

Report of Lab 6

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Purpose
Principles
Procedure
Result

Purpose

用 C/C++ 实现 lab1 ~ lab4.

Principles

1. 只能使用+, -, =, ++, --, !=, <, >, <=, >=, &, |, ~ 运算
2. 只能使用 for, while, do while, if, continue, break, switch case 这些
3. 可以自己写函数但是要符合以上要求

Procedure

使用了助教的代码框架, #define LENGTH 3 位于第 3 行, 提交的 cpp 文件已注释。

```
1  #include <bits/stdc++.h>
2
3  #define LENGTH 3
4  #define MAXLEN 100
5  #define SCORENUM 16
6
7  int16_t lab1(const int16_t a, const int16_t b) {
8      int16_t n = 1, cnt = 0;
9      for(int i = 0; i < b; i++) {
10         if(n & a)
11             cnt++;
12         n += n;
13     }
14     return cnt;
15 }
16
17 int16_t getFn(int16_t f1, int16_t f2, const int16_t p, const int16_t q) {
18     while(f1 >= 0)
19         f1 -= p;
20     f1 += p;
21     while(f2 >= 0)
22         f2 -= q;
23     f2 += q;
24     return f1 + f2;
25 }
26
27 int16_t lab2(const int16_t p, const int16_t q, const int16_t n) {
28     int16_t f[n+1];
29     f[0] = f[1] = 1;
30     for(int i = 2; i <= n; i++)
31         f[i] = getFn(f[i-2], f[i-1], p, q);
32     return f[n];
33 }
```

```

33 }
34
35 int16_t lab3(const int16_t n, const char s[]) {
36     int16_t max = 0, now = 0;
37     for(int i = 1; i < n; i++) {
38         if(s[i] == s[i-1])
39             now++;
40         else
41             now = 0;
42         if(now > max)
43             max = now;
44     }
45     return max+1;
46 }
47
48 void lab4(int16_t score[], int16_t *a, int16_t *b) {
49     *a = *b = 0;
50     int swap, idx;
51     for(int i = 0; i < SCORENUM-1; i++) {
52         idx = i;
53         swap = score[i];
54         for(int j = i+1; j < SCORENUM; j++)
55             if(score[j] < swap) {
56                 swap = score[j];
57                 idx = j;
58             }
59         if(idx != i) {
60             score[idx] = score[i];
61             score[i] = swap;
62         }
63     }
64     for(idx = SCORENUM-1; idx > 11; idx--) {
65         if(score[idx] >= 85)
66             (*a)++;
67         else
68             break;
69     }
70     for(; idx > 7; idx--) {
71         if(score[idx] >= 75)
72             (*b)++;
73         else
74             break;
75     }
76 }
77
78 int main() {
79     std::fstream file;
80     file.open("test.txt", std::ios::in);
81
82     // lab1
83     int16_t a = 0, b = 0;
84     for(int i = 0; i < LENGTH; i++) {
85         file >> a >> b;
86         std::cout << lab1(a, b) << std::endl;
87     }
88
89     // lab2
90     int16_t p = 0, q = 0, n = 0;
91     for(int i = 0; i < LENGTH; i++) {
92         file >> p >> q >> n;
93         std::cout << lab2(p, q, n) << std::endl;
94     }
95 }

```

```

96     // lab3
97     char s[MAXLEN];
98     for(int i = 0; i < LENGTH; i++) {
99         file >> n >> s;
100         std::cout << lab3(n, s) << std::endl;
101     }
102
103
104     // lab4
105     int16_t score[SCORENUM];
106     for(int i = 0; i < LENGTH; i++) {
107         for(int j = 0; j < SCORENUM; j++)
108             file >> score[j];
109         lab4(score, &a, &b);
110         for(int j = 0; j < SCORENUM; j++)
111             std::cout << score[j] << " ";
112         std::cout << std::endl << a << " " << b << std::endl;
113     }
114
115     file.close();
116     return 0;
117 }

```

Result

```

PS D:\Code\ICS\lab6> cd "d:\Code\ICS\lab6\" ; if ($?) { g++ lab6.cpp -o lab6 } ; if ($?) { .\lab6 }
2
4
15
146
818
1219
3
4
3
0 10 20 25 30 35 40 45 50 55 60 80 85 90 95 100
4 1
0 10 15 20 25 35 40 45 50 65 70 75 80 90 95 100
3 2
9 10 11 21 22 33 44 53 55 57 66 77 88 97 98 99
4 1

```