**Program :**

import java.util.Scanner ;

import java.io.\* ;

public class QuadraticEquationSolving

{

public static void main(String [] array)

{

Scanner s = new Scanner(System.in) ;

double a, b, c, r1, r2 ;

System.out.println("\nRoots of quadratic equation\nThe format is\nax2+bx+c") ;

System.out.print("Enter a value :\t") ;

a = s.nextInt() ;

System.out.print("\nEnter b value :\t") ;

b = s.nextInt() ;

System.out.print("\nEnter c value :\t") ;

c = s.nextInt() ;

double det = b\*b - 4\*a\*c ;

if(det > 0)

{

r1 = (-b + Math.sqrt(det)) / (2\*a) ;

r2 = (-b - Math.sqrt(det)) / (2\*a) ;

System.out.format("\nr1 = %.2f\nr2 = %.2f\nRoots are Real and Distinct.", r1, r2) ;

}

else if(det == 0)

{

r1 = r2 = -b / (2\*a) ;

System.out.format("\nr1 = %.2f\nr2 = %.2f\nRoots are Real and Equal.", r1, r2) ;

}

else

{

double real = -b / (2\*a) ;

double img = Math.sqrt(-det) / (2\*a) ;

System.out.format("\nr1 = %.2f + %.2f i", real, img) ;

System.out.format("\nr2 = %.2f + %.2f i", real, img) ;

System.out.print("\nRoots are imaginary.") ;

}

}

}

**Output :**

Roots of quadratic equation

The format is

ax2+bx+c

Enter a value : 2

Enter b value : 2

Enter c value : 2

r1 = -0.50 + 0.87 i

r2 = -0.50 + 0.87 i

Roots are imaginary.

**Program :**

import java.util.Scanner ;

public class FibonacciSeries

{

public static void main(String [] array)

{

Scanner s = new Scanner(System.in) ;

System.out.print("Fibonacci Series\nEnter no.of items to be printed :\t") ;

int n = s.nextInt() ;

int a = 0, b = 1, c = 0 ;

System.out.print("\n0\t1\t") ;

for(int i = 0 ; i <= n-2 ; i++)

{

c = a + b ;

a = b ;

b= c ;

System.out.print(c+"\t") ;

}

}

}

**Output :**

Fibonacci Series

Enter no.of items to be printed : 7

0 1 1 2 3 5 8 13

**Program :**

import java.util.Scanner ;

import java.io.\* ;

public class StringSorting

{

public static void main(String [] array)

{

Scanner s = new Scanner(System.in) ;

String temp ;

System.out.print("String Sorting\nEnter no.of Strings :\t") ;

int n = s.nextInt() ;

String str[] = new String[n] ;

System.out.println("\nEnter Strings :") ;

int i, j ;

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

{

str[i] = s.next() ;

}

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

{

for(j = 0 ; j < n ; j++)

{

if((str[i].compareTo(str[j])) < 0)

{

temp = str[i] ;

str[i] = str[j] ;

str[j] = temp ;

}

}

}

System.out.println("\nSorted Strings :") ;

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

{

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

}

}

}

**Output :**

Enter no.of Strings : 5

Enter Strings :

SteveRogers

TonyStark

ChrisHemsworth

MarkRuffalo

TomHolland

Sorted Strings :

ChrisHemsworth

MarkRuffalo

SteveRogers

TomHolland

TonyStark

**Program :**

import java.util.Scanner ;

public class PrimeNumber

{

public static void main(String [] array)

{

Scanner s = new Scanner(System.in) ;

System.out.print("Enter a number to check if it is truly prime number or not :\t") ;

int n= s.nextInt() ;

if(isPrime(n))

{

System.out.print("\n" + n + " is prime number.") ;

}

else

{

System.out.print("\n" + n + " is a non-prime number.") ;

}

}

static boolean isPrime(int num)

{

if(num <= 1)

{

return false ;

}

for(int i = 2 ; i <= num/2 ; i++)

{

if((num % i) == 0)

{

return false ;

}

}

return true ;

}

}

**Output :**

Enter a number to check if it is truly prime number or not : 209

209 is a non-prime number.

**Program :**

import java.io.\* ;

import java.util.Scanner ;

public class MatrixMultiplication

{

public static void main(String [] array)

{

System.out.print("Matrix Multiplication\n") ;

int r1, r2, c1, c2 ;

Scanner s = new Scanner(System.in) ;

System.out.print("For First matrix\nEnter no.of rows :\t") ;

r1 = s.nextInt() ;

System.out.print("\nEnter no.of columns :\t") ;

c1 = s.nextInt() ;

System.out.print("\nFor Second matrix\nEnter no.of rows :\t") ;

r2 = s.nextInt() ;

System.out.print("\nEnter no.of columns :\t") ;

c2 = s.nextInt() ;

if(c1 != r2)

{

System.out.println("\nMatrix multiplication is not possible.");

System.exit(0) ;

}

int i, j, k ;

int [][] firstMatrix = new int [r1][c1] ;

int [][] secondMarix = new int [r2][c2] ;

System.out.println("\nEnter the elements of First Matrix :") ;

for (i = 0 ; i < r1 ; i++)

{

for(j = 0 ; j < c1 ; j++)

{

firstMatrix[i][j] = s.nextInt() ;

}

}

System.out.println("Enter the elements of Second Matrix :");

for (i = 0 ; i < r2 ; i++)

{

for(j = 0 ; j < c2 ; j++)

{

secondMarix[i][j] = s.nextInt() ;

}

}

int [][] product = new int [r1][c2] ;

for(i = 0 ; i < r1 ; i++)

{

for(j = 0 ; j < c2 ; j++)

{

for(k = 0 ; k < c1 ; k++)

{

product[i][j] += firstMatrix[i][k] \* secondMarix[k][j] ;

}

}

}

System.out.println("Multiplication of given two matrix is :") ;

for(int row[] : product)

{

for(int column : row)

{

System.out.print(column + " ") ;

}

System.out.println();

}

}

}

**Output :**

Matrix Multiplication

For First matrix

Enter no.of rows : 2

Enter no.of columns : 3

For Second matrix

Enter no.of rows : 3

Enter no.of columns : 2

Enter the elements of First Matrix :

3

-2

5

3

0

4

Enter the elements of Second Matrix :

2

3

-9

0

0

4

Multiplication of given two matrix is :

24 29

6 25

**Program:**

import java.util.Scanner ;

public class EB

{

public static void main(String [] array)

{

double amt ;

Scanner s = new Scanner(System.in) ;

System.out.print("Enter your card no :\t") ;

int cno = s.nextInt() ;

System.out.print("\nEnter your name :\t") ;

String cname = s.next() ;

System.out.print("\nEnter your previous reading :\t") ;

int previous = s.nextInt() ;

System.out.print("\nEnter your current reading :\t") ;

int current = s.nextInt() ;

System.out.print("\n1.Domestic\n2.Commercial\nEnter your connection type :\t") ;

int type = s.nextInt() ;

double units = current - previous ;

double dunits = units - 100 ;

switch(type)

{

case 1:

if(units <= 100)

{

amt = units ;

}

else if(dunits <= 200 && dunits >= 101)

{

amt = 100 + (dunits \* 2.50) ;

}

else if(dunits <= 500 && dunits >= 201)

{

amt = 100 + (dunits \* 4) ;

}

else

{

amt = 100 + (dunits \* 6);

}

System.out.print("\nCustomer no :\t" + cno + "\nCustomer name :\t" + cname + "\nUnits :\t" + units + "\nBill Amt :\t" + amt ) ;

break ;

case 2:

if(units <= 100)

{

amt = units \* 2 ;

}

else if(dunits <= 200 && dunits >= 101)

{

amt = 100 + (dunits \* 4.50) ;

}

else if(dunits <= 500 && dunits >= 201)

{

amt = 100 + (dunits \* 6) ;

}

else

{

amt = 100 + (dunits \* 7) ;

}

System.out.print("\nCustomer no :\t" + cno + "\nCustomer name :\t" + cname + "\nUnits :\t" + units + "\nBill Amt :\t" + amt ) ;

break ;

default:

System.out.print("\nInvalid Choice") ;

}

}

}

**Output :**

Enter your card no : 209

Enter your name : Tony\_Stark

Enter your previous reading : 601

Enter your current reading : 1205

1.Domestic

2.Commercial

Enter your connection type : 1

Customer no : 209

Customer name : Tony\_Stark

Units : 604.0

Bill Amt : 3124.0

**Program :**

import java.io.\* ;

import java.util.Scanner ;

import java.lang.\* ;

class Employee

{

String name, address, mail, mobile ;

int id ;

float da, hra, scf, gross, net, pf, bp ;

void getData()

{

System.out.print("Enter name :\t") ;

name = s.next() ;

System.out.print("\nEnter id :\t") ;

id = s.nextInt() ;

System.out.print("\nEnter the address :\t") ;

address = s.next() ;

System.out.print("\nEnter mail :\t") ;

mail = s.next() ;

System.out.print("\nEnter mobile.no \t") ;

mobile = s.next() ;

}

void calc(float basic)

{

da = (float)(basic\*97/100) ;

hra = (float)(basic\*10/100) ;

pf = (float)(basic\*10/100) ;

scf = (float)(basic\*0.1/100) ;

gross = basic + da + hra + pf + scf ;

net = gross - pf ;

}

void display()

{

System.out.print("\n\*\*\*\*\* Employee Details \*\*\*\*\*") ;

System.out.print("\nEmployee Name :\t" + name) ;

System.out.print("\nEmployee ID :\t" + id) ;

System.out.print("\nEmployee Address :\t" + address) ;

System.out.print("\nEmployee Mobile Number :\t" + mobile) ;

System.out.print("\nEmployee Mail ID :\t" + mail) ;

System.out.print("\nEmployee Basic Pay :\t" + b) ;

System.out.print("\nEmployee DA :\t" + da) ;

System.out.print("\nEmployee HRA :\t" + hra) ;

System.out.print("\nEmployee PF :\t" + pf) ;

System.out.print("\nStaff Club Fund :\t" + scf) ;

System.out.print("\nGross Salary :\t" + gross) ;

System.out.print("\nNet Salary :\t" + net) ;

}

}

class Programmer extends Employee

{

float bp ;

Programmer()

{

bp = 2500 ;

}

}

class Ap extends Employee

{

float bp ;

Ap()

{

bp = 5000 ;

}

}

class Asso extends Employee

{

float bp ;

Asso()

{

bp = 7500 ;

}

}

class Prof extends Employee

{

float bp ;

Prof()

{

bp = 10000 ;

}

}

public class EmployeeSalary

{

public static void main(String [] array)

{

Scanner s = new Scanner (System.in) ;

System.out.print("1.Programmer\n2.Assitant Professor\n3.Associate\n4.Professor\nEnter Your Department :\t") ;

int choice = s.nextInt() ;

switch (choice)

{

case 1:

System.out.println("\nEnter Programmer Details :") ;

Programmer p = new Programmer() ;

p.getData() ;

p.calc(p.bp) ;

p.display() ;

break ;

case 2:

System.out.println("\nEnter Assistant Professor Details :") ;

Ap ap = new Ap() ;

ap.getData() ;

ap.calc(ap.bp) ;

ap.display() ;

break ;

case 3:

System.out.println("\nEnter Associate Details :") ;

Asso as = new Asso() ;

as.getData() ;

as.calc(as.bp) ;

as.display() ;

break ;

case 4:

System.out.println("\nEnter Professor Details :") ;

Prof pro = new Prof() ;

pro.getData() ;

pro.calc(pro.bp) ;

pro.display() ;

break ;

default :

System.out.println("\nInvalid Choice") ;

}

System.out.println("\n\*\*\*\*\* Thank You \*\*\*\*\*") ;

}

}

**Output :**

1.Programmer

2.Assitant Professor

3.Associate

4.Professor

Enter Your Department : 1

Enter Programmer Details :

Enter name : Tony\_Stark

Enter id : 209

Enter the address : 347

Enter mail : tonystark@gmail.com

Enter mobile.no 9876543201

\*\*\*\*\* Employee Details \*\*\*\*\*

Employee Name : Tony\_Stark

Employee ID : 209

Employee Address : 347

Employee Mobile Number : 9876543201

Employee Mail ID : tonystark@gmail.com

Employee Basic Pay : 2500.0

Employee DA : 2425.0

Employee HRA : 250.0

Employee PF : 250.0

Staff Club Fund : 2.5

Gross Salary : 5427.5

Net Salary : 5177.5

\*\*\*\*\* Thank You \*\*\*\*\*

**Program :**

import java.io.\* ;

interface Mystack

{

public void pop() ;

public void push() ;

public void display() ;

}

class Stack\_array implements Mystack

{

final static int n = 5 ;

int [] stack = new int[n] ;

int top = -1 ;

public void push()

{

try

{

BufferedReader br = new BufferedReader(new InputStreamReader(System.in)) ;

if(top == (n-1))

{

System.out.println("\nStack Overflow") ;

return ;

}

else

{

System.out.print("\nEnter the element :\t") ;

int ele = Integer.parseInt(br.readLine()) ;

stack[++top] = ele ;

}

}

catch(IOException e)

{

System.out.println("e") ;

}

}

public void pop()

{

if(top < 0)

{

System.out.println("\nStack underflow") ;

return ;

}

else

{

int popper = stack[top] ;

top-- ;

System.out.println("\nPopped element :\t " + popper) ;

}

}

public void display()

{

if(top < 0)

{

System.out.println("\nStack is empty") ;

return ;

}

else

{

String str = "" ;

for(int i = 0 ; i <= top ; i++)

{

str = str + "" + stack[i] + "<--" ;

}

System.out.println("\nElements are :\t" + str) ;

}

}

}

class StackADT

{

public static void main(String [] array) throws IOException

{

BufferedReader br = new BufferedReader(new InputStreamReader(System.in)) ;

System.out.println("Implementation of Stack using Array") ;

Stack\_array stk = new Stack\_array() ;

int ch = 0 ;

do

{

System.out.println("1.Push\n2.Pop\n3.Display\n4.Exit") ;

System.out.print("Enter your choice :\t") ;

ch = Integer.parseInt(br.readLine()) ;

switch(ch)

{

case 1:

stk.push() ;

break ;

case 2:

stk.pop() ;

break ;

case 3:

stk.display() ;

break ;

case 4:

System.out.print(“\*\*\*\*\* Thank You \*\*\*\*\*”) ;

System.exit(0) ;

default:

System.out.println("\nInvaid Choice") ;

}

}

while(ch < 5) ;

}

}

**Output :**

Implementation of Stack using Array

1.Push

2.Pop

3.Display

4.Exit

Enter your choice : 1

Enter the element : 209

1.Push

2.Pop

3.Display

4.Exit

Enter your choice : 1

Enter the element : 347

1.Push

2.Pop

3.Display

4.Exit

Enter your choice : 1

Enter the element : 59

1.Push

2.Pop

3.Display

4.Exit

Enter your choice : 2

Popped element : 59

1.Push

2.Pop

3.Display

4.Exit

Enter your choice : 3

Elements are : 209<--347<--

1.Push

2.Pop

3.Display

4.Exit

Enter your choice : 4

\*\*\*\*\* Thank You \*\*\*\*\*

**Program :**

import java.util.Scanner ;

abstract class Shapes

{

public int x, y ;

public abstract void printArea() ;

float area ;

}

class Rectangle extends Shapes

{

public void printArea()

{

area = x \* y ;

System.out.println("\nArea of Rectangle is :\t " + area) ;

}

}

class Triangle extends Shapes

{

public void printArea()

{

area = (x \* y) / 2 ;

System.out.println("\nArea of Triangle is : \t" + area) ;

}

}

class Circle extends Shapes

{

public void printArea()

{

area = (22 \* x \* x) / 7 ;

System.out.println("\nArea of Circle is : \t" + area) ;

}

}

public class Shape

{

public static void main(String [] array)

{

Scanner s = new Scanner(System.in) ;

System.out.print("Area of a Shape\n1.Rectangle\n2.Triangle\n3.Circle\nEnter your choice :\t") ;

int choice = s.nextInt() ;

int x1, y1 ;

switch(choice)

{

case 1:

Rectangle r = new Rectangle() ;

System.out.println("\nFor Rectangle\nEnter Length and Breath value :") ;

x1 = s.nextInt() ;

y1 = s.nextInt() ;

r.x = x1 ;

r.y = y1 ;

r.printArea() ;

break ;

case 2:

Triangle t = new Triangle() ;

System.out.println("\nFor Triangle\nEnter Base and Height value :") ;

x1 = s.nextInt() ;

y1 = s.nextInt() ;

t.x = x1 ;

t.y = y1 ;

t.printArea() ;

break ;

case 3:

Circle c = new Circle() ;

System.out.print("\nFor Circle\nEnter Radius value :\t") ;

x1 = s.nextInt() ;

c.x = x1 ;

c.printArea() ;

break ;

default:

System.out.print("\nInvalid Choice") ;

}

}

}

**Output 1 :**

Area of a Shape

1.Rectangle

2.Triangle

3.Circle

Enter your choice : 1

For Rectangle

Enter Length and Breath value :

209

347

Area of Rectangle is : 72523.0

**Output 2 :**

Area of a Shape

1.Rectangle

2.Triangle

3.Circle

Enter your choice : 2

For Triangle

Enter Base and Height value :

209

347

Area of Triangle is : 36261.0

**Output 3 :**

Area of a Shape

1.Rectangle

2.Triangle

3.Circle

Enter your choice : 3

For Circle

Enter Radius value : 209

Area of Circle is : 137283.0