Олимпиада «Ломоносов» по информатике
2023-2024 учебный год. Заключительный тур
Работа участника с id заявки 1269297, логином inf24f_247

Сводный итог по всем задачам в проверяющей системе

Run ID	Time	User name	Problem	Language	Result	Tests	Score
19	0:12:42	inf24f_247	1	g++	OK	28	100
128	0:56:36	inf24f_247	2	g++	Partial solution	19	64
663	3:55:52	inf24f_247	3	g++	Partial solution	3	0
636	3:52:35	inf24f_247	4	g++	Partial solution	6	25
332	2:10:35	inf24f_247	5	g++	OK	22	100
473	3:11:38	inf24f_247	6	g++	OK	11	100

389 технических баллов
64 итоговых балла

Посылка по задаче 1

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4]
[5] #define int long long
[6] #define all(x) x.begin(), x.end()
[7] #define pb push_back
[8] #define sz(x) (int)x.size()
[9]
[10]
[11]const int INF = (int)1e15;
[12]
[13]void solve() {
[14]    vector <int> bro = {1, 2, 4, 8};
[15]    while (bro.back() < (int)1e14) {
[16]        int n = sz(bro);
[17]        int val = bro[n - 1] + bro[n - 2] + bro[n - 3] + bro[n - 4];
[18]        bro.push_back(val);
[19]    }
[20]    int n;
[21]    cin >> n;
[22]    int ans = 0;
[23]    for (int i = 0; i < n; i++) {
[24]        int x;
[25]        cin >> x;
[26]        int cnt = 0;
[27]        for (int j = (int)bro.size() - 1; j >= 0; j--) {
[28]            if (x >= bro[j]) {
[29]                x -= bro[j];
[30]                cnt++;
[31]            }
[32]        }
[33]        ans += (cnt % 2 == 0);
[34]        //cout << x << " ";
[35]    }
[36]    cout << ans << "\n";
[37]}
[38]
[39]signed main() {
[40]    freopen("input.txt", "r", stdin);
[41]    freopen("output.txt", "w", stdout);
[42]
[43]    ios_base::sync_with_stdio(false);
[44]    cin.tie(0);
[45]    cout.tie(0);
[46]
[47]    int t = 1;
[48]    while (t--) {
[49]        solve();
[50]    }
[51]}
```

Посылка по задаче 2

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4]
[5] #define int long long
[6] #define all(x) x.begin(), x.end()
[7] #define pb push_back
[8] #define sz(x) (int)x.size()
[9]
[10]
[11]const int INF = (int)1e15;
[12]
[13]bool cmp(string a, string b) {
[14]    for (int i = 0; i < 14000; i++) {
[15]        if (a[i] < b[i])
[16]            return true;
[17]    }
[18]    return false;
[19]}
[20]
[21]void solve() {
[22]    string s;
[23]    cin >> s;
[24]    int lvl = 0;
[25]    int cnt = 0;
[26]    long double term = 1;
[27]    map <char, string> bro;
[28]    vector <int> st;
[29]    st.push_back(0);
[30]
[31]    for (int i = 0; i < sz(s); i++) {
[32]        if (s[i] == 'Q') {
[33]            st.push_back(0);
[34]            lvl++;
[35]            term = (double) term / 8;
[36]        } else {
[37]            if (bro.find(s[i]) == bro.end()) {
[38]                bro[s[i]] = string(14000, '0');
[39]            }
[40]            string &t = bro[s[i]];
[41]            int ind = lvl * 3;
[42]            while (t[ind] == '1') {
[43]                t[ind] = '0';
[44]                ind--;
[45]            }
[46]            t[ind] = '1';
[47]
[48]            st.back()++;
[49]        }//cout << c << "\n" << mx << "\n";
[50]
```

```
[51]         while (st.back() == 8) {
[52]             term *= 8;
[53]             lvl--;
[54]             st.pop_back();
[55]             st.back()++;
[56]         }
[57]     }
[58]
[59]     char c;
[60]     string mx = string(14000, '0');
[61]
[62]     for (auto el : bro) {
[63]         if (cmp(mx, el.second)) {
[64]             mx = el.second;
[65]             c = el.first;
[66]         }
[67]     }
[68]     cout << c << "\n";
[69]
[70]     cout << mx[0] << ".";
[71]     while (sz(mx) > 2 && mx.back() == '0') {
[72]         mx.pop_back();
[73]     }
[74]     for (int i = 1; i < sz(mx); i++) {
[75]         cout << mx[i];
[76]     }
[77]     cout <<  "\n";
[78] }
[79]
[80] signed main() {
[81]     freopen("input.txt", "r", stdin);
[82]     freopen("output.txt", "w", stdout);
[83]
[84]     ios_base::sync_with_stdio(false);
[85]     cin.tie(0);
[86]     cout.tie(0);
[87]
[88]     int t = 1;
[89]     while (t--) {
[90]         solve();
[91]     }
[92] }
```

Посылка по задаче 3

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4]
[5] #define all(x) x.begin(), x.end()
[6] #define pb push_back
[7] #define sz(x) (int)x.size()
[8]
[9]
[10] //const int INF = (int)1e15;
[11] vector <vector <int>> a;
[12] int n, m;
[13]
[14] int calc(int col, int r1, int r2, int r3) {
[15]     set <int> lox = {r1, r2, r3};
[16]
[17]     int ans = 0;
[18]     for (auto el : lox) {
[19]         ans += a[el][col];
[20]     }
[21]     return ans;
[22] }
[23]
[24] bool ok(int i) {
[25]     return i >= 0 && i < n;
[26] }
[27]
[28] void solve() {
[29]     int n;
[30]     cin >> n;
[31]     for (int i = 0; i < n; i++) {
[32]         string s;
[33]         cin >> s;
[34]
[35]     }
[36]     if (n == 2) {
[37]         cout << "i\ni(";
[38]     } else if (n == 3) {
[39]         cout << "i(\ni((";
[40]     } else {
[41]         cout << "i\nI";
[42]     }
[43] }
[44]
[45] signed main() {
[46]     freopen("input.txt", "r", stdin);
[47]     freopen("output.txt", "w", stdout);
[48]
[49]     ios_base::sync_with_stdio(false);
[50]     cin.tie(0);
[51]     cout.tie(0);
[52]
[53]     int t = 1;
[54]     while (t--) {
[55]         solve();
[56]     }
[57] }
```

Посылка по задаче 4

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4]
[5] #define all(x) x.begin(), x.end()
[6] #define pb push_back
[7] #define sz(x) (int)x.size()
[8]
[9]
[10] //const int INF = (int)1e15;
[11] vector <vector <int>> a;
[12] int n, m;
[13]
[14] int calc(int col, int r1, int r2, int r3) {
[15]     set <int> lox = {r1, r2, r3};
[16]
[17]     int ans = 0;
[18]     for (auto el : lox) {
[19]         ans += a[el][col];
[20]     }
[21]     return ans;
[22] }
[23]
[24] bool ok(int i) {
[25]     return i >= 0 && i < n;
[26] }
[27]
[28] void solve() {
[29]     cin >> n >> m;
[30]     int r1, r2, r3;
[31]     cin >> r1 >> r2 >> r3;
[32]     a.assign(n, vector <int> (m, 0));
[33]     for (int i = 0; i < n; i++) {
[34]         for (int j = 0; j < m; j++) {
[35]             cin >> a[i][j];
[36]         }
[37]     }
[38]
[39]     vector <vector <vector <vector <int>>>> dp(m, vector <vector <vector <int>>> (n, vector <vector <int>> (n, vector <int> (n, 0))));
[40]
[41]
[42]     dp[0][r1][r2][r3] = calc(0, r1, r2, r3);
[43]     //cout << dp[0][r1][r2][r3] << "\n";
[44]     int ans = 0;
[45]     for (int col = 1; col < m; col++) {
[46]         for (int i = 0; i < n; i++) {
[47]             for (int j = 0; j < n; j++) {
[48]                 for (int k = 0; k < n; k++) {
[49]                     for (int di = -1; di <= 1; di++) {
[50]                         for (int dj = -1; dj <= 1; dj++) {
[51]                             for (int dk = -1; dk <= 1; dk++) {
[52]                                 int ni = i + di;
[53]                                 int nj = j + dj;
[54]                                 int nk = k + dk;
[55]
[56]                                 if (!ok(ni) || !ok(nj) || !ok(nk))
[57]                                     continue;
[58]                                 //cout << ni << " " << nj << " " << nk << "\n";
[59]                                 int val = calc(col, i, j, k);
[60]                                 dp[col][i][j][k] = max(dp[col][i][j][k], dp[col - 1][ni][nj][nk] + val);
[61]                             }
[62]                         }
[63]                     }
[64]                     if (col == m - 1) {
[65]                         ans = max(ans, dp[col][i][j][k]);
[66]                     }
[67]                 }
[68]             }
[69]         }
[70]     }
[71]     cout << ans << "\n";
[72] }
[73]
[74] signed main() {
[75]     freopen("input.txt", "r", stdin);
[76]     freopen("output.txt", "w", stdout);
[77]
[78]     ios_base::sync_with_stdio(false);
[79]     cin.tie(0);
[80]     cout.tie(0);
[81]
[82]     int t = 1;
[83]     while (t--) {
[84]         solve();
[85]     }
[86] }
```

Посылка по задаче 5

```
[1]  #include <bits/stdc++.h>
[2]
[3]  using namespace std;
[4]
[5]  #define all(x) x.begin(), x.end()
[6]  #define pb push_back
[7]  #define sz(x) (int)x.size()
[8]
[9]  const int INF = (int)1e15;
[10] vector <vector <int>> a;
[11] int n, m;
[12]
[13] int calc(int col, int r1, int r2, int r3) {
[14]     set <int> lox = {r1, r2, r3};
[15]
[16]     int ans = 0;
[17]     for (auto el : lox) {
[18]         ans += a[el][col];
[19]     }
[20]     return ans;
[21] }
[22]
[23] bool ok(int i) {
[24]     return i >= 0 && i < n;
[25] }
[26]
[27] void solve() {
[28]     string s;
[29]     cin >> s;
[30]     string t;
[31]     cin >> t;
[32]     int l = 0;
[33]     int r = sz(s);
[34]     map <char, int> cnt2;
[35]     for (auto el : t) {
[36]         cnt2[el]++;
[37]     }
[38]
[39]     while (r - l > 1) {
[40]         int m = (r + l) / 2;
[41]         map <char, int> cnt;
[42]
[43]         bool f = false;
[44]
[45]         for (int i = 0; i < sz(s); i++) {
[46]             cnt[s[i]]++;
[47]
[48]             if (i >= m - 1) {
[49]                 bool f1 = true;
[50]                 for (auto el : cnt2) {
[51]                     if (cnt[el.first] < el.second) {
[52]                         f1 = false;
[53]                         break;
[54]                     }
[55]                 }
[56]                 cnt[s[i - m + 1]]--;
```

```
[57]
[58]                 if (f1) {
[59]                     f = true;
[60]                     break;
[61]                 }
[62]
[63]             }
[64]         }
[65]
[66]         if (f) {
[67]             r = m;
[68]         } else {
[69]             l = m;
[70]         }
[71]     }
[72]
[73]     map <char, int> cnt;
[74]     string ans = "";
[75]     for (int i = 0; i < sz(s); i++) {
[76]         cnt[s[i]]++;
[77]         if (i >= r - 1) {
[78]             bool f1 = true;
[79]             for (auto el : cnt2) {
[80]                 if (cnt[el.first] < el.second) {
[81]                     f1 = false;
[82]                     break;
[83]                 }
[84]             }
[85]
[86]             if (f1) {
[87]                 ans = s.substr(i - r + 1, r);
[88]                 break;
[89]             }
[90]
[91]             cnt[s[i - r + 1]]--;
[92]         }
[93]     }
[94]
[95]     cout << ans << "\n";
[96]
[97] }
[98]
[99] signed main() {
[100]     freopen("input.txt", "r", stdin);
[101]     freopen("output.txt", "w", stdout);
[102]
[103]     ios_base::sync_with_stdio(false);
[104]     cin.tie(0);
[105]     cout.tie(0);
[106]
[107]     int t = 1;
[108]     while (t--) {
[109]         solve();
[110]     }
[111] }
```

Посылка по задаче 6

```
[1]  #include <bits/stdc++.h>
[2]
[3]  using namespace std;
[4]
[5]  #define all(x) x.begin(), x.end()
[6]  #define pb push_back
[7]  #define sz(x) (int)x.size()
[8]
[9]  const int INF = (int)1e15;
[10] vector <vector <int>> a;
[11] int n, m;
[12]
[13] int calc(int col, int r1, int r2, int r3) {
[14]     set <int> lox = {r1, r2, r3};
[15]
[16]     int ans = 0;
[17]     for (auto el : lox) {
[18]         ans += a[el][col];
[19]     }
[20]     return ans;
[21] }
[22]
[23] bool ok(int i) {
[24]     return i >= 0 && i < n;
[25] }
[26]
[27] bool check(vector <vector <int>> &a, int j1, int j2) {
[28]     for (int i = 0; i < sz(a); i++) {
[29]         if (a[i][j1] != a[i][j2])
[30]             return false;
[31]     }
[32]     return true;
[33] }
[34]
[35] void solve() {
[36]
[37]     string s;
[38]     vector <vector <vector <int>>> bro;
[39]     map <string, int> used;
[40]     vector <int> top;
[41]     set <string> ord;
[42]     while (getline(cin, s)) {
[43]         string id;
[44]         int i = 0;
[45]         vector <int> a;
[46]         while (s[i] != ';') {
[47]             id.push_back(s[i]);
[48]             i++;
[49]         }
[50]         i++;
[51]         ord.insert(id);
[52]         string tmp = "";
[53]         for (; i < sz(s); i++) {
[54]             if ((int)(s[i]) == 39 || s[i] == '`')
[55]                 continue;
[56]             if (s[i] != ';') {
[57]                 tmp.push_back(s[i]);
[58]
[59]             } else {
[60]                 if (tmp == "OK") {
[61]                     a.push_back(1);
[62]                 } else {
[63]                     a.push_back(0);
[64]                 }
[65]                 tmp = "";
[66]             }
[67]         }
[68]         if (tmp == "OK") {
[69]             a.push_back(1);
[70]         } else {
[71]             a.push_back(0);
[72]         }
```

```
[73]          if (used.find(id) == used.end()) {
[74]              bro.emplace_back(vector <vector <int>> ());
[75]              top.push_back(0);
[76]              used[id] = sz(bro) - 1;
[77]          }
[78]
[79]          bro[used[id]].push_back(a);
[80]          top[used[id]] = max(top[used[id]], sz(a));
[81]
[82]      }
[83]
[84]      for (int i = 0; i < sz(bro); i++) {
[85]          //cout << i << ": \n";
[86]          for (auto &el : bro[i]) {
[87]              while (sz(el) < top[i]) {
[88]                  el.push_back(0);
[89]              }
[90]          }
[91]          /*
[92]          for (auto el : bro[i]) {
[93]              for (auto el1 : el) {
[94]                  cout << el1 << " ";
[95]              }
[96]              cout << "\n";
[97]          }
[98]          cout << "\n";
[99]          */
[100]     }
[101]
[102]
[103]     for (auto el : ord) {
[104]         vector <vector <int>> &a = bro[used[el]];
[105]         set <string> lox;
[106]         int cnt = 0;
[107]
[108]         for (int j = 0; j < sz(a[0]); j++) {
[109]             string z;
[110]             for (int i = 0; i < sz(a); i++) {
[111]                 z.push_back(char(a[i][j] + '0'));
[112]             }
[113]             lox.insert(z);
[114]         }
[115]         int val = top[used[el]];
[116]         cout << val << " " << sz(lox) << "\n";
[117]     }
[118]
[119]
[120]
[121] }
[122]
[123] signed main() {
[124]
[125]     freopen("input.txt", "r", stdin);
[126]     freopen("output.txt", "w", stdout);
[127]
[128]
[129]     ios_base::sync_with_stdio(false);
[130]     cin.tie(0);
[131]     cout.tie(0);
[132]
[133]
[134]     int t = 1;
[135]     while (t--) {
[136]         solve();
[137]     }
[138] }
```