

Олимпиада «Ломоносов» по информатике
2023-2024 учебный год. Заключительный тур
Работа участника с id заявки 1219871, логином inf24f_265

Сводный итог по всем задачам в проверяющей системе

Run ID	Time	User name	Problem	Language	Result	Tests	Score
90	0:37:27	inf24f_265	1	python3	OK	28	100
617	3:49:17	inf24f_265	2	g++	OK	28	100
241	1:35:56	inf24f_265	3	python3	OK	28	100
554	3:34:15	inf24f_265	4	g++	Partial solution	7	30
572	3:38:41	inf24f_265	5	python3	OK	22	100
338	2:12:20	inf24f_265	6	python3	OK	11	100
530 технических баллов							
88 итоговых баллов							

Посылка по задаче 1

```
[1] nmax = 40
[2] tetra = [0] * nmax
[3]
[4]
[5] def init():
[6]     tetra[3] = 1
[7]     for i in range(4, nmax):
[8]         tetra[i] = sum(tetra[i-4:])
[9]
[10]
[11] def to_tetra(a):
[12]     ac = a
[13]     ans = []
[14]     for i in range(nmax - 1, 3, -1):
[15]         if a >= tetra[i]:
[16]             ans.append(1)
[17]             a -= tetra[i]
[18]         else:
[19]             ans.append(0)
[20]     # if a != 0 or any([ans[i] * ans[i - 1] * ans[i - 2] * ans[i - 3] != 0 for i in range(3, nmax - 4)]):
[21]     #     raise ValueError(f'{ac} -> {a}: {ans}')
[22]     return ans
[23]
[24]
[25] if __name__ == '__main__':
[26]     init()
[27]     cnt = 0
[28]     for _ in range(int(input())):
[29]         cnt += (sum(to_tetra(int(input())) % 2) == 0)
[30]     print(cnt)
```

Посылка по задаче 2

```
[1] #include <bits/stdc++.h>
[2]
[3] using namespace std;
[4]
[5] int maxn = 10000;
[6] map<char, vector<int>> res;
[7]
[8] void fix(char c) {
[9]     for (int i = maxn-1; i > 0; i--) {
[10]         res[c][i-1] += res[c][i] / 2;
[11]         res[c][i] %= 2;
[12]     }
[13] }
[14]
[15] int dfs(string s, int start=0, int h=0) {
[16]     if (s[start] != 'Q') {
[17]         res[s[start]][h] += 1;
[18]         //cout << "Adding in " << s[start] << " Bit: " << h << endl;
[19]         return start + 1;
[20]     }
[21]     start++;
[22]     for (int i = 0; i < 8; i++)
[23]         start = dfs(s, start, h + 3);
[24]     return start;
[25] }
[26]
[27] bool comp(char a, char b) { // нужно ли менять b на a
[28]     for (int i = 0; i < maxn; i++) {
[29]         if (res[a][i] > res[b][i])
[30]             return 1;
[31]         if (res[a][i] < res[b][i])
[32]             return 0;
[33]     }
[34]     return a < b;
[35] }
[36]
[37] void print(char c) {
[38]     int j = maxn;
[39]     for(; j > 2 && res[c][j-1] == 0; j--);
[40]
[41]     cout << res[c][0] << ".";
[42]     for (int i = 1; i < j; i++)
[43]         cout << res[c][i];
[44]
[45] }
[46]
[47]
[48] int main() {
[49]     string s;
[50]     cin >> s;
[51]     string l = "WROYGCBVD";
[52]     for (auto c: l)
[53]         res[c].resize(maxn);
[54]     dfs(s);
[55]     char mx = 'W';
[56]     for (auto c: l)
[57]         fix(c);
[58]     for (auto c: l)
[59]         if (comp(c, mx))
[60]             mx = c;
[61]     cout << mx << endl;
[62]     print(mx);
[63] }
```

Посылка по задаче 3

```
[1] def decode(s, st=0):
[2]     if s == '[]':
[3]         return 0
[4]     ans = 0
[5]     i = 0
[6]     while st != len(s):
[7]         if s[st:st+3] == 'i(':
[8]             ans += 3 * (12 ** i)
[9]             st += 3
[10]        elif s[st:st+2] == 'i':
[11]            ans += 2 * (12 ** i)
[12]            st += 2
[13]        elif s[st:st+1] == 'i':
[14]            ans += 1 * (12 ** i)
[15]            st += 1
[16]        elif s[st:st+3] == 'I(':
[17]            ans += 6 * (12 ** i)
[18]            st += 3
[19]        elif s[st:st+2] == 'I':
[20]            ans += 5 * (12 ** i)
[21]            st += 2
[22]        elif s[st:st+1] == 'I':
[23]            ans += 4 * (12 ** i)
[24]            st += 1
[25]        elif s[st:st+3] == 'J))':
[26]            ans += 9 * (12 ** i)
[27]            st += 3
[28]        elif s[st:st+2] == 'J)':
[29]            ans += 8 * (12 ** i)
[30]            st += 2
[31]        elif s[st:st+1] == 'J':
[32]            ans += 7 * (12 ** i)
[33]            st += 1
[34]        elif s[st:st+3] == 'j))':
[35]            ans += 12 * (12 ** i)
[36]            st += 3
[37]        elif s[st:st+2] == 'j)':
[38]            ans += 11 * (12 ** i)
[39]            st += 2
[40]        elif s[st:st+1] == 'j':
[41]            ans += 10 * (12 ** i)
[42]            st += 1
[43]        i += 1
[44]    return ans
[45]
[46] def encode(s):
[47]     if s == 0:
[48]         return '[]'
[49]     dg = ['i', 'i(', 'i(', 'I', 'I(', 'I(', 'J', 'J)', 'J))', 'j', 'j)', 'j))']
[50]     ans = ''
[51]     while s > 0:
[52]         ans += dg[s%12 - 1]
[53]         s = (s - 1) // 12
[54]     return ans
[55]
[56] def argmin(a):
[57]     i = 0
[58]     for j in range(len(a)):
[59]         if a[i] >= a[j]:
[60]             i = j
[61]     return i
[62]
[63] def argmax(a):
[64]     i = 0
[65]     for j in range(len(a)):
[66]         if a[i] <= a[j]:
[67]             i = j
[68]     return i
[69]
[70] n = int(input())
[71] a = [decode(input()) for _ in range(n)]
[72] k, l = sorted((argmin(a), argmax(a)))
[73] if k == l:
[74]     k -= 1
[75] print(encode(k+1))
[76] print(encode(l+1))
[77]
[78]
[79]
```

Посылка по задаче 4

```
[1] #include <vector>
[2] #include <iostream>
[3] #include <fstream>
[4]
[5] #pragma GCC optimize("Ofast,fast-math")
[6] //#pragma GCC target("avx,avx2")
[7]
[8] using namespace std;
[9]
[10] int max(int a, int b) {
[11]     return a>b?a:b;
[12] }
[13]
[14] int main() {
[15]     ifstream cin("input.txt");
[16]     cin.tie(0);
[17]     ios::sync_with_stdio(0);
[18]     int r, C, r1, r2, r3;
[19]     cin >> r >> C >> r1 >> r2 >> r3;
[20]     vector<vector<int>> arr(r, vector<int>(C));
[21]     for (int i = 0; i < r; i++)
[22]         for (int j = 0; j < C; j++)
[23]             cin >> arr[i][j];
[24]     int dp[C][r][r]{(int)-1e9};
[25]     dp[0][r1][r2][r3] = arr[r1][0] + (r1 != r2) * arr[r2][0] + (r1 != r3 && r2 != r3) * arr[r3][0];
[26]     for (int n = 0; n < C - 1; n++) {
[27]         for (int i = 0; i < r; i++) {
[28]             for (int j = 0; j < r; j++) {
[29]                 for (int k = 0; k < r; k++) {
[30]                     int temp = dp[n][i][j][k];
[31]                     if (temp < 0)
[32]                         continue;
[33]                     for (int a = (i == 0?0:-1); a <= (i == r-1?0:1); a++) {
[34]                         for (int b = (j == 0?0:-1); b <= (j == r-1?0:1); b++) {
[35]                             for (int c = (k == 0?0:-1); c <= (k == r-1?0:1); c++) {
[36]                                 int ni = i + a, nj = j + b, nk = k + c;
[37]                                 dp[n + 1][ni][nj][nk] = max(dp[n + 1][ni][nj][nk], temp + arr[ni][n+1] + (ni != nj) * arr[nj][n+1] + (ni != nk && nj != nk) * arr[nk][n + 1]);
[38]                             }
[39]                         }
[40]                     }
[41]                 }
[42]             }
[43]         }
[44]     }
[45]     int ans = -1e9;
[46]     for (int i = 0; i < r; i++)
[47]         for (int j = 0; j < r; j++)
[48]             for (int k = 0; k < r; k++)
[49]                 ans = max(ans, dp[C-1][i][j][k]);
[50]     cout << ans;
[51] }
```

Посылка по задаче 5

```
[1] from collections import Counter
[2]
[3]
[4] def check(a, b):
[5]     for k in b.keys():
[6]         # print(k, a[k], b[k])
[7]         if a[k] < b[k]:
[8]             return False
[9]     return True
[10]
[11]
[12] s = input()
[13] k = Counter(input())
[14] n = len(s)
[15]
[16] l = 0
[17] r = 1
[18]
[19] mn_l = 0
[20] mn_r = 10 ** 9
[21] cur = Counter(s[l])
[22] for l in range(n):
[23]     while not check(cur, k) and r != n:
[24]         cur += Counter(s[r])
[25]         r += 1
[26]     if check(cur, k) and mn_r - mn_l > r - l:
[27]         mn_l, mn_r = l, r
[28]     # print(cur, r)
[29]     cur -= Counter(s[l])
[30] if mn_r != 10**9:
[31]     print(s[mn_l:mn_r])
[32] else:
[33]     print()
```

Посылка по задаче 6

```
[1] import sys
[2]
[3] d = dict()
[4] for s in sys.stdin:
[5]     k, *o = s.strip().split(';')
[6]     for i in range(len(o)):
[7]         o[i] = int(o[i] == 'OK')
[8]     if k not in d.keys():
[9]         d[k] = []
[10]    d[k].append(o)
[11] for k in d.keys():
[12]    ln = max(map(len, d[k]))
[13]    for i in range(len(d[k])):
[14]        d[k][i] += [0] * (ln - len(d[k][i]))
[15]
[16] for k in sorted(d.keys()):
[17]    s = list(zip(*filter(lambda x: not all(x), d[k])))
[18]    print(len(s), len(set(s)))
```
