CODE for Complex Number Arithmetics.

```
import java.util.*; //Importing all members from java.util package.
class complex
{
   float real;
   float img;

   complex() //Default constructor.
   {
           this.real = 0;
           this.img = 0;
   }

   complex(float i, float j) //Parameterized constructor.
   {
           this.real = i;
           this.img = j;
   }

   void add(complex c1, complex c2) //Addition.
   {
           complex c3 = new complex();
           c3.real = (c1.real + c2.real);
           c3.img = (c1.img + c2.img);
           System.out.println("Addition of the complex numbers is: " + c3.real + "+" +
c3.img + "i");
   }

   void sub(complex c1, complex c2) //Subtraction.
   {
           complex c3 = new complex();
           c3.real = (c1.real - c2.real);
           c3.img = (c1.img - c2.img);
           System.out.println("Subtraction of the complex numbers is: " + c3.real + "+" +
c3.img + "i");
   }

   void mult(complex c1, complex c2) //Multiplication.
   {
           complex c3 = new complex();
           c3.real= ((c1.real * c2.real) - (c1.img * c2.img));
           c3.img = ((c1.real * c2.img) + (c2.real * c1.img));
```

```
          System.out.println("Multiplication of the complex numbers is: " + c3.real + "+" + c3.img + "i");
   }

   void div(complex c1, complex c2) //Division.
   {
          complex c3 = new complex();
          c3.real = (((c1.real * c2.real) - (c1.img * c2.img))/((c2.real* c2.real) + (c2.img * c2.img)));
          c3.img = (((c2.real * c1.img) + (c1.real * c2.img))/((c2.real * c2.real) + (c2.img * c2.img)));
          System.out.println("Division of the complex numbers is: " + c3.real + "+" + c3.img + "i");
   }
}

//Code performed by Pranit Zambre, Roll Number: 19.

class MainComplex //Main class.
{
   public static void main(String[] args)
   {
   Scanner sc = new Scanner(System.in);
   complex c1 = new complex();
   System.out.println("Enter 1st REAL number here: \n");
   c1.real = sc.nextFloat();
   System.out.println("Enter 1st IMAGINARY number here: \n");
   c1.img = sc.nextFloat();

   System.out.println("Enter 2nd REAL number here: \n");
   float num1 = sc.nextFloat();
   System.out.println("Enter 2nd IMAGINARY number here: \n");
   float num2 = sc.nextFloat();
   complex c2 = new complex(num1, num2);
   complex c3 = new complex();
   System.out.println("Your 1st COMPLEX number is: " + c1.real + "+"+ c1.img + "i \n");
   System.out.println("Your 2nd COMPLEX number is: " + c2.real + "+"+ c2.img + "i \n");

   int ch;
   do //Do-while loop for repeating the menu options.
   {
   System.out.println("\nMenu: \n");
   System.out.println("1.Type 1 for Addition. \n2.Type 2 for Subtraction. \n3.Type 3 for Multiplication. \n4.Type 4 for Division. \n");
```

```
    ch = sc.nextInt();

    switch(ch) //Switch case for performing different operations.
    {
            case 1: c3.add(c1,c2);
            break;

            case 2: c3.sub(c1,c2);
            break;

            case 3: c3.mult(c1,c2);
            break;

            case 4: c3.div(c1,c2);
            break;

            default:
            System.out.println("Invalid operation.");
    }
    }while (ch != 5);
    }
} //Code ends here.
```

OUTPUT.

```
Enter 1st REAL number here:
1

Enter 1st IMAGINARY number here:
2

Enter 2nd REAL number here:
3

Enter 2nd IMAGINARY number here:
4

Your 1st COMPLEX number is: 1.0+2.0i
Your 2nd COMPLEX number is: 3.0+4.0i

Menu:
1.Type 1 for Addition.
2.Type 2 for Subtraction.
3.Type 3 for Multiplication.
4.Type 4 for Division.

1

Addition of the complex numbers is: 4.0+6.0i

Menu:
1.Type 1 for Addition.
2.Type 2 for Subtraction.
3.Type 3 for Multiplication.
4.Type 4 for Division.

2

Subtraction of the complex numbers is: -2.0+-2.0i

Menu:
1.Type 1 for Addition.
2.Type 2 for Subtraction.
```

```
3.Type 3 for Multiplication.
4.Type 4 for Division.

3

Multiplication of the complex numbers is: -5.0+10.0i

Menu:
1.Type 1 for Addition.
2.Type 2 for Subtraction.
3.Type 3 for Multiplication.
4.Type 4 for Division.

4

Division of the complex numbers is: -0.2+0.4i
```