Source File: ~/1337/61/lab61.(C|CPP|cpp|c++|cc|cxx|cp)
Input: Under control of `main` function
Output: Under control of `main` function
Value: 2

The purpose of this assignment is to develop the implementation for the `RealNumber` class. A header file containing the specification is shown in Figure 1, a sample `main` function for testing your implementation is shown in Figure 2, and a sample execution sequence is shown in Figure 3. To use the `Makefile` as distributed in class, add a target of `lab61` to `targets2srcfiles`.

```
1   #ifndef LAB61_H
2   #define LAB61_H
3
4   using namespace std;
5
6   class RealNumber
7   {
8    public:
9     RealNumber(double x = 0.0);      // Initializes realValue
10    int round() const;               // Returns realValue rounded to the
11                                      // nearest integer
12    int wholePart() const;           // Returns the integer part of realValue
13    double fracPart() const;         // Returns the fractional part of realValue
14    double getReal() const;          // Returns realValue
15    void setReal(double x);          // Sets realValue to x
16   private:
17    double realValue;
18  };
19
20  #endif
```

Figure 1. `/usr/local/1337/include/lab61.h`

```
1   #include <iostream>
2   #include <iomanip>
3   #include <lab61.h>
4
5   using namespace std;
6
7   void testRealNumberFunctions(ostream&, const RealNumber&, string);
8
9   int main()
10  {
11     RealNumber x, y(5.25);
12
13     // Prepare for floating-point output format
14     cout << fixed << showpoint << setprecision(2);
15
```

Figure 2. `/usr/local/1337/src/lab61main.C` (Part 1 of 2)

```
16    testRealNumberFunctions(cout, x, "x");
17    testRealNumberFunctions(cout, y, "y");
18
19    x.setReal(x.getReal() + y.getReal() + 0.5);
20    testRealNumberFunctions(cout, x, "x");
21
22    y.setReal(y.getReal() * -1.0);
23    testRealNumberFunctions(cout, y, "y");
24
25    y.setReal(y.getReal() - 0.5);
26    testRealNumberFunctions(cout, y, "y");
27
28    x.setReal(1362.5);
29    testRealNumberFunctions(cout, x, "x");
30
31    y.setReal(-1362.5);
32    testRealNumberFunctions(cout, y, "y");
33
34    return 0;
35  }
36
37  void testRealNumberFunctions(ostream& out, const RealNumber& realNum,
38                               string variableName)
39  {
40    out << variableName + ".getReal() = " << realNum.getReal() << endl;
41    out << variableName + ".round() = " << realNum.round() << endl;
42    out << variableName + ".wholePart() = " << realNum.wholePart() << endl;
43    out << variableName + ".fracPart() = " << realNum.fracPart() << endl << endl;
44  }
```

Figure 2. `/usr/local/1337/src/lab61main.C` (Part 2 of 2)

```
1   newuser@csunix ~> cd 1337
2   newuser@csunix ~/1337> mkdir 61
3   newuser@csunix ~/1337> cd 61
4   newuser@csunix ~/1337/61> cp /usr/local/1337/data/61/* .
5   newuser@csunix ~/1337/61> cp /usr/local/1337/include/lab61.h .
6   newuser@csunix ~/1337/61> cp /usr/local/1337/src/lab61main.C .
7   newuser@csunix ~/1337/61> cp /usr/local/1337/src/Makefile .
8   newuser@csunix ~/1337/61> touch lab61.cpp
9   newuser@csunix ~/1337/61> # Edit Makefile and lab61.cpp
10  newuser@csunix ~/1337/61> make lab61
11  g++ -g -Wall -std=c++11 -c lab61main.C -I/usr/local/1337/include -I.
12  g++ -g -Wall -std=c++11 -c lab61.cpp -I/usr/local/1337/include -I.
13  g++ -o lab61 lab61main.o lab61.o -L/usr/local/1337/lib -lm -lbits
```

Figure 3. Commands to Compile, Link, & Run Lab 61 (Part 1 of 2)

```
14   newuser@csunix ~/1337/61> cat 01.dat
15   newuser@csunix ~/1337/61> cat 01.dat | ./lab61
16   x.getReal() = 0.00
17   x.round() = 0
18   x.wholePart() = 0
19   x.fracPart() = 0.00
20
21   y.getReal() = 5.25
22   y.round() = 5
23   y.wholePart() = 5
24   y.fracPart() = 0.25
25
26   x.getReal() = 5.75
27   x.round() = 6
28   x.wholePart() = 5
29   x.fracPart() = 0.75
30
31   y.getReal() = -5.25
32   y.round() = -5
33   y.wholePart() = -5
34   y.fracPart() = -0.25
35
36   y.getReal() = -5.75
37   y.round() = -6
38   y.wholePart() = -5
39   y.fracPart() = -0.75
40
41   x.getReal() = 1362.50
42   x.round() = 1363
43   x.wholePart() = 1362
44   x.fracPart() = 0.50
45
46   y.getReal() = -1362.50
47   y.round() = -1363
48   y.wholePart() = -1362
49   y.fracPart() = -0.50
50
51   newuser@csunix ~/1337/61> cat 01.dat | ./lab61 > my.out
52   newuser@csunix ~/1337/61> diff 01.out my.out
53   newuser@csunix ~/1337/61>
```

Figure 3. Commands to Compile, Link, & Run Lab 61 (Part 2 of 2)