

**Source File:** ~/1337/54/lab54. (C|CPP|cpp|c++|cc|cxx|cp)  
**Input:** Under control of main function  
**Output:** Under control of main function  
**Value:** 2

At times it can be useful to sort lists of words in non-traditional ways. For instance, when looking for words that share a common suffix, it is useful to perform a sort by comparing the last characters first, then the next-to-last characters, and so forth. Write a function to perform this type of sort.

A header file 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 lab54 to targets2srcfileswithlibrary.

```
1  #ifndef LAB54_H
2  #define LAB54_H
3
4  #include <iostream>
5  #include <string>
6
7  using namespace std;
8
9  // Function rightToLeftSort - sorts the n-element array of strings by
10 // comparing the last characters first, then the next-to-last
11 // characters, and so forth
12 void rightToLeftSort(string array[], int n);
13
14 // Functions from Lab 53
15
16 // Function sort - sorts the n-element array of strings in
17 // ascending order using an exchange sort
18 void sort(string array[], int n);
19
20 // Function writeArray - Writes the n-element array of strings to
21 // output stream out, each element on a separate line
22 ostream& writeArray(ostream& out, const string array[], int n);
23
24 // Function from Lab 49
25
26 // Function stringReverse - Returns the reverse of string s
27 string stringReverse(string s);
28
29 #endif
```

Figure 1. /usr/local/1337/include/lab54.h

```
1  #include <lab54.h>
2  #include <cstdlib>
3
4  using namespace std;
5
6  int main()
7  {
8      string words[100];
9      unsigned int count = 0;
10
11     while (count < 100 && cin >> words[count])
12         ++count;
13
14     cout << "Before Sort:" << endl;
15     writeArray(cout, words, count);
16     rightToLeftSort(words, count);
17     cout << "After Sort:" << endl;
18     writeArray(cout, words, count);
19
20     return EXIT_SUCCESS;
21 }
```

Figure 2. /usr/local/1337/src/lab54main.C

```

1 newuser@csunix ~> cd 1337
2 newuser@csunix ~/1337> mkdir 54
3 newuser@csunix ~/1337> cd 54
4 newuser@csunix ~/1337/54> cp /usr/local/1337/data/54/* .
5 newuser@csunix ~/1337/54> cp /usr/local/1337/include/lab54.h .
6 newuser@csunix ~/1337/54> cp /usr/local/1337/src/lab54main.C .
7 newuser@csunix ~/1337/54> cp /usr/local/1337/src/Makefile .
8 newuser@csunix ~/1337/54> touch lab54.cpp
9 newuser@csunix ~/1337/54> # Edit Makefile and lab54.cpp
10 newuser@csunix ~/1337/54> make lab54
11 g++ -g -Wall -std=c++11 -c lab54main.C -I/usr/local/1337/include -I.
12 g++ -g -Wall -std=c++11 -c lab54.cpp -I/usr/local/1337/include -I.
13 g++ -o lab54 lab54main.o lab54.o -L/usr/local/1337/lib -lm -lbits \
14 -Wl,-whole-archive -llab54 -Wl,-no-whole-archive
15 newuser@csunix ~/1337/54> cat 01.dat
16 first second third fourth fifth sixth
17 seventh eighth ninth tenth eleventh twelfth

18 newuser@csunix ~/1337/54> cat 01.dat | ./lab54
19 Before Sort:
20 array
21 {
22   [ 0] = first
23   [ 1] = second
24   [ 2] = third
25   [ 3] = fourth
26   [ 4] = fifth
27   [ 5] = sixth
28   [ 6] = seventh
29   [ 7] = eighth
30   [ 8] = ninth
31   [ 9] = tenth
32   [10] = eleventh
33   [11] = twelfth
34 }

35 After Sort:
36 array
37 {
38   [ 0] = second
39   [ 1] = third
40   [ 2] = fifth
41   [ 3] = twelfth
42   [ 4] = eighth
43   [ 5] = tenth
44   [ 6] = eleventh
45   [ 7] = seventh
46   [ 8] = ninth
47   [ 9] = fourth
48   [10] = sixth
49   [11] = first
50 }

51 newuser@csunix ~/1337/54> cat 01.dat | ./lab54 > my.out
52 newuser@csunix ~/1337/54> diff 01.out my.out
53 newuser@csunix ~/1337/54> cat 02.dat | ./lab54 > my.out
54 newuser@csunix ~/1337/54> diff 02.out my.out
55 newuser@csunix ~/1337/54>

```

**Figure 3.** Commands to Compile, Link, & Run Lab 54