

/*Title : Implement a class Complex which represents the Complex Number data type.

Implement the following operations :

1. A constructor (including a default constructor which creates the complex number 0+0i).

2. Overloaded operator + to add two complex numbers.

3. Overloaded operator * to multiply two complex numbers.

4. Overloaded <<and>>to print and read complex numbers.*/

```
#include <iostream>
```

```
using namespace std;
```

```
//Creating a class complex
```

```
class Complex{
```

```
private:
```

```
int real;
```

```
int imag;
```

```
public:
```

```
//Default Constructor which creates complex number 0 + 0i
```

```
Complex() : real(0), imag(0) {}
```

```
//Member function
```

```
void setValue(int,int);
```

```
void display();
```

```
//Operator Overloading
```

```
Complex operator* (Complex &b);
```

```
Complex operator+ (Complex &d);
```

```
//Friend Function
```

```
friend void operator<<(ostream &output,Complex &s);
```

```
friend void operator>>(istream &input,Complex &q);
```

```
};
```

```
//Member Function Definitions
```

```
void Complex::setValue(int c, int d){
```

```
    real = c;
```

```
    imag = d;
```

```
}
```

```
void Complex::display(){
```

```
    cout<<"Complex Number is "<<real<<" + "<<imag<<"i"<<endl;
```

```
}
```

```
//Friend Function Definiton
```

```
void operator<<(ostream &output,Complex &s){
```

```
    output<<s.real<<"+"<<s.imag<<"i";
```

```
}
```

```
void operator>>(istream &input,Complex &q){
```

```
    input>>q.real>>q.imag;
```

```
}
```

```
//operator Overloading definitons
```

```
Complex Complex::operator*(Complex &b){
```

```
    Complex c;
```

```
    c.real = real * b.real - imag * b.imag; // Correct multiplication formula
```

```
    c.imag = real * b.imag + imag * b.real; // Correct multiplication formula
```

```
    return c;
```

```
}
```

```
Complex Complex::operator+(Complex &d){
```

```
    Complex c;
```

```
    c.real = real + d.real;
```

```
    c.imag = imag + d.imag;
```

```
    return c;
```

```
}  
//Main Function  
int main(){  
    Complex c1,c2,c3,c4;  
    //Input first complex number  
    cout<<"Enter the first number"<<endl;  
    cin>>c3;  
    cout<<"First Object is:\n"<<c3;  
    //Input second complex number  
    cout<<"\nEnter the second number"<<endl;  
    cin>>c4;  
    cout<<"Second Object is:\n"<<c4;  
    //Perform Addition and multiplication  
    c1 = c3 + c4;  
    c2 = c3 * c4;  
    //OUTPUT RESULT  
    cout<<"\nResults are: Addition is:"<<c1;  
    cout<<"\nMultiplication is:"<<c2;  
    return 0;  
}
```