

Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	40	6	14	360

Task A ()

```
#include <bits/stdc++.h>

#define fi first
#define se second

typedef long long ll;

using namespace std;

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

Task B ()

```
#include <bits/stdc++.h>

#define fi first
#define se second

typedef long long ll;

using namespace std;

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    //freopen("file.in", "r", stdin);
    int n;
    cin >> n;
    if (n == 6) {
        vector<pair<double, double>> a(n);
        for (int i = 0; i < n; i++)
            cin >> a[i].fi >> a[i].se;
        vector<pair<double, double>> arr;
        vector<bool> used(n);
        int ind = 0;
        while (true) {
            arr.push_back(a[ind]);
            used[ind] = 1;
            double minn = 10000000;
            int ans = -1;
            for (int i = 0; i < 6; i++) {
                if (!used[i]) {
                    double dist = (a[ind].fi - a[i].fi) * (a[ind].fi - a[i].fi) + (a[ind].se - a[i].se) * (a[ind].se - a[i].se);
                    if (dist < minn) {
                        minn = dist;
                        ans = i;
                    }
                }
            }
            if (ans == -1)
                break;
            used[ans] = 1;
            ind = ans;
        }
        pair<double, double> c = {(double)(arr[0].fi + arr[3].fi) / 2, (double)(arr[0].se + arr[3].se) / 2};
        cout << arr[0].fi << " " << arr[0].se << endl;
        cout << arr[1].fi << " " << arr[1].se << endl;
        cout << c.fi << " " << c.se << endl;
    }
    if (n == 3) {
        pair<double, double> p1, p2, c;
        cin >> p1.fi >> p1.se;
        cin >> p2.fi >> p2.se;
        cin >> c.fi >> c.se;
        pair<double, double> p3, p4, p5, p6;
        p4.fi = 2 * c.fi - p1.fi;
        p4.se = 2 * c.se - p1.se;
        p5.fi = 2 * c.fi - p2.fi;
        p5.se = 2 * c.se - p2.se;
        pair<double, double> m;
        m.fi = (double)(c.fi + p2.fi) / 2;
        m.se = (double)(c.se + p2.se) / 2;
        p3.fi = 2 * m.fi - p1.fi;
        p3.se = 2 * m.se - p1.se;
        p6.fi = 2 * c.fi - p3.fi;
        p6.se = 2 * c.se - p3.se;
        cout << p1.fi << " " << p1.se << endl;
        cout << p2.fi << " " << p2.se << endl;
        cout << p3.fi << " " << p3.se << endl;
        cout << p4.fi << " " << p4.se << endl;
        cout << p5.fi << " " << p5.se << endl;
        cout << p6.fi << " " << p6.se << endl;
    }
}
```

} }

Task C ()

```
#include <bits/stdc++.h>

#define fi first
#define se second

typedef long long ll;

using namespace std;

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    //freopen("file.in", "r", stdin);
    string t;
    cin >> t;
    int n;
    cin >> n;
    vector<string> a(n);
    for (int i = 0; i < n; i++)
        cin >> a[i];
    int ans = 0;
    for (int i = 0; i < n; i++) {
        vector<vector<int>> dp(t.size(), vector<int>(a[i].size()));
        int answ = 0;
        for (int j = 0; j < t.size(); j++) {
            for (int k = 0; k < a[i].size(); k++) {
                if (t[j] == a[i][k]) {
                    if (k == 0 || j == 0)
                        dp[j][k] = 1;
                    else {
                        for (int ind = j - 1; ind >= 0; ind--) {
                            dp[j][k] = max(dp[j][k], dp[ind][k - 1] + 1);
                        }
                    }
                }
                answ = max(answ, dp[j][k]);
            }
        }
        //cout << ans << endl;
        ans += t.size() - answ;
    }
    cout << ans;
}
```

Task D ()

```
#include <bits/stdc++.h>

#define fi first
#define se second

typedef long long ll;

using namespace std;

int f_x, f_y;
int n, m;

vector<vector<bool>> used(1000, vector<bool>(1000));
vector<vector<pair<int, int>>> a(1000, vector<pair<int, int>>(1000));

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    //freopen("file.in", "r", stdin);
    cin >> n >> m;
    int s_x, s_y;
    cin >> s_x >> s_y >> f_x >> f_y;
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < m; j++) {
            cin >> a[i][j].fi >> a[i][j].se;
        }
    }
    s_x--;
    s_y--;
    f_x--;
    f_y--;
    vector<vector<int>> dp(n, vector<int>(m, 1000));
    dp[s_x][s_y] = 0;
    for (int i = 0; i <= n + m; i++) {
        for (int x = 0; x < n; x++) {
            for (int y = 0; y < m; y++) {
                for (int xx = 0; xx < n; xx++) {
                    for (int yy = 0; yy < m; yy++) {
                        int len = abs(xx + a[xx][yy].fi - x) + abs(yy + a[xx][yy].se - y);
                        dp[x][y] = min(dp[x][y], dp[xx][yy] + len);
                    }
                }
            }
        }
    }
    cout << dp[f_x][f_y];
}
```

Task E ()

```
#include <bits/stdc++.h>

#define fi first
#define se second

typedef long long ll;

using namespace std;

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    //freopen("file.in", "r", stdin);
    int n, m, b;
    cin >> n >> m >> b;
    vector<pair<int, int>> a(b);
    for (int i = 0; i < b; i++) {
        cin >> a[i].fi >> a[i].se;
    }
    if (b == 1) {
        cout << "?_1_100_1_200";
        cout << endl;
        int x, y;
        cin >> x >> y;
        int xx, yy;
        if (x == 1 && y == 100) {
            xx = 1 - a[0].fi + 1;
            yy = 200 - a[0].se + 1;
        }
        else {
            xx = 1 - a[0].fi + 1;
            yy = 100 - a[0].se + 1;
        }
        cout << "!_" << xx << "_" << yy << endl;
    }
}
```

Task F ()

```
#include <bits/stdc++.h>

#define fi first
#define se second

typedef long long ll;

using namespace std;

vector<int> answer(10000);

vector<bool> used(26);

int n, m;

int ans = 0;
int ok = 0;

void dfs(int v, int dist, vector<vector<int>>& g) {
    used[v] = 1;
    ok += dist;
    for (int u : g[v]) {
        if (!used[u])
            dfs(u, dist + 1, g);
    }
}

void gen(int cnt, map<pair<int, int>, bool> mapa, vector<pair<int, int>> arr) {
    if (cnt == n - 1) {
        ans = 0;
        vector<vector<int>> g(n);
        for (int i = 0; i < n - 1; i++) {
            g[arr[i].fi].push_back(arr[i].se);
            g[arr[i].se].push_back(arr[i].fi);
        }
        for (int i = 0; i < n; i++) {
            ok = 0;
            for (int j = 0; j < n; j++)
                used[j] = 0;
            dfs(i, 0, g);
            bool fl = 1;
            for (int j = 0; j < n; j++) {
                if (!used[j])
                    fl = 0;
            }
            if (fl)
                ans += ok;
        }
        answer[ans / 2]++;
    }
    for (int i = 0; i < n; i++) {
        for (int j = i + 1; j < n; j++) {
            pair<int, int> a = {i, j};
            if (!mapa[a]) {
                mapa[a] = 1;
                arr.push_back(a);
                gen(cnt + 1, mapa, arr);
                arr.pop_back();
                mapa[a] = 1;
            }
        }
    }
}

int main()
{
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    //freopen("file.in", "r", stdin);
    cin >> n >> m;
    /* if (n == 7) {
        vector<int> arr(57);
    }
}
```

```

arr[56] = 2520;
arr[52] = 2520;
arr[50] = 5040;
arr[48] = 1470;
arr[46] = 3360;
arr[44] = 1260;
arr[42] = 420;
arr[39] = 21;
arr[35] = 7;
for (int i = 1; i <= m; i++)
    cout << arr[i] << " ";
return 0;
} */
vector<pair<int, int>> arr;
map<pair<int, int>, bool> mapa;
gen(0, mapa, arr);
for (int i = 1; i <= m; i++)
    cout << answer[i] << "┘";
}

```