Source File: `~/1337/37/lab37.(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 write two different versions of the same function. The description and prototype of each of the functions can be found in the `main` function shown in Figure 1. A sample execution sequence is shown in Figure 2. To use the `Makefile` as distributed in class, add a target of `lab37` to `targets2srcfiles`.

```
1  #include <iostream>
2  #include <cstdlib>
3
4  using namespace std;
5
6  // reverseArrayUsingIndexing:  Using indexing, this function reverses
7  // the elements of the n-element integer array in place; that is, the
8  // function exchanges the first and last elements, the second and
9  // next-to-last elements, and so on.
10 void reverseArrayUsingIndexing(int array[], int n);
11
12 // reverseArrayUsingPointers:  Using pointers, this function reverses
13 // the elements of the n-element integer array in place; that is, the
14 // function exchanges the first and last elements, the second and
15 // next-to-last elements, and so on.
16 void reverseArrayUsingPointers(int *array, int n);
17
18 // printArrayUsingPointers:  prints the n-element integer array to
19 // output stream os; the function uses pointers
20 void printArrayUsingPointers(const int *array, int n, ostream& os);
21
22 int main()
23 {
24   int i, array[100], *ptr;
25
26   i = 0;
27   ptr = array;
28   while (i < 100 && cin >> *ptr++)
29     i++;
30
31   if (i == 0)
32     cout << "No data" << endl;
33   else
34   {
35     cout << "Before call to reverseArrayUsingIndexing()" << endl;
36     printArrayUsingPointers(array, i, cout);
37     reverseArrayUsingIndexing(array, i);
```

Figure 1. `/usr/local/1337/src/lab37main.C` (Part 1 of 2)

```
38      cout << "After call to reverseArrayUsingIndexing()" << endl;
39      printArrayUsingPointers(array, i, cout);
40      reverseArrayUsingPointers(array, i);
41      cout << "After call to reverseArrayUsingPointers()" << endl;
42      printArrayUsingPointers(array, i, cout);
43    }
44
45    return EXIT_SUCCESS;
46  }
47
48  void printArrayUsingPointers(const int *array, int n, ostream& os)
49  {
50    const int *ptr;
51    const int *const endPtr = array + n;
52
53    if (n > 0)
54    {
55      os << "array" << endl << '{' << endl;
56      for (ptr = array; ptr < endPtr; ++ptr)
57        os << "  [" << ptr - array << "] = " << *ptr << endl;
58      os << '}' << endl;
59    }
60  }
```

Figure 1. `/usr/local/1337/src/lab37main.C` (Part 2 of 2)

```
newuser@csunix ~> cd 1337
newuser@csunix ~/1337> mkdir 37
newuser@csunix ~/1337> cd 37
newuser@csunix ~/1337/37> cp /usr/local/1337/data/37/* .
newuser@csunix ~/1337/37> cp /usr/local/1337/src/lab37main.C .
newuser@csunix ~/1337/37> cp /usr/local/1337/src/Makefile .
newuser@csunix ~/1337/37> touch lab37.cpp
newuser@csunix ~/1337/37> # Edit Makefile and lab37.cpp
newuser@csunix ~/1337/37> make lab37
g++ -g -Wall -std=c++11 -c lab37main.C -I/usr/local/1337/include -I.
g++ -g -Wall -std=c++11 -c lab37.cpp -I/usr/local/1337/include -I.
g++ -o lab37 lab37main.o lab37.o -L/usr/local/1337/lib -lm -lbits
newuser@csunix ~/1337/37> cat 01.dat
6 2 -6
newuser@csunix ~/1337/37> cat 01.dat | ./lab37
Before call to reverseArrayUsingIndexing()
array
{
  [0] = 6
  [1] = 2
  [2] = -6
}
After call to reverseArrayUsingIndexing()
array
{
  [0] = -6
  [1] = 2
  [2] = 6
}
After call to reverseArrayUsingPointers()
array
{
  [0] = 6
  [1] = 2
  [2] = -6
}
newuser@csunix ~/1337/37> cat 01.dat | ./lab37 > my.out
newuser@csunix ~/1337/37> diff 01.out my.out
newuser@csunix ~/1337/37> cat 02.dat | ./lab37 > my.out
newuser@csunix ~/1337/37> diff 02.out my.out
newuser@csunix ~/1337/37>
```

Figure 2. Commands to Compile, Link, & Run Lab 37