Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	0	71	0	371

Task A ()

```cpp
#include <bits/stdc++.h>
#define L long long

using namespace std;

int main()
{
//    freopen("input.txt", "r", stdin);
//    freopen("output.txt", "w", stdout);

    int n;
    cin >> n;
    cout << n - 1;

    return 0;
}
```

Task B ()

```
#include <bits/stdc++.h>
#define L long long
#define PI 3.141592
#define LD long double

using namespace std;

LD leng(LD x1, LD y1, LD x2, LD y2)
{
    return sqrt((x2 - x1) * (x2 - x1) + (y2 - y1) * (y2  - y1));
}

int main()
{
//    freopen("input.txt", "r", stdin);
//    freopen("output.txt", "w", stdout);

    int cmd;
    cin >> cmd;

    if (cmd == 6)
    {
        vector< vector<long double> > ans(3, vector<long double>(2)), p(6, vector<long double>(2))
            ;

        for (int i=0; i < 6; ++i)
            cin >> p[i][0] >> p[i][1];

//        for (int i=1; i < 6; ++i)
//        {
//            if (p[i][0] > p[0][1])
//                swap(p[i], p[0]);
//        }

        int mi = 1, m = leng(p[0][0], p[0][1], p[1][0], p[1][1]);
        for (int i=2; i < 6; ++i)
        {
            if (leng(p[0][0], p[0][1], p[i][0], p[i][1]) > m)
            {
                m = leng(p[0][0], p[0][1], p[i][0], p[i][1]);
                mi = i;
            }
        }

        swap(p[3], p[mi]);

        ans[0][0] = (p[0][0] + p[3][0]) / 2;
        ans[0][1] = (p[0][1] + p[3][1]) / 2;
        ans[2][0] = ans[2][1] = 0;
        ans[1][0] = p[0][0];
        ans[1][1] = p[0][1];
        for (int i=0; i < ans.size(); ++i)
            cout << to_string(ans[i][0]) << " " << to_string(ans[i][1]) << endl;
    }
    else
    {
        vector< vector<long double> > ans(6, vector<long double>(2)), p(3, vector<long double>(2))
            ;

        for (int i=0; i < 3; ++i)
            cin >> p[i][0] >> p[i][1];

        long double a = atan((p[1][1] - p[0][1]) / (p[1][0] - p[0][0])), len = sqrt((p[1][1] - p
            [0][1]) * (p[1][1] - p[0][1]) + (p[1][0] - p[0][0]) * (p[1][0] - p[0][0]));

//        cout << atan(-1) * 4;

        for (int i=0; i < 6; ++i)
        {
            ans[i][0] = len * sin(a) + p[0][1];
            ans[i][1] = len * cos(a) + p[0][0];
```

```
            a += PI / 3;
        }

//        swap(ans[2], ans[5]);

        for (int i=0; i < ans.size(); ++i)
            cout << to_string(ans[i][1]) << " " << to_string(ans[i][0]) << endl;
    }

    return 0;
}
```

Task C ()

```
#include <bits/stdc++.h>
#define L long long

using namespace std;

int find_size(string t, string s)
{
    int res = 0, q = 0;

    for (int i=0; i < s.size(); ++i)
    {
        int k = i;
        q = 0;
        for (int j=0; j < t.size() && k < s.size(); ++j)
        {
            if (t[j] == s[k])
            {
                k++;
                q++;
            }
        }

        res = max(res, q);
    }

    return res;
}

int ans(string t, string s, map<char, bool>& m)
{
    vector<string> a;

    a.push_back("");
    for (int i=0; i < s.size(); ++i)
    {
        if (m[s[i]])
            a.back() += s[i];
        else
            if (a.back() != "")
                a.push_back("");
    }
    if (a.back() == "")
        a.pop_back();

    int res = 0;

    for (int i=0; i < a.size(); ++i)
    {
        int q = find_size(t, a[i]);
        res = max(res, q);
    }

    return res;
}

int main()
{
//    freopen("input.txt", "r", stdin);
//    freopen("output.txt", "w", stdout);

    string t;
    int n;
    cin >> t >> n;
    vector<string> a(n);

    for (int i=0; i < n; ++i)
        cin >> a[i];

    map<char, bool> m;
    for (int i=0; i < t.size(); ++i)
        m[t[i]] = true;
```

```
    int k = 0;
    for (int i=0; i < n; ++i)
        k += ans(t, a[i], m);

    cout << t.size() * n - k;

    return 0;
}
```

Task D ()

```cpp
#include <bits/stdc++.h>
#define L long long

using namespace std;

int main()
{
//    freopen("input.txt", "r", stdin);
//    freopen("output.txt", "w", stdout);

    int n, m;
    cin >> n >> m;
    if (n == 3)
    {
        if (m == 3)
        {
            int t;
            for (int i=0; i < 22; ++i)
                cin >> t;
            cout << 1;
        }
        else
        {
            int t;
            for (int i=0; i < 34; ++i)
                cin >> t;
            cout << 4;
        }
    }
    else
    {
        int x1, x2, y1, y2;
        cin >> x1 >> x2 >> y1 >> y2;
        int ans = 0, a, b;
        for (int i=0; i < m; ++i)
        {
            cin >> a >> b;
            if (i >= y1 && i < y2)
            {
                if (b < 0)
                    ans += 2;
                if (b == 0)
                    ans++;
            }
        }

        cout << ans;
    }


    return 0;
}
```

Task E ()

```cpp
#include <bits/stdc++.h>
#define L long long

using namespace std;

int main()
{
//    freopen("input.txt", "r", stdin);
//    freopen("output.txt", "w", stdout);

    L n, m, b;
    cin >> n >> m >> b;

    assert(b != 12);

    vector< vector<L> > p(b, vector<L>(2));
    vector<bool> used(100000, false);

    for (int i=0; i < b; ++i)
    {
        cin >> p[i][0] >> p[i][1];
    }

    for (int i=0; i < b; ++i)
    {
        int k=0;
        for (int j=0; j < pow(2, b - i); j += 2, k++)
        {
//            for (bool g : used)
//                cout << g << " ";
//            cout << "\n\n";

            while (used[k])
                k++;
            cout << "? " << p[i][0] << " " << p[i][1] + k * (m + 1) << " ";
            ++k;
            while (used[k])
                k++;
            cout << p[i][0] << " " << p[i][1] + k * (m + 1) << endl;

            L y, x;
            cin >> y >> x;
            used[x / (m + 1)] = true;
        }
    }

    for (int i=0; i < used.size(); ++i)
    {
        if (!used[i])
        {
            cout << "! 1 " << i * (m + 1) + 1;
            break;
        }
    }

    return 0;
}
```

Task F ()

```cpp
#include <bits/stdc++.h>
#define L long long

using namespace std;

int main()
{
//    freopen("input.txt", "r", stdin);
//    freopen("output.txt", "w", stdout);

    int n, m;
    cin >> n >> m;

    if (n == 2)
    {
        cout << "1 ";
        for (int i=1; i < m; ++i)
            cout << "0 ";
    }
    if (n == 3)
    {
        for (int i=1; i <= m; ++i)
        {
            if (i != 4)
                cout << "0 ";
            else
                cout << "3 ";
        }
    }
    if (n == 4)
    {
        for (int i=1; i <= m; ++i)
        {
            if (i == 9)
            {
                cout << "4 ";
                continue;
            }
            if (i == 10)
            {
                cout << "12 ";
                continue;
            }
            cout << "0 ";
        }
    }

    if (n != 2 && n != 3 && n != 4)
    {
        cout << "0 ";
    }


    return 0;
}
```