Олимпиада «Ломоносов» по информатике
2023-2024 учебный год. Заключительный тур
Работа участника с id заявки 1250515, логином inf24f_249

Сводный итог по всем задачам в проверяющей системе

```
Run ID Time User name Problem Language Result Tests Score
23 0:13:58 inf24f_249 1 g++ OK 28 100
153 1:02:27 inf24f_249 2 g++ OK 28 100
300 1:59:50 inf24f_249 3 g++ OK 28 100
438 2:57:02 inf24f_249 5 g++ OK 22 100
400 технических баллов
66 итоговых баллов
```

Посылка по задаче 1

```
[1] #include <iostream>
[2] #include <vector>
[3] #include <algorithm>
[4]
[5] using namespace std;
[6] using ll = long long;
[7] using ld = long double;
[8] const int INF = 3 * 1e9;
[9]
[10]void solve() {
[11]    vector<ll> t{1, 1, 2, 4};
[12]    t.reserve(40);
[13]    for (int i = 4; i < 40; ++i) {
[14]        t.push_back(t[i - 4] + t[i - 3] + t[i - 2] + t[i - 1]);
[15]    }
[16]    reverse(t.begin(), t.end());
[17]    int n;
[18]    cin >> n;
[19]    int am = 0;
[20]    for (int i = 0; i < n; ++i) {
[21]        ll a;
[22]        cin >> a;
[23]        int ans = 0;
[24]        for (auto i : t) {
[25]            if (a >= i) {
[26]                a -= i;
[27]                ans++;
[28]            }
[29]        }
[30]        if (!(ans % 2)) {
[31]            am++;
[32]        }
[33]    }
[34]    cout << am << endl;
[35]}
[36]
[37]int main()
[38]{
[39]    ios_base::sync_with_stdio(false);
[40]    cin.tie(nullptr);
[41]    cout.tie(nullptr);
[42]    int t;
[43]    t = 1;
[44]    while (t--) {
[45]        solve();
[46]    }
[47]    return 0;
[48]}
```

Посылка по задаче 2

```
[1] #include <iostream>
[2] #include <vector>
[3] #include <algorithm>
[4] #include <unordered_map>
[5] #include <string>
[6]
[7] using namespace std;
[8] using ll = long long;
[9] using ld = long double;
[10] const int INF = 3 * 1e9;
[11] unordered_map<char, string> mp;
[12] int ptr = -1;
[13]
[14] bool comp(const pair<string, char>& a, const pair<string, char>& b) {
[15]     if (a.first == b.first) {
[16]         return a.second > b.second;
[17]     }
[18]     return a.first < b.first;
[19] }
[20]
[21] void add(string& n, int r) {
[22]     if (n.size() <= r) {
[23]         n.resize(r + 1, '0');
[24]     }
[25]     if (n[r] == '0') {
[26]         n[r] = '1';
[27]     } else {
[28]         n[r] = '0';
[29]         add(n, r - 1);
[30]     }
[31] }
[32]
[33] void f(const string& s, int r) {
[34]     for (int i = 0; i < 8 && ptr < (int)s.size() - 1; ++i) {
[35]         ptr++;
[36]         if (s[ptr] == 'Q') {
[37]             f(s, r + 3);
[38]         } else {
[39]             add(mp[s[ptr]], r);
[40]         }
[41]     }
[42] }
[43]
[44] void print(const string& s) {
[45]     if (s[0] == '1') {
[46]         cout << "1.0" << endl;
[47]         return;
[48]     }
[49]     int l = s.size();
[50]     while(s[l - 1] == '0') {
[51]         l--;
[52]     }
[53]     cout << s[0] << ".";
[54]     for (int i = 1; i < l; ++i) {
[55]         cout << s[i];
[56]     }
[57]     cout << endl;
[58] }
[59]
[60] void solve(int a) {
[61]     string s;
[62]     cin >> s;
[63]     f(s, 0);
[64]     vector<pair<string, char>> ans;
[65]     for (auto i : mp) {
[66]         ans.emplace_back(i.second, i.first);
[67]     }
[68]     sort(ans.rbegin(), ans.rend(), comp);
[69]     cout << ans[0].second << endl;
[70]     print(ans[0].first);
[71] }
[72]
[73] int main()
[74] {
[75]     ios_base::sync_with_stdio(false);
[76]     cin.tie(nullptr);
[77]     cout.tie(nullptr);
[78]     int t;
[79]     t = 1;
[80]     while (t--) {
[81]         solve(1);
[82]     }
[83]     return 0;
[84] }
```

Посылка по задаче 3

```
[1]  #include <iostream>
[2]  #include <vector>
[3]  #include <algorithm>
[4]  #include <unordered_map>
[5]  #include <string>
[6]
[7]  using namespace std;
[8]  using ll = long long;
[9]  using ld = long double;
[10] const int INF = 3 * 1e9;
[11] unordered_map<char, string> mp;
[12] int ptr = -1;
[13]
[14] bool comp(const pair<string, int>& a, const pair<string, int>& b) {
[15]     if (a.first == b.first) {
[16]         return a.second < b.second;
[17]     }
[18]     if (a.first.size() == b.first.size()) {
[19]         return a.first < b.first;
[20]     }
[21]     return a.first.size() > b.first.size();
[22] }
[23]
[24] string elphize(int n) {
[25]     vector<int> ans;
[26]     ans.reserve(100);
[27]     while(n >= 12) {
[28]         ans.push_back(n % 12);
[29]         n /= 12;
[30]     }
[31]     ans.push_back(n);
[32]     for (int i = 0; i < ans.size() - 1; ++i) {
[33]         if (ans[i] == 0) {
[34]             ans[i] += 12;
[35]             ans[i + 1]--;
[36]         }
[37]     }
[38]     string a = "";
[39]     unordered_map<int, string> mp;
[40]     mp[1] = "i";
[41]     mp[2] = "i(";
[42]     mp[3] = "i((";
[43]     mp[4] = "I";
[44]     mp[5] = "I(";
[45]     mp[6] = "I((";
[46]     mp[7] = "J";
[47]     mp[8] = "J)";
[48]     mp[9] = "J))";
[49]     mp[10] = "j";
[50]     mp[11] = "j)";
[51]     mp[12] = "j))";
[52]     for (auto i : ans) {
[53]         a += mp[i];
[54]     }
[55]     return a;
[56] }
[57]
[58] void solve(int a) {
[59]     int n;
[60]     cin >> n;
[61]     vector<pair<string, int>> v;
[62]     v.reserve(n);
[63]     for (int i = 0; i < n; ++i) {
[64]         string s;
[65]         cin >> s;
[66]         string a = "";
[67]         for (int i = 0; i < s.size(); ++i) {
[68]             if (s == "[]") {
[69]                 a = "M";
[70]                 break;
[71]             }
[72]             if (s[i] == 'i') {
[73]                 if (i + 1 < s.size() && s[i + 1] == '(') {
[74]                     if (i + 2 < s.size() && s[i + 2] == '(') {
[75]                         i = i + 2;
[76]                         a += "J";
[77]                     } else {
[78]                         a += "K";
[79]                         i = i + 1;
[80]                     }
```

```
[81]                 } else {
[82]                     a += "L";
[83]                 }
[84]             }
[85]             if (s[i] == 'I') {
[86]                 if (i + 1 < s.size() && s[i + 1] == '(') {
[87]                     if (i + 2 < s.size() && s[i + 2] == '(') {
[88]                         i = i + 2;
[89]                         a += "G";
[90]                     } else {
[91]                         a += "H";
[92]                         i = i + 1;
[93]                     }
[94]                 } else {
[95]                     a += "I";
[96]                 }
[97]             }
[98]             if (s[i] == 'J') {
[99]                 if (i + 1 < s.size() && s[i + 1] == ')') {
[100]                    if (i + 2 < s.size() && s[i + 2] == ')') {
[101]                        i = i + 2;
[102]                        a += "D";
[103]                    } else {
[104]                        a += "E";
[105]                        i = i + 1;
[106]                    }
[107]                } else {
[108]                    a += "F";
[109]                }
[110]            }
[111]            if (s[i] == 'j') {
[112]                if (i + 1 < s.size() && s[i + 1] == ')') {
[113]                    if (i + 2 < s.size() && s[i + 2] == ')') {
[114]                        i = i + 2;
[115]                        a += "A";
[116]                    } else {
[117]                        a += "B";
[118]                        i = i + 1;
[119]                    }
[120]                } else {
[121]                    a += "C";
[122]                }
[123]            }
[124]        }
[125]        reverse(a.begin(), a.end());
[126]        v.emplace_back(a, i);
[127]    }
[128]    sort(v.begin(), v.end(), comp);
[129]    int ansMx = v[0].second;
[130]    int ansMn = v[n - 1].second;
[131]    for (int i = 1; i < n && v[i].first == v[i - 1].first; ++i) {
[132]        if (v[i].second >= ansMx && v[i].second != ansMn) {
[133]            ansMx = v[i].second;
[134]        }
[135]    }
[136]    ansMn++;
[137]    ansMx++;
[138]    cout << elphize(min(ansMn, ansMx)) << endl << elphize(max(ansMx, ansMn)) << endl;
[139]}
[140]
[141]int main()
[142]{
[143]    ios_base::sync_with_stdio(false);
[144]    cin.tie(nullptr);
[145]    cout.tie(nullptr);
[146]    int t;
[147]    t = 1;
[148]    while (t--) {
[149]        solve(1);
[150]    }
[151]    return 0;
[152]}
```

Посылок по задаче 4 не было

Посылка по задаче 5

```
[1] #include <iostream>
[2] #include <vector>
[3] #include <algorithm>
[4] #include <unordered_map>
[5] #include <string>
[6] #include <deque>
[7]
[8] using namespace std;
[9] using ll = long long;
[10]using ld = long double;
[11]const int INF = 1e9;
[12]
[13]int main()
[14]{
[15]    ios_base::sync_with_stdio(false);
[16]    cin.tie(nullptr);
[17]    cout.tie(nullptr);
[18]    string a;
[19]    string b;
[20]    cin >> a;
[21]    cin >> b;
[22]    unordered_map<char, int> mpB;
[23]    for (auto i : b) {
[24]        mpB[i]++;
[25]    }
[26]    unordered_map<char, deque<int>> mp;
[27]    bool check = false;
[28]    pair<int, int> ans = {0, INF};
[29]    for (int i = 0; i < a.size(); ++i) {
[30]        char c = a[i];
[31]        if (mpB[c] > 0) {
[32]            mpB[c]--;
[33]            mp[c].push_back(i);
[34]            if (mpB[c] == 0) {
[35]                bool ok = true;
[36]                for (auto i : mpB) {
[37]                    if (i.second) {
[38]                        ok = false;
[39]                        break;
[40]                    }
[41]                }
[42]                if (ok) {
[43]                    check = true;
[44]                }
[45]            }
[46]        } else {
[47]            mp[c].push_back(i);
[48]            mp[c].pop_front();
[49]        }
[50]        if (check) {
[51]            int mn = INF, mx = -INF;
[52]            for (auto i : mp) {
[53]                if (!i.second.empty()) {
[54]                    mx = max(mx, i.second.back());
[55]                    mn = min(mn, i.second.front());
[56]                }
[57]            }
[58]            if (mx - mn <= ans.second - ans.first) {
[59]                ans = {mn, mx};
[60]            }
[61]        }
[62]    }
[63]    if (ans != pair<int, int>({0, INF})) {
[64]        for (int i = ans.first; i <= ans.second; ++i) {
[65]            cout << a[i];
[66]        }
[67]    }
[68]    cout << endl;
[69]    return 0;
[70]}
```

Посылок по задаче 6 не было