

Олимпиада «Ломоносов» по информатике  
2023-2024 учебный год. Заключительный тур  
Работа участника с id заявки 1257119, логином inf24f\_292

Сводный итог по всем задачам в проверяющей системе

Run ID	Time	User name	Problem	Language	Result	Tests	Score
113	0:49:44	inf24f_292	1	g++	OK	28	100
252	1:40:48	inf24f_292	2	g++	Partial solution	5	8
385	2:34:37	inf24f_292	3	py3	OK	28	100
483	3:13:53	inf24f_292	4	g++	OK	21	100
618	3:49:27	inf24f_292	5	g++	OK	22	100
408 технических баллов							
68 итоговых баллов							

## Посылка по задаче 1

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4] using ll = long long;
[5] using ld = long double;
[6] using pii = pair<int, int>;
[7] using pll = pair<ll, ll>;
[8] const ll inf = 1e9;
[9] const ll infll = 1e18;
[10]
[11] vector<ll> nums;
[12]
[13] void init() {
[14]     vector<ll> q = {0, 0, 0, 1};
[15]     for (int i = 0; i < 100; ++i) {
[16]         ll s = 0;
[17]         for (int i = 0; i < 4; ++i) {
[18]             s += q[i];
[19]         }
[20]         if (s > inf * 20) {
[21]             break;
[22]         }
[23]         q.erase(q.begin());
[24]         q.push_back(s);
[25]         nums.push_back(s);
[26]     }
[27] }
[28]
[29] bool f(ll a) {
[30]     vector<ll> res(100);
[31]     for (int i = nums.size() - 1; i > -1; --i) {
[32]         if (a - nums[i] >= 0) {
[33]             int k = 0;
[34]             for (int j = i + 1; j < i + 4; ++j) {
[35]                 k += (res[j] == 0);
[36]             }
[37]             if (k > 0) {
[38]                 a -= nums[i];
[39]                 res[i] = 1;
[40]             }
[41]         }
[42]     }
[43]
[44]     ll c = 0;
[45]     for (int i : res) {
[46]         c += i;
[47]     }
[48]     return (c % 2 == 0);
[49] }
[50]
[51] void solve() {
[52]     init();
[53]     ll n; cin >> n;
[54]     ll res = 0;
[55]     for (int i = 0; i < n; ++i) {
[56]         ll a; cin >> a;
[57]         res += f(a);
[58]     }
[59]     cout << res << "\n";
[60] }
[61]
[62] int main()
[63] {
[64]     ios_base::sync_with_stdio(false);
[65]     cin.tie(0);
[66]     freopen("input.txt", "rt", stdin);
[67]
[68]     solve();
[69]
[70]     return 0;
[71] }
```

## Посылка по задаче 2

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4] using ll = long long;
[5] using ld = long double;
[6] using pii = pair<int, int>;
[7] using pll = pair<ll, ll>;
[8] const ll inf = 1e9;
[9] const ll infll = 1e18;
[10]
[11] map<char, int> mp;
[12]
[13] void solve() {
[14]     string tmp = "BCDGORVWY";
[15]     mp['Q'] = -1;
[16]     for (int i = 1; i <= 9; ++i) {
[17]         mp[tmp[i - 1]] = i - 1;
[18]     }
[19]
[20]     string s; cin >> s;
[21]     int linesz = 100000;
[22]     vector<vector<int>> v(10, vector<int>(linesz));
[23]     stack<pii> st;
[24]     st.push({0, 7});
[25]     int n = s.size();
[26]     for (int i = 0; i < n; ++i) {
[27]         int k = mp[s[i]];
[28]         if (k == -1) {
[29]             st.push({st.top().first + 3, 0});
[30]         } else {
[31]             int pos = st.top().first;
[32]             // cout << k << endl;
[33]             v[k][pos]++;
[34]
[35]             auto t = st.top();
[36]             st.pop();
[37]             if (t.second + 1 < 8) {
[38]                 st.push({t.first, t.second + 1});
[39]             }
[40]         }
[41]     }
[42]     for (int i = 0; i < 9; ++i) {
[43]         for (int j = linesz - 1; j > 0; --j) {
[44]             v[i][j - 1] += v[i][j] / 2;
[45]             v[i][j] %= 2;
[46]         }
[47]     }
[48]
[49]     int best = -1;
[50]     for (int i = 0; i < 9; ++i) {
[51]         if (best == -1 || v[best] < v[i]) {
[52]             best = i;
[53]         }
[54]     }
[55]
[56]     vector<int> res = v[best];
[57]     while (res.back() == 0) {
[58]         res.pop_back();
[59]     }
[60]     if (res.size() == 1) {
[61]         res.push_back(0);
[62]     }
[63]
[64]     cout << tmp[best] << "\n";
[65]     cout << res[0] << ".";
[66]     for (int i = 1; i < (int)res.size(); ++i) {
[67]         cout << res[i] << "";
[68]     }
[69] }
[70]
[71] int main()
[72] {
[73]     ios_base::sync_with_stdio(false);
[74]     cin.tie(0);
[75]     freopen("input.txt", "rt", stdin);
[76]
[77]     solve();
[78]
[79]     return 0;
[80] }
```

### Посылка по задаче 3

```
[1] d1 = {
[2]     'i' : 1,
[3]     'i(' : 2,
[4]     'i((' : 3,
[5]     'I' : 4,
[6]     'I(' : 5,
[7]     'I((' : 6,
[8]     'J' : 7,
[9]     'J)' : 8,
[10]    'J))' : 9,
[11]    'j' : 10,
[12]    'j)' : 11,
[13]    'j))' : 12
[14] }
[15]
[16] d2 = {}
[17] for key, value in d1.items():
[18]     d2[value] = key
[19]
[20] def fr(s):
[21]     if s == '[]':
[22]         return 0
[23]     b = 1
[24]     s += '!'
[25]     i = cur = res = 0
[26]     while i < len(s):
[27]         if s[i] == '(' or s[i] == ')':
[28]             cur += 1
[29]             i += 1
[30]         else:
[31]             if cur == 0:
[32]                 if s[i] == '!':
[33]                     break
[34]                 cur = d1[s[i]]
[35]                 i += 1
[36]             else:
[37]                 res = res + b * cur
[38]                 cur = 0
[39]                 b *= 12
[40]     return res
[41]
[42] def to(n):
[43]     v = []
[44]     while n != 0:
[45]         v.append(n % 12)
[46]         n //= 12
[47]
[48]     for i in range(1, len(v)):
[49]         if v[i] != 0 and v[i - 1] == 0:
[50]             for j in range(i, 0, -1):
[51]                 if v[j] != 0 and v[j - 1] == 0:
[52]                     v[j - 1] = 12
[53]                     v[j] -= 1
[54]     while len(v) > 0 and v[len(v) - 1] == 0:
[55]         v.pop()
[56]     if len(v) == 0:
[57]         return '[]'
[58]     for i in range(len(v)):
[59]         v[i] = d2[v[i]]
[60]     return ''.join(v)
[61]
[62] n = int(input())
[63] v = []
[64] for i in range(n):
[65]     s = input().strip()
[66]     v.append(fr(s))
[67]
[68] bi = bj = -1
[69] for i in range(n):
[70]     for j in range(i + 1, n):
[71]         if i == j:
[72]             continue
[73]         if bi == -1 or abs(v[i] - v[j]) > abs(v[bi] - v[bj]) or (abs(v[i] - v[j]) == abs(v[bi]
[74] v[bj]) and i + j > bi + bj):
[75]             bi = i
[76]             bj = j
[77] print(to(bi + 1))
    print(to(bj + 1))
```

## Посылка по задаче 4

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4] using ll = long long;
[5] using ld = long double;
[6] using pii = pair<int, int>;
[7] using pll = pair<ll, ll>;
[8] const ll inf = 1e9;
[9] const ll infll = 1e18;
[10]
[11] int f(int i, int j, int k, int st, vector<vector<int>>& v) {
[12]     if (i == j && j == k) {
[13]         return v[i][st];
[14]     } else if (i == j) {
[15]         return v[i][st] + v[k][st];
[16]     } else if (i == k) {
[17]         return v[i][st] + v[j][st];
[18]     } else if (j == k) {
[19]         return v[i][st] + v[j][st];
[20]     } else {
[21]         return v[i][st] + v[j][st] + v[k][st];
[22]     }
[23] }
[24]
[25] void solve() {
[26]     int n, m; cin >> n >> m;
[27]     int r1, r2, r3; cin >> r1 >> r2 >> r3;
[28]     vector<vector<int>> v(n, vector<int>(m));
[29]     for (int i = 0; i < n; ++i) {
[30]         for (int j = 0; j < m; ++j) {
[31]             cin >> v[i][j];
[32]         }
[33]     }
[34]
[35]     vector<vector<vector<int>>> dp(n, vector<vector<int>>(n, vector<int>(n, -1)));
[36]     dp[r1][r2][r3] = f(r1, r2, r3, 0, v);
[37]     // cout << dp[r1][r2][r3] << endl;
[38]     vector<int> dd = {-1, 0, 1};
[39]
[40]     for (int p = 0; p < m - 1; ++p) {
[41]         vector<vector<vector<int>>> dp2(n, vector<vector<int>>(n, vector<int>(n, -1)));
[42]         for (int i = 0; i < n; ++i) {
[43]             for (int j = 0; j < n; ++j) {
[44]                 for (int k = 0; k < n; ++k) {
[45]                     if (dp[i][j][k] == -1) continue;
[46]                     for (int di : dd) {
[47]                         for (int dj : dd) {
[48]                             for (int dk : dd) {
[49]                                 int p1 = i + di, p2 = j + dj, p3 = k + dk;
[50]                                 if (0 <= p1 && p1 < n && 0 <= p2 && p2 < n && 0 <= p3 && p3 < n) {
[51]                                     dp2[p1][p2][p3] = max(dp2[p1][p2][p3], dp[i][j]
[52] [k] + f(p1, p2, p3, p + 1, v));
[53]                                 }
[54]                             }
[55]                         }
[56]                     }
[57]                 }
[58]             }
[59]         }
[60]         dp = dp2;
[61]     }
[62] }
[63]
[64] int res = 0;
[65] for (int i = 0; i < n; ++i) {
[66]     for (int j = 0; j < n; ++j) {
[67]         for (int k = 0; k < n; ++k) {
[68]             res = max(res, dp[i][j][k]);
[69]         }
[70]     }
[71] }
[72] cout << res << endl;
[73] }
[74]
[75] int main()
[76] {
[77]     ios_base::sync_with_stdio(false);
[78]     cin.tie(0);
[79]     freopen("input.txt", "rt", stdin);
[80]
[81]     solve();
[82]
[83]     return 0;
}
```

## Посылка по задаче 5

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4] using ll = long long;
[5] using ld = long double;
[6] using pii = pair<int, int>;
[7] using pll = pair<ll, ll>;
[8] const ll inf = 1e9;
[9] const ll infll = 1e18;
[10]
[11] const int e = 127;
[12]
[13] void solve() {
[14]     string s, t; cin >> s >> t;
[15]     vector<int> v(e);
[16]     for (char i : t) {
[17]         v[i]++;
[18]     }
[19]
[20]     int n = s.size();
[21]     vector<vector<int>> pref(n + 1, vector<int>(e));
[22]     for (int i = 0; i < n; ++i) {
[23]         pref[i + 1] = pref[i];
[24]         pref[i + 1][s[i]]++;
[25]     }
[26]
[27]     bool ok = 1;
[28]     for (int j = 0; j < e; ++j) {
[29]         if (pref[n][j] < v[j]) {
[30]             ok = 0;
[31]         }
[32]     }
[33]     if (!ok) {
[34]         return;
[35]     }
[36] //     for (int j = 0; j < 26; ++j) {
[37] //         cout << pref[n][j] << " ";
[38] //     }
[39] //     return;
[40]
[41]     ll bi = 1, bj = n + 2;
[42]     for (int i = 1; i <= n; ++i) {
[43]         int l = i - 1, r = n + 1;
[44]         while (r - l > 1) {
[45]             int m = (l + r) / 2;
[46]             bool ok = 1;
[47]             vector<int> v1 = pref[m];
[48]             for (int j = 0; j < e; ++j) {
[49]                 v1[j] -= pref[i - 1][j];
[50]             }
[51]             for (int j = 0; j < e; ++j) {
[52]                 if (v1[j] < v[j]) {
[53]                     ok = 0;
[54]                     break;
[55]                 }
[56]             }
[57]
[58]             if (ok) {
[59]                 r = m;
[60]             } else {
[61]                 l = m;
[62]             }
[63]         }
[64]
[65] //         cout << l << " " << r << endl;
[66]         if (r != n + 1 && r - i + 1 < bj - bi + 1) {
[67]             bi = i, bj = r;
[68]         }
[69]     }
[70]     for (int i = bi; i <= bj; ++i) {
[71]         cout << s[i - 1];
[72]     }
[73] }
[74]
[75] int main()
[76] {
[77]     ios_base::sync_with_stdio(false);
[78]     cin.tie(0);
[79]     freopen("input.txt", "rt", stdin);
[80]
[81]     solve();
[82]
[83]     return 0;
[84] }
```

Посылоч по задаче 6 не было