

**Source File:** ~/2336/39/lab39.(C|CPP|cpp|c++|cc|cxx|cp)  
**Input:** under control of main function  
**Output:** under control of main function  
**Value:** 2

A palindrome is a word, verse, or sentence that is the same when read backward or forward. Write a boolean function that uses stacks to recognize if a string is a palindrome. You will need to use three stacks to implement this function. Your function should perform comparisons in a case-insensitive manner.

A sample main function for testing your function is shown in Figure 1. Commands to compile, link, and run this assignment are 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  #include <cctype>
4  #include <string>
5
6  using namespace std;
7
8  bool isPalindrome(string);
9  void rmPuncSpaces(string&);
10
11 int main()
12 {
13     string str;
14
15     while (getline(cin, str))
16     {
17         cout << str;
18         rmPuncSpaces(str);
19         cout << " is ";
20         if (!isPalindrome(str))
21             cout << "not ";
22         cout << "a palindrome" << endl;
23     }
24
25     return EXIT_SUCCESS;
26 }
27
28 void rmPuncSpaces(string& str)
29 {
30     int i;
31     string wsPunct;                // whitespace & punctuation
32     string::size_type idx;
33
34     for (i=0; i<128; ++i)
35         if (isspace(i) || ispunct(i))
36             wsPunct += i;
37
```

Figure 1. /usr/local/2336/src/lab39main.C (Part 1 of 2)

```

38 while ((idx = str.find_first_of(wsPunct)) != string::npos)
39     if (idx == 0) // it's at the beginning
40         str = str.substr(idx+1);
41     else if (idx == str.length() - 1) // it's at the end
42         str = str.substr(0,idx);
43     else // it's interior
44         str = str.substr(0, idx) + str.substr(idx+1);
45
46 }

```

Figure 1. /usr/local/2336/src/lab39main.C (Part 2 of 2)

```

1  newuser@csunix ~> cd 2336
2  newuser@csunix ~/2336> ./getlab.ksh 39
3  * Checking to see if a folder exists for Lab 39. . .No
4  * Creating a folder for Lab 39
5  * Checking to see if Lab 39 has sample input and output files. . .Yes
6  * Copying input and output files for Lab 39
7  from folder /usr/local/2336/data/39 to folder ./39
8  * Checking to see if /usr/local/2336/src/lab39main.C exists. . .Yes
9  * Copying file /usr/local/2336/src/lab39main.C to folder ./39
10 * Checking to see if /usr/local/2336/include/lab39.h exists. . .No
11 * Copying file /usr/local/2336/src/Makefile to folder ./39
12 * Adding a target of lab39 to targets2srcfiles
13 * Touching file ./39/lab39.cpp
14 * Edit file ./39/lab39.cpp in Notepad++
15 newuser@csunix ~/2336> cd 39
16 newuser@csunix ~/2336/39> ls
17 01.dat      01.out      Makefile    lab39.cpp   lab39main.C
18 newuser@csunix ~/2336/39> make lab39
19 g++ -g -Wall -std=c++11 -c lab39main.C -I/usr/local/2336/include -I.
20 g++ -g -Wall -std=c++11 -c lab39.cpp -I/usr/local/2336/include -I.
21 g++ -o lab39 lab39main.o lab39.o -L/usr/local/2336/lib -lm -lbits

```

<pre> 22 newuser@csunix ~/2336/39&gt; cat 01.dat 23 1996 24 bottle 25 12345 26 radar 27 a Toyota 28 Madam, I'm Adam 29 Was it a rat I saw? 30 Norma is as selfless as I am, Ron. 31 A man, a plan, a canal--Panama! 32 Tarzan raised Desi Arnaz' rat. </pre>	<pre> 33 newuser@csunix ~/2336/39&gt; cat 01.dat   ./lab39 34 1996 is not a palindrome 35 bottle is not a palindrome 36 12345 is not a palindrome 37 radar is a palindrome 38 a Toyota is a palindrome 39 Madam, I'm Adam is a palindrome 40 Was it a rat I saw? is a palindrome 41 Norma is as selfless as I am, Ron. is a palindrome 42 A man, a plan, a canal--Panama! is a palindrome 43 Tarzan raised Desi Arnaz' rat. is a palindrome </pre>
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```

44 newuser@csunix ~/2336/39> cat 01.dat | ./lab39 > my.out
45 newuser@csunix ~/2336/39> diff 01.out my.out
46 newuser@csunix ~/2336/39>

```

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