**Source File:**   ~/2336/42/lab42.(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 receives a string of characters. The function should push each character of the string onto a stack as well as add each character to a queue. When all characters of the input string have been processed, the function should use the basic stack and queue operations to determine if the input string is a palindrome. 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 `lab42` 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/lab42main.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/lab42main.C (Part 2 of 2)

```
1   newuser@csunix ~> cd 2336
2   newuser@csunix ~/2336> ./getlab.ksh 42
3     * Checking to see if a folder exists for Lab 42. . .No
4     * Creating a folder for Lab 42
5     * Checking to see if Lab 42 has sample input and output files. . .Yes
6     * Copying input and output files for Lab 42
7       from folder /usr/local/2336/data/42 to folder ./42
8     * Checking to see if /usr/local/2336/src/lab42main.C exists. . .Yes
9     * Copying file /usr/local/2336/src/lab42main.C to folder ./42
10    * Checking to see if /usr/local/2336/include/lab42.h exists. . .No
11    * Copying file /usr/local/2336/src/Makefile to folder ./42
12    * Adding a target of lab42 to targets2srcfiles
13    * Touching file ./42/lab42.cpp
14    * Edit file ./42/lab42.cpp in Notepad++
15  newuser@csunix ~/2336> cd 42
16  newuser@csunix ~/2336/42> ls
17  01.dat       01.out       Makefile     lab42.cpp     lab42main.C
18  newuser@csunix ~/2336/42> make lab42
19  g++ -g -Wall -std=c++11 -c lab42main.C -I/usr/local/2336/include -I.
20  g++ -g -Wall -std=c++11 -c lab42.cpp -I/usr/local/2336/include -I.
21  g++ -o lab42 lab42main.o lab42.o -L/usr/local/2336/lib -lm -lbits
```

```
22  newuser@csunix ~/2336/42> cat 01.dat        33  newuser@csunix ~/2336/42> cat 01.dat | ./lab42
23  1996                                        34  1996 is not a palindrome
24  bottle                                      35  bottle is not a palindrome
25  12345                                       36  12345 is not a palindrome
26  radar                                       37  radar is a palindrome
27  a Toyota                                    38  a Toyota is a palindrome
28  Madam, I'm Adam                             39  Madam, I'm Adam is a palindrome
29  Was it a rat I saw?                         40  Was it a rat I saw? is a palindrome
30  Norma is as selfless as I am, Ron.          41  Norma is as selfless as I am, Ron. is a palindrome
31  A man, a plan, a canal--Panama!             42  A man, a plan, a canal--Panama! is a palindrome
32  Tarzan raised Desi Arnaz' rat.              43  Tarzan raised Desi Arnaz' rat. is a palindrome
```

```
44  newuser@csunix ~/2336/42> cat 01.dat | ./lab42 > my.out
45  newuser@csunix ~/2336/42> diff 01.out my.out
46  newuser@csunix ~/2336/42>
```

**Figure 2.** Commands to Compile, Link, & Run Lab 42