```cpp
 1: // Dr. Rykalova
 2: // test.cpp for PS1a
 3: // updated 1/31/2020
 4: /*
 5: *  Computing IV – Assignment – PS1a
 6: *  Instructor: Prof. Yelena Rykalova
 7: *
 8: *  Due Date: 01/31/22
 9: *
10: *  Author: Matthew Lorette Anaya
11: *
12: *  Description: This program is an implementation of a Fibonacci Linear F
eedback Shift Register
13:                    Takes in a seed and generates bits with seed() and number
s with generate(int)
14:                    This is the test file with BOOST unit tests.
15: */
16:
17:
18: #include <iostream>
19: #include <string>
20:
21: #include "FibLFSR.h"
22:
23: #define BOOST_TEST_DYN_LINK
24: #define BOOST_TEST_MODULE Main
25: #include <boost/test/unit_test.hpp>
26:
27: BOOST_AUTO_TEST_CASE(sixteenBitsThreeTaps) {
28:
29:   FibLFSR l("1011011000110110");
30:   BOOST_REQUIRE(l.step() == 0);
31:   BOOST_REQUIRE(l.step() == 0);
32:   BOOST_REQUIRE(l.step() == 0);
33:   BOOST_REQUIRE(l.step() == 1);
34:   BOOST_REQUIRE(l.step() == 1);
35:   BOOST_REQUIRE(l.step() == 0);
36:   BOOST_REQUIRE(l.step() == 0);
37:   BOOST_REQUIRE(l.step() == 1);
38:
39:   FibLFSR l2("1011011000110110");
40:   BOOST_REQUIRE(l2.generate(9) == 51);
41: }
42:
43:   // Test case that prints out the starting and the resulting bit
44:   // patterns whilst checking to make sure the correct result is printed
45: BOOST_AUTO_TEST_CASE(customTestCase1) {
46:   std::cout << "\n------Custom Test Case 1------" << std::endl;
47:   FibLFSR l("1011011000110110");
48:   std::cout << "\tOriginal seed: " << l << std::endl;
49:
50:   int res = l.generate(5);
51:   BOOST_REQUIRE(res == 3);
52:
53:   std::cout << "Results of generate(5): " << l << " " << res << std::endl
;
54:   std::cout << std::endl;
55: }
56:
57: BOOST_AUTO_TEST_CASE(customTestCase2) {
58:   std::cout << "\n------Custom Test Case 2------" << std::endl;
59:
60:   std::string tooShort = "10010110";
61:   std::string tooLong = "10011001001010101101";
62:
```

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   63:    std::cout << "Test exception thrown for too short seed: 10010110" << st
d::endl;
   64:    BOOST_REQUIRE_THROW(FibLFSR("10010110"), std::invalid_argument);
   65:
   66:    std::cout << "Test exception thrown for too long seed: 10011001001010101
101" << std::endl;
   67:    BOOST_REQUIRE_THROW(FibLFSR("10011001001010101101"), std::invalid_argume
nt);
   68: }
   69:
```