Олимпиада «Ломоносов» по информатике
2023-2024 учебный год. Заключительный тур
Работа участника с id заявки 1264687, логином inf24f_219

Сводный итог по всем задачам в проверяющей системе

```
Run ID Time User name Problem Language Result Tests Score
28 0:15:23 inf24f_219 1 g++ OK 28 100
80 0:35:40 inf24f_219 2 g++ Partial solution 16 52
143 1:00:40 inf24f_219 3 g++ Partial solution 18 60
304 2:01:19 inf24f_219 4 g++ Partial solution 14 65
347 2:16:04 inf24f_219 5 g++ OK 22 100
411 2:43:25 inf24f_219 6 g++ Partial solution 2 10
387 технических баллов
64 итоговых балла
```

Посылка по задаче 1

```cpp
[1]  #include<bits/stdc++.h>
[2]
[3]  #define ll long long
[4]  #define ii pair<ll, ll>
[5]  #define V vector
[6]  #define P pair
[7]  #define F first
[8]  #define S second
[9]  #define pb push_back
[10] #define for_(i, n) for(int i = 0; i < n; i++)
[11] #define for_in(i, l, r) for(int i = l; i < r; i++)
[12] #define for_r(i, n) for(int i = n - 1; i >= 0; i--)
[13] #define for_inr(i, l, r) for(int i = r - 1; i >= l; i--)
[14]
[15] using namespace std;
[16]
[17] const ll inf = 1ll << 60;
[18]
[19] int main() {
[20]     cin.tie(0);
[21]     ios_base::sync_with_stdio(0);
[22]     V<ll> t = {0, 0, 0, 1};
[23]     while(t.back() < (1 << 24)) {
[24]         ll s = t.size();
[25]         t.pb(t[s - 1] + t[s - 2] + t[s - 3] + t[s - 4]);
[26]     }
[27]     int n;
[28]     cin >> n;
[29]     ll c = 0;
[30]     for_(i, n) {
[31]         ll a;
[32]         cin >> a;
[33]
[34]         int z = 0;
[35]         for(int j = upper_bound(t.begin(), t.end(), a) - t.begin() - 1; j > 3; j--) {
[36]             if(a >= t[j]) {
[37]                 a -= t[j];
[38]                 z++;
[39]             }
[40]         }
[41]
[42]         if(z % 2 == 0)
[43]             c++;
[44]     }
[45]     cout << c;
[46] }
```

Посылка по задаче 2

```
[1]  #include<bits/stdc++.h>
[2]
[3]  #define ll long long
[4]  #define ii pair<ll, ll>
[5]  #define V vector
[6]  #define P pair
[7]  #define F first
[8]  #define S second
[9]  #define pb push_back
[10] #define for_(i, n) for(int i = 0; i < n; i++)
[11] #define for_in(i, l, r) for(int i = l; i < r; i++)
[12] #define for_r(i, n) for(int i = n - 1; i >= 0; i--)
[13] #define for_inr(i, l, r) for(int i = r - 1; i >= l; i--)
[14]
[15] using namespace std;
[16]
[17] const ll inf = 1ll << 60;
[18]
[19] int main() {
[20]     cin.tie(0);
[21]     ios_base::sync_with_stdio(0);
[22]
[23]     string s;
[24]     cin >> s;
[25]     int d = 0, md = 0;
[26]     map<char, ll> r;
[27]     stack<int> st;
[28]     st.push(7);
[29]     for(char c : s) {
[30]         st.top()++;
[31]         if(c == 'Q') {
[32]             st.push(0);
[33]             d++;
[34]             if(d > md) {
[35]                 md++;
[36]                 for(auto p : r)
[37]                     p.S *= 8;
[38]             }
[39]         }
[40]         else {
[41]             r[c] += 1ll << (3*(md - d));
[42]             while(!st.empty() && st.top() == 8) {
[43]                 st.pop();
[44]                 d--;
[45]             }
[46]         }
[47]     }
[48]
[49]     P<char, ll> b = *r.begin();
[50]     for(auto p : r)
[51]         if(b.S < p.S)
[52]             b = p;
[53]     cout << b.F << endl;
[54]     if(b.S == (1 << 3*md))
[55]         cout << "1.0";
[56]     else {
[57]         cout << "0.";
[58]         for(ll k = 1ll << (3*md - 1); b.S > 0; k >>= 1) {
[59]             if(k > b.S)
[60]                 cout << 0;
[61]             else {
[62]                 cout << 1;
[63]                 b.S -= k;
[64]             }
[65]         }
[66]     }
[67] }
```

Посылка по задаче 3

```
[1]  #include<bits/stdc++.h>
[2]
[3]  #define ll long long
[4]  #define ii pair<ll, ll>
[5]  #define V vector
[6]  #define P pair
[7]  #define F first
[8]  #define S second
[9]  #define pb push_back
[10] #define for_(i, n) for(int i = 0; i < n; i++)
[11] #define for_in(i, l, r) for(int i = l; i < r; i++)
[12] #define for_r(i, n) for(int i = n - 1; i >= 0; i--)
[13] #define for_inr(i, l, r) for(int i = r - 1; i >= l; i--)
[14]
[15] using namespace std;
[16]
[17] const ll inf = 1ll << 60;
[18]
[19] int main() {
[20]     cin.tie(0);
[21]     ios_base::sync_with_stdio(0);
[22]     int n;
[23]     cin >> n;
[24]     ll* a = new ll[n];
[25]     for_(i, n) {
[26]         string s;
[27]         cin >> s;
[28]         a[i] = 0;
[29]         if(s == "[]")
[30]             continue;
[31]
[32]         int c = 0;
[33]         for(char d : s) {
[34]             if(d == '(' || d == ')')
[35]                 c++;
[36]             else {
[37]                 a[i] += c;
[38]                 switch(d) {
[39]                 case 'i':
[40]                     c = 1;
[41]                     break;
[42]                 case 'I':
[43]                     c = 4;
[44]                     break;
[45]                 case 'J':
[46]                     c = 7;
[47]                     break;
[48]                 case 'j':
[49]                     c = 11;
[50]                     break;
[51]                 }
[52]             }
[53]         }
[54]         a[i] += c;
[55]     }
[56]
[57]     int mn = n - 1, mx = n - 1;
[58]     for_r(i, n) {
[59]         if(a[i] < a[mn])
[60]             mn = i;
[61]         if(a[i] > a[mx])
[62]             mx = i;
[63]     }
[64]
[65]     if(mn > mx)
[66]         swap(mn, mx);
[67]     if(mn == mx)
[68]         mn--;
[69]
```

```
[70]    string d[] { "i", "i(", "i((", "I", "I(", "I((", "J", "J)", "J))", "j", "j)", "j))" };
[71]    ll x = mn + 1, y = mx + 1;
[72]    while(x > 0) {
[73]        if(x % 12) {
[74]            cout << d[x % 12 - 1];
[75]        }
[76]        else {
[77]            cout << d[11];
[78]            x -= 12;
[79]        }
[80]        x /= 12;
[81]    }
[82]    cout << endl;
[83]    while(y > 0) {
[84]        if(y % 12) {
[85]            cout << d[y % 12 - 1];
[86]        }
[87]        else {
[88]            cout << d[11];
[89]            y -= 12;
[90]        }
[91]        y /= 12;
[92]    }
[93] }
```

Посылка по задаче 4

```
[1]  #include<bits/stdc++.h>
[2]
[3]  #define ll long long
[4]  #define ii pair<ll, ll>
[5]  #define V vector
[6]  #define P pair
[7]  #define F first
[8]  #define S second
[9]  #define pb push_back
[10] #define for_(i, n) for(int i = 0; i < n; i++)
[11] #define for_in(i, l, r) for(int i = l; i < r; i++)
[12] #define for_r(i, n) for(int i = n - 1; i >= 0; i--)
[13] #define for_inr(i, l, r) for(int i = r - 1; i >= l; i--)
[14]
[15] using namespace std;
[16]
[17] const ll inf = 1ll << 60;
[18]
[19] struct pos {
[20]     int x, y, z;
[21] };
[22]
[23] bool operator<(pos p1, pos p2) {
[24]     if(p1.x != p2.x)
[25]         return p1.x < p2.x;
[26]     if(p1.y != p2.y)
[27]         return p1.y < p2.y;
[28]     if(p1.z != p2.z)
[29]         return p1.z < p2.z;
[30]     return false;
[31] }
[32]
[33] ll** a;
[34] ll val(int i, int x, int y, int z) {
[35]     ll s = a[x][i];
[36]     if(x != y)
[37]         s += a[y][i];
[38]     if(x != z && y != z)
[39]         s += a[z][i];
[40]     return s;
[41] }
[42]
[43] int main() {
[44]     cin.tie(0);
[45]     ios_base::sync_with_stdio(0);
[46]     int n, m;
[47]     cin >> n >> m;
[48]
[49]     int x, y, z;
[50]     cin >> x >> y >> z;
[51]
[52]     a = new ll*[n];
[53]     for_(i, n) a[i] = new ll[m];
[54]     for_(i, n) for_(j, m) cin >> a[i][j];
[55]
[56]     map<pos, ll>* dp = new map<pos, ll>[m];
[57]     for_(i, m) {
[58]         for_(x, n) for_(y, n) for_(z, n)
[59]             dp[i][{x, y, z}] = -inf;
[60]     }
[61]     dp[0][{x, y, z}] = val(0, x, y, z);
[62]
[63]     for_(i, m - 1) {
[64]         for_(x, n) for_(y, n) for_(z, n) {
[65]             for_in(x_, max(0, x - 1), min(x + 2, n)) for_in(y_, max(0, y -
[66] 1), min(y + 2, n)) for_in(z_, max(0, z - 1), min(z + 2, n)) {
[67]                 dp[i + 1][{x_, y_, z_}] = max(dp[i + 1][{x_, y_, z_}], dp[i]
[68] [{x, y, z}] + val(i + 1, x_, y_, z_));
[69]             }
[70]         }
[71]     }
[72]
[73]     ll awn = 0;
[74]     for_(x, n) for_(y, n) for_(z, n) {
[75]         awn = max(awn, dp[m - 1][{x, y, z}]);
[76]     }
        cout << awn;
    }
```

Посылка по задаче 5

```
[1] #include<bits/stdc++.h>
[2]
[3] #define ll long long
[4] #define ii pair<ll, ll>
[5] #define V vector
[6] #define P pair
[7] #define F first
[8] #define S second
[9] #define pb push_back
[10]#define for_(i, n) for(int i = 0; i < n; i++)
[11]#define for_in(i, l, r) for(int i = l; i < r; i++)
[12]#define for_r(i, n) for(int i = n - 1; i >= 0; i--)
[13]#define for_inr(i, l, r) for(int i = r - 1; i >= l; i--)
[14]
[15]using namespace std;
[16]
[17]const ll inf = 1ll << 60;
[18]
[19]int main() {
[20]    cin.tie(0);
[21]    ios_base::sync_with_stdio(0);
[22]    string s, t;
[23]    cin >> s >> t;
[24]    map<char, int> m;
[25]    for(char c : t)
[26]        m[c]++;
[27]
[28]    ii b = {0, -1};
[29]    map<char, int> c;
[30]    for(int l = 0, r = 0; r < s.size(); r++) {
[31]        c[s[r]]++;
[32]        while(l <= r) {
[33]            for(auto p : m)
[34]                if(p.S > c[p.F])
[35]                    goto nx;
[36]            if(b.S == -1 || r - l < b.S - b.F)
[37]                b = {l, r};
[38]            c[s[l]]--;
[39]            l++;
[40]        }
[41]        nx:;
[42]    }
[43]
[44]    for_in(i, b.F, b.S + 1)
[45]        cout << s[i];
[46]}
```

Посылка по задаче 6

```
[1]  #include<bits/stdc++.h>
[2]
[3]  #define ll long long
[4]  #define ii pair<ll, ll>
[5]  #define V vector
[6]  #define P pair
[7]  #define F first
[8]  #define S second
[9]  #define pb push_back
[10] #define for_(i, n) for(int i = 0; i < n; i++)
[11] #define for_in(i, l, r) for(int i = l; i < r; i++)
[12] #define for_r(i, n) for(int i = n - 1; i >= 0; i--)
[13] #define for_inr(i, l, r) for(int i = r - 1; i >= l; i--)
[14]
[15] using namespace std;
[16]
[17] const ll inf = 1ll << 60;
[18]
[19] int main() {
[20]     cin.tie(0);
[21]     ios_base::sync_with_stdio(0);
[22]     string s;
[23]     map<string, int> tc;
[24]     map<string, set<V<bool>>> tk;
[25]     while(cin >> s) {
[26]         if(s == "e")
[27]             break;
[28]         s.pb(';');
[29]         string nm, rs = "\1";
[30]         V<bool> ct;
[31]         for(char c : s) {
[32]             if(c == ';') {
[33]                 if(rs == "OK")
[34]                     ct.pb(1);
[35]                 else if(rs != "\1")
[36]                     ct.pb(0);
[37]                 rs.clear();
[38]             }
[39]             else {
[40]                 if(rs == "\1")
[41]                     nm.pb(c);
[42]                 else
[43]                     rs.pb(c);
[44]             }
[45]         }
[46]
[47]         if(tc[nm] < ct.size()) {
[48]             for(auto p : tk[nm])
[49]                 for_(i, ct.size() - tc[nm])
[50]                     p.pb(0);
[51]             tc[nm] = ct.size();
[52]         }
[53]         tk[nm].insert(ct);
[54]     }
[55]
[56]     for(auto p : tc) {
[57]         cout << p.S << ' ' << tk[p.F].size() << endl;
[58]     }
[59] }
```