Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	40	63	0	403

Task A ()

```cpp
#include <bits/stdc++.h>
#define int long long
#define pii pair<int, int>
#define X first
#define Y second
#define vi vector<int>
#define vvi vector<vi>
#define all(x) x.begin(), x.end()
using namespace std;

int32_t main() {
    ios_base::sync_with_stdio(NULL);
    cin.tie(0); cout.tie(0);
    int n;
    cin >> n;
    cout << n - 1;
}
```

Task B ()

```cpp
#include <bits/stdc++.h>
#define int long long
#define pii pair<int, int>
#define X first
#define Y second
#define vi vector<int>
#define vvi vector<vi>
#define all(x) x.begin(), x.end()
#define double long double
using namespace std;


struct point{
    double x, y;
    point operator-(point a){
        return {x - a.x, y - a.y};
    }
    point operator+(point a){
        return {x + a.x, y + a.y};
    }
};

double dist(point a, point b){
    return sqrt(pow(a.x - b.x, 2) + pow(a.y - b.y, 2) + 0.0);
}

point pr(double k, point a){
    return {a.x * k, a.y * k};
}

int32_t main() {
    ios_base::sync_with_stdio(NULL);
    cin.tie(0); cout.tie(0);
    cout << fixed << setprecision(20);
    int n;
    cin >> n;
    if (n == 6){
        vector<point> a(6);
        for (int i = 0; i < n; ++i)
            cin >> a[i].x >> a[i].y;
        vector<pair<double, int>> d(n -1);
        for (int i = 1; i < n; ++i)
            d[i - 1] = {dist(a[0], a[i]), i};
        sort(all(d));
        cout << a[0].x << "_" << a[0].y << "\n";
        cout << a[d[2].Y].x << "_" << a[d[2].Y].y << "\n";
        cout << a[d[3].Y].x << "_" << a[d[3].Y].y << "\n";
    }
    else {
        vector<point> a(3);
        for (int i = 0; i < n; ++i)
            cin >> a[i].x >> a[i].y;
        vector<point> b(3);
        point m = {(a[1].x + a[2].x) / 2 , (a[1].y + a[2].y) / 2};
        m = m - a[0];
        m = pr(4.0 / 3.0, m);
        b[0] = (a[0] + m);

        m = {(a[0].x + a[2].x) / 2 , (a[0].y + a[2].y) / 2};
        m = m - a[1];
        m = pr(4.0 / 3.0, m);
        b[1] = (a[1] + m);

        m = {(a[1].x + a[0].x) / 2 , (a[1].y + a[0].y) / 2};
        m = m - a[2];
        m = pr(4.0 / 3.0, m);
        b[2] = (a[2] + m);
        cout << a[0].x << "_" << a[0].y << "\n";
        cout << b[1].x << "_" << b[1].y << "\n";
        cout << a[2].x << "_" << a[2].y << "\n";
        cout << b[0].x << "_" << b[0].y << "\n";
        cout << a[1].x << "_" << a[1].y << "\n";
```

```cpp
        cout << b[2].x << " " << b[2].y << "\n";

    }
    int prost;
    cin >> prost;
}
```

Task C ()

```cpp
#include <bits/stdc++.h>
#define int long long
#define pii pair<int, int>
#define X first
#define Y second
#define vi vector<int>
#define vvi vector<vi>
#define all(x) x.begin(), x.end()
#define double long double
using namespace std;


int32_t main() {
    ios_base::sync_with_stdio(NULL);
    cin.tie(0); cout.tie(0);
    string s;
    cin >> s;
    int res = 0;
    int n;
    cin >> n;
    while(n--){
        string t;
        cin >> t;
        int mn = 1e18;
        for (int i = 0; i < t.size(); ++i){
            int p1 =i;
            int p2 = 0;
            int tec = 0;
            while(p2 < s.size()){
                if (p1 >= t.size())
                    p2++, tec++;
                else if (t[p1] == s[p2])
                    p1++, p2++;
                else
                    p2++, tec++;
            }
            mn = min(mn, tec);
        }
        res += mn;
    }
    cout << res;
}
```

Task D ()

```cpp
#include <bits/stdc++.h>
#define int long long
#define pii pair<int, int>
#define X first
#define Y second
#define vi vector<int>
#define vvi vector<vi>
#define all(x) x.begin(), x.end()
#define double long double
using namespace std;
const int N = 1000;

int n, m;
pii a[N][N];

int st(int x1, int y1, int x2, int y2){
    int xr = (x2 - x1) - a[x1][y1].X;
    int yr = (y2 - y1) - a[x1][y1].Y;
    return abs(xr) + abs(yr);
}

pii ras(int id){
    return {id / m, id % m};
}

int32_t main(){
    cin >> n >> m;
    int xs, ys, xf, yf;
    cin >> xs >> ys >> xf >> yf;
    xs--; ys--; xf--; yf--;
    for (int i = 0; i < n; ++i)
        for (int j = 0; j < m; ++j)
            cin >> a[i][j].X >> a[i][j].Y;
    vi d(n * m, 1e18);
    d[m * xf + yf] = 0;
    set<pair<int, int>> q;
    q.insert({0, m * xf + yf});
    while(q.size()){
        int v = q.begin()->Y;
        q.erase(*q.begin());
        for (int x =0; x < n; ++x)
            for (int y = 0; y < m; ++y)
            if (d[x * m + y] > d[v] + st(x, y, ras(v).X, ras(v).Y)){
                q.erase({d[x * m + y], x * m + y});
                d[x * m + y] = d[v] + st(x, y, ras(v).X, ras(v).Y);
                q.insert({d[x * m + y], x * m + y});
            }
    }
    cout << d[xs * m + ys];
}
```

Task E ()

```cpp
#include <bits/stdc++.h>
#define int long long
#define pii pair<int, int>
#define X first
#define Y second
#define vi vector<int>
#define vvi vector<vi>
#define all(x) x.begin(), x.end()
#define double long double
using namespace std;

int n, m, b;
pii a[20];
int res[1 << 15];
set<int> q;
int sapros = 0;

int post(int id1, int id2){
    int x1 = a[res[id1]].X;
    int y1 = a[res[id1]].Y + id1 * m;
    int x2 = a[res[id2]].X;
    int y2 = a[res[id2]].Y + id2 * m;
    ++sapros;
    if (sapros > 8191)
        exit(1);
    cout << "?_" << x1 << "_" << y1 << "_" << x2 << "_" << y2 << endl;
    res[id1]++;
    res[id2]++;
    int s, t;
    cin >> s >> t;
    int id = t / m;
    res[id] = 0;
    q.erase(id);
    if (res[id1] == b){
        cout <<"!_0_" << id1 * m << endl;
        exit(0);
    }
    if (res[id2] == b){
        cout <<"!_0_" << id2 * m << endl;
        exit(0);
    }
}
int32_t main() {
    cin >> n >> m >> b;
    for (int i = 0; i < b; ++i)
        cin >> a[i].X >> a[i].Y, a[i].X--, a[i].Y--;
    for (int i = 0; i < ((int)1 << (b)); ++i)
        q.insert(i), res[i] = 0;
    for (int i = 1; i <= b; ++i){
        vector<int> sapr;
        for (int x : q)
            sapr.push_back(x);
        int cnt = 0;
        for (int j = 0; j < sapr.size() -1; ++j)
            if (res[sapr[j]] == i - 1){
                int id2 = j + 1;
                while(id2 < sapr.size() && res[sapr[id2]] != i - 1)
                    ++id2;
                if (id2 >= sapr.size())
                    break;
                cnt++;
                if (cnt > ((int)1 << (b + 1 - i)))
                    break;
                post(sapr[j], sapr[id2]);
                j = id2;
            }
    }
    for (int i = 0; i < ((int)1 << 15); ++i)
        if (res[i]){
            cout <<"!_0_" << i * m << endl;
            return 0;
        }
```

}

Task F ()