Олимпиада СПбГУ по информатике 2018/19 учебного года

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A	B	C	D	E	F	Sum
100	100	100	60	21	0	381

Task A (100)

```cpp
#include<iostream>
#include<iomanip>
#include<stack>
#include<set>
#include<string>
#include<map>
#include<cmath>
#include<algorithm>
#include<deque>
#include<vector>
#include<queue>

using namespace std;
typedef long long ll;
const double PI = acos(-1.0);

int main() {
	int n, m;
	cin >> n >> m;
	while (m > n) {
		if (m % 2 != 0) {
			cout << "NO";
			system("pause>null");
			return 0;
		}
		m /= 2;
	}
	if (m == n) {
		cout << "YES";
	} else {
		cout << "NO";
	}

	system("pause>null");
	return 0;
}
```

Task B (100)

```cpp
#include<iostream>
#include<iomanip>
#include<stack>
#include<set>
#include<string>
#include<map>
#include<cmath>
#include<algorithm>
#include<deque>
#include<vector>
#include<queue>

using namespace std;
typedef long long ll;
const double PI = acos(-1.0);

int main() {
	int n;
	cin >> n;
	string st;
	cin >> st;
	for (int i = 0; i < n; i++) {
		if (st[i] == 'o') {
			if (i > 0) {
				if (st[i - 1] == 'r') {
					cout << "YES";
					system("pause>null");
					return 0;
				}
			}
			if (i < n - 1) {
				if (st[i + 1] == 'r') {
					cout << "YES";
					system("pause>null");
					return 0;
				}
			}
			if (i < n - 2) {
				if (st[i + 2] == 'r') {
					cout << "YES";
					system("pause>null");
					return 0;
				}
			}
		}
	}

	cout << "NO";
	system("pause>null");
	return 0;
}
```

Task C (100)

```cpp
#include<iostream>
#include<iomanip>
#include<stack>
#include<set>
#include<string>
#include<map>
#include<cmath>
#include<algorithm>
#include<deque>
#include<vector>
#include<queue>
#include<cstdlib>

using namespace std;
typedef long long ll;
const double PI = acos(-1.0);

int main() {
	int n;
	cin >> n;
	vector<set<int> > mn(n);
	vector<int> vt(n);

	for (int i = 0; i < n - 1; i++) {
		int a, b;
		cin >> a >> b;
		a--;
		b--;
		vt[a]++;
		vt[b]++;
		mn[a].insert(b);
		mn[b].insert(a);
	}

	stack<int> st;
	vector<int> pr(n, 1);
	for (int i = 0; i < n; i++) {
		if (vt[i] == 1) {
			st.push(i);
		}
	}
	vector<int> mx(n, 0);
	while (!st.empty()) {
		int q = st.top();
		st.pop();
		for (auto it = mn[q].begin(); it != mn[q].end(); it++) {
			if (vt[*it] > 1) {
				pr[*it] += pr[q];
				vt[*it]--;
				mx[*it] = max(mx[*it], pr[q]);
				if (vt[*it] == 1) {
					st.push(*it);
				}
			}
		}
		mx[q] = max(mx[q], n - pr[q]);
	}

	for (int i = 0; i < n; i++) {
		cout << mx[i] + 1 << ' ';
	}
	system("pause>null");
	return 0;
}
```

Task D (60)

```
#include<iostream>
#include<iomanip>
#include<stack>
#include<set>
#include<string>
#include<map>
#include<cmath>
#include<algorithm>
#include<deque>
#include<vector>
#include<queue>
#include<cstdlib>

using namespace std;
typedef long long ll;
const double PI = acos(-1.0);


int main() {
	string rt = "";
	string st;
	cin >> st;
	int t, n, p;
	cin >> t >> n >> p;
	int z = (n + 1) / 2;
	for (int iz = 0; iz < t; iz++) {
		if (st[0] == 's') {
			string s;
			cin >> s;
			if (n == 3) {
				rt += 'a' + s.substr(0, 6) + '␣' + 'b' + s.substr(0, 3) + s.substr
				    (6, 3) + '␣' + 'c' + s.substr(3, 3) + s.substr(6, 3) + '\n';
			}
			if (n == 5) {
				rt += 'a' + s.substr(0, 6) + '␣' + 'b' + s.substr(0, 3) + s.substr
				    (6, 3) + '␣' + 'c' + s.substr(3, 3) + s.substr(6, 3) + '␣';
				rt += 'd' + s.substr(0, 3) + s.substr(6, 3) + '␣' + 'e' + s.substr
				    (3, 3) + s.substr(6, 3) + '\n';
			}
		}
		else {
			vector<string> em(n, "");
			vector<string> mas(z);
			for (int i = 0; i < z; i++) {
				cin >> mas[i];
				em[(int)(mas[i][0] - 'a')] = mas[i].substr(1, p - 1);
			}
			if (n == 3) {
				if (em[0] != "") {
					rt += em[0];
					if (em[1] != "") {
						rt += em[1].substr(3, 3);
					}
					else {
						rt += em[2].substr(3, 3);
					}
				}
				else {
					rt += em[1].substr(0, 3);
					rt += em[2].substr(0, 6);
				}
				rt += '\n';
			}
			if (n == 5) {
				if (em[1] == "") em[1] = em[3];
				if (em[2] == "") em[2] = em[4];
				if (em[0] != "") {
					rt += em[0];
					if (em[1] != "") {
```

```
                                        rt += em[1].substr(3, 3);
                                }
                                else {
                                        rt += em[2].substr(3, 3);
                                }
                        }
                        else {
                                rt += em[1].substr(0, 3);
                                rt += em[2].substr(0, 6);
                        }
                        rt += '\n';
                }
        }
    }
    cout << rt;
    system("pause>null");
    return 0;
}
```

Task E (21)

```
#include<iostream>
#include<iomanip>
#include<stack>
#include<set>
#include<string>
#include<map>
#include<cmath>
#include<algorithm>
#include<deque>
#include<vector>
#include<queue>
#include<cstdlib>

using namespace std;
typedef long long ll;
typedef unsigned long long ld;
const double PI = acos(-1.0);
const long long M = 1e+9;

int main() {
        int n;
        cin >> n;
        vector <pair < ll , ll > > st(n);
        for (int i = 0; i < n; i++) {
                ll a, b;
                cin >> a >> b;
                st[i] = make_pair(a, b);
        }
        ll p1, p2, q1, q2;
        cin >> p1 >> p2 >> q1 >> q2;
        for (int i = 0; i < n; i++) {
                st[i].first -= p1;
                st[i].second -= p2;
        }
        q1 -= p1;
        q2 -= p2;
        p1 = 0;
        p2 = 0;
        ll e1 = q1 - p1;
        ll e2 = q2 - p2;
        ll w1, w2;
        ll t;
        if (e1 == 0) {
                t = abs(M / e2);
        }
        else if (e2 == 0) {
                t = abs(M / e1);
        }
        else {
                ll t1 = abs(M / e1);
                ll t2 = abs(M / e2);
                t = min(t1, t2);
        }
        w1 = p1 + e1 * t;
        w2 = p2 + e2 * t;
        ld mn = (ld)((w1 - st[0].first) * (w1 - st[0].first)) + (ld)((w2 - st[0].second) * (w2 -
            st[0].second));
        for (int i = 1; i < n; i++) {
                mn = min(mn, (ld)((w1 - st[i].first) * (w1 - st[i].first)) + (ld)((w2 - st[i].
                    second) * (w2 - st[i].second)));
        }
        int ans = 0;
        for (int i = 0; i < n; i++) {
                if (mn == (ld)((w1 - st[i].first) * (w1 - st[i].first)) + (ld)((w2 - st[i].second)
                    * (w2 - st[i].second))) {
                        if (ans == 0) {
                                ans = i + 1;
                        } else {
                                cout << -1;
```

```
                                system("pause>null");
                                return 0;
                        }
                }
        }
        cout << ans;

        system("pause>null");
        return 0;
}
```

Task F (—)