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Title : C++ program for Complex Number Arithmetic using Operator Overloading

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### **//Program:**

```
#include<iostream>
```

```
#include<math.h>
```

```
using namespace std;
```

```
class complex
```

```
{
```

```
    public:
```

```
    int real,imag;
```

```
    complex()
```

```
    {
```

```
        int r=0,i=0;
```

```
        real=r;
```

```
        imag=i;
```

```
    }
```

```
    friend istream & operator >>(istream &,complex &);
```

```
    friend ostream & operator <<(ostream &,const complex &);
```

```
    friend void operator +(complex &,complex &);
```

```
    friend void operator -(complex &,complex &);
```

```
    friend void operator *(complex &,complex &);
```

```
    friend void operator /(complex &,complex &);
```

```
};

istream & operator >>(istream &in,complex &c)
{
    cout<<"Real part= ";
    in>>c.real;
    cout<<"Imaginary part= ";
    in>>c.imag;

}
```

```
ostream & operator <<(ostream &out,const complex &c)
{
    out<<c.real;
    out<<" +i" << "(" <<c.imag<< ")" << endl;

}
```

```
void operator +(complex &c1,complex &c2)
{
    int real,imag;
    real=c1.real+c2.real;
    imag=c1.imag+c2.imag;
    cout<<"Addition of two complex obj= " <<real<<" +i" <<imag<<endl;

}
```

```
void operator -(complex&c1,complex&c2)
{
    int real,imag,x;
    real=c1.real-c2.real;
    imag=c1.imag-c2.imag;
    cout<<"Subtration of two complex objects.= ";
    cout<<real<<" +i" << "(" <<imag<< ")" << endl;
```

```

}

void operator *(complex &c1,complex &c2)
{
    int mul;

    mul=c1.real*c2.real+c1.real*c2.imag+c1.imag*c2.real+c1.imag*c2.imag;

    cout<<"Multiplication of two complex objects="
    "<<c1.real*c2.real<<"+"i"<<"("<<c1.real*c2.imag<<"")<<"+"i"<<"("<<c1.imag*c2.real<<"
    ")<<"+"<<c1.imag*c2.imag<<endl;
}

void operator /(complex &c1,complex &c2)
{
    float div_real;
    float div_imag;

    div_real=(c1.real*c2.real+c1.imag*c2.imag)/(pow(c2.real,2)+pow(c2.imag,2));
    div_imag=(c1.imag*c2.real-c1.real*c2.imag)/(pow(c2.real,2)+pow(c2.imag,2));

    cout<<"Division of two complex obj.=
    ("<<div_real<<")+("<<div_imag<<"i"<<endl;
}

int main()
{
    complex c1;
    cin>>c1;
    cout<<"the complex object = ";
    cout<<c1;
    complex c2;
    cin>>c2;
    cout<<"the complex object = ";
    cout<<c2;
    int ch;
    while(1)
    {

```

```

cout<<"1.ADDITION OF COMPLEX NO."<<endl;
cout<<"2.SUBTRACTION OF COMPLEX NO."<<endl;
cout<<"3.MULTIPLICATION OF COMPLEX NO."<<endl;
cout<<"4.DIVISION OF COMPLEX NO."<<endl;
cout<<"Enter Your Choice"<<endl;
cin>>ch;
switch(ch)
{
    case 1:c1+c2;
        break;
    case 2:c1-c2;
        break;
    case 3:c1*c2;
        break;
    case 4:c1/c2;
        break;

}

}

}

/*

```

## OUTPUT:

Real part= -3

Imaginary part= 5

the complex object =  $-3+i(5)$

Real part= -3

Imaginary part= 1

the complex object =  $-3+i(1)$

1.ADDITION OF COMPLEX NO.

2.SUBTRACTION OF COMPLEX NO.

3.MULTIPLICATION OF COMPLEX NO.

4.DIVISION OF COMPLEX NO.

Enter Your Choice

1

Addition of two complex obj=  $-6+i6$

1.ADDITION OF COMPLEX NO.

2.SUBTRACTION OF COMPLEX NO.

3.MULTIPLICATION OF COMPLEX NO.

4.DIVISION OF COMPLEX NO.

Enter Your Choice

2

Subtraction of two complex objects.=  $0+i(4)$

1.ADDITION OF COMPLEX NO.

2.SUBTRACTION OF COMPLEX NO.

3.MULTIPLICATION OF COMPLEX NO.

4.DIVISION OF COMPLEX NO.

Enter Your Choice

3

Multiplication of two complex objects=  $9+i(-3)+i(-15)+5$

1.ADDITION OF COMPLEX NO.

2.SUBTRACTION OF COMPLEX NO.

3.MULTIPLICATION OF COMPLEX NO.

4.DIVISION OF COMPLEX NO.

Enter Your Choice

4

Division of two complex obj.=  $(1.4)+(-1.2)i$

1.ADDITION OF COMPLEX NO.

2.SUBTRACTION OF COMPLEX NO.

3.MULTIPLICATION OF COMPLEX NO.

4.DIVISION OF COMPLEX NO.

Enter Your Choice

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