

Sumedh ahire  
FYMCA-B 03  
BATCH 1  
ASSIGNMENT 4

CODE:

```
#include <iostream>
#include <cmath>
```

```
using namespace std;
```

```
class Complex {
public:
    // Default constructor
    Complex() : real(0.0), imag(0.0) {}

    // Parameterized constructor
    Complex(double r, double i) : real(r), imag(i) {}

    // Friend function for addition
    friend Complex operator+(const Complex& c1, const Complex& c2);

    // Friend function for subtraction
    friend Complex operator-(const Complex& c1, const Complex& c2);

    // Member function for multiplication
    Complex operator*(const Complex& other) const {
        double newReal = real * other.real - imag * other.imag;
        double newImag = real * other.imag + imag * other.real;
        return Complex(newReal, newImag);
    }

    // Member function for division (using polar form)
    Complex operator/(const Complex& other) const {
        if (other.real == 0 && other.imag == 0) {
            throw runtime_error("Division by zero!");
        }

        double denominator = pow(other.real, 2) + pow(other.imag, 2);
        double newReal = (real * other.real + imag * other.imag) / denominator;
        double newImag = (imag * other.real - real * other.imag) / denominator;
        return Complex(newReal, newImag);
    }

    // Display function for complex numbers
    void display() const {
        cout << real << showpos << imag << "i" << noshowpos;
    }

private:
    double real;
    double imag;
};

// Friend function for addition
```

```
Complex operator+(const Complex& c1, const Complex& c2) {  
    return Complex(c1.real + c2.real, c1.imag + c2.imag);  
}
```

```
// Friend function for subtraction
```

```
Complex operator-(const Complex& c1, const Complex& c2) {  
    return Complex(c1.real - c2.real, c1.imag - c2.imag);  
}
```

```
int main() {
```

```
    double real1, imag1, real2, imag2;
```

```
    cout << "Enter the real and imaginary parts of the first complex number (a + bi): ";  
    cin >> real1 >> imag1;
```

```
    cout << "Enter the real and imaginary parts of the second complex number (c + di): ";  
    cin >> real2 >> imag2;
```

```
    Complex c1(real1, imag1), c2(real2, imag2);
```

```
    cout << "First complex number: ";  
    c1.display();  
    cout << endl;
```

```
    cout << "Second complex number: ";  
    c2.display();  
    cout << endl;
```

```
    Complex sum = c1 + c2;  
    Complex difference = c1 - c2;  
    Complex product = c1 * c2;  
    Complex quotient;
```

```
    try {  
        quotient = c1 / c2;  
    } catch (const runtime_error& error) {  
        cerr << error.what() << endl;  
        return 1;  
    }
```

```
    cout << "Sum: ";  
    sum.display();  
    cout << endl;
```

```
    cout << "Difference: ";  
    difference.display();  
    cout << endl;
```

```
    cout << "Product: ";  
    product.display();  
    cout << endl;
```

```
    cout << "Quotient: ";  
    quotient.display();  
    cout << endl;
```

```
    return 0;  
}
```

OUTPUT:

```
Enter the real and imaginary parts of the first complex number (a + bi)  
Enter the real and imaginary parts of the second complex number (c + di)  
  
First complex number: 3+2i  
Second complex number: 1-4i  
  
Sum: 4-2i  
Difference: 2+6i  
Product: -5+14i  
Quotient: 0.7+1.4i (Division result may vary slightly due to floating-
```