```
1 // Justin Dang Student ID: 1148267
 2 /*
 3 Instantiates and prints two complex numbers
 5 checks if the complex numbers are equal to each other
 6
   Calculates, stores, and prints the sum, difference, and product of the two
 7
     numbers
 8
 9 Calculates and prints the cubes of both complex numbers
10 */
11
12 #include <iostream>
13 using namespace std;
14
15 class CNumber {
16
       friend ostream& operator << (ostream&, const CNumber&);</pre>
        friend istream& operator >> (istream&, CNumber&);
17
   public:
18
       CNumber(float = 0.0, float = 0.0);
19
20
21
       CNumber operator + (const CNumber& rhs) const {
22
           return CNumber(num1 + rhs.num1, num2 + rhs.num2);
23
        }
        CNumber operator - (const CNumber& rhs) const {
24
25
           return CNumber(num1 - rhs.num1, num2 - rhs.num2);
26
        }
27
       CNumber operator * (const CNumber& rhs) const {
28
           return CNumber(((num1 * rhs.num1) - (num2 * rhs.num2)), ((num1 *
              rhs.num2) + (num2 * rhs.num1)));
29
        }
30
        bool operator == (const CNumber& rhs) const {
31
           return (num1 == rhs.num1 && num2 == rhs.num2);
32
        }
33
       bool operator != (const CNumber& rhs) const {
            return (num1 != rhs.num1 || num2 != rhs.num2);
34
35
        }
36
       CNumber& operator ++ () {
37
           CNumber temp = *this; // 1
            num1 = (temp.num1 * temp.num1 * temp.num1) - ((float)3 * temp.num1 *
38
              (temp.num2 * temp.num2));// 2
           num2 = ((float)3 * (temp.num1 * temp.num1) * temp.num2) - (temp.num2 *
39
              temp.num2 * temp.num2);//3
40
           return *this;// 4
41
42
        }
43
       CNumber operator ++ (int) {
44
           CNumber temp = *this;
45
46
           num1 = (temp.num1 * temp.num1 * temp.num1) - ((float)3 * temp.num1 *
              (temp.num2 * temp.num2));
47
           num2 = ((float)3 * (temp.num1 * temp.num1) * temp.num2) - (temp.num2 *
```

```
temp.num2 * temp.num2);
48
49
            return temp;
50
        }
51
        void SetNum1(float);
52
        void SetNum2(float);
53 private:
54
        float num1, num2;
55 };
56 CNumber::CNumber(float a, float b) {
57
        SetNum1(a);
58
        SetNum2(b);
59 }
60 void CNumber::SetNum1(float a) {
61
        num1 = a;
62 }
63 void CNumber::SetNum2(float a) {
64
        num2 = a;
65 }
66 ostream& operator << (ostream& output, const CNumber& cNum) {
67
        if (cNum.num2 >= 0) {
            output << cNum.num1 << '+' << cNum.num2 << 'i';
68
69
70
        else if (cNum.num2 <= 0) {</pre>
71
            output << cNum.num1 << cNum.num2 << 'i';
72
        }
73
        return output;
74 }
75 istream& operator >> (istream& input, CNumber& cNum) {
76
        input >> cNum.num1 >> cNum.num2;
77
        return input;
78 }
79
80 int main()
81 {
        CNumber num1, num2(10.0, 5.0), num3;
82
83
84
85
86
        cout << "1st complex number: " << num1 << endl;</pre>
        cout << "2nd complex number: " << num2 << "\n\n";</pre>
87
88
89
        if (num1 == num2)
            cout << num1 << " is equal to " << num2 << "\n\n";</pre>
90
91
        else if (num1 != num2)
92
            cout << num1 << " is not equal to " << num2 << "\n\n";</pre>
93
94
        num3 = num1 + num2;
        cout << "The sum of the complex numbers is: " << num3 << "\n\n";</pre>
95
96
97
        num3 = num1 - num2;
98
        cout << "The difference of the complex numbers is: " << num3 << "\n\n";</pre>
```

```
99
100
         num3 = num1 * num2;
         cout << "The product of the complex numbers is: " << num3 << "\n\n";</pre>
101
102
103
104
105
         num1++;
         cout << "The cube of num 1 is: " << num1 << endl;</pre>
106
107
108
         num2++;
109
         cout << "The cube of num 2 is: " << num2 << endl;</pre>
110
         return 0;
111 }
112 /*
113 1st complex number: 0+0i
114 2nd complex number: 10+5i
115
116 0+0i is not equal to 10+5i
117
118 The sum of the complex numbers is: 10+5i
119
120 The difference of the complex numbers is: -10-5i
121
122 The product of the complex numbers is: 0+0i
123
124 The cube of num 1 is: 0+0i
125 The cube of num 2 is: 250+1375i
126 */
127
```