static void main(String args[])**

**{**

**int rollNo=100;**

**System.out.println(rollNo);**

**}**

**}**

1. Find the result of following expressions. You need to determine the [primitive data type](https://youtu.be/1ydNljiCSX0) of the variable by looking carefully the given expression and initialize variables by any random value.

A. y = x2 + 3x - 7 (print value of y)

B. y = x++ + ++x (print value of x and y)

C. z = x++ - --y - --x + x++ (print value of x ,y and z)

D. z = x && y || !(x || y) (print value of z) [ x, y, z are boolean variables ]

**class ASS3**

**{**

**public static void main(String args[])**

**{**

**int x=2;**

**int y=((x\*x) + (3\*x) - 7);**

**System.out.println(y);**

**y=x++ + ++x;**

**System.out.println(x);**

**System.out.println(y);**

**boolean a=false;**

**boolean b=false;**

**boolean z= a && b || !(a || b);**

**System.out.println(z);**

**}**

**}**

1. Write a program that initializes 2 byte type of variables. Add the values of these variables and store in a byte type of variable. [Note: [primitive down casting](https://youtu.be/CjQ07STtWpQ) is required in this program ] .

**class ByteExp{**

**public static void main(String args[]){**

**byte a=12,b=12,c;**

**c=(byte)(a+b);**

**System.out.println(c);**

**}**

**}**

1. Write a program that takes user’s name as [command line argument](https://youtu.be/NCYXNGjxEjs) and prints Welcome <entered user name>.

**class WelcomUser{**

**public static void main(String args[]){**

**System.out.println("Taking input from command line arguments : ");**

**System.out.println("Welcome "+args[0]+"!!!!!!!!!");**

**}**

**}**

1. Write a program that takes radius of a circle as input. Read the entered radius using [Scanner class](https://youtu.be/8pDFOcWbzXE). Then calculate and print the area and circumference of the circle.

**import java.util.Scanner;**

**class Circle{**

**public static void main(String args[])**

**{**

**Scanner sc=new Scanner(System.in);**

**double rad;**

**System.out.println("Enter Radius of circle : ");**

**rad=sc.nextDouble();**

**double area,circumference;**

**area=3.14\*rad\*rad;**

**System.out.println("Area of circle : "+area);**

**circumference=2\*3.14\*rad;**

**System.out.println("Circumference of circle : "+circumference);**

**}**

**}**

1. Write a program to calculate sum of 5 subject’s marks & find percentage. Take the obtained marks from user using Scanner class. Output should be in this format [ percentage marks = 99 % ]. Use [concatenation operator](https://youtu.be/C7SRqTQZSr0) here.

**import java.util.Scanner;**

**class Marks{**

**public static void main(String args[]);**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter marks of 5 subjects : ");**

**int num,sum=0;**

**for (int i=0 ;i<5 ;i++){**

**num=sc.nextInt();**

**sum+=num;**

**}**

**sum=(sum/500)\*100;**

**System.out.println("Percentage : "+sum);**

**}**

1. Write a program to find the simple interest. Take the principle amount, rate of interest and time from user using [Scanner class](https://youtu.be/8pDFOcWbzXE).

**import java.util.Scanner;**

**class SimpleInterest{**

**public static void main(String args[]){**

**int p,t;**

**double r,a;**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter principle amount : ");**

**p=sc.nextInt();**

**System.out.println("Enter time : ");**

**t=sc.nextInt();**

**System.out.println("Enter rate : ");**

**r=sc.nextDouble();**

**a=p\*(1+(r\*t));**

**System.out.println("Simple interest : "+a);**

**}**

**}**

1. Write a program to read the days (eg. 670 days) as integer value using [Scanner class.](https://youtu.be/8pDFOcWbzXE) Now convert the entered days into complete years, months and days and print them.

**import java.util.Scanner;**

**public class YDays**

**{**

**public static void main(String args[])**

**{**

**int ndays, year, week, day;**

**Scanner sc = new Scanner(System.in);**

**System.out.print("Enter the no of days : ");**

**ndays = sc.nextInt();**

**year = ndays / 365;**

**ndays = ndays % 365;**

**System.out.println("years : "+year);**

**week = ndays / 7;**

**ndays = ndays % 7;**

**System.out.println("weeks : "+week);**

**day = ndays;**

**System.out.println("days : "+day);**

**}**

**}**

1. Write a program to convert temperature from Fahrenheit to Celsius. Take Fahrenheit as input using [Scanner class.](https://youtu.be/8pDFOcWbzXE) [ formula : C= 5\*(f-32)/9 ]

**import java.util.Scanner;**

**class Temperature{**

**public static void main(String args[]){**

**double f,c;**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter temp in fahrenheit : ");**

**f=sc.nextDouble();**

**c=5\*((f-32)/9);**

**System.out.println("Temp in celsius : "+c);**

**}**

**}**

1. Write a program to swap two numbers without using third variable.

**import java.util.Scanner;**

**class SwapNo{**

**public static void main(String args[]){**

**int num1,num2;**

**Scanner sc=new Scanner(System.in);**

**System.out.print("Enter 1st number : ");**

**num1=sc.nextInt();**

**System.out.print("Enter 2nd number : ");**

**num2=sc.nextInt();**

**num1=num1+num2;**

**num2=num1-num2;**

**num1=num1-num2;**

**System.out.println("num1 : "+num1+"\nnum2 : "+num2);**

**}**

**}**

1. In a company an employee is paid as under: If his basic salary is less than Rs. 10000, then HRA = 10% of basic salary and DA = 90% of basic salary. If his salary is either equal to or above Rs. 10000, then HRA = Rs. 2000 and DA = 98% of basic salary. If the employee's salary is input by the user write a program to find his gross salary. [ formula : GS= Basic + DA + HRA ]

**import java.util.Scanner;**

**class Employee{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**double sal,HRA,DA,GS;**

**System.out.print("Enter basic salary of employee : ");**

**sal=sc.nextDouble();**

**if(sal < 10000){**

**HRA=((10\*sal)/100);**

**DA=((90\*sal)/100);**

**GS=sal+HRA+DA;**

**System.out.println("Basic salary = "+sal+"\nHRA = "+HRA+"\nDA = "**

**+DA+"\nGS = "+GS);**

**}**

**else**

**{**

**HRA=2000;**

**DA=((98\*sal)/100);**

**GS=sal+HRA+DA;**

**System.out.println("Basic salary = "+sal+"\nHRA = "+HRA+"\nDA = "**

**+DA+"\nGS = "+GS);**

**}**

**}**

**}**

1. Program to find greatest in 3 numbers. [ once using [if else statement](https://youtu.be/YEXDjvNg6-M) and then using [ternary operator](https://youtu.be/C7SRqTQZSr0) ( [logical operator](https://youtu.be/C7SRqTQZSr0)) ]

**import java.util.Scanner;**

**class Greatest{**

**public static void main(String args[]){**

**int num1,num2,num3;**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter 3 numbers : ");**

**num1=sc.nextInt();**

**num2=sc.nextInt();**

**num3=sc.nextInt();**

**if(num1 > num2 && num1 > num3){**

**System.out.println("Greatest of 3 number is : "+num1);**

**}else if(num2 > num1 && num2 > num3){**

**System.out.println("Greatest of 3 number is : "+num2);**

**}else{**

**System.out.println("Greatest of 3 number is : "+num3);**

**}**

**int num=(num1>num2)?(num1>num3)?num1:num3:(num2>num3)?num2:num3;**

**System.out.println("\nGreatest no : "+num);**

**}**

**}**

1. Program to check that entered year is a leap year or not.

**import java.util.Scanner;**

**class Leapyr{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**System.out.print("Enter year : ");**

**int yr=sc.nextInt();**

**if((yr%4==0) || ((yr%4==0) && (yr%100!=0)) || (yr%400==0)){**

**System.out.println(yr+" is leap year.");**

**}else{**

**System.out.println(yr+" is not a leap year.");**

**}**

**}**

**}**

1. Accept person’s gender (character m for male and f for female), age (integer), as input and then check whether person is eligible for marriage or not.

**import java.util.Scanner;**

**class Eligible{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**String gender;**

**int age;**

**System.out.println("Enter gender and age of person : ");**

**gender=sc.next();**

**age=sc.nextInt();**

**if(age >= 21){**

**System.out.println("You are eligible for marriage!!!");**

**}**

**else**

**{**

**System.out.println("Sorry You are not eligible for marriage....");**

**}**

**}**

**}**

1. Write a program to print table of any entered number [using loop](https://youtu.be/U6gf1JH9UdU).

**import java.util.Scanner;**

**class Q16{**

**public static void main(String args[]){**

**Scanner sc = new Scanner(System.in);**

**System.out.println("Enter a number :");**

**int num = sc.nextInt();**

**for(int i=1;i<=10;i++){**

**System.out.println(num+" x "+i+" = "+(num\*i));**

**}**

**}**

**}**

1. Write a program to reverse a given number.

**class Q17{**

**public static void main(String args[]){**

**Scanner sc = new Scanner(System.in);**

**System.out.println("Enter a number :");**

**int num = sc.nextInt();**

**int rev=0,rem;**

**while(num!=0){**

**rem=num%10;**

**rev=rev\*10+rem;**

**num=num/10;**

**}**

**System.out.println("Reverse number :"+rev);**

**}**

**}**

1. Program to check whether number is prime or not.

**import java.util.Scanner;**

**class PrimeNo{**

**public static void main(String args[]){**

**int num;**

**Scanner sc=new Scanner(System.in);**

**num=sc.nextInt();**

**int flag=0;**

**if(num==1 || num==2 || num==0)**

**System.out.println("Not a prime number.");**

**else{**

**for(int i=2;i<=num;i++){**

**if(num%2==0){**

**flag++;**

**break;**

**}**

**}**

**if(flag==0){**

**System.out.println("Prime number.");**

**}else{**

**System.out.println("Not a prime number.");**

**}**

**}**

**}**

**}**

1. Calculate series : 12+22+32+42+.........+n2

**import java.util.Scanner;**

**class Series{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**int num;**

**System.out.println("Enter the limit : ");**

**num=sc.nextInt();**

**for(int i=12;i<num;i+=10){**

**System.out.print(i+",");**

**}**

**}**

**}**

1. Print all prime numbers between two given numbers. [ [break continue](https://youtu.be/yauIvIlXquc) ]

**import java.util.Scanner;**

**class AllPrime{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**int num1,num2,count=0;**

**System.out.println("Enter Upper limit : ");**

**num1=sc.nextInt();**

**System.out.println("Enter Lower limit : ");**

**num2=sc.nextInt();**

**for(int i=num1;i<=num2;i++){**

**count=0;**

**for(int j=2;j<=Math.sqrt(i);j++){**

**if(i%j==0){**

**count++;**

**break;**

**}**

**}**

**if(count==0 && i!=0 && i!=1 && i!=2){**

**System.out.println(i);**

**}**

**}**

**num1=Math.sqrt(81);**

**System**

**}**

**}**

1. Program to show sum and average of 10 element array. Accept [array elements](https://youtu.be/Un-WMt_QsHM) from user.

**import java.util.Scanner;**

**class SumArray{**

**public static void main(String args[]){**

**int arr[]=new int[10];**

**int sum=0;**

**double avg=0;**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter 10 numbers : ");**

**for(int i=0;i<10;i++){**

**arr[i]=sc.nextInt();**

**sum+=arr[i];**

**}**

**System.out.println("Sum of all elements : "+sum);**

**avg=(sum / 10.0);**

**System.out.println("Average of 10 elements : "+avg);**

**}**

**}**

1. Sort a ten element [array](https://youtu.be/Un-WMt_QsHM) in descending order.

**import java.util.Scanner;**

**import java.util.Arrays;**

**class SortArray{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter number of elements : ");**

**int num=sc.nextInt();**

**int arr[]=new int[num];**

**System.out.println("Enter elements : ");**

**for(int i=0;i<num;i++){**

**arr[i]=sc.nextInt();**

**}**

**System.out.println("Sorted list of elements : ");**

**int temp=0,min;**

**for(int i=0;i<num;i++){**

**for(int j=i+1;j<num;j++){**

**if(arr[i]<arr[j]){**

**temp=arr[i];**

**arr[i]=arr[j];**

**arr[j]=temp;**

**}**

**}**

**}**

**/\* Arrays.sort(arr); (inbuild sort method)**

**for(int i=num-1;i>=0;i--){**

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

**}**

**\*/**

**for(int a : arr){**

**System.out.println(a);**

**}**

**}**

**}**

1. Write a program to reverse the [array](https://youtu.be/Un-WMt_QsHM) elements.

**import java.util.Scanner;**

**class RevArray{**

**public static void main(String args[]){**

**int n,i,j;**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter size of array : ");**

**n=sc.nextInt();**

**char arr[]=new char[n];**

**System.out.println("Enter values of array : ");**

**for(int a=0;a<n;a++){**

**arr[a]=sc.next().charAt(0);**

**}**

**for(int a=n-1;a>=0;a--){**

**System.out.print(arr[a]);**

**}**

**}**

**}**

1. Write a program to search an element in the [array](https://youtu.be/Un-WMt_QsHM).

**import java.util.Scanner;**

**class SearchV{**

**public static void main(String args[]){**

**int num,n,arr[];**

**Scanner sc=new Scanner(System.in);**

**System.out.print("Enter array size : ");**

**n=sc.nextInt();**

**arr=new int[n];**

**System.out.println("Enter Values of array : ");**

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

**arr[i]=sc.nextInt();**

**}**

**System.out.print("Enter number to be search : ");**

**num=sc.nextInt();**

**int flag=0;**

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

**if(arr[i]==num){**

**System.out.println(num + " is present at "+(i+1)+"th index");**

**flag=1;**

**break;**

**}**

**}**

**if(flag==0){**

**System.out.println(num+" is not present in array.");**

**}**

**}**

**}**

1. Write the program to find the sum of even elements and sum of odd elements present in the [array](https://youtu.be/Un-WMt_QsHM) of integer type.

**class EvenOddsum{**

**public static void main(String args[]){**

**int even=0,odd=0;**

**int arr[]=new int[]{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16};**

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

**if(arr[i]%2 == 0){**

**even+=arr[i];**

**}else{**

**odd+=arr[i];**

**}**

**}**

**System.out.print("Given array : ");**

**for(int a:arr){**

**System.out.print(a+" ");**

**}**

**System.out.println("\nSum of even elements : "+even);**

**System.out.println("Sum of odd elements : "+odd);**

**}**

**}**

1. Create an [array](https://youtu.be/Un-WMt_QsHM) of 17 elements in 5 rows. And calculate sum of all elements.

**class Q26{**

**public static void main(String args[]){**

**int sum=0;**

**int arr[][]=new int[5][];**

**int a[]={1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17};**

**for(int i=0;i<5;i++){**

**arr[i]=a;**

**}**

**System.out.println("Given array : ");**

**int b[]=new int[5];**

**for(int i[]:arr){**

**for(int j:i){**

**System.out.print(" "+j);**

**sum+=j;**

**}**

**System.out.println("");**

**}**

**System.out.println("Addition of all elements : "+sum);**

**}**

**}**

1. Write a program to fine the smallest and greatest number present in the [array](https://youtu.be/Un-WMt_QsHM) of integer type.

**import java.util.Scanner;**

**class SLargeNo{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**System.out.print("Enter size of array : ");**

**int n=sc.nextInt();**

**int arr[]=new int[n];**

**System.out.println("Enter elements :");**

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

**arr[i]=sc.nextInt();**

**}**

**int temp=0;**

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

**for(int j=i;j<arr.length;j++){**

**if(arr[i]>arr[j]){**

**temp=arr[i];**

**arr[i]=arr[j];**

**arr[j]=temp;**

**}**

**}**

**}**

**/\*for(int i:arr){**

**for(int j:arr){**

**if(i>j){**

**temp=i;**

**i=j;**

**j=temp;**

**}**

**}**

**}\*/**

**System.out.println("Sorted array is : ");**

**for(int i : arr){**

**System.out.println(i+" ");**

**}**

**System.out.println("Largest element from array : "+**

**arr[(arr.length)-1]+"\nSmallest element from array :"**

**+arr[0]);**

**}**

1. [Initialize one String type of array](https://youtu.be/FSQxydxHLwY) and print the elements using for each loop.

**import java.util.Scanner;**

**class StringArray{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**String arr[]=new String[5];**

**System.out.println("Enter elements : ");**

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

**arr[i]=sc.next();**

**}**

**System.out.println("Given string array : ");**

**for(String s:arr){**

**System.out.println(s);**

**}**

**}**

**}**

1. Write a program to print the total number of one-D arrays in a [two-D array](https://youtu.be/w1nQh0Evgyw) and the number of elements in every one-D array present in the [two-D arrays](https://youtu.be/w1nQh0Evgyw).

**import java.util.Scanner;**

**class Q29{**

**public static void main(String args[]){**

**int sum=0,count=0;**

**int arr[][]=new int[][]{**

**{1,2,3},**

**{4,5},**

**{6,7,8,9}**

**};**

**System.out.println("Number of total 1d array : "+**

**arr.length);**

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

**sum=0;**

**for(int j=0;j<arr[i].length;j++){**

**sum+=arr[i][j];**

**}**

**System.out.println("Sum of "+(i+1)+"th 1d array : "**

**+sum);**

**}**

**}**

**}**

1. Create an integer type [2-D array](https://youtu.be/w1nQh0Evgyw) of [size [3X3]](https://youtu.be/yC1ux1nSvd0). Take the elements from the user and then calculate the sum of the elements present in the [diagonal](https://youtu.be/WhlZdnaC_Dk).

**import java.util.Scanner;**

**class DiagonalSum{**

**public static void main(String args[]){**

**int arr[][]=new int[3][3];**

**int sum=0;**

**Scanner sc=new Scanner(System.in);**

**System.out.println("Enter elements : ");**

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

**for(int j=0;j<arr[i].length;j++){**

**arr[i][j]=sc.nextInt();**

**if(i==j){**

**sum+=arr[i][j];**

**}**

**}**

**}**

**System.out.println("2D array : ");**

**for(int a[]: arr){**

**for(int b:a){**

**System.out.print(" "+ b);**

**}**

**System.out.println();**

**}**

**System.out.println("Sum of diagonal elements : "+**

**sum);**

**}**

**}**

1. Create a [class](https://youtu.be/qWcl4Ar_4uY) Student with 2 data members rno and name. Create one method setData() that takes roll number and student name as parameter and stores them in data members rno and name. Create one more method showData() to print the data member values. Create another [class](https://youtu.be/qWcl4Ar_4uY) ( main [class](https://youtu.be/qWcl4Ar_4uY)) StudentDemo that creates Student class object and calls setData() and showData() methods.

**A)**

**class Student{**

**private int rollNo;**

**private String name;**

**public void setData(int rn,String n){**

**rollNo=rn;**

**name=n;**

**}**

**public void showData(){**

**System.out.println("Roll No : "+rollNo);**

**System.out.println("Name : "+name);**

**}**

**}**

**class StudentDemo{**

**public static void main(String args[]){**

**Student s=new Student();**

**s.setData(39,"Dinesh");**

**s.showData();**

**System.out.println("===================");**

**Student s1=new Student();**

**s1.setData(94,”Daksh");**

**s1.showData();**

**System.out.println("=====================");**

**}**

**}**

**B)**

**class Student{**

**private int rollNo;**

**private String name;**

**public static int count=0;**

**public void setData(int rn,String n){**

**rollNo=rn;**

**name=n;**

**count++;**

**}**

**public void showData(){**

**System.out.println("Roll No : "+rollNo);**

**System.out.println("Name : "+name);**

**}**

**}**

**class StudentDemo1{**

**public static void main(String args[]){**

**Student s=new Student();**

**s.setData(39,"Dinesh");**

**s.showData();**

**System.out.println("===================");**

**Student s1=new Student();**

**s1.setData(94,"Daksh");**

**s1.showData();**

**System.out.println("=====================");**

**System.out.println("Total number of Students : "**

**+s.count);**

**}**

**}**

1. Modify the above program (no. 30) to count the no of Student [objects](https://youtu.be/qWcl4Ar_4uY) created. [ In this program [static variable](https://youtu.be/R7GenCGZr_E) is required ]

**import java.util.Scanner;**

**class Student{**

**private int rno;**

**private String name;**

**private static int count=0;**

**void setData(int rollno,String sname){**

**rno=rollno;**

**name=sname;**

**count++;**

**}**

**void showData(){**

**System.out.println("rno :"+rno);**

**System.out.println("name :"+name);**

**System.out.println("no :"+count);**

**}**

**}**

**class Q32{**

**public static void main(String args[]){**

**Student s1 = new Student();**

**s1.setData(1,"Aditya");**

**s1.showData();**

**Student s2 = new Student();**

**s2.setData(2,"Aaditya");**

**s2.showData();**

**}**

**}**

1. Write a program to demonstrate functionalities of [this keyword in java](https://youtu.be/syjHm5GfnEI).

**import java.util.Scanner;**

**class Student{**

**private int rollno;**

**private String sname;**

**void setData(int rollno,String sname){**

**this.rollno=rollno;**

**this.sname=sname;**

**}**

**void showData(){**

**System.out.println("rollno :"+rollno);**

**System.out.println("sname :"+sname);**

**}**

**}**

**class Q33{**

**public static void main(String args[]){**

**Student s1 = new Student();**

**s1.setData(1,"Aditya");**

**s1.showData();**

**}**

**}**

1. Create a [class](https://youtu.be/qWcl4Ar_4uY) Circle that has two data members, one to store the radius and another to store area and three methods first init() method to input radius from user, second calculateArea() method to calculate area of circle and third display() method to display values of radius and area. Create [class](https://youtu.be/qWcl4Ar_4uY) CircleDemo ( main class) that creates the Circle object and calls init(), calculateArea() and display() methods.

**import java.util.Scanner;**

**class Circle{**

**private double radius;**

**private double area;**

**private float pi=3.142f;**

**Scanner sc=new Scanner(System.in);**

**void init(){**

**System.out.print("Enter radius of circle : ");**

**radius=sc.nextDouble();**

**}**

**void calculateArea(){**

**area=pi\*radius\*radius;**

**}**

**void display(){**

**System.out.println("===============================");**

**System.out.println("Radius of cicle : "+radius**

**+"\nArea of circle : "+area);**

**}**

**}**

**class CircleDemo{**

**public static void main(String args[]){**

**//Scanner sc=new Scanner(System.in);**

**Circle c=new Circle();**

**c.init();**

**c.calculateArea();**

**c.display();**

**}**

**}**

1. Create a class MathOperation that has four [static methods](https://youtu.be/xhVlEWpz8Lw). add() method that takes two integer numbers as parameter and returns the sum of the numbers. subtract() method that takes two integer numbers as parameter and returns the difference of the numbers. multiply() method that takes two integer numbers as parameter and returns the product. power() method that takes two integer numbers as parameter and returns the power of first number to second number. Create another class Demo (main class) that takes the two numbers from the user and calls all four methods of MathOperation class by providing entered numbers and prints the return values of every method.

**class MathOperation{**

**static int add(int a,int b){**

**return (a+b);**

**}**

**static int subtract(int a,int b){**

**return (a-b);**

**}**

**static int multiply(int a,int b){**

**return a\*b;**

**}**

**static double power(int a,int b){**

**return Math.pow(a,b);**

**}**

**}**

**class Demo{**

**public static void main(String args[]){**

**System.out.println("Addition : "+MathOperation.add(5,4));**

**System.out.println("Addition : "+MathOperation.subtract(5,4));**

**System.out.println("Addition : "+MathOperation.multiply(5,4));**

**System.out.println("Addition : "+MathOperation.power(5,4));**

**}**

**}**

1. Create a class MathOperation containing [overloaded methods](https://youtu.be/uv1ZDTxapcw) ‘multiply’ to calculate multiplication of following arguments.
   1. two integers
   2. three floats
   3. all elements of array
   4. one double and one integer

**class MathDemo{**

**int multiply(int a,int b){**

**return a\*b;**

**}**

**float multiply(float a,float b,float c){**

**return a\*b\*c;**

**}**

**int multiply(int arr[]){**

**int mul=1;**

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

**mul\*=arr[i];**

**}**

**return mul;**

**}**

**double multiply(double a,int b){**

**return a\*b;**

**}**

**}**

**class MathOp{**

**public static void main(String args[]){**

**MathDemo m=new MathDemo();**

**System.out.println("Two int multiplication : "**

**+m.multiply(4,5));**

**System.out.println("Three float multiplication : "**

**+m.multiply(5.3f,4.5f,5.6f));**

**int arr[]={1,2,3,4,5};**

**System.out.println("Array multiplication : "**

**+m.multiply(arr));**

**System.out.println("one double and one int : "**

**+m.multiply(4.87D,5));**

**}**

**}**

1. Create a class Person with properties (name and age) with following features.
   1. Default age of person should be 18.
   2. A person object can be initialized with name and age.
   3. Method to display name and age of person

Create another class PersonDemo ( main class ) that demonstrates the functionalities of Person class by creating Person object and calling methods.

**class Person{**

**private int age;**

**private String name;**

**Person(){**

**this.age=18;**

**}**

**Person(int age,String name){**

**this.age=age;**

**this.name=name;**

**}**

**void display(){**

**System.out.println("Name : "+name+**

**"\nAge : "+age);**

**}**

**}**

**class PersonDemo{**

**public static void main(String args[]){**

**Person p=new Person();**

**System.out.println("Default age ");**

**p.display();**

**System.out.println("Given properties of person : ");**

**Person p1=new Person(24,"Pooja");**

**p1.display();**

**}**

**}**

1. Create a class Employee with three data members (empNo, salary and totalSalary) and following features.
   1. Only [parameterized constructor](https://youtu.be/kULXZmsZQFo). [Do not [overload the constructor](https://youtu.be/l8J_ROfYPts)]
   2. totalSalary always represents salary total of all the employees created.
   3. empNo should be auto incremented.
   4. display total employees and totalSalary using a method.

Create another class EmployeeDemo (main class) that creates some Employee objects and calls Employee method to display no. of employees and total of their salaries.

**class Employee{**

**private static int empno;**

**private double salary;**

**private static double totalSal;**

**Employee(double salary){**

**empno++;**

**this.salary=salary;**

**totalSal+=salary;**

**}**

**void display(){**

**System.out.println("Total Employee : "+empno**

**+"\nTotal salary : "+totalSal);**

**}**

**}**

**class EmployeeDemo{**

**public static void main(String args[]){**

**Employee e=new Employee(5000.7);**

**Employee e1=new Employee(5000);**

**Employee e2=new Employee(5000);**

**e2.display();**

**System.out.println("============");**

**Employee e3=new Employee(5000);**

**e3.display();**

**}**

**}**

1. Create class Product with three data members (pid, price, quantity) and [parameterized constructor](https://youtu.be/kULXZmsZQFo) that takes values for all three data members.

Create a main method in different class (say ProductDemo) and perform following task:

a. Accept information for five Product objects from user and store objects in an array

b. Find pid of product with highest price.

c. Create a static method (with array of product’s object as argument) in Product class to calculate and return total amount spent on all products. ( amount spent **on single product = price of product \* quantity of product )**

**import java.util.Scanner;**

**class Product{**

**private int pid;**

**private float price;**

**private int quantity;**

**Product(int pid,float price,int quantity){**

**this.pid=pid;**

**this.price=price;**

**this.quantity=quantity;**

**}**

**void display(){**

**System.out.println("PID : "+pid);**

**System.out.println("Quantity : "+quantity);**

**System.out.println("Price : "+price);**

**System.out.println("==========================");**

**}**

**float getPrice(){**

**return (this.price);**

**}**

**static float maxPrice(Product pr[]){**

**float total=0;**

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

**total+=(pr[i].price \* pr[i].quantity);**

**}**

**return total;**

**}**

**}**

**class ProductDemo{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**Product e[]=new Product[3];**

**int pid,quantity;**

**float price;**

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

**System.out.print("Enter pid : ");**

**pid=sc.nextInt();**

**System.out.print("Enter price of product : ");**

**price=sc.nextFloat();**

**System.out.print("Enter quantity : ");**

**quantity=sc.nextInt();**

**e[i]=new Product(pid,price,quantity);**

**}**

**System.out.println("=========================");**

**System.out.println("All Product details : ");**

**for(Product p : e){**

**p.display();**

**}**

**System.out.print("PID of Highest price product : ");**

**float temp=0;**

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

**temp=e[i].getPrice();**

**for(int j=0;j<e.length;j++){**

**if(temp < e[j].getPrice()){**

**temp=e[j].getPrice();**

**}**

**}**

**}**

**System.out.println(temp);**

**System.out.println("=========================");**

**System.out.println("Total price spent : "+Product.maxPrice(e));**

**}**

**}**

1. Create a class Student having data members name, roll no., age and score. Write a program to accept 10 records of student and store them in an array. And then arrange the student records based on the score group [0-50], [50-65], [65-80], [80-100].

import java.util.Scanner;

class Student{

private int rollNo,age;

private String name;

private float score;

Student(int rollNo,String name,int age,float score){

this.rollNo=rollNo;

this.name=name;

this.age=age;

this.score=score;

}

float getScores(){

return this.score;

}

void display(){

System.out.println("Roll no : "+rollNo

+"\nName :"+name+"\nAge : "+age

+"\nscore : "+score);

System.out.println("==========================");

}

}

class StudentRecord{

public static void main(String args[]){

Scanner sc=new Scanner(System.in);

Student s[]=new Student[5];

int rollNo,age;

String name;

float score;

int op;

while(true){

System.out.println("Choose option : \n1.Add student record \n2.Display score\n3.Exit");

op=sc.nextInt();

switch(op){

case 1:

System.out.println("Enter 5 records : ");

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

System.out.print("Enter roll no : ");

rollNo=sc.nextInt();

System.out.print("Enter Name : ");

name=sc.next();

System.out.print("Enter age : ");

age=sc.nextInt();

System.out.print("Enter Score : ");

score=sc.nextFloat();

s[i]=new Student(rollNo,name,age,score);

}

System.out.println("============================");

break;

case 2:

System.out.print("Enter the range : ");

int start=sc.nextInt();

int last=sc.nextInt();

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

if(s[i].getScores() > start && s[i].getScores()<= last){

s[i].display();

}

}

System.out.println("===================================");

break;

case 3:

System.exit(0);

break;

default:

System.out.println("Enter valid option");

break;

}

}

}

}

1. Write a program to demonstrate [this() construct](https://youtu.be/bm-LjrQwE1Q) functionality.

**class Demo{**

**private int id;**

**private String name;**

**Demo(int id){**

**this.id=id;**

**System.out.println("Id constructor");**

**}**

**Demo(int id ,String name){**

**this(id); //this construct should be on**

**//first line of constructor**

**this.name=name;**

**System.out.println("name constructor");**

**}**

**void getId(){**

**System.out.println("Id : "+id);**

**}**

**void show(){**

**this.getId();**

**System.out.println("Name : "+name);**

**}**

**}**

**class ThisDemo{**

**public static void main(String args[]){**

**Demo d=new Demo(39,"Harshada kerkar");**

**d.show();**

**}**

**}**

1. Create a class Tile to store the edge length of a square tile, and create another class Floor to store length and width of a rectangular floor. Add method totalTiles(Tile t) in Floor class with Tile as argument to calculate the whole number of tiles needed to cover the floor completely.

**import java.util.Scanner;**

**class Tiles{**

**private int squareLength;**

**Tiles(int squareLength){**

**this.squareLength=squareLength;**

**}**

**int getLength(){**

**return squareLength;**

**}**

**}**

**class FloorNo{**

**private float rectLength;**

**private float rectWidth;**

**FloorNo(float rectLength,float rectWidth){**

**this.rectLength=rectLength;**

**this.rectWidth=rectWidth;**

**}**

**void totalTiles(Tiles t){**

**int squareLength=t.getLength();**

**float row=rectWidth/squareLength;**

**float col=rectLength/squareLength;**

**int totalTiles=(int)(row\*col);**

**System.out.println("Total tiles required to cover floor : "**

**+totalTiles);**

**}**

**}**

**class Floor{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**System.out.print("Enter length of square tiles : ");**

**int sl=sc.nextInt();**

**Tiles t=new Tiles(sl);**

**System.out.print("Enter floor length :");**

**float len=sc.nextFloat();**

**System.out.print("Enter floor width :");**

**float width=sc.nextFloat();**

**FloorNo f=new FloorNo(len,width);**

**f.totalTiles(t);**

**}**

**}**

1. Create a class OneBHK with instance variables roomArea, hallArea and price. Then create default constructor that initializes instance variables with some values and a parameterized constructor that takes values for all instance variables and stores them in instance variables. Now create a method named show() to print OneBHK’s instance variable values.

Create another class TwoBHK which has [(inherites)](https://youtu.be/Xtj8XLWiKlA) all the properties and behaviors of OneBHK and a new instance variable room2Area. Then create default constructor to initialize all 4 instance variables and a parameterized constructor to take the values for initialization of all instance variables. Override show() method to print all data member information.

Write main method in another class (Say Demo) and store three TwoBHK flat’s information and print information using show method. Also print total amount of all flats.

**import java.util.Scanner;**

**class OneBHK{**

**private float roomArea,hallArea,price;**

**private static int count;**

**OneBHK(){**

**roomArea=0;**

**hallArea=0;**

**price=0;**

**}**

**OneBHK(float roomArea,float hallArea,float price){**

**this.roomArea=roomArea;**

**this.hallArea=hallArea;**

**this.price=price;**

**//count++;**

**}**

**float getPrice(){**

**return price;**

**}**

**void show(){**

**count++;**

**System.out.println("Room "+count+" : "+" - \nRoom area : "+roomArea**

**+"\nHall area : "+hallArea+"\nPrice : "+price);**

**}**

**}**

**class TwoBHK extends OneBHK{**

**float room2Area;**

**TwoBHK(){**

**super();**

**room2Area=0;**

**}**

**TwoBHK(float roomArea,float hallArea,float price,float room2Area)**

**{**

**super(roomArea,hallArea,price);**

**this.room2Area=room2Area;**

**}**

**void show(){**

**super.show();**

**System.out.println("Room 2 area : "+room2Area);**

**}**

**}**

**class RoomDemo{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**TwoBHK t[]=new TwoBHK[3];**

**System.out.println("Insert details : ");**

**float ra,ha,p,ra2;**

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

**System.out.print("Enter room area for 1BHK : ");**

**ra=sc.nextFloat();**

**System.out.print("Enter room area for 2BHK : ");**

**ra2=sc.nextFloat();**

**System.out.print("Enter hall area for 1BHK : ");**

**ha=sc.nextFloat();**

**System.out.print("Enter price : ");**

**p=sc.nextFloat();**

**t[i]=new TwoBHK(ra,ha,p,ra2);**

**System.out.println("-------------------------");**

**}**

**System.out.println("===========================");**

**System.out.println("Room details : ");**

**double sum=0;**

**for(TwoBHK tb: t){**

**tb.show();**

**sum+=tb.getPrice();**

**System.out.println("===========================");**

**}**

**System.out.println("Total price for rooms : "+sum);**

**}**

**}**

1. Create three classes

* Faculty with two data members facultyId and salary and two methods, one intput() method for accepting facultyId as input and another printSalary() to print salary.
* FullTimeFaculty that [inherits](https://youtu.be/iF6fw004RAw) class Faculty with two data members’ basicSalary and allowance. Override input() method in this class that calls super class inut() method and accepts basicSalary and allowance as input. Salary should not be accepted as input but should be calculated using formula (basicSalary + allowance)
* PartTimeFaculty that [inherits](https://youtu.be/k0oaIxwpdz0) class Faculty with two data members’ workingHours, ratePerHour. [Override](https://youtu.be/2cbzGNLaCtY) input() method in this class that calls super class inut() method and accepts workingHours and ratePerHour as input. Salary should not be accepted as input but should be calculated using formula ( workingHour \* ratePerHour )

**import java.util.Scanner;**

**class Faculty{**

**private int facultyId;**

**private double salary;**

**Scanner sc=new Scanner(System.in);**

**void input(){**

**System.out.println("Enter faculty id : ");**

**facultyId=sc.nextInt();**

**}**

**void setSalary(double salary){**

**this.salary=salary;**

**}**

**void printSalary(){**

**System.out.println("Salary : "+salary);**

**}**

**}**

**class FullTimeFaculty extends Faculty{**

**private double basicsal;**

**private double allowance;**

**void input(){**

**super.input();**

**System.out.print("Enter basic salary : ");**

**basicsal=sc.nextDouble();**

**System.out.print("Enter allowance : ");**

**allowance=sc.nextDouble();**

**setSalary(basicsal+allowance);**

**}**

**}**

**class PartTimeFaculty extends Faculty{**

**private double hour;**

**private double ratePH;**

**void input(){**

**super.input();**

**System.out.print("Enter working hours : ");**

**hour=sc.nextDouble();**

**System.out.print("Enter rate per hour : ");**

**ratePH=sc.nextDouble();**

**setSalary(hour\*ratePH);**

**}**

**}**

**class FacultyDemo{**

**public static void main(String args[]){**

**System.out.println("For full time faculty : ");**

**FullTimeFaculty f=new FullTimeFaculty();**

**f.input();**

**f.printSalary();**

**System.out.println("-------------------------");**

**System.out.println("For Part time faculty : ");**

**PartTimeFaculty p=new PartTimeFaculty();**

**p.input();**

**p.printSalary();**

**}**

**}**

1. Create a class Student with two members : rollno and percentage. Create default and parameterized constructors. Create method show() to display information. Create another class CollegeStudent inherits Student class. Add a new member semester to it. Create default and parameterized constructors. [Also override](https://youtu.be/2cbzGNLaCtY) show() method that calls [super](https://youtu.be/saWlv18bw_U) class show() method and displays semester. Create another class SchoolStudent inherits Student class. Add a new member className(eg 12th ,10th etc.) to it. Create default and parameterized constructors. Also [override](https://youtu.be/2cbzGNLaCtY) show() method that calls [super](Aishwary) class show() method and displays className. Create a class( say Demo) with main method that carries out the operation of the project : -- has array to store objects of any class(Student, CollegeStudent or SchoolStudent) --create two CollegeStudent and three SchoolStudent objects and store them inside the array -- display all records from the array -- search record on the basic of rollno and check given rollno is of SchoolStudent or of CollegeStudent. --count how many students are having A grade, if for A grade percentage >75.

**import java.util.Scanner;**

**class Student{**

**private int rollNo;**

**private float percentage;**

**Student(){**

**rollNo=0;**

**percentage=0;**

**}**

**Student(int rollNo,float percentage){**

**this.rollNo=rollNo;**

**this.percentage=percentage;**

**}**

**void show(){**

**System.out.println("Roll No : "+rollNo+**

**"\nPercentage : "+percentage);**

**}**

**double getPercentage(){**

**return percentage;**

**}**

**int getId(){**

**return rollNo;**

**}**

**}**

**class CollegeStudent extends Student{**

**private int semister;**

**CollegeStudent(){**

**semister=0;**

**}**

**CollegeStudent(int rollNo,float percentage,int semister){**

**super(rollNo,percentage);**

**this.semister=semister;**

**}**

**void show(){**

**super.show();**

**System.out.println("Semister : "+semister);**

**}**

**}**

**class SchoolStudent extends Student{**

**private String className;**

**SchoolStudent(){**

**className="";**

**}**

**SchoolStudent(int rollNo,float percentage,String className){**

**super(rollNo,percentage);**

**this.className=className;**

**}**

**void show(){**

**super.show();**

**System.out.println("Class name : "+className);**

**}**

**String getClassName(){**

**return className;**

**}**

**}**

**class StudentDemo{**

**public static void main(String args[]){**

**Scanner sc=new Scanner(System.in);**

**Student s[]=new Student[5];**

**s[0]=new SchoolStudent(1,45.5F,"10th");**

**s[1]=new SchoolStudent(2,80.65F,"12th");**

**s[2]=new CollegeStudent(3,74.6F,6);**

**s[3]=new CollegeStudent(4,60.56F,1);**

**s[4]=new SchoolStudent(5,98.6F,"10th");**

**/\*for (Student s1 : s){**

**s1.show();**

**System.out.println("-------------------");**

**}\*/**

**System.out.println("=========================");**

**int id;**

**String ans;**

**System.out.print("Enter roll no : ");**

**id=sc.nextInt();**

**/\*for(Student s1: s){**

**if(s1.getId()==id){**

**s1.show();**

**}**

**}\*/**

**for(int i=0;i<s.length;i++)**

**{**

**if(id==s[i].getId())**

**{**

**if(s[i] instanceof SchoolStudent)**

**{**

**System.out.println("School Student");**

**}else{**

**System.out.println("College Student");**

**}**

**}**

**}**

**System.out.println("=========================");**

**int count=0;**

**for(Student s1: s){**

**if(s1.getPercentage() > 75){**

**count++;**

**}**

**}**

**System.out.println("Number of Students having A grade : "+count);**

**}**

**}**

1. Create a program to demonstrate the use of [instanceof operator](https://youtu.be/NDuPFInLGCE) or secure [reference down casting](https://youtu.be/jFyDeMseMG8).

**class Shape {**

**int length;**

**int height;**

**Shape() {**

**length=0;**

**height=0;**

**}**

**Shape(int length, int height) {**

**this.length = length;**

**this.height = height;**

**}**

**void show() {**

**System.out.println("Length: " + length + " height: " + height);**

**}**

**void Area(){**

**}**

**}**

**class Rectangle extends Shape {**

**Rectangle(int length, int height) {**

**super(length, height);**

**}**

**void Area() {**

**super.show();**

**System.out.println("Area: " + (length \* height));**

**}**

**void diagonal() {**

**double a = Math.pow(length, 2) + Math.pow(height, 2);**

**System.out.println(" Diagonal is: " + (Math.sqrt(a)));**

**}**

**}**

**class Triangle extends Shape {**

**Triangle(int length, int height) {**

**super(length, height);**

**}**

**void Area() {**

**super.show();**

**System.out.println("Area: " + (0.5 \* length \* height));**

**}**

**}**

**public class SafeDownCast {**

**public static void main(String[] args) {**

**Shape sArr[] = { new Rectangle(30, 40), new Triangle(10, 20) };**

**sArr[0].Area();**

**if(sArr[0] instanceof Rectangle){**

**Rectangle r = (Rectangle) sArr[0];**

**r.diagonal();**

**}else**

**{**

**System.out.println("Not type of rectange");**

**}**

**sArr[1].Area();**

**}**

**}**

1. Create a program to demonstrate [constructor chaining.](https://youtu.be/DuwKsrX9S74)

**class Abc**

**{**

**Abc()**

**{**

**System.out.println("No-arg Constructor Abc");**

**}**

**Abc(int i)**

**{**

**System.out.println("Parameterized Constructor Abc");**

**}**

**}**

**class Pqr extends Abc**

**{**

**Pqr()**

**{**

**System.out.println("No-arg Constructor Pqr");**

**}**

**Pqr(int i)**

**{**

**System.out.println("Parameterized Constructor Pqr");**

**}**

**}**

**class ConstructorChain**

**{**

**public static void main(String args[])**

**{**

**Pqr p = new Pqr();**

**Pqr P1 = new Pqr(39);**

**}**

**}**

1. Create an Abstract class Processor with int member variable data and method showData to display data value. Create abstract method process() to define processing of member data. Create a class Factorial using abstract class Processor to calculate and print factorial of a number by overriding the process method. b. Create a class Circle using abstract class Processor to calculate and print area of a circle by overriding the process method.Ask user to enter choice (factorial or circle area). Also ask data to work upon. Use Processor class [reference](https://youtu.be/I2L4y-ZQfyo) to achieve this mechanism.

**package Q48;**

**import java.util.Scanner;**

**abstract class Processor{**

**int data;**

**abstract void process(int data);**

**void show() {**

**System.out.println("Entered Data is : "+data);**

**}**

**}**

**class Factorial extends Processor{**

**@Override**

**void process(int data) {**

**int fact=1;**

**while(data>=1) {**

**fact=fact\*data;**

**data=data-1;**

**}**

**System.out.println("Factorial of "+data+" is :"+fact);**

**}**

**}**

**class Circle extends Processor{**

**@Override**

**void process(int data) {**

**double area = (3.14 \* data \* data) ;**

**System.out.println("Area of Circle is : "+area);**

**}**

**}**

**public class Q48 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**Processor f = new Factorial();**

**Processor c= new Circle();**

**int data;**

**System.out.println("Select the operations :");**

**System.out.println("For Factorial : F");**

**System.out.println("For Circle: C");**

**char a = sc.next().charAt(0);**

**switch (a) {**

**case 'F': System.out.print("Enter the number :");**

**data=sc.nextInt();**

**f.show();**

**f.process(data);**

**break;**

**case 'C': System.out.print("Enter the radius :");**

**data=sc.nextInt();**

**c.show();**

**c.process(data);**

**break;**

**default:System.out.println("Please Enter the valid operation...");**

**}**

**}**

**}**

1. Create Interface Taxable with members salesTax=7% and incomeTax=10.5%. create abstract method calcTax(). a. Create class Employee(empId,name,salary) and implement Taxable to calculate incomeTax on yearly salary. b. Create class Product(pid,price,quantity) and implement Taxable to calculate salesTax on unit price of product. c. Create class for main method(Say XYZ), accept employee information and a product information from user and print income tax and sales tax respectively.

**package Q49;**

**import java.util.Scanner;**

**interface Taxable{**

**double salesTax = 0.07;**

**double incomeTax = 0.105;**

**void calcTac();**

**}**

**class Employee implements Taxable{**

**int empId,salary;**

**String name;**

**public Employee(int empId, int salary, String name) {**

**super();**

**this.empId = empId;**

**this.salary = salary;**

**this.name = name;**

**}**

**@Override**

**public void calcTac() {**

**double ysal = salary\*12;**

**double tax = ysal \* incomeTax;**

**System.out.println("Yearly Salary is : "+ysal);**

**System.out.println("Income Tax is : "+tax);**

**}**

**}**

**class Product implements Taxable{**

**int pid,price,quantity;**

**public Product(int pid, int price, int quantity) {**

**super();**

**this.pid = pid;**

**this.price = price;**

**this.quantity = quantity;**

**}**

**@Override**

**public void calcTac() {**

**double t = price \* quantity ;**

**double tax = t\*salesTax;**

**double total = t + tax;**

**double unitP = total/quantity;**

**System.out.println("Total sales tax : "+tax);**

**System.out.println("Unit price of product : "+unitP);**

**}**

**}**

**//c. Create class for main method(Say XYZ), accept employee information and a product information from user and print income tax**

**//and sales tax respectively.**

**public class Q49 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**System.out.println("Enter the Employee Details :");**

**System.out.print("Employee ID : ");**

**int eid = sc.nextInt();**

**System.out.print("Enter the Employee Salary :");**

**int sal = sc.nextInt();**

**System.out.print("Enter the Employee Name : ");**

**String name = sc.next();**

**Taxable e = new Employee(eid,sal,name);**

**e.calcTac();**

**System.out.println("Enter the Product details : ");**

**System.out.print("Enter the product Id : ");**

**int pid = sc.nextInt();**

**System.out.println("Enter the price of the product : ");**

**int price = sc.nextInt();**

**System.out.println("Enter the Quatity of Product :");**

**int q = sc.nextInt();**

**Taxable p = new Product(pid,price,q);**

**p.calcTac();**

**}**

**}**

1. Explain the importance of toString() and equals() method of the Object class and override them on class Employee(empId,name,salary). a. Create class for main method(say XYZ),and accept five employees information and store in an array. Also ensure if entered empId already exist or not (use equals method). b. Display all employee info using toString method.

**package Q50;**

**import java.util.Scanner;**

**class Employee {**

**//int empId;**

**String name;**

**int salary;**

**public int empId;**

**public Employee(int empId, String name, int salary) {**

**super();**

**this.empId = empId;**

**this.name = name;**

**this.salary = salary;**

**}**

**@Override**

**public String toString() {**

**return empId + " " + name + " " + salary ;**

**}**

**@Override**

**public boolean equals(Object obj) {**

**if(obj == null)**

**return false;**

**if(obj instanceof Employee) {**

**Employee emp = (Employee)obj;**

**if( empId == emp.empId) {**

**System.out.println("empId is already exists.");**

**return true;**

**}**

**}**

**return false;**

**}**

**}**

**public class Q50 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**Employee arr[]=new Employee[2];**

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

**System.out.print("Enter the empId :");**

**int a=sc.nextInt();**

**System.out.print("Enter the name :");**

**String n=sc.next();**

**System.out.print("Enter the salary :");**

**int s=sc.nextInt();**

**arr[i]= new Employee(a,n,s);**

**for(int j=0;j<i;j++) {**

**if(arr[i].equals(arr[j])) {**

**i--;**

**break;**

**}**

**}**

**}**

**for(Employee e:arr) {**

**System.out.println(e);**

**}**

**}**

**}**

1. Create a program that helps banks to maintain records. It should have following facilities. o Anybody can create current or saving account with following initial information: account number, name, balance, and branch. o display account detail for a particular accounts. o display total money deposited in bank. o allow deposit and withdrawal in an account . o for saving account opening balance and minimum balance must be 5000. o for current account opening balance and minimum balance must be 1000. o can not withdraw the amount from the account that makes balance less than the minimum balance.

**package Q51;**

**import java.util.Scanner;**

**class Account{**

**static int totalDeposit=0;**

**int accNo;**

**String name;**

**int bal;**

**String branch;**

**public Account(int accNo, String name, int bal, String branch) {**

**super();**

**this.accNo = accNo;**

**this.name = name;**

**this.bal = bal;**

**this.branch = branch;**

**totalDeposit=totalDeposit+bal;**

**}**

**public Account() {**

**super();**

**}**

**void totalDeposite() {**

**System.out.println("Total deposite in bank : "+totalDeposit);**

**}**

**void display() {**

**System.out.println("Account Number : "+accNo);**

**System.out.println("Account Holder Name : "+name);**

**System.out.println("Account Balance : "+bal);**

**System.out.println("Branch Name : "+branch);**

**}**

**}**

**class Current extends Account {**

**public Current(int accNo, String name, int bal, String branch) {**

**super(accNo, name, bal, branch);**

**}**

**void Display() {**

**super.display();**

**System.out.println("Current Account Details is : ");**

**}**

**void addBal(int amount) {**

**bal=bal+amount;**

**}**

**void widral(int amount) {**

**bal=bal-amount;**

**}**

**}**

**class Saving extends Account {**

**public Saving(int accNo, String name, int bal, String branch) {**

**super(accNo, name, bal, branch);**

**}**

**void Display() {**

**super.display();**

**System.out.println("Saving Account Details is : ");**

**}**

**void addBal(int amount) {**

**bal=bal+amount;**

**}**

**void widral(int amount) {**

**bal=bal-amount;**

**}**

**}**

**public class Q51 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**Saving s[] = new Saving[10];**

**Current c[] = new Current[10];**

**int i=0,j=0;**

**System.out.println("Enter the Account Type : \n 1 : Saving Accoung \n 2 : Current Account ");**

**int choice = sc.nextInt();**

**switch(choice) {**

**case 1 :**

**System.out.print("Enter saving accoun number : ");**

**int accNo = sc.nextInt();**

**System.out.print("Enter the name : ");**

**String name = sc.next();**

**System.out.print("Enter the money tobe deposite ");**

**int bal=sc.nextInt();**

**while(bal<5000) {**

**System.out.println("Deposite should be above 5000");**

**System.out.print("Enter the money tobe deposite ");**

**bal=sc.nextInt();**

**if(bal>5000)**

**break;**

**}**

**System.out.println("Enter the branch : ");**

**String branch = sc.next();**

**s[i]=new Saving(accNo,name,bal,branch);**

**// i++;**

**s[i].display();**

**}**

**}**

**}**

1. Input name of a person and count how many vowels it contains. Use String class functions.

**import java.util.Scanner;**

**public class Q52 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**System.out.println("Enter fname : ");**

**String s1 = sc.next();**

**int count =0;**

**/\*char ch[]=s1.toCharArray();**

**for(char a:ch)**

**{**

**if(a=='a' || a=='e' || a=='i' || a=='o' || a=='u'|| a=='A' || a=='E' || a=='I' || a=='O' || a=='U')**

**{**

**count++;**

**}**

**}\*/**

**for(int i=0;i<s1.length();i++)**

**{**

**char a=s1.charAt(i);**

**if(a=='a' || a=='e' || a=='i' || a=='o' || a=='u'|| a=='A' || a=='E' || a=='I' || a=='O' || a=='U')**

**{**

**count++;**

**}**

**}**

**System.out.println(count);**

**}**

**}**

1. Input data exactly in the following format, and print sum of all integer values. “67, 89, 23, 67, 12, 55, 66”. (Hint use String class split method and Integer class parseInt method) .

**public class Q53 {**

**public static void main(String[] args) {**

**String s1 ="67, 89, 23, 67, 12, 55, 66";**

**String [] str = s1.split(", ");**

**int a[]=new int[str.length];**

**int sum=0;**

**for(int i=0;i<a.length;i++)**

**{**

**a[i] = Integer.parseInt(str[i]);**

**sum=sum+a[i];**

**}**

**System.out.println("Sum = "+sum);**

**}**

**}**

1. [Write a program to reverse the given String](https://youtu.be/sMiEsob6EoQ).

**package Q54;**

**import java.util.Scanner;**

**public class Q54 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**String s=sc.next();**

**StringBuilder str = new StringBuilder(s);**

**System.out.println(str);**

**str.reverse();**

**System.out.println(str);**

**}**

**}**

1. [Write a program to count no of words in the String](https://youtu.be/JRYUwMqyfKk).

**package Q55;**

**import java.util.Scanner;**

**public class Q55 {**

**public static void main(String[] args) {**

**//Scanner sc = new Scanner(System.in);**

**String str = "Hello CDAC Mumbai and CDAC Juhu";**

**String arr[] = str.split(" ");**

**int a = arr.length;**

**System.out.println(a);**

**}**

**}**

1. [Write a program to convert very first character of every word in uppercase in a String](https://youtu.be/CVpG67GZ8GE).

**package Q56;**

**public class Q56 {**

**public static void main(String[] args) {**

**String str = "hello cdac mumbai and cdac juhu";**

**String s[]=str.split(" ");**

**for(String a : s) {**

**char c = a.charAt(0);**

**int i = (int)c;**

**if(i > 96) {**

**i=i-32;**

**}**

**c=(char)i;**

**a=c+a.substring(1);**

**System.out.print(a+" ");**

**}**

**}**

**}**

1. [Write a program to reverse every word of the String](https://youtu.be/ukl-GvR43Xs).

**package Q57;**

**public class Q57 {**

**public static void main(String[] args) {**

**String str = "Hello Cdac Mumbai And Cdac Juhu";**

**String s[]=str.split(" ");**

**for(String a : s) {**

**StringBuffer s1= new StringBuffer(a);**

**System.out.print(s1.reverse()+" ");**

**}**

**}**

**}**

1. Store name of weekdays in an array (starting from “Sunday” at 0 index). Ask day position from user and print day name. Handle array index out of bound exception and give proper message if user enter day index outside range (0-6).

**package Q58;**

**import java.util.Scanner;**

**public class Q58 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**String str[] = {"Sunday","Monday","Tuesday","Wednesday","Thusday","Firday","Saturday"};**

**System.out.println("Enter the day number : ");**

**int z = sc.nextInt();**

**try {**

**System.out.println("The day is : "+str[z]);**

**}catch(ArrayIndexOutOfBoundsException e) {**

**System.out.println("Enter Valid Value");**

**}**

**}**

**}**

1. Create a class Voter(voterId, name, age) with parameterized constructor. The parameterized constructor should throw a checked exception if age is less than 18. The message of exception is “invalid age for voter ”

**package Q59;**

**class Voter{**

**int voterId;**

**String vName;**

**int age;**

**Voter(int voterId, String vName,int age ){**

**if(age<18) {**

**//System.out.println("Hello");**

**try {**

**throw new Exception("invalid age for voter");**

**} catch (Exception e) {**

**//e.printStackTrace();**

**System.out.println(e);**

**}**

**}**

**else {**

**//System.out.println("QQQQ");**

**this.age=age;**

**this.voterId=voterId;**

**this.vName=vName;**

**}**

**}**

**public String display() {**

**return "Voter [voterId=" + voterId + ", vName=" + vName + ", age=" + age + "]";**

**}**

**}**

**public class Q59 {**

**public static void main(String[] args) {**

**Voter a = new Voter(1,"Aditya",12);**

**System.out.println(a.display());**

**Voter a1 = new Voter(1,"Aditya",22);**

**System.out.println(a.display());**

**}**

**}**

1. Create Interface StudentFee and declare following method. getFee() throws InvalidFeeException. This method ask fees from user and throws exception if user enters invalid or negative fees Create class Student with members (name, fees) and implement the StudentFee Interface.

**package AssignPractice;**

**import java.util.Scanner;**

**interface StudentFee{**

**int getFee();**

**}**

**public class Ques60 implements StudentFee {**

**static String name;**

**int fee;**

**public static void main(String[] args) {**

**System.out.println("Enter name : ");**

**Scanner sc = new Scanner(System.in);**

**Ques60 q = new Ques60();**

**q.name = sc.next();**

**q.fee = q.getFee();**

**System.out.println("Name : "+q.name+" Fee : "+q.fee);**

**}**

**@Override**

**public int getFee() {**

**System.out.println("Enter the Fee : ");**

**Scanner sc = new Scanner(System.in);**

**fee = sc.nextInt();**

**if(fee<0) {**

**try {**

**throw new Exception("InvalidFeeException");**

**} catch (Exception e) {**

**// TODO Auto-generated catch block**

**System.out.println(e);**

**}**

**}else {**

**return fee;**

**}**

**return 0;**

**}**

**}**

1. Create a Thread class to print following star (\*) pattern on screen with delay of 1 second between each \* print. Number of lines in the pattern should be passed to the constructor of Thread class. \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* Use this class in main method and ask user to enter number of lines to print.

**package AssignPractice;**

**//Use this class in main method and ask user to enter number of lines to print.**

**import java.util.Scanner;**

**class MyThread extends Thread {**

**int num;**

**public MyThread(int num) {**

**super();**

**this.num = num;**

**}**

**public void run() {**

**for(int i=1;i<=num;i++) {**

**try {**

**Thread.sleep(1000);**

**} catch (InterruptedException e) {**

**// TODO Auto-generated catch block**

**e.printStackTrace();**

**}**

**System.out.print("\*"+" ");**

**}**

**System.out.println("\nEND");**

**}**

**}**

**public class Ques61 {**

**public static void main(String[] args) {**

**Scanner sc = new Scanner(System.in);**

**System.out.println("Enter the number : ");**

**int n = sc.nextInt();**

**MyThread m = new MyThread(n);**

**m.start();**

**}**

**}**

1. Create a class that checks whether a given number is prime or not using Runnable interface.

**package AssignPractice;**

**import java.util.Scanner;**

**public class Ques62{**

**public static void main(String[] args) {**

**int n;**

**Scanner sc = new Scanner(System.in);**

**System.out.println("Enter the number : ");**

**n=sc.nextInt();**

**MyThread t = new MyThread(n);**

**t.run();**

**}**

**}**

**class MyThread implements Runnable{**

**int n;**

**public MyThread(int n) {**

**super();**

**this.n = n;**

**}**

**@Override**

**public void run() {**

**int i,m=0,flag=0;**

**m=n/2;**

**if(n==0||n==1){**

**System.out.println(n+" is not prime number");**

**}else{**

**for(i=2;i<=m;i++){**

**if(n%i==0){**

**System.out.println(n+" is not prime number");**

**flag=1;**

**break;**

**}**

**}**

**if(flag==0) {**

**System.out.println(n+" is prime number");**

**}**

**}**

**}}**

1. Write a program to count how many times character ‘t’ occurs in a file.

import java.util.Scanner;

**class Ques63 {**

**static final int MAX\_CHAR = 256;**

**static void getOccuringChar(String str)**

**{**

**// Create an array of size 256 i.e. ASCII\_SIZE**

**int count[] = new int[MAX\_CHAR];**

**int len = str.length();**

**// Initialize count array index**

**for (int i = 0; i < len; i++)**

**count[str.charAt(i)]++;**

**// Create an array of given String size**

**char ch[] = new char[str.length()];**

**for (int i = 0; i < len; i++) {**

**ch[i] = str.charAt(i);**

**int find = 0;**

**for (int j = 0; j <= i; j++) {**

**// If any matches found**

**if (str.charAt(i) == ch[j])**

**find++;**

**}**

**if (find == 1)**

**System.out.println("Number of Occurrence of " +**

**str.charAt(i) + " is:" + count[str.charAt(i)]);**

**}**

**}**

**public static void main(String[] args)**

**{**

**Scanner sc = new Scanner(System.in);**

**String str = "Cdac Kharghar";**

**getOccuringChar(str);**

**}**

**}**

1. Write a program to count no of words in a text file and average word size.

**package AssignPractice;**

**import java.io.BufferedReader;**

**import java.io.FileReader;**

**public class Ques64**

**{**

**public static void main(String[] args) throws Exception {**

**String line;**

**int count = 0;**

**//Opens a file in read mode**

**FileReader file = new FileReader("D://CDAC//JAVA//CDAC//Java//TextSol//Assign1.txt");**

**BufferedReader br = new BufferedReader(file);**

**//Gets each line till end of file is reached**

**while((line = br.readLine()) != null) {**

**//Splits each line into words**

**String words[] = line.split(" ");**

**//Counts each word**

**count = count + words.length;**

**}**

**System.out.println("Number of words present in given file: " + count);**

**br.close();**

**}**

**}**

1. Write a program to count number of bytes in a image file(jpeg/png/gif). Also find how much time it will take to upload the file on server if internet speed is 256 bps(bits per second).

**package AssignPractice;**

**import java.awt.image.BufferedImage;**

**import java.io.ByteArrayInputStream;**

**import java.io.ByteArrayOutputStream;**

**import java.io.File;**

**import java.io.IOException;**

**import javax.imageio.ImageIO;**

**import com.sun.org.apache.xerces.internal.impl.dv.util.Base64;**

**public class Ques65 {**

**public static void main(String[] args) throws IOException{**

**String dirName="C:\\Users\\Admin\\OneDrive\\Pictures\\Screenshots";**

**ByteArrayOutputStream baos=new ByteArrayOutputStream(1000);**

**BufferedImage img=ImageIO.read(new File(dirName,"dip.png"));**

**ImageIO.write(img, "jpg", baos);**

**baos.flush();**

**String base64String=Base64.encode(baos.toByteArray());**

**baos.close();**

**byte[] bytearray = Base64.decode(base64String);**

**BufferedImage imag=ImageIO.read(new ByteArrayInputStream(bytearray));**

**ImageIO.write(imag, "jpg", new File(dirName,"snap.jpg"));**

**}**

**}**

1. Write a program to store your shopping details in a binary file(shopping.dat) with information itemName, price, quantity. (Use ObjectOutputStream to store Item class object ).

**package com.java2novice.files;**

**import java.io.Serializable;**

**public class Ques66 implements Serializable {**

**private static final long serialVersionUID = -299482035708790407L;**

**private String name;**

**private String gender;**

**private int age;**

**private String role;**

**// private transient String role;**

**public Ques66(String n) {**

**this.name = n;**

**}**

**public String getGender() {**

**return gender;**

**}**

**public void setGender(String gender) {**

**this.gender = gender;**

**}**

**public int getAge() {**

**return age;**

**}**

**public void setAge(int age) {**

**this.age = age;**

**}**

**public String getRole() {**

**return role;**

**}**

**public void setRole(String role) {**

**this.role = role;**

**}**

**@Override**

**public String toString() {**

**return "Employee:: Name=" + this.name + " Age=" + this.age + " Gender=" + this.gender + " Role=" + this.role;**

**}**

**}**

1. Write a program to read data from shopping.dat file creted in above problem and find total money spent on all shopping items. . (Use ObjectInputStream to read Item class object).

**package AssignPractice;**

**import java.io.FileInputStream;**

**import java.io.IOException;**

**import java.io.ObjectInputStream;**

**public class Ques67 {**

**public static void main(String[] args) {**

**try {**

**FileInputStream is = new FileInputStream("D://CDAC//JAVA//CDAC//Java//TextSol//Assign1.txt");**

**ObjectInputStream ois = new ObjectInputStream(is);**

**Ques67 emp = (Ques67) ois.readObject();**

**ois.close();**

**is.close();**

**System.out.println(emp.toString());**

**} catch (ClassNotFoundException | IOException e) {**

**e.printStackTrace();**

**}**

**}**

**}**