

# Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	40	0	5	345

## Task A ()

```
#include<iostream>
#include<vector>
#include<set>
#include<map>
#include<string>
#include<algorithm>

using namespace std;

signed main() {
    int n;
    cin >> n;
    int l = 0, r = 0;
    for(int i = 0; i < 100; i++) {
        int sum = (n + 1);
        l = sum / 2;
    }
    cout << l;
}
```

## Task B ()

```
#include<iostream>
#include<vector>
#include<set>
#include<map>
#include<string>
#include<algorithm>
#include<cmath>

using namespace std;

signed main() {
    int n;
    cin >> n;
    if (n == 6) {
        vector<pair<double, double>> vec;
        vector<double> used(6);
        for (int i = 0; i < 6; i++) {
            double a, b;
            cin >> a >> b;
            vec.push_back({ a, b });
        }
        used[0] = 1;
        int nw = 0;
        vector<int> ans;
        ans.push_back(0);
        while (ans.size() < 6) {
            double d = 1e9;
            int num;
            for (int i = 0; i < 6; i++) {
                if (!used[i] && (abs(vec[i].first - vec[nw].first) + abs(vec[i].second - vec[nw].second) < d)) {
                    d = abs(vec[i].first - vec[nw].first) + abs(vec[i].second - vec[nw].second);
                    num = i;
                }
            }
            nw = num;
            ans.push_back(num);
            used[num] = 1;
        }
        cout.precision(19);
        cout << vec[ans[0]].first << "┐" << vec[ans[0]].second << "\n" << vec[ans[1]].first << "┐" << vec[ans[1]].second << "\n" << vec[ans[2]].first << "┐" << vec[ans[2]].second << "\n" << vec[ans[3]].first << "┐" << vec[ans[3]].second << "\n" << vec[ans[4]].first << "┐" << vec[ans[4]].second << "\n" << vec[ans[5]].first << "┐" << vec[ans[5]].second << "\n";
    }
    else {
        vector<pair<double, double>> vec(6);
        cin >> vec[0].first >> vec[0].second >> vec[1].first >> vec[1].second >> vec[2].first >> vec[2].second >> vec[3].first >> vec[3].second >> vec[4].first >> vec[4].second >> vec[5].first >> vec[5].second;
        vec[4].first = vec[3].first + vec[0].first - vec[1].first;
        vec[4].second = vec[3].second + vec[0].second - vec[1].second;
        pair<double, double> m04 = { (vec[0].first + vec[4].first) / 2, (vec[0].second + vec[4].second) / 2 };
        pair<double, double> m13 = { (vec[1].first + vec[3].first) / 2, (vec[1].second + vec[3].second) / 2 };
        vec[5].first = m04.first + (m04.first - m13.first) / 2;
        vec[5].second = m04.second + (m04.second - m13.second) / 2;
        vec[2].first = m13.first + (m13.first - m04.first) / 2;
        vec[2].second = m13.second + (m13.second - m04.second) / 2;
        for (int i = 0; i < 6; i++) {
            cout.precision(19);
            cout << vec[i].first << "┐" << vec[i].second << "\n";
        }
    }
}
```

## Task C ()

```
#include<iostream>
#include<vector>
#include<set>
#include<map>
#include<string>
#include<algorithm>

using namespace std;

signed main() {
    string t;
    cin >> t;
    int n;
    cin >> n;
    int ans = 0;
    for (int i = 0; i < n; i++) {
        string s;
        cin >> s;
        s += '&';
        int cnt = 1e9;
        for (int j = 0; j < s.size(); j++) {
            int np = 0;
            int ns = j;
            int c = 0;
            while (np < t.size()) {
                if (t[np] == s[ns]) {
                    ns++;
                    np++;
                }
                else {
                    np++;
                    c++;
                }
            }
            cnt = min(cnt, c);
        }
        ans += cnt;
    }
    cout << ans;
}
```

## Task D ()

```
#include<iostream>
#include<vector>
#include<set>
#include<map>
#include<string>
#include<algorithm>
#include<cmath>

using namespace std;

int n, m;
vector<vector<pair<int, int>>> vec;
int stx, sty, fnx, fny;
vector<vector<int>> dp;

int dist(int ax, int ay, int bx, int by) {
    return abs(ax - bx + vec[ax][ay].first) + abs(ay + vec[ax][ay].second - by);
}

signed main() {
    cin >> n >> m;
    vec.resize(n + 1, vector<pair<int, int>>(m + 1));
    dp.resize(n + 1, vector<int>(m + 1, 1e9));
    cin >> stx >> sty >> fnx >> fny;
    for (int i = 1; i <= n; i++) {
        for (int j = 1; j <= m; j++) {
            cin >> vec[i][j].first >> vec[i][j].second;
        }
    }
    dp[fnx][fny] = 0;
    set<pair<int, pair<int, int>>> s;
    s.insert({ 0, {fnx, fny} });
    while (s.size()) {
        int vx = s.begin()->second.first;
        int vy = s.begin()->second.second;
        s.erase(s.begin());
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= m; j++) {
                if (dp[vx][vy] + dist(i, j, vx, vy) < dp[i][j]) {
                    s.erase({ dp[i][j], {i, j} });
                    dp[i][j] = dp[vx][vy] + dist(i, j, vx, vy);
                    s.insert({ dp[i][j], {i, j} });
                }
            }
        }
    }
    cout << dp[stx][sty];
}
```

## Task E ()

```
#include<iostream>
#include<vector>
#include<set>
#include<map>
#include<string>
#include<algorithm>
#include<cmath>

using namespace std;

#define int long long

signed main() {
    int n, m, b;
    cin >> n >> m >> b;
    vector<pair<int, int>> vec(b);
    for (int i = 0; i < b; i++) {
        cin >> vec[i].first >> vec[i].second;
    }
    int mx = 1, my = 1;
    int id = 0;
    map<pair<int, int>, int> mp;
    while (true) {
        bool fl = 1;
        for (int i = 0; i < n; i++) {
            cout << endl << "?_ " << mx + vec[i].first - 1 << "_ " << my + vec[i].second
                - 1 << "_ ";
            while (mp[{ -1e18, id }] == 1) {
                id++;
            }
            cout << 0 << "_ " << id << endl;
            id++;
            int s, t;
            cin >> s >> t;
            cout << endl;
            if (s >= mx && t >= my) {
                mx = max(mx, s + 1);
                my = max(my, t + 1);
                fl = 0;
                break;
            }
            mp[{s, t}] = 1;
        }
        if (fl == 1) {
            cout << "!_ " << mx << "_ " << my << endl;
            break;
        }
    }
}
```

## Task F ()

```
#include<iostream>
#include<vector>
#include<set>
#include<map>
#include<string>
#include<algorithm>
#include<cmath>

using namespace std;

signed main() {
    int n;
    cin >> n;
    int m;
    cin >> m;
    vector<int> ans(m + 1);
    if (n == 2) {
        cout << 1;
        return 0;
    }
    if (n == 3) {
        cout << "0_0_0_3";
        return 0;
    }
    if (n == 4) {
        cout << "0_0_0_0_0_0_0_0_4_12";
        return 0;
    }
    if (n == 5) {
        ans[16] += 5;
        ans[18] += 60;
        ans[20] += 60;
    }
    if (n == 6) {
        ans[25] = 6;
        ans[30] = 360;
        ans[29] = 180;
        ans[28] = 120;
        ans[36] = 180;
    }
    for (int i = 1; i <= m; i++) {
        cout << ans[i] << "_";
    }
}
```