Олимпиада «Ломоносов» по информатике
2024-2025 учебный год. Заключительный этап
Работа участника с id заявки 1431109, логином inf25f_302

Сводный итог по всем задачам в проверяющей системе

RunID	Time	Username	Prob	Lang	Result	Tests	Score
290	3:42:02	inf25f_302	5	g++	Partial solution	1	0
236	3:12:01	inf25f_302	1	g++	Partial solution	18	56
234	3:10:04	inf25f_302	3	g++	Partial solution	21	90
83	1:16:32	inf25f_302	2	g++	OK	28	100
N/A	N/A	inf25f_364	4	N/A	N/A	0	0

246 технических баллов
70 итоговых баллов

Посылка по задаче 1

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4] vector<int> g[1000002];
[5] int p[1000002] = {0};
[6] queue<int> lay;
[7] void bfs(int v) {
[8]     lay.push(v);
[9]     p[v] = -1;
[10]    while (!lay.empty()) {
[11]        auto q = lay.front();
[12]        lay.pop();
[13]        for (auto u : g[q]) {
[14]            if (p[u] == 0) {
[15]                p[u] = q;
[16]                lay.push(u);
[17]            }
[18]        }
[19]    }
[20] }
[21]
[22] int main() {
[23]    for (int i = 1; i < 1000001; i++) {
[24]        if (i%2 == 0) {
[25]            g[i/2].push_back(i);
[26]            g[i].push_back(i/2);
[27]        }
[28]        else {
[29]            if (3*i + 1 < 1000001) {
[30]                g[3 * i + 1].push_back(i);
[31]                g[i].push_back(3 * i + 1);
[32]            }
[33]        }
[34]    }
[35]    int a, b;
[36]    cin >> a >> b;
[37]    if (a == b) {
[38]        cout << 0 << endl;
[39]        exit(0);
[40]    }
[41]    bfs(b);
[42]    int t = p[a];
[43]    vector<int> ans;
[44]    while (p[t] != -1) {
[45]        ans.push_back(t);
[46]        t = p[t];
[47]    }
[48]    cout << ans.size() + 1 << endl;
[49]    for (auto k : ans)
[50]        cout << k << " ";
[51]    return 0;
[52] }
```

Посылка по задаче 2

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4]
[5] vector<int> strtoarr(string a) {
[6]     vector<int> arr(52, 0);
[7]     int n = a.size() - 1;
[8]     int razr = 51;
[9]     int plus = 0;
[10]    for (int i = n; i >= 0; i--) {
[11]        if (a[i] == '_')
[12]            plus += 156;
[13]        else if (a[i] == '^')
[14]            plus += 52;
[15]        else if (a[i] == '~')
[16]            plus += 104;
[17]        else if (a[i] - 'A' > 30) {
[18]            int cnt = a[i] - 'A' - 6 + plus;
[19]            plus = cnt/52;
[20]            cnt %= 52;
[21]            arr[razr] = cnt;
[22]            razr--;
[23]        }
[24]        else if (a[i] - 'A' < 30) {
[25]            int cnt = a[i] - 'A' + plus;
[26]            plus = cnt/52;
[27]            cnt %= 52;
[28]            arr[razr] = cnt;
[29]            razr--;
[30]        }
[31]    }
[32]    arr[razr] += plus;
[33]    return arr;
[34]}
[35]
[36]int main() {
[37]    int n;
[38]    cin >> n;
[39]    vector<vector<int>> nums;
[40]    vector<int> strange;
[41]    for (int i = 0; i < n; i++) {
[42]        string s;
[43]        cin >> s;
[44]        nums.push_back(strtoarr(s));
[45]    }
[46]    {
[47]        vector<int> tmp;
[48]        for (int i = 0; i < 52; i++)
[49]            tmp.push_back(0);
[50]        nums.push_back(tmp);
[51]    }
[52]    /*for (auto p : nums) {
[53]        for (auto q : p) {
[54]            cout << q << " ";
[55]        }
[56]        cout << endl;
[57]    }*/
[58]    for (int i = 0; i < n; i++) {
[59]        if (nums[i] < nums[i + 1])
[60]            strange.push_back(i);
[61]    }
[62]    if (strange.size() == 1)
[63]        cout << strange[0] + 1 << " " << strange[0] + 2 << endl;
[64]    if (strange.size() == 2)
[65]        cout << strange[0] + 1 << " " << strange[1] + 2 << endl;
[66]    return 0;
[67]}
```

Посылка по задаче 3

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4]
[5] int p[10];
[6]
[7] #define int long long
[8]
[9] vector<vector<int>> g;
[10]int n, t, m;
[11]int test(vector<int> bb) {
[12]    vector<vector<int>> gg(bb.size(), vector<int>(bb.size()));
[13]    int l = bb.size();
[14]    for (int i = 0; i < l; i++) {
[15]        for (int j = 0; j < l; j++) {
[16]            gg[i][j] = g[bb[i]][bb[j]];
[17]        }
[18]    }
[19]    for (int i = 0; i < l; i++) {
[20]        for (int j = 0; j < l; j++) {
[21]            for (int k = 0; k < l; k++) {
[22]                if (gg[i][k] > gg[i][j] + gg[j][k]) {
[23]                    gg[i][k] = gg[i][j] + gg[j][k];
[24]                    gg[k][i] = gg[i][k];
[25]                }
[26]            }
[27]        }
[28]    }
[29]
[30]    /*for (auto pp : gg) {
[31]        for (auto q : pp) {
[32]            cout << q << " ";
[33]        }
[34]        cout << endl;
[35]    }
[36]    cout << endl;*/
[37]    vector<vector<int>> dp((1ll << l), vector<int>(l, 1e10));
[38]    dp[1][0] = 0;
[39]    for (int mask = 0; mask < (1ll << l); mask++) {
[40]        for (int j = 0; j < l; j++) {
[41]            for (int i = 0; i < l; i++) {
[42]                if (((mask >> i) & 1) == 0) {
[43]                    dp[mask | (1 << i)][i] = min(dp[mask | (1 << i)][i], dp[mask][j] + g[bb[j]][bb[i]]);
[44]                }
[45]            }
[46]        }
[47]    }
```

```
    int mn = (int)1e18;
    for (int i = 0; i < l; i++)
        mn = min(dp[(1ll << l) - 1][i] + gg[i][0], mn);
    /*for (auto c : bb)
        cout << c << " ";
    cout << endl;
    cout << mn << endl;*/
    return (mn <= t);
}

signed main() {
    cin >> n >> t >> m;
    g.resize(n, vector<int>(n, 0));
    for (int i = 0; i < n; i++)
        cin >> p[i];
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            cin >> g[i][j];
        }
    }
    for (int i = 0; i < m; i++) {
        int u, v, w;
        cin >> u >> v >> w;
        u--;v--;
        g[u][v] = min(g[u][v], w);
        g[v][u] = min(g[v][u], w);
    }
    int ans = p[0];
    vector<int> bbans = {0};
    for (int mask = 1; mask < (1 << n); mask += 2) {
        vector<int> bb;
        int pp = 0;
        for (int i = 0; i < n; i++) {
            if (((mask >> i) & 1) == 1) {
                bb.push_back(i);
                pp += p[i];
            }
        }
        if (pp > ans)
            if(test(bb)) {
                bbans = bb;
                ans = pp;
            }
    }
    cout << bbans.size() << endl;
    for (auto c : bbans)
        cout << c + 1 << " ";
    cout << endl;
    return 0;
}
```

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

Посылка по задаче 5

```
[1] #include <bits/stdc++.h>
[2]
[3] #define int long long
[4] using namespace std;
[5] int m, n, k;
[6]
[7] vector<int> p;
[8] vector<int> q;
[9] vector<bool> visited;
[10]
[11]void mxup(int a) {
[12]    visited[a] = 1;
[13]    if (p[a] == -1)
[14]        return;
[15]    mxup(p[a]);
[16]}
[17]
[18]int lca(int b) {
[19]    if (visited[b])
[20]        return b;
[21]    return p[b];
[22]}
[23]
[24]signed main() {
[25]    cin >> m >> n >> k;
[26]    p.resize(n);
[27]    q.resize(n);
[28]    visited.resize(n, 0);
[29]    for (int i = 0; i < n; i++)
[30]        p[i] = -1;
[31]    for (int i = 0; i < n - 1; i++) {
[32]        int s, d, b;
[33]        cin >> s >> d >> b;
[34]        s--;d--;
[35]        p[d] = s;
[36]        q[d] = b;
[37]    }
[38]    for (int i = 0; i < k; i++) {
[39]        int a, b;
[40]        cin >> a >> b;
[41]        a--;b--;
[42]        for (int j = 0; j < n; j++)
[43]            visited[j] = 0;
[44]        mxup(a);
[45]        int ab = lca(b);
[46]        set<int> bb;
[47]        while (a != ab) {
[48]            bb.insert(q[a]);
[49]            a = p[a];
[50]        }
[51]        while (b != ab) {
[52]            bb.insert(q[a]);
[53]            b = p[a];
[54]        }
[55]        bb.insert(-1);
[56]        bb.insert(m);
[57]        vector<int> cb;
[58]        for (auto ll : bb)
[59]            cb.push_back(ll);
[60]        int ans = 0;
[61]        for (int i = 0; i < cb.size() - 1; i++) {
[62]            ans = max(ans, cb[i + 1] - cb[i] - 1);
[63]        }
[64]        cout << ans << endl;
[65]    }
[66]    return 0;
[67]}
```