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PRN - B24cCE1079

Subject - Object Oriented Programming

Assignment 4

PROGRAM

/*PROBLEM STATEMENT: Implement a class Complex which represents the Complex Number.

Implement the following functions Using Operator Overloading:

1. Constructors (Include all constructor types)
2. Overload operator + to add two complex numbers using member function
3. Overload operator * to multiply two complex numbers using friend function
4. Overload operators << and >> to output and accept Complex Numbers

*/

```
#include <iostream>
using namespace std;
```

```
class complex {
    float real, imag;
public:
    complex() { real = 0; imag = 0; }
    complex(float a, float b) {
        real = a;
        imag = b;
    }
}
```

```
// Overload + operator
complex operator+(const complex &c) {
    return complex(real + c.real, imag + c.imag);
}
```

```
// Friend function to multiply two complex numbers
friend complex operator*(const complex &c1, const complex &c2);
```

```
// Overload << and >> as friend function
friend ostream& operator>>(ostream &in, complex &c);
friend ostream& operator<<(ostream &out, const complex &c);
};
```

```
// Define multiplication
complex operator*(const complex &c1, const complex &c2) {
```

```

    float r = c1.real * c2.real - c1.imag * c2.imag;
    float i = c1.real * c2.imag + c1.imag * c2.real;
    return complex(r, i);
}

// Define >> operator
istream& operator>>(istream &in, complex &c) {
    cout << "Enter real part: ";
    in >> c.real;
    cout << "Enter imaginary part: ";
    in >> c.imag;
    return in;
}

// Define << operator
ostream& operator<<(ostream &out, const complex &c) {
    out << c.real<<" + i";
    out << c.imag;
    return out;
}

int main() {
    complex c1, c2;

    // Input complex numbers using >>
    cout << "Enter first complex number:\n";
    cin >> c1;
    cout << "Enter second complex number:\n";
    cin >> c2;

    // Output complex numbers using <<
    cout << "First complex number: " << c1 << endl;
    cout << "Second complex number: " << c2 << endl;

    complex sum = c1 + c2;
    complex product = c1 * c2;

    cout << "Sum: " << sum << endl;
    cout << "Product: " << product << endl;

    return 0;
}

```

```
Enter first complex number:  
Enter real part: 3  
Enter imaginary part: 4  
Enter second complex number:  
Enter real part: 5  
Enter imaginary part: 2  
First complex number:  $3+i4$   
Second complex number:  $5+i2$   
Sum:  $8+i6$   
Product:  $7+i26$ 
```