

Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	40	6	0	346

Task A ()

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

using namespace std;

typedef long long ll;
typedef long double ld;
typedef unsigned long long ull;

random_device rd;
mt19937 rnd(rd());

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

Task B ()

```
#include <iostream>
#include <string>
#include <vector>
#include <set>
#include <map>
#include <bitset>
#include <queue>
#include <algorithm>
#include <cmath>
#include <iomanip>
#include <random>

using namespace std;

typedef long long ll;
typedef long double ld;
typedef unsigned long long ull;

random_device rd;
mt19937 rnd(rd());

struct pt {
    ld x, y;
};

ld ro(pt a, pt b) {
    return sqrtl((a.x - b.x) * (a.x - b.x) + (a.y - b.y) * (a.y - b.y));
}

int main() {
    ios_base::sync_with_stdio(0);
    cin.tie(NULL);
    cout.tie(NULL);
    ll n;
    cin >> n;
    vector<pt> all(n);
    if (n == 6) {
        for (ll i = 0; i < n; i++)
            cin >> all[i].x >> all[i].y;
        ld mi = 10000.0;
        for (ll i = 1; i < n; i++) {
            ld ne = ro(all[0], all[i]);
            if ((ne + 1e-2) < mi)
                mi = ne;
        }
        cout << fixed;
        cout << setprecision(7);
        cout << all[0].x << "┐" << all[0].y << '\n';
        for (ll i = 1; i < n; i++)
            if (abs(ro(all[0], all[i]) - mi) < 1e-2) {
                cout << all[i].x << "┐" << all[i].y << '\n';
            }
    }
    else {
        for (ll i = 0; i < n; i++)
            cin >> all[i].x >> all[i].y;
        pt a1, a2, a3;
        if (abs(ro(all[0], all[1]) - ro(all[0], all[2])) >= 1e-2) {
            a1 = all[0];
            if (ro(all[0], all[1]) + 1e-2 < ro(all[0], all[2])) {
                a2 = all[1];
                a3 = all[2];
            }
            else {
                a2 = all[2];
                a3 = all[1];
            }
        }
        else {
            a2 = all[0];
            a1 = all[1];
            a3 = all[2];
        }
    }
}
```

```

    }
    pt o;
    o.x = a1.x - (a2.x - a3.x);
    o.y = a1.y - (a2.y - a3.y);
    cout << fixed;
    cout << setprecision(7);
    all.clear();
    all.push_back(a1); all.push_back(a2); all.push_back(a3);
    for (ll i = 0; i < n; i++)
        cout << all[i].x << " " << all[i].y << "\n";
    for (ll i = 0; i < n; i++) {
        cout << all[i].x + (o.x - all[i].x) * 2 << " " << all[i].y + (o.y - all[i]
            ].y) * 2 << "\n";
    }
}
return 0;
}

```

Task C ()

```
#include <iostream>
#include <string>
#include <vector>
#include <set>
#include <map>
#include <bitset>
#include <queue>
#include <algorithm>
#include <cmath>
#include <iomanip>
#include <random>

using namespace std;

typedef long long ll;
typedef long double ld;
typedef unsigned long long ull;

random_device rd;
mt19937 rnd(rd());

int main() {
    ios_base::sync_with_stdio(0);
    cin.tie(NULL);
    cout.tie(NULL);
    string t;
    cin >> t;
    ll n;
    cin >> n;
    ll ans = 0;
    for (ll q = 0; q < n; q++) {
        string s;
        cin >> s;
        ll otv = t.size();
        for (ll i = 0; i < t.size(); i++) {
            for (ll j = 0; j < s.size(); j++) {
                ll temp = 0;
                if (s[j] == t[i]) {
                    ll e = j + 1;
                    temp++;
                    for (ll w = i + 1; w < t.size() && e < s.size(); w++) {
                        if (s[e] == t[w]) {
                            temp++;
                            e++;
                        }
                    }
                    otv = min(otv, (ll)t.size() - temp);
                }
            }
        }
        ans += otv; //cout << otv << '\n';
    }
    cout << ans;
    return 0;
}
```

Task D ()

```
#include <iostream>
#include <string>
#include <vector>
#include <set>
#include <map>
#include <bitset>
#include <queue>
#include <algorithm>
#include <cmath>
#include <iomanip>
#include <random>

using namespace std;

typedef long long ll;
typedef long double ld;
typedef unsigned long long ull;

random_device rd;
mt19937 rnd(rd());

struct pt {
    ll x, y;
};

ll n, m;
set <pair <ll, ll>> u;
vector <vector <pt>> all(1001, vector <pt>(1001));
vector <vector <ll>> dp(1001, vector <ll>(1001, 1e18));
queue <pt> q;

void check(pt now, ll a, ll b) {
    pt temp = now;
    temp.x += a + all[now.x][now.y].x;
    temp.y += b + all[now.x][now.y].y;
    if (temp.x >= 0 && temp.x < n && temp.y >= 0 && temp.y < m && dp[temp.x][temp.y] > dp[now.x][now.y] + abs(a) + abs(b)) {
        dp[temp.x][temp.y] = dp[now.x][now.y] + abs(a) + abs(b);
        if (u.find({ temp.x, temp.y }) == u.end()) {
            q.push(temp);
            u.insert({ temp.x, temp.y });
        }
    }
}

int main() {
    ios_base::sync_with_stdio(0);
    cin.tie(NULL);
    cout.tie(NULL);
    cin >> n >> m;
    pt st, fi;
    ll err = 0;
    cin >> st.x >> st.y >> fi.x >> fi.y, st.x--, st.y--, fi.x--, fi.y--;
    for (ll i = 0; i < n; i++)
        for (ll j = 0; j < m; j++) {
            cin >> all[i][j].x >> all[i][j].y;
            if (all[i][j].x != 0 || all[i][j].y != 0)
                err++;
        }
    if (err == 0) {
        cout << abs(fi.x - st.x) + abs(fi.y - st.y);
        return 0;
    }
    dp[st.x][st.y] = 0;
    q.push(st);
    while (!q.empty()) {
        pt now = q.front();
        u.erase({ now.x, now.y });
        q.pop();
        pt temp = now;
        while (temp.x + all[temp.x][temp.y].x >= 0 && temp.x + all[temp.x][temp.y].x < n
```

```

    && temp.y + all[temp.x][temp.y].y >= 0 && temp.y + all[temp.x][temp.y].y < m)
    {
        ll ax = all[temp.x][temp.y].x, ay = all[temp.x][temp.y].y;
        temp.x += ax;
        temp.y += ay;
        if (dp[temp.x][temp.y] > dp[now.x][now.y]) {
            dp[temp.x][temp.y] = dp[now.x][now.y];
            if (u.find({ temp.x, temp.y }) == u.end()) {
                q.push(temp);
                u.insert({ temp.x, temp.y });
            }
        }
        else break;
    }
    for (ll a = -n; a <= n; a++)
        for (ll b = -m; b <= m; b++)
            check(now, a, b);
}
cout << dp[fi.x][fi.y];
return 0;
}

```

Task E ()

```
#include <iostream>
#include <string>
#include <vector>
#include <set>
#include <map>
#include <bitset>
#include <queue>
#include <algorithm>
#include <cmath>
#include <iomanip>
#include <random>

using namespace std;

typedef long long ll;
typedef long double ld;
typedef unsigned long long ull;

random_device rd;
mt19937 rnd(rnd());

struct pt {
    ll x, y;
};

int main() {
    ios_base::sync_with_stdio(0);
    cin.tie(NULL);
    cout.tie(NULL);
    ll n, m, b;
    cin >> n >> m >> b;
    vector<pt> bl(b);
    for (ll i = 0; i < b; i++)
        cin >> bl[i].x >> bl[i].y, bl[i].x, bl[i].y;
    cout << endl;
    ll ma = m;
    ll s2 = 8191 / b;
    ll sz = 1;
    while (sz * 2 < s2)
        sz *= 2;
    //sz = 6;
    vector<pt> ou;
    vector<bool> u(sz + 10);
    vector<int> in(sz + 10);
    for (ll j = 0; j < b; j++) {
        ll i = 0;
        ll e = 0;
        while (i < sz) {
            if (!u[i]) {
                ou.push_back({ bl[j].x, bl[j].y + ma * i });
                e++;
            }
            if (e % 2 == 0 && e != 0) {
                cout << "?_ " << ou[0].x << "_ " << ou[0].y << "_ " << ou[1].x << "_ "
                    << ou[1].y << endl;
                in[ou[0].y / ma]++;
                in[ou[1].y / ma]++;
                ou.clear();
                pt s;
                cin >> s.x >> s.y, s.x--, s.y--;
                cout << endl;
                ll nom = s.y / ma;
                u[nom] = true;
            }
            i++;
        }
    }
    for (ll i = 0; i < sz + 10; i++)
        if (!u[i] && in[i] == b) {
            cout << "!_ " << 1 << "_ " << i * ma + 1 << endl;
            break;
        }
}
```

```
}    return 0;
```


Task F ()