Олимпиада «Ломоносов» по информатике
2024-2025 учебный год. Заключительный этап
Работа участника с id заявки 1372813, логином inf25f_352

Сводный итог по всем задачам в проверяющей системе

RunID	Time	Username	Prob	Lang	Result	Tests	Score
328	3:50:28	inf25f_352	3	g++	OK	23	100
N/A	N/A	inf25f_352	4	N/A	N/A	0	0
228	3:08:09	inf25f_352	1	g++	Partial solution	22	72
205	2:59:51	inf25f_352	5	g++	Partial solution	1	0
94	1:26:30	inf25f_352	2	g++	OK	28	100

272 технических балла
78 итоговых баллов

Посылка по задаче 1

```
[1]  #include <iostream>
[2]  #include <unordered_map>
[3]  #include <map>
[4]  #include <set>
[5]  #include <iomanip>
[6]  #include <algorithm>
[7]  #include <vector>
[8]  #include <cmath>
[9]  #include <string>
[10] #include <deque>
[11]
[12] using namespace std;
[13] using ll = long long;
[14] using ld = long double;
[15] # define aint(v) v.begin(), v.end()
[16] # define raint(v) v.rbegin(), v.rend()
[17]
[18] int a, b;
[19] bool ok = true;
[20]
[21] void bfs(vector <int>& ans) {
[22]     vector <int> d(5000000, -1);
[23]     vector <int> p(5000000, -1);
[24]     vector <bool> used(5000000, false);
[25]     deque <int> q;
[26]     d[a] = 0;
[27]     used[a] = true;
[28]     q.push_back(a);
[29]     while (!q.empty()) {
[30]         int v = q.front();
[31]         q.pop_front();
[32]         // cout << v << '\n';
[33]         // cout.flush();
[34]         if (v % 2 == 0 && v % 2 == 0 && !used[v / 2]) {
[35]             used[v / 2] = true;
[36]             d[v / 2] = d[v] + 1;
[37]             p[v / 2] = v;
[38]             q.push_back(v / 2);
[39]         }
[40]         if (v * 2 < 5000000 && !used[v * 2]) {
[41]             used[v * 2] = true;
[42]             d[v * 2] = d[v] + 1;
[43]             p[v * 2] = v;
[44]             q.push_back(v * 2);
[45]         }
[46]         if (3 * v + 1 < 5000000 && v % 2 == 1 && !used[3 * v + 1]) {
[47]             used[3 * v + 1] = true;
[48]             d[3 * v + 1] = d[v] + 1;
[49]             p[3 * v + 1] = v;
[50]             q.push_back(3 * v + 1);
[51]         }
```

```
[52]          if ((v - 1) % 3 == 0 && ((v - 1) / 3) % 2 == 1 && !used[(v - 1) / 3]) {
[53]              used[(v - 1) / 3] = true;
[54]              d[(v - 1) / 3] = d[v] + 1;
[55]              p[(v - 1) / 3] = v;
[56]              q.push_back((v - 1) / 3);
[57]          }
[58]      }
[59]      //
[60]      if (d[b] == -1) {
[61]          ok = false;
[62]          return;
[63]      }
[64]      int pos = b;
[65]      ans.reserve(10000);
[66]      while (pos != a) {
[67]          if (pos != b) ans.push_back(pos);
[68]          pos = p[pos];
[69]      }
[70]      // ans.push_back(a);
[71]      reverse(aint(ans));
[72]  }
[73]
[74]  void run() {
[75]      vector <int> ans;
[76]      bfs(ans);
[77]      if (!ok) {
[78]          cout << -1;
[79]          return;
[80]      }
[81]      cout << ans.size() + 1 << '\n';
[82]      for (auto sym : ans) {
[83]          cout << sym << " ";
[84]      }
[85]  }
[86]
[87]  void fast() {
[88]      ios::sync_with_stdio(false);
[89]      cin.tie(0);
[90]      cout.tie(0);
[91]  }
[92]
[93]  signed main() {
[94]      fast();
[95]      cin >> a >> b;
[96]      if (a == b) {
[97]          cout << 0;
[98]          return 0;
[99]      }
[100]     run();
[101]     return 0;
[102] }
```

Посылка по задаче 2

```
[1]  #include <iostream>
[2]  #include <unordered_map>
[3]  #include <map>
[4]  #include <set>
[5]  #include <iomanip>
[6]  #include <algorithm>
[7]  #include <vector>
[8]  #include <cmath>
[9]  #include <string>
[10] #include <deque>
[11]
[12] using namespace std;
[13] using ll = long long;
[14] using ld = long double;
[15] # define all(v) v.begin(), v.end()
[16] # define rall(v) v.rbegin(), v.rend()
[17]
[18] ll n;
[19] map <string, ll> alpha;
[20]
[21] struct number {
[22]     string str;
[23]     vector <string> s;
[24]     // bool operator>(number& b) {
[25]     //     if (s.size() != b.s.size()) {
[26]     //         return s.size() > b.s.size();
[27]     //     }
[28]     //     for (ll i = 0; i < (ll)s.size(); ++i) {
[29]     //         if (s[i] != b.s[i]) {
[30]     //             return alpha[s[i]] > alpha[b.s[i]];
[31]     //         }
[32]     //     }
[33]     //     return false;
[34]     // }
[35]     bool operator<(number& b) {
[36]         if (s.size() != b.s.size()) {
[37]             return s.size() < b.s.size();
[38]         }
[39]         for (ll i = 0; i < (ll)s.size(); ++i) {
[40]             if (s[i] != b.s[i]) {
[41]                 return alpha[s[i]] < alpha[b.s[i]];
[42]             }
[43]         }
[44]         return true;
[45]     }
[46] };
[47]
[48] vector <number> arr;
[49] vector <string> abobus;
[50]
[51] void run() {
[52]     vector <ll> ans;
[53]     for (ll i = 0; i < n; ++i) {
[54]         if (arr[i].str != abobus[i]) {
[55]             ans.push_back(i);
[56]         }
```

```
[57]      }
[58]      cout << ans[0] + 1 << " " << ans[1] + 1;
[59]  }
[60]
[61]  void fast() {
[62]      ios::sync_with_stdio(false);
[63]      cin.tie(0);
[64]      cout.tie(0);
[65]  }
[66]
[67]  void init() {
[68]      ll ABOBA = 0;
[69]      for (ll i = 0; i < 26; ++i) {
[70]          char c = 'A' + i;
[71]          string s;
[72]          s += c;
[73]          alpha[s] = ABOBA;
[74]          ++ABOBA;
[75]      }
[76]      for (ll i = 0; i < 26; ++i) {
[77]          char c = 'a' + i;
[78]          string s;
[79]          s += c;
[80]          alpha[s] = ABOBA;
[81]          ++ABOBA;
[82]      }
[83]      for (ll i = 0; i < 26; ++i) {
[84]          char c = 'A' + i;
[85]          string s;
[86]          s += c;
[87]          s += '^';
[88]          alpha[s] = ABOBA;
[89]          ++ABOBA;
[90]      }
[91]      for (ll i = 0; i < 26; ++i) {
[92]          char c = 'a' + i;
[93]          string s;
[94]          s += c;
[95]          s += '^';
[96]          alpha[s] = ABOBA;
[97]          ++ABOBA;
[98]      }
[99]      for (ll i = 0; i < 26; ++i) {
[100]         char c = 'A' + i;
[101]         string s;
[102]         s += c;
[103]         s += '~';
[104]         alpha[s] = ABOBA;
[105]         ++ABOBA;
[106]     }
[107]     for (ll i = 0; i < 26; ++i) {
[108]         char c = 'a' + i;
[109]         string s;
[110]         s += c;
[111]         s += '~';
```

```
[112]         alpha[s] = ABOBA;
[113]         ++ABOBA;
[114]     }
[115]     for (ll i = 0; i < 26; ++i) {
[116]         char c = 'A' + i;
[117]         string s;
[118]         s += c;
[119]         s += '_';
[120]         alpha[s] = ABOBA;
[121]         ++ABOBA;
[122]     }
[123]     for (ll i = 0; i < 26; ++i) {
[124]         char c = 'a' + i;
[125]         string s;
[126]         s += c;
[127]         s += '_';
[128]         alpha[s] = ABOBA;
[129]         ++ABOBA;
[130]     }
[131] }
[132]
[133] signed main() {
[134]     fast();
[135]     cin >> n;
[136]     arr.resize(n);
[137]     abobus.resize(n);
[138]     vector <string> tmp;
[139]     //
[140]     init();
[141]     //
[142]     for (ll i = 0; i < n; ++i) {
[143]         string s;
[144]         cin >> s;
[145]         abobus[i] = s;
[146]         string num;
[147]         for (ll i = 0; i < (ll)s.size(); ++i) {
[148]             num += s[i];
[149]             if (i != (ll)s.size() - 1 && not(('a' <= s[i + 1] && s[i + 1] <= 'z') || ('A' <= s[i + 1] && s[i + 1] <=
[150]                 num += s[i + 1];
[151]                 ++i;
[152]             }
[153]             tmp.push_back(num);
[154]             num.clear();
[155]         }
[156]         arr[i].s = tmp;
[157]         arr[i].str = s;
[158]         tmp.clear();
[159]     }
[160]     // reverse(all(abobus));
[161]     sort(rall(arr));
[162]     run();
[163]     return 0;
[164] }
```

Посылка по задаче 3

```
[1]  #include <iostream>
[2]  // #include <unordered_map>
[3]  // #include <map>
[4]  // #include <set>
[5]  // #include <iomanip>
[6]  #include <algorithm>
[7]  #include <vector>
[8]  // #include <cmath>
[9]  // #include <string>
[10] // #include <deque>
[11]
[12] using namespace std;
[13] using ll = long long;
[14] using ld = long double;
[15] # define aint(v) v.begin(), v.end()
[16] # define raint(v) v.rbegin(), v.rend()
[17]
[18] #pragma GCC optimize("avx,avx2,bmi,bmi2")
[19] // #pragma GCC target("O3")
[20]
[21] int n, t, m;
[22] vector <ll> score;
[23] vector <vector<ll>> g;
[24]
[25] int ans = 0;
[26] vector <int> trip;
[27]
[28] vector <bool> used;
[29] vector <int> arr;
[30] void perebor(int cnt, ll baints, int tek, ll timer) {
[31]     if (timer + g[tek][0] <= t) {
[32]         if (ans < baints) {
[33]             ans = baints;
[34]             trip = arr;
[35]         } else if (ans == baints && trip.size() > arr.size()) {
[36]             ans = baints;
[37]             trip = arr;
[38]         } else if (ans == baints && trip.size() == arr.size()) {
[39]             vector <int> sorted = arr;
[40]             sort(aint(sorted));
[41]             sort(aint(trip));
[42]             if (sorted < trip) {
[43]                 ans = baints;
[44]                 trip = sorted;
[45]             }
[46]         }
[47]     }
[48]     if (cnt == n) {
[49]         return;
[50]     }
[51]     //
[52]     for (int i = 0; i < n; ++i) {
[53]         if (!used[i] && timer + g[tek][i] <= t) {
[54]             used[i] = true;
[55]             arr.push_back(i);
[56]             perebor(cnt + 1, baints + score[i], i, timer + g[tek][i]);
[57]             arr.pop_back();
[58]             used[i] = false;
[59]         }
[60]     }
[61] }
[62]
```

```
[63] void run() {
[64]     // floyd
[65]     for (int k = 0; k < n; ++k) {
[66]         for (int i = 0; i < n; ++i) {
[67]             for (int j = 0; j < n; ++j) {
[68]                 if (i == j) continue;
[69]                 g[i][j] = min(g[i][j], g[i][k] + g[k][j]);
[70]             }
[71]         }
[72]     }
[73]     arr.reserve(n);
[74]     trip.reserve(n);
[75]     // perebor
[76]     used.assign(n, false);
[77]     arr.push_back(0);
[78]     used[0] = true;
[79]     perebor(1, score[0], 0, 0);
[80]     //
[81]     sort(aint(trip));
[82]     cout << trip.size() << '\n';
[83]     for (auto sym : trip) {
[84]         cout << sym + 1 << " ";
[85]     }
[86] }
[87]
[88] void fast() {
[89]     ios::sync_with_stdio(false);
[90]     cin.tie(0);
[91]     cout.tie(0);
[92] }
[93]
[94] signed main() {
[95]     fast();
[96]     cin >> n >> t >> m;
[97]     score.assign(n, 0);
[98]     for (int i = 0; i < n; ++i) {
[99]         cin >> score[i];
[100]    }
[101]    //
[102]    g.assign(n, vector <ll>(n, 0));
[103]    for (int i = 0; i < n; ++i) {
[104]        for (int j = 0; j < n; ++j) {
[105]            cin >> g[i][j];
[106]        }
[107]    }
[108]    int u = 0, v = 0;
[109]    ll w = 0;
[110]    for (int i = 0; i < m; ++i) {
[111]        cin >> u >> v >> w;
[112]        --u; --v;
[113]        g[u][v] = min(g[u][v], w);
[114]        g[v][u] = min(g[v][u], w);
[115]    }
[116]    run();
[117]    return 0;
[118] }
```

Посылка по задаче 4
Посылок по задаче 4 не было отправлено.

Посылка по задаче 5

```
[1] #include <iostream>
[2] #include <vector>
[3] #include <deque>
[4]
[5] using namespace std;
[6]
[7] void fast() {
[8]     ios::sync_with_stdio(false);
[9]     cin.tie(0);
[10]    cout.tie(0);
[11] }
[12]
[13] signed main() {
[14]    fast();
[15]    int m, n, k;
[16]    int a = 0, b = 0, ind = 0;
[17]    cin >> m >> n >> k;
[18]    vector <vector<bool>> arr(n, vector <bool>(m, false));
[19]    vector <vector<pair<int, int>>> g(n);
[20]    //
[21]    for (int i = 0; i < n - 1; ++i) {
[22]        cin >> a >> b >> ind;
[23]        --a; --b;
[24]        g[a].emplace_back(b, ind);
[25]    }
[26]    //
[27]    deque <int> q;
[28]    q.push_back(0);
[29]    while (!q.empty()) {
[30]        int v = q.front();
[31]        q.pop_front();
[32]        for (auto sym : g[v]) {
[33]            arr[sym.first] = arr[v];
[34]            arr[sym.first][sym.second] = true;
[35]            q.push_back(sym.first);
[36]        }
[37]    }
[38]    //
[39]    for (int z = 0; z < k; ++z) {
[40]        cin >> a >> b;
[41]        --a; --b;
[42]        int j = 0, len_maxx = 0;
[43]        for (int i = 0; i < m; ++i) {
[44]            if (i > j) j = i;
[45]            while (!arr[a][j] && !arr[b][j] && j < m) {
[46]                ++j;
[47]            }
[48]            len_maxx = max(len_maxx, j - i);
[49]            i = j;
[50]        }
[51]        cout << len_maxx << '\n';
[52]    }
[53]    return 0;
[54] }
```