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**Assignment No 1**

**Problem Statement : Design a class 'Complex 'with data members for real and imaginary part. Provide default and Parameterized constructors. Write a program to perform arithmetic operations of two complex numbers.**

package Constructor;

import java.util.\*;

//Created a default class Complex\_Op

class Complex\_Op {

private int real,imag;

//initialised real and imaginary value of a complex number by using default constructor

Complex\_Op(){

real=0;

imag=0;

}

//parameterised constructor

Complex\_Op(int x,int y){

real=x;

imag=y;

}

//method to perform addition of two complex number

void add(Complex\_Op a,Complex\_Op b) {

real=a.real+b.real;

imag=a.imag+b.imag;

}

//method to perform subtraction of two complex number

void sub(Complex\_Op a,Complex\_Op b) {

real=a.real-b.real;

imag=a.imag-b.imag;

}

//method to perform of two complex number

void product(Complex\_Op a,Complex\_Op b) {

real=a.real\*b.real-a.imag\*b.imag;

imag=a.real\*b.imag+a.imag\*b.real;

}

//method to perform division of two complex number

void div(Complex\_Op a,Complex\_Op b) {

Complex\_Op temp=new Complex\_Op();

int mod;

mod=(b.real\*b.real+b.imag\*b.imag) ;

real=(a.real\*b.real+a.imag\*b.imag)/mod;

imag=(a.imag\*b.real-a.real\*b.imag)/mod;

}

void display() {

System.out.println("Complex Number : "+real +" +"+ imag+"i");

}}

public class Complex{

public static void main(String[] args) {

int p,q;//p and q are real and imaginary part of complex number respectively

System.out.println("Enter first number : ");

Scanner sc=new Scanner(System.in);

p=sc.nextInt();

q=sc.nextInt();

Complex\_Op m=new Complex\_Op(p,q);//passing values of p and q in the constructor for creating an object m

System.out.println("Enter second number : ");

p=sc.nextInt();

q=sc.nextInt();

Complex\_Op n=new Complex\_Op(p,q);//passing values of p and q in the constructor for creating an object m

System.out.println("Select \n 1 to add \n 2 to subtract \n 3 to multiply \n 4 to divide \n ");

Complex\_Op ans=new Complex\_Op();//creating an object by using default constructor

int x=sc.nextInt();

switch (x) {

case 1: ans.add(m,n);//method calling for adding two complex numbers

ans.display();

break;

case 2: ans.sub(m,n);//method calling for subtracting two complex numbers

ans.display();

break;

case 3: ans.product(m,n);//method calling for mutiplying two complex numbers

ans.display();

break;

case 4 :ans.div(m,n);//method calling for dividing two complex numbers

ans.display();

break;

default : System.out.println("Enter a valid input");

}

}

}

**Output:**

Enter first number :

-2 2

Enter second number :

1 -1

Select

1 to add

2 to subtract

3 to multiply

4 to divide

1

Complex Number : -1 +1i

Enter first number :

-2 2

Enter second number :

1 -2

Select

1 to add

2 to subtract

3 to multiply

4 to divide

2

Complex Number : -3 +4i

Enter first number :

1 -1

Enter second number :

1 -1

Select

1 to add

2 to subtract

3 to multiply

4 to divide

3

Complex Number : 0 +-2i

Enter first number :

6 3

Enter second number :

2 3

Select

1 to add

2 to subtract

3 to multiply

4 to divide

4

Complex Number : 1 +0i