

```
4
5 struct Complex
6 {
7     double realValue;
8     double imagValue;
9 };
10
11 void display(const Complex &c)
12 {
13     if (c.realValue == 0 && c.imagValue == 0)
14         cout << "0" << endl;
15     else if (c.realValue == 0)
16         cout << c.imagValue << "i" << endl;
17     else if (c.imagValue == 0)
18         cout << c.realValue << endl;
19     else
20     {
21         if (c.imagValue > 0)
22             cout << c.realValue << "+" << c.imagValue << "i" << endl;
23         else if (c.imagValue < 0)
24             cout << c.realValue << c.imagValue << "i" << endl;
25     }
26 }
27
28 Complex conjugate(const Complex &c)
29 {
30     Complex conj = c;
31     if (c.imagValue != 0)
32         conj.imagValue *= -1;
33
34     return conj;
```

```
4
5 class Complex
6 {
7 private:
8     double realValue;
9     double imagValue;
10 public:
11     double getRealValue() const
12     {
13         return realValue;
14     }
15     double getImagValue() const
16     {
17         return imagValue;
18     }
19     void setRealValue(double r)
20     {
21         realValue = r;
22     }
23     void setImagValue(double i)
24     {
25         imagValue = i;
26     }
27 };
28
29 void display(const Complex &c)
30 {
31     if (c.getRealValue() == 0 && c.getImagValue() == 0)
32         cout << "0" << endl;
33     else if (c.getRealValue() == 0)
34         cout << c.getImagValue() << "i" << endl;
35     else if (c.getImagValue() == 0)
36         cout << c.getRealValue() << endl;
37     else
38     {
39         if (c.getImagValue() > 0)
40             cout << c.getRealValue() << "+" << c.getImagValue() << "i" << endl;
41         else if (c.getImagValue() < 0)
42             cout << c.getRealValue() << c.getImagValue() << "i" << endl;
43     }
44 }
45
46 Complex conjugate(const Complex &c)
47 {
48     Complex conj = c;
49     if (c.getImagValue() != 0)
50         conj.setImagValue(c.getImagValue() * -1);
51
52     return conj;
```

```

35 }
36
37 Complex sum(const Complex &c1, const Complex &c2)
38 {
39     Complex c3;
40     c3.realValue = c1.realValue + c2.realValue;
41     c3.imagValue = c1.imagValue + c2.imagValue;
42     return c3;
43 }
44 Complex difference(const Complex &c1, const Complex &c2)
45 {
46     Complex c3;
47     c3.realValue = c1.realValue - c2.realValue;
48     c3.imagValue = c1.imagValue - c2.imagValue;
49     return c3;
50 }
51 Complex multiply(const Complex &c1, const Complex &c2)
52 {
53     Complex c3;
54     c3.realValue = (c1.realValue * c2.realValue) - ((c1.imagValue * c2.imagValue));
55     c3.imagValue = (c1.realValue*c2.imagValue) + (c1.imagValue*c2.realValue);
56     return c3;
57 }
58
59 int main()
60 {
61     Complex w;
62     w.realValue = 2;
63     w.imagValue = 0;
64     display(w);
65     cout << endl;
66
67     Complex x;
68     x.realValue = -4;
69     x.imagValue = -2;
70     display(x);
71     cout << endl;
72
73     Complex y;
74     y.realValue = 5;
75     y.imagValue = -1;
76     display(y);
77     cout << endl;
78
79     Complex z;
80     z.realValue = 0;
81     z.imagValue = -1;
82     display(z);
83     cout << endl;
84
85     Complex result = difference(multiply(sum(w, z), conjugate(x)), y);
86     cout << "Result = ";
87     display(result);
88
89     return 0;
90 }

```

```

56 }
57
58 Complex sum(const Complex &c1, const Complex &c2)
59 {
60     Complex c3;
61     c3.setRealValue(c1.getRealValue() + c2.getRealValue());
62     c3.setImagValue(c1.getImagValue() + c2.getImagValue());
63     return c3;
64 }
65 Complex difference(const Complex &c1, const Complex &c2)
66 {
67     Complex c3;
68     c3.setRealValue(c1.getRealValue() - c2.getRealValue());
69     c3.setImagValue(c1.getImagValue() - c2.getImagValue());
70     return c3;
71 }
72 Complex multiply(const Complex &c1, const Complex &c2)
73 {
74     Complex c3;
75     c3.setRealValue((c1.getRealValue() * c2.getRealValue()) - ((c1.getImagValue() *
76     c2.getImagValue())));
77     c3.setImagValue((c1.getRealValue()*c2.getImagValue()) +
78     (c1.getImagValue()*c2.getRealValue()));
79     return c3;
80 }
81 int main()
82 {
83     Complex w;
84     w.setRealValue(2);
85     w.setImagValue(0);
86     display(w);
87     cout << endl;
88
89     Complex x;
90     x.setRealValue(-4);
91     x.setImagValue(-2);
92     display(x);
93     cout << endl;
94
95     Complex y;
96     y.setRealValue(5);
97     y.setImagValue(-1);
98     display(y);
99     cout << endl;
100
101     Complex z;
102     z.setRealValue(0);
103     z.setImagValue(-1);
104     display(z);
105     cout << endl;
106
107     Complex result = difference(multiply(sum(w, z), conjugate(x)), y);
108     cout << "Result = ";
109     display(result);
110
111     return 0;
112 }

```