Олимпиада «Ломоносов» по информатике
2023-2024 учебный год. Заключительный тур
Работа участника с id заявки 1259027, логином inf24f_214

Сводный итог по всем задачам в проверяющей системе

Run ID Time User name Problem Language Result Tests Score
48 0:25:23 inf24f_214 1 g++ OK 28 100
199 1:16:33 inf24f_214 2 g++ OK 28 100
576 3:39:43 inf24f_214 3 g++ Partial solution 9 24
360 2:23:35 inf24f_214 4 g++ Partial solution 20 95
402 2:38:38 inf24f_214 5 g++ Partial solution 20 90
409 технических баллов
68 итоговых баллов

Посылка по задаче 1

```cpp
[1]  #include <iostream>
[2]  #include <algorithm>
[3]  #include <math.h>
[4]  #include <vector>
[5]  #include <set>
[6]  #include <map>
[7]  #include <string>
[8]  #include <queue>
[9]
[10] using namespace std;
[11] using ll = long long;
[12] using ld = long double;
[13] vector <ll> dp(34);
[14] map <ll, ll> dp1;
[15]
[16] ll f(ll x){
[17]     if (dp1[x] != 0) return dp1[x];
[18]     ll cx = x;
[19]     vector <ll> pp(34);
[20]     for (ll i = 33; i>=0; i--){
[21]         if (x >= dp[i]){
[22]             x-=dp[i];
[23]             pp[i] = 1;
[24]         }
[25]     }
[26]     ll res = 0;
[27]     for (ll i=0; i<34; i++) if (pp[i] == 1) res++;
[28]     if (res % 2 == 0) dp1[cx] = 1;
[29]     else dp1[cx] = 2;
[30]     return dp1[cx];
[31] }
[32]
[33] void solve(){
[34]     ll i, n, p, ans = 0;
[35]     cin>>n;
[36]     for (i=0; i<n; i++){
[37]         cin>>p;
[38]         if (f(p) == 1) ans++;
[39]     }
[40]     cout<<ans;
[41] }
[42]
[43] int main()
[44] {
[45]     ios::sync_with_stdio(false), cin.tie(0), cout.tie(0);
[46]     ll t = 1;
[47]     //cin>>t;
[48]     dp[0] = 1, dp[1] = 2, dp[2] = 4, dp[3] = 8;
[49]     for (ll i=4; i<34; i++) dp[i] = dp[i-1] + dp[i-2] + dp[i-3] + dp[i-4];
[50]     while (t--) solve();
[51] }
```

Посылка по задаче 2

```
[1]  #include <iostream>
[2]  #include <algorithm>
[3]  #include <math.h>
[4]  #include <vector>
[5]  #include <set>
[6]  #include <map>
[7]  #include <string>
[8]  #include <queue>
[9]
[10] using namespace std;
[11] using ll = long long;
[12] using ld = long double;
[13] map <char, vector <ll> > k;
[14] vector <char> b = {'W', 'R', 'O', 'Y', 'G','C', 'B', 'V', 'D'};
[15] ll ii = -1;
[16]
[17] bool f1(ll j, ll ans){
[18]     for (ll i = 0; i<2000; i++){
[19]         if (k[b[j]] > k[b[ans]]) return true;
[20]         if (k[b[j]] < k[b[ans]]) return false;
[21]     }
[22]     return false;
[23] }
[24]
[25] void f2(ll j){
[26]     ll p, ost;
[27]     for (ll i = 1999; i>0; i--){
[28]         ost = k[b[j]][i] % 2;
[29]         p = k[b[j]][i] / 2;
[30]         k[b[j]][i] = ost;
[31]         k[b[j]][i-1] += p;
[32]     }
[33] }
[34]
[35] void f3(string& s, ll j){
[36]     ll kk = 0;
[37]     for (ii = ii+1; ii<s.size(); ii++){
[38]         if (s[ii] == 'Q') f3(s, j+3);
[39]         else k[s[ii]][j]++;
[40]         kk++;
[41]         if (kk == 8) return;
[42]     }
[43] }
[44]
[45] void solve(){
[46]     ll i;
[47]     string s;
[48]     cin>>s;
[49]     vector <ll> ex(2000);
[50]     sort(b.begin(), b.end());
[51]     for (i=0; i<9; i++)k[b[i]] = ex;
[52]
[53]     f3(s, 0);
[54]
[55]     for (i=0; i<9; i++) (f2(i));
[56]
[57]     ll ans = 0, lst = 1;
[58]     for (i=1; i<9; i++) if (f1(i, ans)) ans = i;
[59]     cout<<b[ans]<<endl;
[60]     cout<<k[b[ans]][0]<<'.';
[61]     for (i=2; i<2000; i++) if (k[b[ans]][i] == 1) lst = i;
[62]     for (i=1; i<=lst; i++) cout<<k[b[ans]][i];
[63] }
[64]
[65] int main()
[66] {
[67]     ios::sync_with_stdio(false), cin.tie(0), cout.tie(0);
[68]     ll t = 1;
[69]     while (t--) solve();
[70] }
```

Посылка по задаче 3

```
[1]   #include <iostream>
[2]   #include <algorithm>
[3]   #include <math.h>
[4]   #include <vector>
[5]   #include <set>
[6]   #include <map>
[7]   #include <string>
[8]   #include <queue>
[9]
[10]  using namespace std;
[11]  using ll = long long;
[12]  using ld = long double;
[13]  vector <string> mp = {"[]", "i", "i(", "i((", "I", "I(", "I((", "J", "J)", "J))", "j", "j)", "j))"};
[14]
[15]  void f1(string s, vector <ll>& nw){
[16]      for (int i=0; i<100; i++) nw[i] = 0;
[17]      ll p = 0, ind = -1, ost;
[18]      for (int j = 0; j<s.size(); j++){
[19]          if (s[j] == '[') p = 0, ind++;
[20]          else if (s[j] == ']') p = 0;
[21]          else if (s[j] == 'i'){
[22]              if (ind >= 0) nw[ind] = p;
[23]              p = 1;
[24]              ind++;
[25]          }
[26]          else if (s[j] == 'I'){
[27]              if (ind >= 0) nw[ind] = p;
[28]              p = 4;
[29]              ind++;
[30]          }
[31]          else if (s[j] == 'J'){
[32]              if (ind >= 0) nw[ind] = p;
[33]              p = 7;
[34]              ind++;
[35]          }
[36]          else if (s[j] == 'j'){
[37]              if (ind >= 0) nw[ind] = p;
[38]              p = 10;
[39]              ind++;
[40]          }
[41]          else p++;
[42]      }
[43]      if (ind >= 0) nw[ind] = p;
[44]
[45]      for (int i=0; i<99; i++){
[46]          p = nw[i] /12;
[47]          ost = nw[i] % 12;
[48]          nw[i] = ost;
[49]          nw[i+1] += p;
[50]      }
[51]
[52]  }
[53]
[54]  bool f2(vector <ll>& lst, vector <ll>& nw){
[55]      for (int i = 99; i>= 0; i--){
[56]          if (nw[i] > lst[i]) return true;
```

```
[57]            if (nw[i] < lst[i]) return false;
[58]        }
[59]        return true;
[60] }
[61]
[62] bool f3(vector <ll>& lst, vector <ll>& nw){
[63]        for (int i = 99; i>= 0; i--){
[64]            if (nw[i] < lst[i]) return true;
[65]            if (nw[i] > lst[i]) return false;
[66]        }
[67]        return true;
[68] }
[69]
[70] void solve(){
[71]        ll n, i, j, p, ind, amn = 0, amx = 0;
[72]        string s;
[73]        cin>>n;
[74]        vector <ll> mn(100);
[75]        vector <ll> mx(100);
[76]        vector <ll> nw(100);
[77]        cin>>s;
[78]        f1(s, mn);
[79]        f1(s, mx);
[80]        for (i=1; i<n; i++){
[81]            cin>>s;
[82]            f1(s, nw);
[83]            if (f2(mx, nw)) mx = nw, amx = i;
[84]            if (f3(mn, nw)) mn = nw, amn = i;
[85]        }
[86]
[87]        if (f2(mx, mn)) amn = n-2, amx = n-1;
[88]
[89]        amn++, amx++;
[90]        if (amn > amx) swap(amn, amx);
[91]        string ans = "";
[92]        ans = mp[amn%12];
[93]        if (amn /12 != 0) ans += mp[amn/12];
[94]        cout<<ans<<endl;
[95]        ans = mp[amx%12];
[96]        if (amx /12 != 0) ans += mp[amx/12];
[97]        cout<<ans;
[98]
[99] }
[100]
[101]int main()
[102]{
[103]    ios::sync_with_stdio(false), cin.tie(0), cout.tie(0);
[104]    ll t = 1;
[105]    while (t--) solve();
[106]}
```

Посылка по задаче 4

```
[1]  #include <iostream>
[2]  #include <algorithm>
[3]  #include <math.h>
[4]  #include <vector>
[5]  #include <set>
[6]  #include <map>
[7]  #include <string>
[8]  #include <queue>
[9]
[10] using namespace std;
[11] using ll = long long;
[12] using ld = long double;
[13] vector <vector <ll> > a;
[14]
[15] void f1(ll x, ll y, ll z, ll n, ll i, ll p, vector <vector <vector <ll> > >& dp1){
[16]     for (int px = -1; px<=1; px++){
[17]         for (int py = -1; py<=1; py++){
[18]             for (int pz = -1; pz<=1; pz++){
[19]                 ll nx = x + px, ny = y + py, nz = z + pz;
[20]                 if (nx >= 0 && nx<n && ny>=0 && ny<n && nz>=0 && nz<n){
[21]                     ll np = p + a[nx][i];
[22]                     if (ny != nx) np += a[ny][i];
[23]                     if (nz != nx && nz != ny) np += a[nz][i];
[24]                     dp1[nx][ny][nz] = max(dp1[nx][ny][nz], np);
[25]                 }
[26]             }
[27]         }
[28]     }
[29] }
[30]
[31] void solve(){
[32]     ll n, m, i, j, p, x, y, z, nx, ny, nz, np;
[33]     cin >> n >> m >> x >> y >> z;
[34]     a.resize(n, vector <ll> (m));
[35]     for (i=0; i<n; i++){
[36]         for (j=0; j<m; j++){
[37]             cin>>a[i][j];
[38]         }
[39]     }
[40]     p = a[x][0];
[41]     if (y != z) p += a[y][0];
[42]     if (z != x && z != y) p += a[z][0];
[43]     vector <vector <vector <ll> > > dp(n, vector <vector <ll> > (n, vector <ll> (n, -1)));
[44]     dp[x][y][z] = p;
[45]
[46]     for (i=1; i<m; i++){
[47]         vector <vector <vector <ll> > > dp1(n, vector <vector <ll> > (n, vector <ll> (n, -1)));
[48]         for (x = 0; x<n; x++){
[49]             for (y=0; y<n; y++){
[50]                 for (z=0; z<n; z++){
[51]                     if (dp[x][y][z] != -1){
[52]                         p = dp[x][y][z];
[53]                         f1(x, y, z, n, i, p, dp1);
[54]                     }
[55]                 }
[56]             }
[57]         }
[58]         dp = dp1;
[59]     }
[60]     ll ans = 0;
[61]     for (x = 0; x<n; x++){
[62]         for (y=0; y<n; y++){
[63]             for (z=0; z<n; z++){
[64]                 if (dp[z][y][z] != -1) ans= max(ans, dp[x][y][z]);
[65]             }
[66]         }
[67]     }
[68]     cout<<ans;
[69] }
[70]
[71] int main()
[72] {
[73]     ios::sync_with_stdio(false), cin.tie(0), cout.tie(0);
[74]     ll t = 1;
[75]     while (t--) solve();
[76] }
```

```
[1]  #include <iostream>
[2]  #include <algorithm>
[3]  #include <math.h>
[4]  #include <vector>
[5]  #include <set>
[6]  #include <map>
[7]  #include <string>
[8]  #include <queue>
[9]
[10] using namespace std;
[11] using ll = long long;
[12] using ld = long double;
[13] map <char, ll> nk;
[14] map <char, ll> k;
[15]
[16] void solve(){
[17]     ll i, dl = 0, l, r, al= 0, ar = 1e18;
[18]     string s, t, as;
[19]     cin>>s>>t;
[20]     for (i = 0; i<t.size(); i++){
[21]         nk[t[i]]++;
[22]         if (nk[t[i]] == 1) dl++;
[23]     }
[24]     l = 0;
[25]     for (i=0; i<s.size(); i++){
[26]         k[s[i]]++;
[27]         if (k[s[i]] == nk[s[i]]) dl--;
[28]         if (dl == 0) break;
[29]     }
[30]     r = i;
[31]     if (r == s.size()){
[32]         cout<<"";
[33]         return;
[34]     }
[35]     for (l=1; l<s.size(); l++){
[36]         k[s[l-1]]--;
[37]         while (r + 1 < s.size() && k[s[l-1]] < nk[s[l-1]]){
[38]             r++;
[39]             k[s[r]]++;
[40]         }
[41]         if (k[s[l-1]] >= nk[s[l-1]]){
[42]             if (r-l+1 < ar - al + 1){
[43]                 al = l;
[44]                 ar = r;
[45]             }
[46]         }
[47]         else break;
[48]     }
[49]     for (i=al; i<= ar; i++) cout<<s[i];
[50] }
[51]
[52] int main()
[53] {
[54]     ios::sync_with_stdio(false), cin.tie(0), cout.tie(0);
[55]     ll t = 1;
[56]     while (t--) solve();
[57] }
```

Посылок по задаче 6 не было