

```
1: //
2: //  LFSR.cpp
3: //  ps2
4: //
5: //  Created by Jingxian Shi on 2/5/18.
6: //  Copyright © 2018 Jingxian Shi. All rights reserved.
7: //
8:
9: #include "LFSR.hpp"
10:
11: LFSR::LFSR(string s, int pos)
12: {
13:     seed = s;
14:     tap = pos;
15: }
16:
17: LFSR::~~LFSR()
18: {
19:
20: }
21:
22: int LFSR::step()
23: {
24:     int left_most = seed.at(0) - '0';
25:     int tap_bit = seed.at(seed.length() - 1 - tap) - '0'; //bug here
26:
27:     int xor_bit = left_most ^ tap_bit;
28:
29:     for(unsigned int i = 0; i < seed.length() - 1; i++)
30:     {
31:         seed.at(i) = seed.at(i + 1);
32:     }
33:     seed.at(seed.length() - 1) = '0' + xor_bit;
34:
35:     return xor_bit;
36: }
37:
38: int LFSR::generate(int k)
39: {
40:     if(k > 31 || k < 0)
41:     {
42:         return -1;
43:     }
44:
45:     int num = 0;
46:
47:     for(int i = 0; i < k; i++)
48:     {
49:         int bit = step();
50:         num *= 2;
51:         if(bit == 1)
52:         {
53:             num += 1;
54:         }
55:     }
56:
57:     return num;
58: }
59:
60: ostream& operator<< (ostream& out, LFSR& LFSR)
61: {
62:     out << LFSR.seed;
63:     return out;
64: }
65:
```