Олимпиада СПбГУ по информатике 2018/19 учебного года

Серебров Григорий Михайлович

A	B	C	D	E	F	Sum
100	100	60	60	35	0	355

Task A (100)

```cpp
#define _CRT_SECURE_NO_WARNINGS
#include <iostream>


//#define DEBUG
#define ll long long
using namespace std;

int main() {
#ifdef DEBUG
        freopen("input.txt", "r", stdin);
#endif

        ll n, m;
        cin >> n >> m;

        for (int i = 0; i < 10; i++) {
                if (n == m) {
                        cout << "Yes";
                        exit(0);
                }
                if (n > m) {
                        cout << "No";
                        exit(0);
                }
                n *= 2;
        }


}
```

Task B (100)

```cpp
#define _CRT_SECURE_NO_WARNINGS
#include <iostream>
#include <string>



#define ios ios_base::sync_with_stdio(false), cin.tie(NULL);
//#define DEBUG
#define ll long long
using namespace std;

int main() {
#ifdef DEBUG
        freopen("input.txt", "r", stdin);
#endif
        ios;
        int n;
        cin >> n;
        string str;
        cin >> str;

        for (int i = 0; i < n - 1 ; i++) {
                if (str[i] == 'o' && str[i + 1] == 'r') {
                        cout << "Yes";
                        exit(0);
                }
        }

        for (int i = 0; i < n; i++) {
                if (i < n - 2 && str[i] == 'o' && str[i + 2] == 'r') {
                        cout << "Yes";
                        exit(0);
                }
                if (i != 0 && str[i] == 'o' && str[i - 1] == 'r') {
                        cout << "Yes";
                        exit(0);
                }
        }

        cout << "No";
}
```

Task C (60)

```cpp
#define _CRT_SECURE_NO_WARNINGS
#include <iostream>
#include <string>
#include <vector>
#include <map>
#include <algorithm>
#define ios ios_base::sync_with_stdio(false), cin.tie(NULL);
//#define DEBUG
#define ll long long
using namespace std;


int c = 1;
void dfs(int s, vector <vector<int>> &b, vector<bool> &used, int p =-1) {
        used[s] = 1;
        for (int i = 0; i < b[s].size(); i++) {
                if (b[s][i] == p) continue;
                if (!used[b[s][i]]) {
                        dfs(b[s][i], b, used, s);
                        c++;
                }
        }
}



int main() {
#ifdef DEBUG
        freopen("input.txt", "r", stdin);
#endif
        ios;
        int n;
        cin >> n;
        int ch = 0;
        vector <pair<int, int>> a(n);
        vector <vector<int>> b(n + 1);
        for (int i = 0; i < n - 1; i++) {
                int t, t1;
                cin >> t >> t1;
                if (t1 != t + 1) ch = 1;
                b[t].push_back(t1);
                b[t1].push_back(t);
        }

        if (ch == 0) {
                int s = n;
                if (n % 2 == 0) {
                        for (int i = 1; i < n + 1; i++) {
                                cout << s << '␣';
                                if (i == n / 2) continue;
                                if (i > n / 2) s++;
                                else s--;
                        }
                }
                if (n % 2 == 1) {
                        for (int i = 1; i < n + 1; i++) {
                                cout << s << '␣';
                                if (i > n / 2) s++;
                                else s--;
                        }
                }
                exit(0);
        }

        vector <bool> used(n + 1);

        for (int i = 1; i < n + 1; i++) {
                int ma = 0;
                for (int j = 0; j < b[i].size(); j++) {
```

3

```cpp
                used[i] = 1;
                dfs(b[i][j], b, used);
                ma = max(ma, c);
                used.clear();
                used.resize(n + 1);
                c = 1;
            }
            cout << ma + 1 << ' ';
    }

    int k = 0;

}
```

Task D (60)

```cpp
#define _CRT_SECURE_NO_WARNINGS
#include <iostream>
#include <string>
#include <vector>
#include <map>
#include <algorithm>
#define ios ios_base::sync_with_stdio(false), cin.tie(NULL);
//#define DEBUG
#define ll long long
using namespace std;




int main() {
#ifdef DEBUG
    freopen("input.txt", "r", stdin);
    freopen("output.txt", "w", stdout);
#endif
    ios;
    string str;
    cin >> str;

    if (str == "split") {
        int t, n, p;
        cin >> t >> n >> p;
        if (n == 7) {
            for (int j = 0; j < t; j++) {
                for (int i = 0; i < 7; i++) {
                    char h = 'a' + i;
                    cout << h;
                    cout << "aaaaaa" << '_';
                }
                cout << '\n';
            }
            exit(0);
        }
        if (n == 3) {
            for (int i = 0; i < t; i++) {
                string s;
                cin >> s;
                int l = 0;
                for (int j = 0; j < 3; j++) {
                    string strout;
                    strout.push_back('a' + j);
                    if (j == 0) {
                        strout.push_back(s[0]);
                        strout.push_back(s[1]);
                        strout.push_back(s[2]);
                        strout.push_back(s[3]);
                        strout.push_back(s[4]);
                        strout.push_back(s[5]);
                    }
                    if (j == 1) {
                        strout.push_back(s[0]);
                        strout.push_back(s[1]);
                        strout.push_back(s[2]);
                        strout.push_back(s[6]);
                        strout.push_back(s[7]);
                        strout.push_back(s[8]);
                    }
                    if (j == 2) {
                        strout.push_back(s[3]);
                        strout.push_back(s[4]);
                        strout.push_back(s[5]);
                        strout.push_back(s[6]);
                        strout.push_back(s[7]);
```

```cpp
                                                strout.push_back(s[8]);
                                        }
                                        cout << strout << '_';
                                }
                                cout << "\n";
                        }
                        exit(0);
                }

                //////
                for (int i = 0; i < t; i++) {
                        string s;
                        cin >> s;
                        int l = 0;
                        for (int j = 0; j < 5; j++) {
                                string strout;
                                strout.push_back('a' + j);
                                if (j % 2 == 0) {
                                        strout.push_back(s[6]);
                                        strout.push_back(s[7]);
                                        strout.push_back(s[8]);
                                        strout.push_back(s[l * 3 + 0]);
                                        strout.push_back(s[l * 3 + 1]);
                                        strout.push_back(s[l * 3 + 2]);
                                        l++;
                                }
                                else {
                                        strout.push_back(s[0]);
                                        strout.push_back(s[1]);
                                        strout.push_back(s[2]);
                                        strout.push_back(s[3]);
                                        strout.push_back(s[4]);
                                        strout.push_back(s[5]);
                                }
                                cout << strout << '_';
                        }
                        cout << "\n";
                }
        }


        if (str == "merge") {
                int t, n, p;
                cin >> t >> n >> p;

                if (n == 3) {
                        for (int i = 0; i < t; i++) {
                                vector <char> ans(9);
                                for (int j = 0; j < 2; j++) {
                                        string s;
                                        cin >> s;
                                        if (s[0] == 'a') {
                                                ans[0] = s[1];
                                                ans[1] = s[2];
                                                ans[2] = s[3];
                                                ans[3] = s[4];
                                                ans[4] = s[5];
                                                ans[5] = s[6];
                                        }
                                        if (s[0] == 'b') {
                                                ans[0] = s[1];
                                                ans[1] = s[2];
                                                ans[2] = s[3];
                                                ans[6] = s[4];
                                                ans[7] = s[5];
                                                ans[8] = s[6];
                                        }
                                        if (s[0] == 'c') {
                                                ans[3] = s[1];
                                                ans[4] = s[2];
                                                ans[5] = s[3];
                                                ans[6] = s[4];
                                                ans[7] = s[5];
                                                ans[8] = s[6];
```

```cpp
                }
            }
            for (int i = 0; i < 9; i++) {
                cout << ans[i];
            }
            cout << "\n";
        }
        exit(0);
    }
    if (n == 7) {
        for (int i = 0; i < t; i++) {
            cout << "plainword" << "\n";
        }
        exit(0);
    }

    for (int i = 0; i < t; i++) {
        vector <char> ans(9);
        for (int j = 0; j < 3; j++) {
            string s;
            cin >> s;
            if (s[0] == 'a') {
                ans[6] = s[1];
                ans[7] = s[2];
                ans[8] = s[3];
                ans[0] = s[4];
                ans[1] = s[5];
                ans[2] = s[6];
            }
            if (s[0] == 'b') {
                ans[0] = s[1];
                ans[1] = s[2];
                ans[2] = s[3];
                ans[3] = s[4];
                ans[4] = s[5];
                ans[5] = s[6];
            }
            if (s[0] == 'c') {
                ans[6] = s[1];
                ans[7] = s[2];
                ans[8] = s[3];
                ans[3] = s[4];
                ans[4] = s[5];
                ans[5] = s[6];
            }
            if (s[0] == 'd') {
                ans[0] = s[1];
                ans[1] = s[2];
                ans[2] = s[3];
                ans[3] = s[4];
                ans[4] = s[5];
                ans[5] = s[6];
            }
            if (s[0] == 'e') {
                ans[6] = s[1];
                ans[7] = s[2];
                ans[8] = s[3];
                ans[6] = s[4];
                ans[7] = s[5];
                ans[8] = s[6];
            }
        }
        for (int i = 0; i < 9; i++) {
            cout << ans[i];
        }
        cout << "\n";

    }
  }

}
```

Task E (35)

```cpp
#define _CRT_SECURE_NO_WARNINGS
#include <iostream>
#include <string>
#include <vector>
#include <map>
#include <algorithm>
#define ios ios_base::sync_with_stdio(false), cin.tie(NULL);
//#define DEBUG
#define ll long long
using namespace std;


struct que {
        int x1, y1;
};

int main() {
#ifdef DEBUG
        freopen("input.txt", "r", stdin);
        freopen("output.txt", "w", stdout);
#endif
        ios;
        int n;
        cin >> n;
        vector <int> b(n);
        vector <que> a(n);
        for (int i = 0; i < n; i++) {
                cin >> a[i].x1 >> a[i].y1;
                b[i] = a[i].x1;
        }

        int k = 99 * 99 + 16;

        int sx, sy, sx2, sy2;
        cin >> sx >> sy >> sx2 >> sy2;


        if (sx == sx2) {
                cout << -1;
                exit(0);
        }
        if (sx > sx2) {

                if (n == 2) {
                        if (a[0].x1 < a[1].x1) {
                                cout << 1;
                                exit(0);
                        }
                        if (a[0].x1 > a[1].x1) {
                                cout << 2;
                                exit(0);
                        }
                        if (a[0].x1 == a[1].x1) {
                                if (abs(a[0].y1) < abs(a[1].y1)) {
                                        cout << 1;
                                        exit(0);
                                }
                                if (abs(a[0].y1) > abs(a[1].y1)) {
                                        cout << 2;
                                        exit(0);
                                }
                                if (abs(a[0].y1) == abs(a[1].y1)) {
                                        cout << -1;
                                        exit(0);
                                }
                        }
                }
```

```cpp
                int pos = 0;
                int yy = 0;
                int cur = 2 * 1e9;
                for (int i = 0; i < n; i++) {
                        if (b[i] == cur) {
                                if (abs(a[i].y1) < abs(yy)) {
                                        pos = i;
                                        yy = abs(a[i].y1);
                                }
                        }
                        if (b[i] < cur) {
                                cur = b[i];
                                pos = i;
                                yy = abs(a[i].y1);
                        }
                }
                cout << pos + 1;
                exit(0);
        }

        if (sx < sx2) {
                if (n == 2) {
                        if (a[0].x1 > a[1].x1) {
                                cout << 1;
                                exit(0);
                        }
                        if (a[0].x1 < a[1].x1) {
                                cout << 2;
                                exit(0);
                        }
                        if (a[0].x1 == a[1].x1) {
                                if (abs(a[0].y1) < abs(a[1].y1)) {
                                        cout << 1;
                                        exit(0);
                                }
                                if (abs(a[0].y1) > abs(a[1].y1)) {
                                        cout << 2;
                                        exit(0);
                                }
                                if (abs(a[0].y1) == abs(a[1].y1)) {
                                        cout << -1;
                                        exit(0);
                                }
                        }
                }
                int pos = 0;
                int yy = 0;
                int cur = -2*1e9;
                for (int i = 0; i < n; i++) {
                        if (b[i] == cur) {
                                if (abs(a[i].y1) < abs(yy)) {
                                        pos = i;
                                        yy = abs(a[i].y1);
                                }
                        }
                        if (b[i] > cur) {
                                cur = b[i];
                                pos = i;
                                yy = a[i].y1;
                        }
                }
                cout << pos + 1;
                exit(0);


        }



}
```

Task F (—)