

Олимпиада «Ломоносов» по информатике  
2023-2024 учебный год. Заключительный тур  
Работа участника с id заявки 1266630, логином inf24f\_246

Сводный итог по всем задачам в проверяющей системе

Run ID	Time	User name	Problem	Language	Result	Tests	Score
26	0:15:06	inf24f_246	1	g++	OK	28	100
386	2:34:54	inf24f_246	2	g++	OK	28	100
110	0:47:30	inf24f_246	3	python3	Partial solution	18	60
516	3:23:08	inf24f_246	4	g++	Partial solution	7	30
248	1:37:54	inf24f_246	5	g++	OK	22	100
390 технических баллов							
65 итоговых баллов							

## Посылка по задаче 1

```
[1] #include <iostream>
[2] #include <vector>
[3]
[4] using namespace std;
[5] #define ll long long
[6] #define ull unsigned ll
[7]
[8] int main() {
[9]     cin.tie(nullptr); cout.tie(nullptr);
[10]    ios::sync_with_stdio(false);
[11]    int n; cin >> n;
[12]    vector<ull> a(35);
[13]    a[0] = 1;
[14]    a[1] = 2;
[15]    a[2] = 4;
[16]    a[3] = 8;
[17]    a[4] = 15;
[18]    for (int i = 5; i < 35; ++i)
[19]        a[i] = a[i-1] * 2 - a[i-5];
[20]    int ans = 0;
[21]    while (n--) {
[22]        ull tmp; cin >> tmp;
[23]        int add = 1;
[24]        for (int i = 34; i >= 0; i--) {
[25]            if (tmp >= a[i]) {
[26]                tmp -= a[i];
[27]                add ^= 1;
[28]            }
[29]        }
[30]        ans+=add;
[31]    }
[32]    cout << ans << '\n';
[33]    return 0;
[34] }
```

## Посылка по задаче 2

```
[1] #include <iostream>
[2] #include <vector>
[3] #include <map>
[4] #include <set>
[5]
[6] using namespace std;
[7] #define ll long long
[8] #define ull unsigned ll
[9]
[10] string TREE;
[11]
[12] struct Tree {
[13]     char color;
[14]     vector<Tree> deti;
[15] };
[16]
[17]
[18] map<char, vector<int>> colors;
[19] int max_lvl = 0;
[20]
[21] void build(Tree &tree, int &ind, int lvl = 0) {
[22]     max_lvl = max(max_lvl, lvl);
[23]     if (TREE[ind] != 'Q') {
[24]         tree.color = TREE[ind++];
[25]         return;
[26]     }
[27]     tree.color = 'Q';
[28]     ind++;
[29]     tree.deti.resize(8);
[30]     for (int i = 0; i < 8; ++i)
[31]         build(tree.deti[i], ind, lvl+1);
[32] }
[33]
[34] void count(const Tree &tree, int lvl=0) {
[35]     if (tree.color == 'Q') {
[36]         for (int i = 0; i < 8; ++i) {
[37]             count(tree.deti[i], lvl+1);
[38]         }
[39]         return;
[40]     }
[41]     colors[tree.color][3 * lvl]++;
[42]     int ind = 3 * lvl;
[43]     while (colors[tree.color][ind] >= 2 && ind > 0) {
[44]         colors[tree.color][ind-1] += colors[tree.color][ind] / 2;
[45]         colors[tree.color][ind] %= 2;
[46]         ind -= 1;
[47]     }
[48] }
[49]
[50] int main() {
[51]     cin.tie(nullptr); cout.tie(nullptr);
[52]     ios::sync_with_stdio(false);
[53]     cin >> TREE;
[54]     Tree tree;
[55]     int ind = 0;
[56]     build(tree, ind);
```

```

[57] colors['W'].resize(2000);
[58] colors['R'].resize(2000);
[59] colors['O'].resize(2000);
[60] colors['Y'].resize(2000);
[61] colors['G'].resize(2000);
[62] colors['C'].resize(2000);
[63] colors['B'].resize(2000);
[64] colors['V'].resize(2000);
[65] colors['D'].resize(2000);
[66] count(tree);
[67] set<char> candidates{'W', 'R', 'O', 'Y', 'G', 'C', 'B', 'V', 'D'};
[68] string choice = "BCDGORVWY";
[69] for (int i = 0; candidates.size() > 1 && i < max_lvl * 3 + 1; ++i) {
[70]     bool meow = false;
[71]     for (auto &cand: candidates) {
[72]         if (colors[cand][i] != 0) {
[73]             meow = true;
[74]             break;
[75]         }
[76]     }
[77]     if (meow) {
[78]         for (auto &cand: choice) {
[79]             if (candidates.count(cand) == 0)
[80]                 continue;
[81]             if (colors[cand][i] == 0)
[82]                 candidates.erase(cand);
[83]         }
[84]     }
[85] }
[86] char ans_color;
[87] for (auto &i: choice) {
[88]     if (candidates.count(i) != 0) {
[89]         ans_color = i;
[90]         break;
[91]     }
[92] }
[93] cout << ans_color << '\n';
[94] if (colors[ans_color][0] == 1) {
[95]     cout << "1.0\n";
[96] } else {
[97]     int end;
[98]     for (end = 1999; colors[ans_color][end] == 0; --end);
[99]     cout << "0.";
[100]     for (int i = 1; i <= end; ++i) {
[101]         cout << colors[ans_color][i];
[102]     }
[103]     cout << '\n';
[104] }
[105] return 0;
[106] }

```

### Посылка по задаче 3

```
[1] n = int(input())
[2]
[3] a = [0] * n
[4] for _ in range(n):
[5]     tmp = input()
[6]     tmp = tmp.replace("[", "0")
[7]     tmp = tmp.replace("i(", "3")
[8]     tmp = tmp.replace("i(", "2")
[9]     tmp = tmp.replace("i", "1")
[10]    tmp = tmp.replace("I(", "6")
[11]    tmp = tmp.replace("I(", "5")
[12]    tmp = tmp.replace("I", "4")
[13]    tmp = tmp.replace("J)", "9")
[14]    tmp = tmp.replace("J)", "8")
[15]    tmp = tmp.replace("J", "7")
[16]    tmp = tmp.replace("j)", "C")
[17]    tmp = tmp.replace("j)", "B")
[18]    tmp = tmp.replace("j", "A")
[19]    tmp = tmp[::-1]
[20]    for i in range(len(tmp)):
[21]        a[_] += 12 ** i * int(tmp[i], 16)
[22]
[23] d = {
[24]     1: "i",
[25]     2: "i(",
[26]     3: "i(",
[27]     4: "I",
[28]     5: "I(",
[29]     6: "I(",
[30]     7: "J",
[31]     8: "J)",
[32]     9: "J)",
[33]     10: "j",
[34]     11: "j)",
[35]     12: "j))"
[36] }
[37]
[38] mn, mx = 0, 0
[39] for i in range(n):
[40]     if a[i] >= a[mx]:
[41]         mx = i
[42]     if a[i] <= a[mn]:
[43]         mn = i
[44] if mn == mx:
[45]     mx = n - 1
[46]     mn = n - 2
[47] mn, mx = sorted([mn, mx])
[48] def to_elfen(q):
[49]     t = []
[50]     while q > 0:
[51]         t += [q % 12]
[52]         q //= 12
[53]     for i in range(len(t)-1, 0, -1):
[54]         if t[i-1] == 0:
[55]             t[i] -= 1
[56]             t[i-1] = 12
[57]     while t[-1] == 0:
[58]         t = t[:-1]
[59]     ans = ""
[60]     for i in t:
[61]         ans += d[i]
[62]     return ans
[63]
[64] print(to_elfen(mn+1))
[65] print(to_elfen(mx+1))
```

## Посылка по задаче 4

```
[1] #include <iostream>
[2] #include <vector>
[3] #include <algorithm>
[4] #include <array>
[5]
[6] using namespace std;
[7] #define ll long long
[8] #define ull unsigned ll
[9]
[10] int main() {
[11]     cin.tie(nullptr); cout.tie(nullptr);
[12]     ios::sync_with_stdio(false);
[13]     int r, c; cin >> r >> c;
[14]     vector<vector<int>> gl(c, vector<int>(r));
[15]     int pos[3];
[16]     cin >> pos[0] >> pos[1] >> pos[2];
[17]     int ans = 0;
[18]     for (int row = 0; row < r; row++)
[19]         for (int col = 0; col < c; col++)
[20]             cin >> gl[col][row];
[21]     sort(pos, pos + 3);
[22]     for (int countermeownyaaaa = 0; countermeownyaaaa < 6; ++countermeownyaaaa) {
[23]         int cur = 0;
[24]         vector<vector<int>> loc(c, vector<int>(r));
[25]         copy(gl.begin(), gl.end(), loc.begin());
[26]         for (int pes = 0; pes < 3; ++pes) {
[27]             vector<vector<array<int, 2>>> dp(c, vector<array<int, 2>>(r, {-1, -1}));
[28]             dp[0][pos[pes]] = {loc[0][pos[pes]], 0};
[29]             for (int col = 0; col < c-1; ++col) {
[30]                 for (int row = 0; row < r; ++row) {
[31]                     if (dp[col][row][0] == -1) continue;
[32]                     for (int offset = -1; offset <= 1; ++offset) {
[33]                         if (row + offset < 0 || row + offset >= r) continue;
[34]                         if (loc[col+1][row+offset] + dp[col][row][0] > dp[col+1][row+offset][0] || dp[col+1][row+offset][1] == -1)
[35]                             dp[col+1][row+offset] = {loc[col+1][row+offset] + dp[col][row][0], row};
[36]                     }
[37]                 }
[38]             }
[39]             auto p = max_element(dp[c-1].begin(), dp[c-1].end());
[40]             cur += (*p)[0];
[41]             int last_row = p - dp[c-1].begin();
[42]             for (int col = c - 1; col >= 0; --col) {
[43]                 loc[col][last_row] = 0;
[44]                 last_row = dp[col][last_row][1];
[45]             }
[46]         }
[47]         ans = max(ans, cur);
[48]         next_permutation(pos, pos+3);
[49]     }
[50]     cout << ans << '\n';
[51]     return 0;
[52] }
```

## Посылка по задаче 5

```
[1] #include <iostream>
[2] #include <vector>
[3] #include <map>
[4] #include <array>
[5]
[6] using namespace std;
[7] #define ll long long
[8] #define ull unsigned ll
[9]
[10] int main() {
[11]     cin.tie(nullptr); cout.tie(nullptr);
[12]     ios::sync_with_stdio(false);
[13]     string a, b; cin >> a >> b;
[14]     vector<int> needed(100);
[15]     int need = 0;
[16]     for (int i = 0; i < b.size(); ++i) {
[17]         needed[b[i] - 33]++;
[18]         if (needed[b[i] - 33] == 1) need++;
[19]     }
[20]     array<int, 2> ans = {-1, 1000000};
[21]     vector<int> cur(100);
[22]     int i = 0, j = 0;
[23]     cur[a[i] - 33]++;
[24]     if (cur[a[i] - 33] == needed[a[i] - 33]) {
[25]         need--;
[26]     }
[27]     while (i != j || j != a.size() - 1) {
[28]         while (need > 0 && j != a.size() - 1) {
[29]             j++;
[30]             cur[a[j] - 33]++;
[31]             if (cur[a[j] - 33] == needed[a[j] - 33])
[32]                 need--;
[33]         }
[34]         if (need > 0) break;
[35]         while (need == 0 && i <= j) {
[36]             if (ans[1] - ans[0] > j - i) {
[37]                 ans = {i, j};
[38]             }
[39]             cur[a[i] - 33]--;
[40]             if (cur[a[i] - 33] == needed[a[i] - 33] - 1)
[41]                 need++;
[42]             i++;
[43]         }
[44]     }
[45]     if (ans[0] == -1) {
[46]         cout << "\n";
[47]     } else {
[48]         for (int i = ans[0]; i <= ans[1]; ++i) {
[49]             cout << a[i];
[50]         }
[51]         cout << '\n';
[52]     }
[53]     return 0;
[54] }
```

Посылоч по задаче 6 не было