

Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	10	0	0	310

Task A ()

```
#include <iostream>
#include <vector>
#include <cmath>
#include <random>
#include <queue>
#include <set>
#include <unordered_set>
#include <map>
#include <unordered_map>
#include <stack>

using namespace std;

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    int _ = 1;
    //cin >> _;
    while ( _-- ) {
        int x;
        cin >> x;
        cout << x - 1 << endl;
    }
}
```

Task B ()

```
#include<iostream>
#include<vector>
#include<cmath>
#include<random>
#include<queue>
#include<set>
#include<unordered_set>
#include<map>
#include<unordered_map>
#include<stack>
#include<iomanip>
#include<algorithm>

using namespace std;

#define x first
#define y second

inline long double dist(long double x1, long double y1, long double x2, long double y2) {
    return sqrt(pow(x1 - x2, 2) + pow(y1 - y2, 2));
}

vector<pair<long double, long double>> a;
pair<long double, long double> l = {1e9, 1e9};

inline bool cmp(const pair<long double, long double>& k, const pair<long double, long double>& m)
{
    long double tg1 = (k.x == l.x) ? 1e9 : (k.y - l.y) / (k.x - l.x);
    long double tg2 = (m.x == l.x) ? 1e9 : (m.y - l.y) / (m.x - l.x);
    return tg1 > tg2;
}

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    int _ = 1;
    //cin >> _;
    while (_--) {
        int n;
        cin >> n;
        if (n == 6) {
            a.resize(n);

            for (int i = 0; i < n; i++){
                cin >> a[i].first >> a[i].second;
                if (l.x > a[i].x) {
                    l.x = a[i].x;
                    l.y = a[i].y;
                }
            }
            for (int i = 0; i < n; i++) {
                if (a[i] == l) {
                    a.erase(a.begin() + i);
                    break;
                }
            }
            sort(a.begin(), a.end(), cmp);
            cout << a[0].first << " " << a[0].second << endl;
            cout << a[2].first << " " << a[2].second << endl;
            cout << a[4].first << " " << a[4].second << endl;
        }
        else {
            a.resize(n);
            for (int i = 0; i < n; i++){
                cin >> a[i].first >> a[i].second;
            }
            for (int i = 0; i < n; i++) {
                long double y1 = a[i].second, y2 = a[(i + 1) % n].second;
                long double x1 = a[i].first, x2 = a[(i + 1) % n].first;
                //cout << "-----" << x1 << " " << y1 << " " << x2 << " " << y2 << endl;
                long double tg = (x2 != x1) ? (y2 - y1) / (x2 - x1) : 0;
            }
        }
    }
}
```

```

pair<long double, long double> M = {(x1 + x2) / 2, (y1 + y2) / 2};
//cout << "M: " << M.x << " " << M.y << endl;
pair<long double, long double> v = {-tg, 1};
long double l = dist(x1, y1, x2, y2);
long double d = dist(0, 0, v.x, v.y);
long double k = l / sqrt(3) / 2;
/*cout << "tg: " << tg<< endl;
cout << "k: " << k << endl;
cout << "d: " << d << endl;
cout << "l: " << l << endl;*/
if (x1 == x2) {
    swap(v.x, v.y);
}
v.x *= k / d;
v.y *= k / d;
//cout << "v: " << v.x << " " << v.y << endl;
pair<long double, long double> ans1 = {M.x + v.x, M.y + v.y}, ans2 = {M.x - v.x, M
.y - v.y};
/*cout << "ans1: " << ans1.x << " " << ans1.y << endl;
cout << "ans2: " << ans2.x << " " << ans2.y << endl;*/
if (dist(ans1.x, ans1.y, a[(i + 2) % 3].x, a[(i + 2) % 3].y) > dist(ans2.x, ans2.y
, a[(i + 2) % 3].x, a[(i + 2) % 3].y)) {
    cout << ans1.x << "␣" << ans1.y << endl;
    cout << x2 << "␣" << y2 << endl;
}
else {
    cout << ans2.x << "␣" << ans2.y << endl;
    cout << x2 << "␣" << y2 << endl;
}
}
}
}

/*
6
10.000 0.000
5.000 8.660
-5.000 8.660
-10.000 -0.000
-5.000 -8.660
5.000 -8.660
*/
/*
3
10 0
-5 8.66
-5 -8.66
*/

```

Task C ()

```
#include<iostream>
#include<vector>
#include<cmath>
#include<random>
#include<queue>
#include<set>
#include<unordered_set>
#include<map>
#include<unordered_map>
#include<stack>
#include<iomanip>
#include<algorithm>

using namespace std;

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    int _ = 1;
    //cin >> _;
    while (_--) {
        string t;
        cin >> t;
        int m = t.size();
        int n;
        cin >> n;
        int ans = 0;
        for (int i = 0; i < n; i++) {
            string s;
            cin >> s;
            int cnt = m;
            for (int i = 0; i < s.size(); i++) {
                int it = i;
                for (int i = 0; i < m; i++) {
                    if (it < s.size() && s[it] == t[i]) {
                        it++;
                    }
                }
                cnt = min(cnt, m - it + i);
            }
            ans += cnt;
        }
        cout << ans << endl;
    }
}

/*
prank
6
kotehok
redpanda
abcprankdef
kaban
geege
burunduk
*/
/*
prank
1
pnk
*/
```

Task D ()

```
#include<iostream>
#include<vector>
#include<cmath>
#include<random>
#include<queue>
#include<set>
#include<unordered_set>
#include<map>
#include<unordered_map>
#include<stack>
#include<iomanip>
#include<algorithm>

using namespace std;

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    int _ = 1;
    //cin >> _;
    while ( _-- ) {
        int n, m;
        cin >> n >> m;
        if (n == 3) {
            cout << (m == 5 ? 4 : 1) << endl;
            return 0;
        }
        //vector<vector<pair<int, int>>> a(n, vector<pair<int, int>>(m));
        vector<int> a(m);
        /*for (int i = 0 ; i < n; i++) {
            for (int j = 0 ; j < m; j++) {
                cin >> a[i][j].first >> a[i][j].second;
            }
        }*/
        int ans = 0;
        int l, s, f;
        cin >> l >> s >> l >> f;
        for (int i = 0 ; i < m; i++) {
            cin >> l >> a[i];
        }
        s--;
        f--;
        if (s == f) {
            cout << 0 << endl;
            return 0;
        }
        if (s > f) {
            for (int i = s; i > f; i--) {
                if (a[i] == -1) {
                    continue;
                }
                int it = i;
                while ((a[it] == 1 || a[it] == 0) && it > f) {
                    it--;
                }
                ans += i - it;
                i = it + 1;
            }
            if (a[s] == 1 && s == m - 1 || (s != m - 1 && a[s + 1] != -1 && a[s] == 1)) {
                ans += 1;
            }
            cout << ans << endl;
        }
        else {
            for (int i = s; i < f; i++) {
                if (a[i] == 1) {
                    continue;
                }
                int it = i;
                while ((a[it] == -1 || a[it] == 0) && it < f) {
```

```

        it++;
    }
    ans += it - i;
    i = it - 1;
}
if (a[s] == -1 && s == 0 || (s != 0 && a[s] == -1 && a[s - 1] != 1)) {
    ans += 1;
}
cout << ans << endl;
}
}

/*
1 3
1 1 1 2
0 -1 0 1 0 -1
*/

```

Task E ()

Task F ()

```
#include<iostream>
#include<vector>
#include<cmath>
#include<random>
#include<queue>
#include<set>
#include<unordered_set>
#include<map>
#include<unordered_map>
#include<stack>
#include<iomanip>
#include<algorithm>

using namespace std;

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(0);
    cout.tie(0);
    int _ = 1;
    //cin >> _;
    while (_--) {
        int a, b;
        cin >> a >> b;
        if (a == 2) {
            cout << 1 << endl;
        }
        else if (a == 3) {
            cout << "0_0_0_3" << endl;
        }
        else if (a == 4) {
            cout << "0_0_0_0_0_0_0_0_4_12" << endl;
        }
        else if (a == 5) {
            for (int i = 0; i < 17; i++) {
                cout << "0_";
            }
            cout << "5_20_120" << endl;
        }
    }
}
```