

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

using namespace std;

inline void speed_up() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
}

signed main() {
    // freopen("input.txt", "r", stdin);
    // freopen("output.txt", "w", stdout);
    // speed_up();
    int n;
    cin >> n;
    if (n <= 1) {
        cout << 0;
        return 0;
    }
    int ans = 0;
    while ((n - ans) / 2 >= 1) {
        ans += (n - ans) / 2;
    }
    cout << ans;
    return 0;
}
```

Task B ()

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

using namespace std;

inline void speed_up() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
}

struct pt {
    int x, y;
    pt () {
        x = y = 0;
    }
    pt (int new_x, int new_y) {
        x = new_x;
        y = new_y;
    }
    int len() {
        return sqrt(x*x + y*y);
    }
};

pt operator + (pt a, pt b) { return pt(a.x + b.x, a.y + b.y); }
pt operator - (pt a, pt b) { return pt(a.x - b.x, a.y - b.y); }
pt operator / (pt a, int z) { return pt(a.x / z, a.y / z); }
pt operator * (pt a, int z) { return pt(a.x * z, a.y * z); }
pt do_norm(pt a, int len) {
    return a / a.len() * len;
}

bool comp(pt a, pt b) {
    if (a.y < b.y)
        return true;
    if (a.y > b.y)
        return false;
    return (a.x > b.x);
}

void save() {
    vector<pt> all(6);
    for (int i = 0; i < 6; ++i) {
        cin >> all[i].x >> all[i].y;
    }
    sort(all.begin(), all.end(), comp);
    if (all[0].x < all[1].x)
        swap(all[0], all[1]);
    cout << all[0].x << " " << all[0].y << "\n";
    cout << all[1].x << " " << all[1].y << "\n";
    pt d = (all[1] - all[0]);
    pt c = (all[1] + all[0]) / 2;
    pt e = pt(d.y, -d.x);
    pt a = c + do_norm(e, e.len() * sqrt(3) / 2);
    cout << a.x << " " << a.y << "\n";
}

void build() {
    vector<pt> all(3);
    for (int i = 0; i < 3; ++i) {
        cin >> all[i].x >> all[i].y;
    }
    sort(all.begin(), all.end(), comp);

    pt d = all[2] - all[1], e = all[2] - all[0];
    cout << all[0].x << " " << all[0].y << "\n";
    cout << all[1].x << " " << all[1].y << "\n";
    cout << (all[1] + e).x << " " << (all[1] + e).y << "\n";
    cout << (all[0] + e*2).x << " " << (all[0] + e*2).y << "\n";
    cout << (all[1] + d*2).x << " " << (all[1] + d*2).y << "\n";
    cout << (all[0] + d).x << " " << (all[0] + d).y << "\n";
}
```

```
}  
  
signed main() {  
    // freopen("input.txt", "r", stdin);  
    // freopen("output.txt", "w", stdout);  
    // speed_up();  
    int n;  
    cin >> n;  
    if (n == 3)  
        build();  
    else  
        save();  
    return 0;  
}
```

Task C ()

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

using namespace std;

inline void speed_up() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
}

int f(string x, string s) {
    int n = x.length(), m = s.length();
    int ans = m;
    for (int i = 0; i < n; ++i) {
        int new_ans = 0, l = i;
        for (int j = 0; j < m; ++j) {
            if (x[l] == s[j])
                ++l;
            else
                ++new_ans;
        }
        if (new_ans < ans)
            ans = new_ans;
    }
    return ans;
}

signed main() {
    // freopen("input.txt", "r", stdin);
    // freopen("output.txt", "w", stdout);
    speed_up();
    string s;
    cin >> s;
    int n, ans = 0;
    cin >> n;
    for (int i = 0; i < n; ++i) {
        string x;
        cin >> x;
        ans += f(x, s);
    }
    cout << ans;
    return 0;
}
```

Task D ()

Task E ()

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

using namespace std;
signed main() {
    int n, m, b;
    cin >> n >> m >> b;
    vector <pair <int, int> > black(b);
    for (int i = 0; i < b; ++i) {
        int x, y;
        cin >> x >> y;
        --x, --y;
        black[i] = {x, y};
    }
    bool mark = true;
    vector <vector <int> > field(1 << (b / 2), vector <int> (1 << (b / 2 + b % 2), 0));
    for (int l = 0; l < b; ++l) {
        for (int i = 0; i < (1 << (b / 2)); i += 1) {
            for (int j = 0; j < (1 << (b / 2 + b % 2)); j += 1) {
                if (field[i][j] == -1)
                    continue;
                if (mark) {
                    cout << "?_ " << black[l].first + i * n + 1 << "_ " << black[l].second + j * m +
                        1 << "_ ";
                    mark = false;
                } else {
                    cout << black[l].first + i * n + 1 << "_ " << black[l].second + j * m + 1 <<
                        endl;
                    mark = true;
                }
                if (field[i][j] != -1)
                    ++field[i][j];
                if (!mark)
                    continue;
                int x, y;
                cin >> x >> y;
                --x, --y;
                field[x / n][y / m] = -1;
            }
        }
    }
    if (!mark) {
        cout << 100000012345678 << "_ " << 100000012345678 << endl;
        int x, y;
        cin >> x >> y;
        --x;
        field[x / n][y / m] = -1;
    }
    for (int i = 0; i < (1 << (b / 2)); i += 1) {
        for (int j = 0; j < (1 << (b / 2 + b % 2)); j += 1) {
            if (field[i][j] == b) {
                cout << "!_ " << n * i + 1 << "_ " << m * j + 1 << endl;
                return 0;
            }
        }
    }
    return 0;
}
```

Task F ()

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

using namespace std;

inline void speed_up() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
}

signed main() {
    // freopen("input.txt", "r", stdin);
    // freopen("output.txt", "w", stdout);
    // speed_up();
    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_4_12";
    }
    return 0;
}
```