

```
public class Complex {

    double real = 0.0000;
    double img = 0.0000;
    double mod = 0.0000; // modulus
    double arg = 0.0000; // angle

    // set data from main
    public void setData(double real, double img) {
        this.real = real;
        this.img = img;
    }

    // method to calculate the modulus
    void calcMod() {
        mod = Math.sqrt(Math.pow(real, 2) + Math.pow(img, 2));
    }

    // method to calculate the argument
    void calcArg() {
        arg = Math.atan(img / real);
        if (real > 0) {
            if (img > 0) { // 1st quadrant
                arg = arg * 180 / Math.PI;
            } else { // 4th quadrant
                arg = 360 + arg * 180 / Math.PI;
            }
        } else {
            if (img > 0) { // 2nd quadrant
                arg = 180 + arg * 180 / Math.PI;
            } else { // 3rd quadrant
                arg = 180 + arg * 180 / Math.PI;
            }
        }
    }

    double getMod() {
        return mod;
    }

    double getArg() { //returns degrees
        return arg;
    }
}
```

```
// This app calculates the phasor (polar) components of two complex numbers
// given their real and imaginary components (a + bi).
```

```
public class ComplexApp {

    // formatter object
    static NumberFormat format1 = new DecimalFormat("#0.0000");

    public static void main(String[] args) {

        Scanner input1 = new Scanner(System.in);

        // 1st number
        Complex c1 = new Complex(); //create object from class Complex
        System.out.println("Enter real component of 1st number: ");
        double real1 = input1.nextDouble();
        System.out.println("Enter imaginary component of 1st number: ");
        double img1 = input1.nextDouble();
        c1.setData(real1, img1); // invokes setter method to input data

        // invoke method to calculate the modulus and argument
        c1.calcMod();
        c1.calcArg();
        double modulus = c1.getMod();
        System.out.println("Modulus = " + format1.format(modulus));
        double argument = c1.getArg();
        System.out.println("Argument (deg) = " +
            format1.format(argument));

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

        // 2nd number
        Complex c2 = new Complex(); //create object from class Complex
        System.out.println("Enter real component of 2nd number: ");
        double real2 = input1.nextDouble();
        System.out.println("Enter imaginary component of 2nd number: ");
        double img2 = input1.nextDouble();
        c2.setData(real2, img2); // invokes setter method to input data

        // invoke method to calculate the modulus and argument
        c2.calcMod();
        c2.calcArg();
        double modulus2 = c2.getMod();
        System.out.println("Modulus = " + format1.format(modulus2));
        double argument2 = c2.getArg();
        System.out.println("Argument (deg) = " +
            format1.format(argument2));

        input1.close(); // close scanner
    }
}
```

## OUTPUT

Enter real component of 1st number:

-3

Enter imaginary component of 1st number:

4

Modulus = 5.0000

Argument (deg) = 126.8699

\*\*\*\*\*

Enter real component of 2nd number:

3

Enter imaginary component of 2nd number:

-4

Modulus = 5.0000

Argument (deg) = 306.8699