Source File: ~/1337/39/lab39.(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 `lab39` to `targets2srcfiles`.

```
1    #include <iostream>
2    #include <cstdlib>
3
4    using namespace std;
5
6    // modeUsingIndexing:  Using indexing, this function returns the mode
7    // of the n-element integer array.  The mode is defined as the value
8    // which occurs most frequently in a set of data.  The count of the
9    // number of times the mode occurs in the array is returned via the
10   // third parameter.
11   int modeUsingIndexing(const int array[], int n, int& count);
12
13   // modeUsingPointers:  Using pointers, this function returns the mode
14   // of the n-element integer array.  The mode is defined as the value
15   // which occurs most frequently in a set of data.  The count of the
16   // number of times the mode occurs in the array is returned via the
17   // third parameter.
18   int modeUsingPointers(const int *array, int n, int& count);
19
20   // printArrayUsingPointers:  prints the n-element integer array to
21   // output stream os; the function uses pointers
22   void printArrayUsingPointers(const int *array, int n, ostream& os);
23
24   int main()
25   {
26     int i, array[100], *ptr, mode, count;
27
28     i = 0;
29     ptr = array;
30     while (i < 100 && cin >> *ptr++)
31       i++;
32
33     if (i == 0)
34       cout << "No data" << endl;
35     else
36     {
37       printArrayUsingPointers(array, i, cout);
38       mode = modeUsingIndexing(array, i, count);
39       cout << "Using Indexing Mode = " << mode << " count = " << count << endl;
40       mode = modeUsingPointers(array, i, count);
41       cout << "Using Pointers Mode = " << mode << " count = " << count << endl;
42     }
43
44     return EXIT_SUCCESS;
45   }
```

Figure 1. `/usr/local/1337/src/lab39main.C` (Part 1 of 2)

```
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/lab39main.C (Part 2 of 2)

```
1   newuser@csunix ~> cd 1337
2   newuser@csunix ~/1337> mkdir 39
3   newuser@csunix ~/1337> cd 39
4   newuser@csunix ~/1337/39> cp /usr/local/1337/data/39/* .
5   newuser@csunix ~/1337/39> cp /usr/local/1337/src/lab39main.C .
6   newuser@csunix ~/1337/39> cp /usr/local/1337/src/Makefile .
7   newuser@csunix ~/1337/39> touch lab39.cpp
8   newuser@csunix ~/1337/39> # Edit Makefile and lab39.cpp
9   newuser@csunix ~/1337/39> make lab39
10  g++ -g -Wall -std=c++11 -c lab39main.C -I/usr/local/1337/include -I.
11  g++ -g -Wall -std=c++11 -c lab39.cpp -I/usr/local/1337/include -I.
12  g++ -o lab39 lab39main.o lab39.o -L/usr/local/1337/lib -lm -lbits
13  newuser@csunix ~/1337/39> cat 01.dat
14  6 2 6
15  newuser@csunix ~/1337/39> cat 01.dat | ./lab39
16  array
17  {
18    [0] = 6
19    [1] = 2
20    [2] = 6
21  }
22  Using Indexing Mode = 6 count = 2
23  Using Pointers Mode = 6 count = 2
24  newuser@csunix ~/1337/39> cat 01.dat | ./lab39 > my.out
25  newuser@csunix ~/1337/39> diff 01.out my.out
26  newuser@csunix ~/1337/39> cat 02.dat | ./lab39 > my.out
27  newuser@csunix ~/1337/39> diff 02.out my.out
28  newuser@csunix ~/1337/39> cat 03.dat | ./lab39 > my.out
29  newuser@csunix ~/1337/39> diff 03.out my.out
30  newuser@csunix ~/1337/39> cat 07.dat | ./lab39 > my.out
31  newuser@csunix ~/1337/39> diff 07.out my.out
32  newuser@csunix ~/1337/39> cat 10.dat | ./lab39 > my.out
33  newuser@csunix ~/1337/39> diff 10.out my.out
34  newuser@csunix ~/1337/39>
```

Figure 2. Commands to Compile, Link, & Run Lab 39