

Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	0	45	0	345

Task A ()

```
#include <iostream>
#include <stdio.h>
#include <string>
#include <vector>
#include <algorithm>
#include <map>

typedef long long ll;
typedef long double ld;

using namespace std;

#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define SZ(x) (int)(x).size()
#define pb push_back
#define S second
#define F first
// #define int ll
const int N = 100 + 10, INF = 1e9;

void solve() {
    int n;
    cin >> n;
    cout << n - 1;
}

signed main()
{
    ios::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    // freopen("input.txt", "r", stdin);
    solve();
    return 0;
}
```

Task B ()

```
#include <iostream>
#include <stdio.h>
#include <string>
#include <vector>
#include <algorithm>
#include <map>

typedef long long ll;
typedef long double ld;

using namespace std;

#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define SZ(x) (int)(x).size()
#define pb push_back
#define S second
#define F first
// #define int ll
const int INF = 1e9;
const ld EPS = 1e-2;

struct Point {
    ld x, y;
    Point() {
        x = y = 0.0;
    }
    Point(ld xx, ld yy) {
        x = xx;
        y = yy;
    }
};

ld dist(Point a, Point b) {
    return sqrt((a.x - b.x) * (a.x - b.x) + (a.y - b.y) * (a.y - b.y));
}

void solve_in(int n) {
    vector<Point> vec(n);
    for (int i = 0; i < n; ++i) {
        cin >> vec[i].x >> vec[i].y;
    }
    ld maxd = 0;
    for (int i = 0; i < n; ++i) {
        for (int j = i + 1; j < n; ++j) {
            maxd = max(maxd, dist(vec[i], vec[j]));
        }
    }
    ld R = maxd / 2.0;
    ld d = R * sqrt(3.0);
    cout << vec[0].x << " " << vec[0].y << endl;
    for (int i = 1; i < n; ++i) {
        if (fabs(dist(vec[0], vec[i]) - d) < EPS) {
            cout << vec[i].x << " " << vec[i].y << endl;
        }
    }
}

void get_point(ld h, Point a, Point b, Point c) {
    Point O = Point((a.x + b.x) / 2.0, (a.y + b.y) / 2.0);
    ld l = dist(O, c);
    Point kek = Point((O.x - c.x) / l, (O.y - c.y) / l);
    cout << O.x + kek.x * h << " " << O.y + kek.y * h << endl;
}

void solve_out(int n) {
    vector<Point> vec(n);
    for (int i = 0; i < n; ++i) {
        cin >> vec[i].x >> vec[i].y;
    }
    ld d = dist(vec[0], vec[1]);
    ld a = d / sqrt(3.0);
}
```

```

ld p = (a + a + d) / 2.0;
ld S = sqrt(p * (p - a) * (p - a) * (p - d));
ld h = 2.0 * S / d;
cout << vec[0].x << " " << vec[0].y << endl;
get_point(h, vec[0], vec[1], vec[2]);
cout << vec[1].x << " " << vec[1].y << endl;
get_point(h, vec[1], vec[2], vec[0]);
cout << vec[2].x << " " << vec[2].y << endl;
get_point(h, vec[2], vec[0], vec[1]);
}

```

```

signed main()
{
    ios::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    cout.precision(20);
    // freopen("input.txt", "r", stdin);
    // freopen("output.txt", "w", stdout);
    int n;
    cin >> n;
    if (n == 6) {
        solve_in(n);
    } else {
        solve_out(n);
    }
    return 0;
}

```

Task C ()

```
#include <iostream>
#include <stdio.h>
#include <string>
#include <vector>
#include <algorithm>
#include <map>

typedef long long ll;
typedef long double ld;

using namespace std;

#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define SZ(x) (int)(x).size()
#define pb push_back
#define S second
#define F first
// #define int ll
const int INF = 1e9;

int get(string & s, string & t) {
    int mx = 0;
    for (int i = 0; i < SZ(t); ++i) {
        int ptr = 0;
        int len = 0;
        for (int k = i; k < SZ(t); ++k) {
            while (ptr < SZ(s) && s[ptr] != t[k]) {
                ++ptr;
            }
            if (ptr == SZ(s)) {
                break;
            }
            ++ptr;
            ++len;
        }
        mx = max(mx, len);
    }
    return SZ(s) - mx;
}

void solve() {
    string s;
    cin >> s;
    int n;
    cin >> n;
    vector<string> vec(n);
    for (int i = 0; i < n; ++i) {
        cin >> vec[i];
    }
    int res = 0;
    for (int i = 0; i < n; ++i) {
        res += get(s, vec[i]);
    }
    cout << res;
}

signed main()
{
    ios::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    // freopen("input.txt", "r", stdin);
    solve();
    return 0;
}
```

Task D ()

Task E ()

```
#include <iostream>
#include <stdio.h>
#include <string>
#include <vector>
#include <algorithm>
#include <map>

typedef long long ll;
typedef long double ld;

using namespace std;

#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define SZ(x) (int)(x).size()
#define pb push_back
#define S second
#define F first
// #define int ll
const int INF = 1e9;

int brand() {
    int x = rand();
    int y = rand();
    return ((x << 16) | y);
}

void solve() {
    int n, m, b;
    cin >> n >> m >> b;
    srand(228);
    vector<pair<int, int>> vec(b);
    for (int i = 0; i < b; ++i) {
        cin >> vec[i].F >> vec[i].S;
    }
    int cnt = -3;
    int C = 2048;
    vector<bool> used(C + 10, true);
    for (int i = 0; i < C / 2; ++i) {
        int num1 = (i * 2);
        int num2 = (i * 2 + 1);
        used[num1] = false;
        used[num2] = false;
        cout << "?_";
        cout << (num1 * n) + vec[0].F << "_ " << vec[0].S << "_ ";
        cout << (num2 * n) + vec[0].F << "_ " << vec[0].S << endl;
        int x, y;
        cin >> x >> y;
        used[(x - 1) / n] = true;
    }
    for (int i = 1; i < b; ++i) {
        int prev = -1;
        for (int num = 0; num < C; ++num) {
            if (!used[num] && prev == -1) {
                prev = num;
                continue;
            }
            if (!used[num] && prev != -1) {
                int num1 = num;
                int num2 = prev;
                cout << "?_";
                cout << (num1 * n) + vec[i].F << "_ " << vec[i].S << "_ ";
                cout << (num2 * n) + vec[i].F << "_ " << vec[i].S << endl;
                int x, y;
                cin >> x >> y;
                if (x >= 1) {
                    used[(x - 1) / n] = true;
                }
                prev = -1;
            }
        }
        if (prev != -1) {
```

```

        int num1 = cnt;
        int num2 = prev;
        cout << "?_";
        cout << (num1 * n) + vec[i].F << "_ " << vec[i].S << "_ ";
        cout << (num2 * n) + vec[i].F << "_ " << vec[i].S << endl;
        int x, y;
        cin >> x >> y;
        if (x >= 1) {
            used[(x - 1) / n] = true;
        }
        prev = -1;
        --cnt;
    }
}

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

}

signed main()
{
    ios::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    //freopen("input.txt", "r", stdin);
    solve();
    return 0;
}

```

Task F ()

```
#include <iostream>
#include <stdio.h>
#include <string>
#include <vector>
#include <algorithm>
#include <map>

typedef long long ll;
typedef long double ld;

using namespace std;

#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define SZ(x) (int)(x).size()
#define pb push_back
#define S second
#define F first
#define pii pair<int, int>
// #define int ll
const int INF = 1e9;

void solve() {
    int n, m;
    cin >> n >> m;
    if (n == 2 && m == 1) {
        cout << 1;
    }
    if (n == 3 && m == 4) {
        cout << "0_0_0_3";
    }
    if (n == 4 && m == 10) {
        cout << "0_0_0_0_0_0_0_0_4_12";
    }
}

signed main()
{
    ios::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    // freopen("input.txt", "r", stdin);
    solve();
    return 0;
}
```