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1  // Justin Dang Student ID: 1148267
2  /*
3  Instantiates and prints two complex numbers
4
5  Calculates, stores, and prints the sum, difference, and product of the two
     numbers
6
7  Calculates and prints the cubes of both complex numbers
8  */
9
10 #include <iostream>
11 using namespace std;
12
13 class CNumber {
14 public:
15     CNumber(float = 0.0, float = 0.0);
16
17     void SetNum1(float);
18     void SetNum2(float);
19     float GetNum1();
20     float GetNum2();
21
22     void Add(CNumber, CNumber, float &, float &);
23     void Subtract(CNumber, CNumber, float &, float &);
24     void Product(CNumber, CNumber, float &, float &);
25
26     void PrintNum(CNumber);
27     void Cube(CNumber);
28 private:
29     float num1, num2;
30 };
31 CNumber::CNumber(float a, float b){
32     SetNum1(a);
33     SetNum2(b);
34 }
35 void CNumber::SetNum1(float a) {
36     num1 = a;
37 }
38 void CNumber::SetNum2(float a) {
39     num2 = a;
40 }
41 float CNumber::GetNum1() {
42     return num1;
43 }
44 float CNumber::GetNum2() {
45     return num2;
46 }
47 void CNumber::Add(CNumber a, CNumber b, float &c, float &d) {
48     float num1 = a.GetNum1();
49     float num2 = a.GetNum2();
50     float num3 = b.GetNum1();
51     float num4 = b.GetNum2();
```

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52
53      c = num1 + num3;
54      d = num2 + num4;
55  }
56  void CNumber::Subtract(CNumber a, CNumber b, float &c, float &d) {
57      float num1 = a.GetNum1();
58      float num2 = a.GetNum2();
59      float num3 = b.GetNum1();
60      float num4 = b.GetNum2();
61
62      c = num1 - num3;
63      d = num2 - num4;
64  }
65  void CNumber::Product(CNumber a, CNumber b, float &c, float &d) {
66      float num1 = a.GetNum1();
67      float num2 = a.GetNum2();
68      float num3 = b.GetNum1();
69      float num4 = b.GetNum2();
70
71      c = ((num1 * num3) - (num2 * num4));
72      d = ((num1 * num4) + (num2 * num3));
73  }
74  void CNumber::PrintNum(CNumber a) {
75      float num1 = a.GetNum1();
76      float num2 = a.GetNum2();
77      if (num2 > 0)
78          cout << num1 << "+" << num2 << 'i';
79      else if(num2 < 0)
80          cout << num1 << num2 << 'i';
81  }
82  void CNumber::Cube(CNumber i) {
83      float num1 = i.GetNum1();
84      float num2 = i.GetNum2();
85      float a, b;
86
87      a = (num1 * num1 * num1) - ((float)3 * num1 * (num2 * num2));
88      b = ((float)3 * (num1 * num1) * num2) - (num2 * num2 * num2);
89
90      if(b >= 0)
91          cout << "The cube of ( " << num1 << "+" << num2 << "i ) is: "
92          << a << "+" << b << 'i' << "\n\n";
93      else if(b <= 0)
94          cout << "The cube of ( " << num1 << num2 << "i ) is: "
95          << a << b << 'i' << "\n\n";
96  }
97
98  int main()
99  {
100     CNumber num1, num2;
101     float sNum1, sNum2, dNum1, dNum2, pNum1, pNum2;
102
103     sNum1 = sNum2 = dNum1 = dNum2 = pNum1 = pNum2 = 0.0;
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```
104     num2.SetNum1(5.0);
105     num2.SetNum2(5.0);
106
107     num1.Add(num1, num2, sNum1, sNum2);
108     if (sNum2 >= 0){
109         cout << "1st complex number: " << num1.GetNum1() << '+' << num1.GetNum2()
               << 'i' << endl;
110         cout << "2nd complex number: " << num2.GetNum1() << '+' << num2.GetNum2()
               << 'i' << "\n\n";
111         cout << "The sum of the complex numbers is: " << sNum1 << '+' << sNum2 <<
               'i' << "\n\n";
112     }
113     else if (sNum2 <= 0) {
114         cout << "1st complex number: " << num1.GetNum1() << num1.GetNum2() << 'i'
               << endl;
115         cout << "2nd complex number: " << num2.GetNum1() << num2.GetNum2() << 'i'
               << "\n\n";
116         cout << "The sum of the complex numbers is: " << sNum1 << sNum2 << 'i' <<
               "\n\n";
117     }
118
119     num1.Subtract(num1, num2, dNum1, dNum2);
120     if (dNum2 >= 0) {
121         cout << "The difference of the complex numbers is: " << dNum1 << '+' <<
              dNum2 << 'i' << "\n\n";
122     }
123     else if (dNum2 <= 0) {
124         cout << "The difference of the complex numbers is: " << dNum1 << dNum2 <<
               'i' << "\n\n";
125     }
126
127     num1.Product(num1, num2, pNum1, pNum2);
128     if (pNum2 >= 0) {
129         cout << "The product of the complex numbers is: " << pNum1 << '+' <<
              pNum2 << 'i' << "\n\n";
130     }
131     else if (pNum2 <= 0) {
132         cout << "The product of the complex numbers is: " << pNum1 << pNum2 <<
              'i' << "\n\n";
133     }
134
135     num1.Cube(num1);
136
137     num2.Cube(num2);
138
139     return 0;
140 }
141 /*
142 1st complex number: 0+0i
143 2nd complex number: 10+5i
144
145 The sum of the complex numbers is: 10+5i
```

```
146
147 The difference of the complex numbers is: -10-5i
148
149 The product of the complex numbers is: 0+0i
150
151 The cube of ( 0+0i ) is: 0+0i
152
153 The cube of ( 10+5i ) is: 250+1375i
154 */
```