Source File: `~/1337/38/lab38.(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 `lab38` to `targets2srcfiles`.

```
1  #include <iostream>
2  #include <iomanip>
3  #include <cstdlib>
4
5  using namespace std;
6
7  // isIncreasingUsingIndexing:  Using indexing, this function returns
8  // true if the elements of the n-element array are in increasing
9  // order; that is, array[i] < array[i+1] for i = 0, 1, 2, ..., n-2.
10 // The function returns false otherwise.
11 bool isIncreasingUsingIndexing(const int array[], int n);
12
13 // isIncreasingUsingPointers:  Using pointers, this function returns
14 // true if the elements of the n-element array are in increasing
15 // order and false otherwise.
16 bool isIncreasingUsingPointers(const 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   bool answer;
26
27   i = 0;
28   ptr = array;
29   while (i < 100 && cin >> *ptr++)
30     i++;
31
32   if (i == 0)
33     cout << "No data" << endl;
```

Figure 1. `/usr/local/1337/src/lab38main.C` (Part 1 of 2)

```
34    else
35    {
36      printArrayUsingPointers(array, i, cout);
37      answer = isIncreasingUsingIndexing(array, i);
38      cout << boolalpha;
39      cout << "isIncreasingUsingIndexing(array, i) = " << answer << endl;
40      answer = isIncreasingUsingPointers(array, i);
41      cout << "isIncreasingUsingPointers(array, i) = " << answer << endl;
42    }
43
44    return EXIT_SUCCESS;
45  }
46
47  void printArrayUsingPointers(const int *array, int n, ostream& os)
48  {
49    const int *ptr;
50    const int *const endPtr = array + n;
51
52    if (n > 0)
53    {
54      os << "array" << endl << '{' << endl;
55      for (ptr = array; ptr < endPtr; ++ptr)
56        os << "  [" << ptr - array << "] = " << *ptr << endl;
57      os << '}' << endl;
58    }
59  }
```

Figure 1. `/usr/local/1337/src/lab38main.C` (Part 2 of 2)

```
newuser@csunix ~> cd 1337
newuser@csunix ~/1337> mkdir 38
newuser@csunix ~/1337> cd 38
newuser@csunix ~/1337/38> cp /usr/local/1337/data/38/* .
newuser@csunix ~/1337/38> cp /usr/local/1337/src/lab38main.C .
newuser@csunix ~/1337/38> cp /usr/local/1337/src/Makefile .
newuser@csunix ~/1337/38> touch lab38.cpp
newuser@csunix ~/1337/38> # Edit Makefile and lab38.cpp
newuser@csunix ~/1337/38> make lab38
g++ -g -Wall -std=c++11 -c lab38main.C -I/usr/local/1337/include -I.
g++ -g -Wall -std=c++11 -c lab38.cpp -I/usr/local/1337/include -I.
g++ -o lab38 lab38main.o lab38.o -L/usr/local/1337/lib -lm -lbits
newuser@csunix ~/1337/38> cat 01.dat
2305 1361 1362 1331 1341 1351
newuser@csunix ~/1337/38> cat 01.dat | ./lab38
array
{
  [0] = 2305
  [1] = 1361
  [2] = 1362
  [3] = 1331
  [4] = 1341
  [5] = 1351
}
isIncreasingUsingIndexing(array, i) = false
isIncreasingUsingPointers(array, i) = false
newuser@csunix ~/1337/38> cat 01.dat | ./lab38 > my.out
newuser@csunix ~/1337/38> diff 01.out my.out
newuser@csunix ~/1337/38> cat 02.dat | ./lab38 > my.out
newuser@csunix ~/1337/38> diff 02.out my.out
newuser@csunix ~/1337/38> cat 03.dat | ./lab38 > my.out
newuser@csunix ~/1337/38> diff 03.out my.out
newuser@csunix ~/1337/38>
```

Figure 2. Commands to Compile, Link, & Run Lab 38