

**Source File:** ~/2336/40/lab40.(C|CPP|cpp|c++|cc|cxx|cp)  
**Input:** under control of main function  
**Output:** under control of main function  
**Value:** 2

Consider a mathematical expression that includes several sets of nested delimiters, parentheses ( ( and ) ), brackets ( [ and ] ), and braces ( { and } ). Write a function that will ensure that the delimiters are nested correctly; that is, we want to check that

1. There are an equal number of right and left delimiters.
2. Every right delimiter is preceded by a matching left delimiter.

Your solution must incorporate a **stack** for representing the delimiters.

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 **lab40** to **targets2srcfiles**.

```
1  #include <iostream>
2  #include <cstdlib>
3  #include <string>
4
5  using namespace std;
6
7  bool isNestedCorrectly(string);
8
9  int main()
10 {
11     string str;
12
13     while (getline(cin, str))
14     {
15         cout << str;
16         cout << " is nested ";
17         if (!isNestedCorrectly(str))
18             cout << "in";
19         cout << "correctly" << endl;
20     }
21
22     return EXIT_SUCCESS;
23 }
```

**Figure 1.** /usr/local/2336/src/lab40main.C

```

1  newuser@csunix ~> cd 2336
2  newuser@csunix ~/2336> ./getlab.ksh 40
3      * Checking to see if a folder exists for Lab 40. . .No
4      * Creating a folder for Lab 40
5      * Checking to see if Lab 40 has sample input and output files. . .Yes
6      * Copying input and output files for Lab 40
7          from folder /usr/local/2336/data/40 to folder ./40
8      * Checking to see if /usr/local/2336/src/lab40main.C exists. . .Yes
9      * Copying file /usr/local/2336/src/lab40main.C to folder ./40
10     * Checking to see if /usr/local/2336/include/lab40.h exists. . .No
11     * Copying file /usr/local/2336/src/Makefile to folder ./40
12     * Adding a target of lab40 to targets2srcfiles
13     * Touching file ./40/lab40.cpp
14     * Edit file ./40/lab40.cpp in Notepad++
15  newuser@csunix ~/2336> cd 40
16  newuser@csunix ~/2336/40> ls
17  01.dat      01.out      Makefile      lab40.cpp      lab40main.C
18  newuser@csunix ~/2336/40> make lab40
19  g++ -g -Wall -std=c++11 -c lab40main.C -I/usr/local/2336/include -I.
20  g++ -g -Wall -std=c++11 -c lab40.cpp -I/usr/local/2336/include -I.
21  g++ -o lab40 lab40main.o lab40.o -L/usr/local/2336/lib -lm -lbits
22  newuser@csunix ~/2336/40> cat 01.dat
23  7 - ((x * ((x + y) / (j - 3)) + y) / (4 - 2.5))
24  7 - ({x * [(x + y) / (j - 3)] + y} / (4 - 2.5))
25  ((a + b)
26  a + b(
27  )a + b(
28  {[(a + b) * 10 + c] * 10 + d}
29  (((((((((( ))) ))))))))
30  (((((((((( ))) ))))))))
31  (((((((((( ))) ))))))))
32  (((((((((( ))) )))))))(
33  )((((((((((( ))) ))))))))
34  newuser@csunix ~/2336/40> cat 01.dat | ./lab40
35  7 - ((x * ((x + y) / (j - 3)) + y) / (4 - 2.5)) is nested correctly
36  7 - ({x * [(x + y) / (j - 3)] + y} / (4 - 2.5)) is nested correctly
37  ((a + b) is nested incorrectly
38  a + b( is nested incorrectly
39  )a + b( is nested incorrectly
40  {[(a + b) * 10 + c] * 10 + d} is nested correctly
41  (((((((((( ))) )))))))) is nested correctly
42  (((((((((( ))) )))))))) is nested incorrectly
43  (((((((((( ))) )))))))) is nested incorrectly
44  (((((((((( ))) )))))))( is nested incorrectly
45  )((((((((((( ))) )))))))) is nested incorrectly
46  newuser@csunix ~/2336/40> cat 01.dat | ./lab40 > my.out
47  newuser@csunix ~/2336/40> diff 01.out my.out
48  newuser@csunix ~/2336/40>

```

Figure 2. Commands to Compile, Link, &amp; Run Lab 40