

Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	40	0	0	340

Task A ()

```
#include <iostream>

using namespace std;

int main() {
    int n;
    cin >> n;
    cout << n - 1;
    return 0;
}
```

Task B ()

```
#include <iostream>
#include <iomanip>
#include <vector>
#include <cmath>

#define x first
#define y second

using namespace std;

typedef long double ld;

int main() {
    int n;
    cin >> n;
    if (n == 6) {
        vector <pair <ld, ld>> a(n);
        for (int i = 0; i < n; i++) {
            cin >> a[i].x >> a[i].y;
        }
        int ban = -1;
        ld dist = 1e9;
        vector <pair <ld, ld>> ans(3);
        ans[1] = { a[0].x, a[0].y };
        for (int j = 0; j < 2; j++) {
            dist = 1e9;
            int k = 0;
            for (int i = 1; i < n; i++) {
                if (i != ban) {
                    if (hypot(a[i].x - a[0].x, a[i].y - a[0].y) < dist) {
                        dist = hypot(a[i].x - a[0].x, a[i].y - a[0].y);
                        k = i;
                    }
                }
            }
            if (ban == -1) {
                ans[0] = { a[k].x, a[k].y };
            }
            else {
                ans[2] = { a[k].x, a[k].y };
            }
            ban = k;
        }
        ld x1 = ans[0].x - ans[1].x;
        ld y1 = ans[0].y - ans[1].y;
        ld x2 = ans[2].x - ans[1].x;
        ld y2 = ans[2].y - ans[1].y;
        if (x1 * y2 - x2 * y1 > 0) {
            swap(ans[0], ans[2]);
        }
        for (pair <ld, ld> p : ans) {
            cout << fixed << setprecision(6) << p.x << '\u' << p.y << '\n';
        }
    }
    else {
        vector <pair <ld, ld>> a(6);
        cin >> a[5].x >> a[5].y >> a[0].x >> a[0].y >> a[1].x >> a[1].y;
        pair <ld, ld> p = { a[0].x + (a[0].x - a[5].x), a[0].y + (a[0].y - a[5].y) };
        for (int i = 2; i <= 4; i++) {
            a[i] = { a[i - 1].x + (a[i - 1].x - p.x), a[i - 1].y + (a[i - 1].y - p.y) };
            p = { a[i - 1].x + (a[i - 1].x - a[i - 2].x), a[i - 1].y + (a[i - 1].y - a[i - 2].y) };
        }
        for (int i = 0; i < 6; i++) {
            cout << fixed << setprecision(6) << a[i].x << '\u' << a[i].y << '\n';
        }
    }
    return 0;
}

/*
```

```

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

```

```

6
5.000 -8.660
-5.000 -8.660
-10.000 -0.000
-5.000 8.660
5.000 8.660
10.000 0.000

```

```

cout << fixed << setprecision(3) << a[0].x << ' ' << a[0].y << '\n';
cout << fixed << setprecision(3) << a[1].x << ' ' << a[1].y << '\n';
cout << fixed << setprecision(6) << a[5].x << ' ' << a[5].y << '\n';

```

```

*/

```

Task C ()

```
#include <iostream>
#include <string>
#include <vector>

using namespace std;

string s, t;

bool can(int x) {
    int y = t.size() - x;
    for (int a = 0; a <= int(s.size()) - y; a++) {
        int b = a + y;
        int j = 0, c = 0;
        for (int i = a; i < b; i++) {
            int k = t.find(s[i], j);
            if (k != string::npos) {
                j = k + 1;
                c++;
            }
        }
        if (c >= y) {
            return true;
        }
    }
    return false;
}

int solve() {
    int l = -1, r = t.size();
    while (r - l > 1) {
        int m = (r + l) / 2;
        if (can(m)) {
            r = m;
        }
        else {
            l = m;
        }
    }
    return r;
}

int main() {
    cin >> t;
    int n;
    cin >> n;
    int ans = 0;
    for (int i = 0; i < n; i++) {
        cin >> s;
        ans += solve();
    }
    cout << ans;
    return 0;
}
```

Task D ()

```
#include <iostream>
#include <vector>
#include <queue>

const int inf = 1e8;

using namespace std;

int main() {
    int n, m;
    cin >> n >> m;
    int ar, ac, br, bc;
    cin >> ar >> ac >> br >> bc;
    vector < vector <pair <int, int>>> a(n + 2, vector <pair <int, int>>(m + 2));
    for (int i = 1; i <= n; i++) {
        for (int j = 1; j <= m; j++) {
            cin >> a[i][j].first >> a[i][j].second;
        }
    }
    int ans = abs(br - (ar + a[ar][ac].first)) + abs(bc - (ac + a[ar][ac].second));
    priority_queue <pair <int, pair <int, int>>, vector <pair <int, pair <int, int>>>, greater
        <pair <int, pair <int, int>>> pq;
    vector <vector <int>> d(n + 2, vector <int>(m + 2, inf));
    d[ar][ac] = 0;
    pq.push({ d[ar][ac], { ar, ac } });
    while (!pq.empty()) {
        int dist = pq.top().first, r = pq.top().second.first, c = pq.top().second.second;
        pq.pop();
        if (dist > d[r][c]) {
            continue;
        }
        int x = r + a[r][c].first;
        int y = c + a[r][c].second;
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= m; j++) {
                if (d[r][c] + abs(i - x) + abs(j - y) < d[i][j] && d[r][c] + abs(i
                    - x) + abs(j - y) < ans) {
                    d[i][j] = d[r][c] + abs(i - x) + abs(j - y);
                    pq.push({ d[i][j], { i, j } });
                }
            }
        }
    }
    cout << min(d[br][bc], ans);
    return 0;
}
```

Task E ()

```
#include <iostream>
#include <vector>

#define x first
#define y second
using namespace std;

int main() {
    int n, m, b;
    cin >> n >> m >> b;
    vector <pair <int, int>> a(b);
    for (int i = 0; i < b; i++) {
        cin >> a[i].x >> a[i].y;
    }
    if (b == 1) {
        cout << '?' << '\n' << 0 << '\n' << 0 << '\n';
        cout << 1000000000 << '\n' << 0 << endl;
        int r, c;
        cin >> r >> c;
        if (r == 0) {
            cout << '!' << '\n' << 1000000000 << '\n' << 0 << endl;
        }
        else {
            cout << '!' << '\n' << 0 << '\n' << 0 << endl;
        }
    }
    return 0;
}
```

Task F ()

```
#include <iostream>

using namespace std;

int main() {
    int n;
    cin >> n;
    if (n == 2) {
        cout << 1;
    }
    else if (n == 3) {
        cout << "0_0_0_3";
    }
    else if (n == 4) {
        cout << "0_0_0_0_0_0_0_0_4_12";
    }
    return 0;
}
```