

Source File: ~/1337/36/lab36.(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 lab36 to targets2srcfiles.

```
1  #include <iostream>
2  #include <cstdlib>
3
4  using namespace std;
5
6  // largestUsingIndexing: receives an n-element integer array and returns
7  // the index of the largest element; the function uses indexing
8  int largestUsingIndexing(const int array[], int n);
9
10 // largestUsingPointers: receives an n-element integer array and returns
11 // a pointer to the largest element; the function uses pointers
12 int *largestUsingPointers(const int *array, int n);
13
14 // printArrayUsingPointers: prints the n-element integer array to
15 // output stream os; the function uses pointers
16 void printArrayUsingPointers(const int *array, int n, ostream& os);
17
18 int main()
19 {
20     int i, array[100], *ptr, largestIndex, *largestPtr;
21
22     i = 0;
23     ptr = array;
24     while (i < 100 && cin >> *ptr)
25     {
26         i++;
27         ptr++;
28     }
29
30     if (i == 0)
31         cout << "No data" << endl;
32     else
33     {
34         printArrayUsingPointers(array, i, cout);
35         largestIndex = largestUsingIndexing(array, i);
36         cout << "Largest Using Indexing = " << array[largestIndex]
37             << " and located at index " << largestIndex << endl;
```

Figure 1. /usr/local/1337/src/lab36main.C (Part 1 of 2)

```
38     largestPtr = largestUsingPointers(array, i);
39     cout << "Largest Using Pointers = " << *largestPtr
40           << " and located at index " << largestPtr - array << endl;
41 }
42
43 return EXIT_SUCCESS;
44 }
45
46 void printArrayUsingPointers(const int *array, int n, ostream& os)
47 {
48     const int *ptr;
49     const int *const endPtr = array + n;
50
51     if (n > 0)
52     {
53         os << "array" << endl << '{' << endl;
54         for (ptr = array; ptr < endPtr; ++ptr)
55             os << " [" << ptr - array << "] = " << *ptr << endl;
56         os << '}' << endl;
57     }
58 }
```

Figure 1. /usr/local/1337/src/lab36main.C (Part 2 of 2)

```
1 newuser@csunix ~> cd 1337
2 newuser@csunix ~/1337> mkdir 36
3 newuser@csunix ~/1337> cd 36
4 newuser@csunix ~/1337/36> cp /usr/local/1337/data/36/* .
5 newuser@csunix ~/1337/36> cp /usr/local/1337/src/lab36main.C .
6 newuser@csunix ~/1337/36> cp /usr/local/1337/src/Makefile .
7 newuser@csunix ~/1337/36> touch lab36.cpp
8 newuser@csunix ~/1337/36> # Edit Makefile and lab36.cpp
9 newuser@csunix ~/1337/36> make lab36
10 g++ -g -Wall -std=c++11 -c lab36main.C -I/usr/local/1337/include -I.
11 g++ -g -Wall -std=c++11 -c lab36.cpp -I/usr/local/1337/include -I.
12 g++ -o lab36 lab36main.o lab36.o -L/usr/local/1337/lib -lm -lbits
13 newuser@csunix ~/1337/36> cat 01.dat
14 2305 1361 1362 1331 1341 1351
15 newuser@csunix ~/1337/36> cat 01.dat | ./lab36
16 array
17 {
18     [0] = 2305
19     [1] = 1361
20     [2] = 1362
21     [3] = 1331
22     [4] = 1341
23     [5] = 1351
24 }
25 Largest Using Indexing = 2305 and located at index 0
26 Largest Using Pointers = 2305 and located at index 0
27 newuser@csunix ~/1337/36> cat 01.dat | ./lab36 > my.out
28 newuser@csunix ~/1337/36> diff 01.out my.out
29 newuser@csunix ~/1337/36> cat 02.dat | ./lab36 > my.out
30 newuser@csunix ~/1337/36> diff 02.out my.out
31 newuser@csunix ~/1337/36> cat 03.dat | ./lab36 > my.out
32 newuser@csunix ~/1337/36> diff 03.out my.out
33 newuser@csunix ~/1337/36>
```

Figure 2. Commands to Compile, Link, & Run Lab 36