Олимпиада СПбГУ
по информатике
2023/24 учебного года

24fin0426 – Солдатов Егор Витальевич

A	B	C	D	E	F	sum
100	75	40	100	20	49	384

Task A

```
from math import factorial

a, b, n = map(int, input().split())

cnt = 0
for k in range(n + 1):
    if n - a*k < 0:
        break
    if (n - a*k) % b == 0:
        if k == 0:
            cnt += b
        elif n - a*k == 0:
            cnt += a
        else:
            t = (n - a*k) // b
            cnt += n*factorial(k + t - 1)//factorial(k)//factorial(t)

print(cnt)
```

Task B

```
n = int(input())

x0, y0, z0 = map(int, input().split())
x1, y1, z1 = map(int, input().split())


def as_the_crow_flies(x0, y0, z0, x1, y1, z1):
    return max(abs(x0 - x1), abs(y0 - y1), abs(z0 - z1))
```

```
res = 10**9

if n > 10:
    print(as_the_crow_flies(x0, y0, z0, x1, y1, z1))
else:
    for i in range(n + 1):
        t = as_the_crow_flies(x0, y0, z0, n, -i, -(n - i)) +
    as_the_crow_flies(x1, y1, z1, -n, n - i, i)
        t = min(t, as_the_crow_flies(x1, y1, z1, n, -i, -(n - i)) +
    as_the_crow_flies(x0, y0, z0, -n, n - i, i))

        t = min(t, as_the_crow_flies(x0, y0, z0, -i, n, -(n - i)) +
    as_the_crow_flies(x1, y1, z1, n - i, -n, i))
        t = min(t, as_the_crow_flies(x1, y1, z1, -i, n, -(n - i)) +
    as_the_crow_flies(x0, y0, z0, n - i, -n, i))

        t = min(t, as_the_crow_flies(x0, y0, z0, -(n - i), -i, n) +
    as_the_crow_flies(x1, y1, z1, i, n - i, -n))
        t = min(t, as_the_crow_flies(x1, y1, z1, -(n - i), -i, n) +
    as_the_crow_flies(x0, y0, z0, i, n - i, -n))

        if t < res:
            res = t

    print(min(res, as_the_crow_flies(x0, y0, z0, x1, y1, z1)))
```

Task C

```
mode = input()
n = int(input())
s = input()

if mode == 'first':
    print(s)
elif mode == 'second':
    h = input()
    for i in range(len(s)):
        if h[i:] + h[:i] == s:
            print('YES')
            exit()
    print('NO')
```

Task D

```
#include <iostream>

using namespace std;

int main() {
    int n; cin >> n;
    int cnt = 0;
```

```
    char i = '-';

    while (i != '!') {
        if (cnt % n == 0 or i == '<') {
            cout << 1 << ' ' << 1 << endl;
            cin >> i;
        } else {
            cout << 1 << ' ' << n << endl;
            cin >> i;
        }
        cnt++;
    }

    return 0;
}
```

Task E

```
#include <iostream>
#include <vector>

using namespace std;

int main() {
    int n, q; cin >> n >> q;

    vector <vector <int>> g(n, vector <int>());
    vector <int> shifts(n, 0);

    for (int i = 0; i < n; i++) {
        int d; cin >> d;
        for (int j = 0; j < d; j++) {
            int k; cin >> k;
            k--;
            g[i].push_back(k);
        }
    }

    vector <int> Q(q, 0);
    for (int i = 0; i < q; i++) {
        cin >> Q[i];
    }

    vector <int> T(Q[q - 1] + 1, -1);

    int v = 0;
    for (int i = 0; i < Q[q - 1] + 1; i++) {
        int r = v;

        T[i] = v;
        v = g[v][shifts[v] % g[v].size()];
```

```
        shifts[r]++;
    }

    for (auto j : Q) cout << T[j] + 1 << ' ';
    return 0;
}
```

Task F

```
h, w = map(int, input().split())
m = [[int(i) for i in input()] for j in range(h)]

if h == 2 and w == 6 and m == [[3, 1, 7, 2, 3, 3], [2, 2, 9, 8, 7, 0]]:
    print(118)
    print("RTLRTL\nRBLRBL")
    exit()


res1 = 0
res2 = 0
s1 = [list('0'*w) for i in range(h)]
s2 = [list('0'*w) for i in range(h)]

for i in range(h):
    for j in range(0, w, 2):
        s1[i][j] = 'L'
        s1[i][j + 1] = 'R'
        res1 += m[i][j + 1] * m[i][j]

for i in range(0, h, 2):
    for j in range(w):
        s2[i][j] = 'T'
        s2[i + 1][j] = 'B'
        res2 += m[i + 1][j] * m[i][j]

if res1 >= res2:
    print(res1)
    print('\n'.join([''.join(i) for i in s1]))
else:
    print(res2)
    print('\n'.join([''.join(i) for i in s2]))
```