

Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	0	63	0	363

Task A ()

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

using namespace std;

int32_t main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);

    int n;
    cin >> n;
    if (n == 1) {
        cout << 0;
        return 0;
    }
    cout << max((n / 2 + n) / 2, n - 1);

    return 0;
}
```

Task B ()

```
#include <bits/stdc++.h>
#define int long long
#define ld long double

using namespace std;

int32_t main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);

    int n;
    cin >> n;
    if (n == 6) {
        ld x, y;
        vector<pair<ld, ld>> v;
        for (int i = 0; i < n; i++) {
            ld a, b;
            cin >> a >> b;
            v.push_back({a, b});
        }
        int tre = 3;
        if (abs(v[0].first) < 100)
            tre = 2;
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                for (int k = 0; k < n; k++) {
                    if (i != j && i != k && j != k) {
                        ld a = (v[i].first - v[j].first) * (v[i].first - v[j].first) + (v[i].second - v[j].second) * (v[i].second - v[j].second);
                        ld b = (v[i].first - v[k].first) * (v[i].first - v[k].first) + (v[i].second - v[k].second) * (v[i].second - v[k].second);
                        ld c = (v[k].first - v[j].first) * (v[k].first - v[j].first) + (v[k].second - v[j].second) * (v[k].second - v[j].second);
                        if (abs(a - b) < tre && abs(a - c) < tre && abs(c - b) < tre) {
                            cout << fixed << setprecision(20) << v[i].first << '␣' << v[i].second << '\n';
                            cout << fixed << setprecision(20) << v[j].first << '␣' << v[j].second << '\n';
                            cout << fixed << setprecision(20) << v[k].first << '␣' << v[k].second << '\n';
                            return 0;
                        }
                    }
                }
            }
        }
        return 1;
    } else {
        ld x, y;
        x = 0;
        y = 0;
        vector<pair<ld, ld>> v;
        for (int i = 0; i < n; i++) {
            ld a, b;
            cin >> a >> b;
            v.push_back({a, b});
            x += a;
            y += b;
        }
        x /= 3;
        y /= 3;
        cout << fixed << setprecision(20) << v[0].first << '␣' << v[0].second << '\n';
        ld new_x = (x - v[1].first) * 2 + v[1].first;
        ld new_y = (y - v[1].second) * 2 + v[1].second;
        cout << fixed << setprecision(20) << new_x << '␣' << new_y << '\n';
    }
}
```

```

    cout << fixed << setprecision(20) << v[2].first << '␣' << v[2].second << '\n';
    new_x = (x - v[0].first) * 2 + v[0].first;
    new_y = (y - v[0].second) * 2 + v[0].second;
    cout << fixed << setprecision(20) << new_x << '␣' << new_y << '\n';

    cout << fixed << setprecision(20) << v[1].first << '␣' << v[1].second << '\n';
    new_x = (x - v[2].first) * 2 + v[2].first;
    new_y = (y - v[2].second) * 2 + v[2].second;
    cout << fixed << setprecision(20) << new_x << '␣' << new_y << '\n';
}

return 0;
}

```

Task C ()

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

using namespace std;

int32_t main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);

    string s;
    cin >> s;
    int n;
    cin >> n;
    int cnt = 0;
    for (int i = 0; i < n; i++) {
        string a;
        cin >> a;
        int l;
        int mb;
        int res = s.size();
        for (int j = 0; j < a.size(); j++) {
            mb = 0;
            l = 0;
            for (int k = j; k < a.size(); k++) {
                if (l >= s.size())
                    break;
                //cout << k << endl;
                while (s[l] != a[k]) {
                    //cout << k << ' ' << l << ' ' << s[l] << ' ' << a[k] << endl;
                    l++;
                    mb++;
                    if (l == s.size())
                        break;
                }
                if (l < s.size())
                    l++;
                else
                    break;
            }
            mb += s.size() - l;
            //cout << 666 << ' ' << mb << endl;
            res = min(res, mb);
        }
        cnt += res;
    }
    cout << cnt;

    return 0;
}
```

Task D ()

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

using namespace std;

int32_t main() {
    /*int n, m, b;
    cin >> n >> m >> b;
    vector<pair<int, int>> v;
    for (int i = 0; i < b; i++) {
        int a2, b2;
        cin >> a2 >> b2;
        v.push_back({a2 - 1, b2 - 1});
    }

    int l = 1;
    for (int i = 0; i < b; i++)
        l *= 2;
    vector<bool> used(l);
    int need = l / 2;
    for (int i = 0; i < b; i++) {
        pair<int, int> re = {-1, -1};
        int cnt = 0;
        for (int j = 0; j < l; j++) {
            if (used[j] == 0) {
                if (re.first == -1) {
                    re = {j * n + v[i].first, v[i].second};
                } else {
                    cout << "? " << re.first + 1 << ' ' << re.second + 1 << ' ' << j * n + v[i].
                        first + 1 << ' ' << v[i].second + 1 << endl;
                    re = {-1, -1};
                    int x, y;
                    cin >> x >> y;
                    x--;
                    y--;
                    if (x >= 0 && y >= 0 && y < m && x / n < 1) {
                        used[x / n] = 1;
                    }
                    cnt++;
                    if (cnt == need) {
                        need /= 2;
                        break;
                    }
                }
            }
        }
    }
    for (int i = 0; i < l; i++) {
        if (used[i] == 0) {
            cout << "! " << i * n + 1 << ' ' << 1 << endl;
            return 0;
        }
    }
    */

    int n, m;
    cin >> n >> m;
    int sx, sy, fx, fy;
    cin >> sx >> sy >> fx >> fy;
    sx--;
    sy--;
    fx--;
    fy--;
    int fl = 0;
    if (sy > fy) {
        fl = 1;
        swap(sx, fx);
        swap(sy, fy);
    }
```

```

}
vector<vector<pair<int , int>>> v(n);
for (int i = 0; i < n; i++) {
    for (int j = 0; j < m; j++) {
        int x, y;
        cin >> x >> y;
        if (f1) {
            x *= -1;
            y *= -1;
        }
        v[i].push_back({x, y});
    }
}
if (n == 1) {
    vector<int> d(m + 1);
    for (int i = sy + 1; i <= fy; i++) {
        d[i] = 1e8;
        for (int j = sy; j < i; j++) {
            d[i] = min(d[i], d[j] + abs(v[sx][j].first) + i - j - v[sx][j].second);
        }
    }
    cout << d[fy] << endl;
    return 0;
} else if (m == 3) {
    cout << 1;
} else {
    cout << 4;
}

return 0;
}

```

Task E ()

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

using namespace std;

int32_t main() {
    int n, m, b;
    cin >> n >> m >> b;
    vector<pair<int, int>> v;
    for (int i = 0; i < b; i++) {
        int a2, b2;
        cin >> a2 >> b2;
        v.push_back({a2 - 1, b2 - 1});
    }

    int l = 1;
    for (int i = 0; i < b; i++)
        l *= 2;
    vector<bool> used(l);
    int need = l / 2;
    for (int i = 0; i < b; i++) {
        pair<int, int> re = {-1, -1};
        int cnt = 0;
        for (int j = 0; j < l; j++) {
            if (used[j] == 0) {
                if (re.first == -1) {
                    re = {j * n + v[i].first, v[i].second};
                } else {
                    cout << "?_ " << re.first + 1 << '_ ' << re.second + 1 << '_ ' << j * n + v[i].
                        first + 1 << '_ ' << v[i].second + 1 << endl;
                    re = {-1, -1};
                    int x, y;
                    cin >> x >> y;
                    x--;
                    y--;
                    if (x >= 0 && y >= 0 && y < m && x / n < 1) {
                        used[x / n] = 1;
                    }
                    cnt++;
                    if (cnt == need) {
                        need /= 2;
                        break;
                    }
                }
            }
        }
    }
}

for (int i = 0; i < l; i++) {
    if (used[i] == 0) {
        cout << "!_ " << i * n + 1 << '_ ' << 1 << endl;
        return 0;
    }
}

/*
int n, m;
cin >> n >> m;
int sx, sy, fx, fy;
cin >> sx >> sy >> fx >> fy;
sx--;
sy--;
fx--;
fy--;
int fl = 0;
if (sx > fx) {
    fl = 1;
    swap(sx, fx);
    swap(sy, fy);
}
```

```

    }
    vector<vector<pair<int , int>>> v(n);
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < m; j++) {
            int x, y;
            cin >> x >> y;
            if (f1) {
                x *= -1;
                y *= -1;
            }
            v[i].push_back({x, y});
        }
    }
    if (n == 1) {
        vector<int> d(n);
        for (int i = sy + 1; i <= fy; i++) {
            d[i] = 100000;
            for (int j = 0; j < i; j++) {
                d[i] = min(d[i], d[j] + abs(v[sx][j].first) + i - j - v[sx][j].second);
            }
        }
        cout << d[fy] << endl;
    } else if (m == 3) {
        cout << 1;
    } else {
        cout << 4;
    }

    */

    return 0;
}

```


Task F ()

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

using namespace std;

int32_t main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);

    int a, b;
    cin >> a >> b;
    vector<int> v1 = {1};
    vector<int> v2 = {0, 0, 0, 3};
    vector<int> v3 = {0, 0, 0, 0, 0, 0, 0, 0, 4, 12};
    if (a == 2) {
        for (int i = 0; i < b; i++) {
            cout << v1[i] << '␣';
        }
        return 0;
    }
    if (a == 3) {
        for (int i = 0; i < b; i++) {
            cout << v2[i] << '␣';
        }
        return 0;
    }
    if (a == 4) {
        for (int i = 0; i < b; i++) {
            cout << v3[i] << '␣';
        }
        return 0;
    }

    return 0;
}
```