Олимпиада СПбГУ по информатике 2018/19 учебного года

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A	B	C	D	E	F	Sum
100	100	100	60	35	0	395

Task A (100)

```cpp
//#include "stdafx.h"
#include <iostream>
#include <vector>
#include <string>
#include <map>
#include <set>
#include <list>
#include <algorithm>
#define ll long long
#define pb push_back
#define eb emplace_back
#define all(v) v.begin(), v.end()
#define rep(i, n) for(int i = 0;i < n; i++)

using namespace std;

int main(){
        ios::sync_with_stdio(0); cin.tie(0); cout.tie(0);
        int n, m;
        cin >> n >> m;
        while (m % 2 == 0){
                if (n == m){
                        cout << "Yes";
                        return 0;
                }
                m /= 2;
        }
        if (n == m){
                cout << "Yes";
                return 0;
        }
        cout << "No";
}
```

Task B (100)

```cpp
//#include "stdafx.h"
#include <iostream>
#include <vector>
#include <string>
#include <map>
#include <set>
#include <list>
#include <algorithm>
#define ll long long
#define pb push_back
#define eb emplace_back
#define all(v) v.begin(), v.end()
#define rep(i, n) for(int i = 0;i < n; i++)

using namespace std;

int main(){
        ios::sync_with_stdio(0); cin.tie(0); cout.tie(0);
        int n;
        cin >> n;
        string s;
        cin >> s;
        rep(i, n-1){
                if (s[i] == 'o' && s[i + 1] == 'r'){
                        cout << "Yes";
                        return 0;
                }
                if (s[i] == 'r' && s[i + 1] == 'o'){
                        cout << "Yes";
                        return 0;
                }
        }
        rep(i, n - 2){
                if (s[i] == 'o' && s[i + 2] == 'r'){
                        cout << "Yes";
                        return 0;
                }
        }
        cout << "No";
}
```

Task C (100)

```cpp
//#include "stdafx.h"
#include <iostream>
#include <vector>
#include <string>
#include <map>
#include <set>
#include <list>
#include <algorithm>
#define ll long long
#define pb push_back
#define eb emplace_back
#define all(v) v.begin(), v.end()
#define rep(i, n) for(int i = 0;i < n; i++)

using namespace std;

int n;
vector<int> a[100005];
bool used[100005];
vector<pair<int, int>> nado[100005];
int res[100005];

int dfs(int v){
        used[v] = true;
        int sum = 1;
        for (int i = 0; i < a[v].size(); i++){
                int x = a[v][i];
                if (!used[x]){
                        int u = dfs(x);
                        nado[v].eb(x, u);
                        nado[x].eb(v, n - u);
                        sum += u;
                }
        }
        return sum;
}

int main(){
        ios::sync_with_stdio(0); cin.tie(0); cout.tie(0);
        cin >> n;
        rep(i, n - 1){
                int x, y;
                cin >> x >> y;
                x--; y--;
                a[x].pb(y);
                a[y].pb(x);
        }
        fill(used, used + 100005, false);
        dfs(0);
        rep(i, n){
                int mx = 0;
                for (auto x : nado[i]){
                        mx = max(mx, x.second);
                }
                cout << (mx + 1) << "_";
        }
}
```

Task D (60)

```cpp
//#include "stdafx.h"
#include <iostream>
#include <vector>
#include <string>
#include <map>
#include <set>
#include <list>
#include <algorithm>
#define ll long long
#define pb push_back
#define sd(i,j) substr(i,j)
#define eb emplace_back
#define all(v) v.begin(), v.end()
#define rep(i, n) for(int i = 0;i < n; i++)

using namespace std;


void split(){
        string s, a, b, c, d, e;
        int t, n, p;
        cin >> t >> n >> p;
        if (n == 3){
                rep(w, t){
                        cin >> s;
                        cout << 'x' << s.substr(0, 6) << "_y" << s.substr(3, 6) << "_z" << s.
                            substr(0, 3) << s.substr(6, 3) << '\n';
                }
        }
        else{
                rep(w, t){
                        cin >> s;
                        s += 'z';
                        a = 'a' + s.sd(0, 6);
                        b = 'b' + s.sd(2, 6);
                        c = 'c' + s.sd(4, 6);
                        d = 'd' + s.sd(6, 4) + s.sd(0, 2);
                        e = 'e' + s.sd(8,2) + s.sd(0, 4);
                        cout << a << "_" << b << "_" << c << "_" << d << "_" << e << '\n';
                }
        }
}

void merge(){
        string s, a, b, c;
        int t, n, p;
        cin >> t >> n >> p;
        if (n == 3){
                rep(w, t){
                        cin >> a >> b;
                        if (a[0] == 'x'){
                                s = a.substr(1, 6) + b.substr(4, 3);
                        }
                        else if (a[0] == 'y'){
                                s = b.substr(1, 3) + a.substr(1, 6);
                        }
                        else{
                                if (b[0] == 'x'){
                                        s = b.substr(1, 6) + a.substr(4, 3);
                                }
                                else{
                                        s = a.substr(1, 3) + b.substr(1, 6);
                                }
                        }
                        cout << s << '\n';
                }
        }
        else{
                rep(w, t){
```

```cpp
cin >> a >> b >> c;
if (a[0] > b[0])
        swap(a, b);
if (a[0] > c[0])
        swap(a, c);
if (b[0] > c[0])
        swap(b, c);
if (a[0] > b[0])
        swap(a, b);
if (a[0] > c[0])
        swap(a, c);
if (b[0] > c[0])
        swap(b, c);
if (a[0] > b[0])
        swap(a, b);
if (a[0] > c[0])
        swap(a, c);
if (b[0] > c[0])
        swap(b, c);
// a < b < c
if (a[0] == 'a'){
        s = a.substr(1, 6);
        if (b[0] == 'b'){
                s += b.substr(5, 2);
                if (c[0] == 'c'){
                        s += c[5];
                }
                else if (c[0] == 'd'){
                        s += c[3];
                }
                else if (c[0] == 'e'){
                        s += c[1];
                }
        }
        else if (b[0] == 'c'){
                s += b.substr(3, 3);
        }
        else if (b[0] == 'd'){
                s += b.substr(1, 3);
        }
        else if (b[0] == 'e'){
                exit(2);
                if (c[0] == 'b'){
                        s += c.sd(5, 2);
                        s += b[1];
                }
                else if (c[0] == 'c'){
                        s += c.sd(3, 3);
                }
                else if (c[0] == 'd'){
                        s += c.sd(1, 3);
                }
        }
}
else if (a[0] == 'b'){
        if (b[0] == 'c'){
                if (c[0] == 'd'){
                        s = c.sd(5, 2) + a.substr(1, 6) + b[5];
                }
                else if (c[0] == 'e'){
                        if (c[0] == 'e')
                                s = c.sd(3, 4) + b.sd(1, 5);
                }
        }
        else if (b[0] == 'd'){
                if (c[0] == 'e')
                        s = c.sd(3, 4) + a.sd(3, 4) + b[3];
                else
                        exit(2);
        }
}
else{
        if (a[0] == 'c' && b[0] == 'd' && c[0] == 'e')
                s = c.sd(3, 4) + a.sd(1, 5);
```

```cpp
                            else
                                    exit(2);
                    }
                    cout << s << '\n';
                }
        }
}


int main(){
        ios::sync_with_stdio(0); cin.tie(0); cout.tie(0);
        string s;
        cin >> s;
        if (s == "split")
                split();
        else
                merge();
}
```

Task E (35)

```cpp
//#include "stdafx.h"
#include <iostream>
#include <vector>
#include <string>
#include <map>
#include <set>
#include <list>
#include <algorithm>
#include <cmath>
#define ll long long
#define pb push_back
#define sd(i,j) substr(i,j)
#define eb emplace_back
#define all(v) v.begin(), v.end()
#define rep(i, n) for(int i = 0;i < n; i++)

using namespace std;

int main(){
        #define int long long
        ios::sync_with_stdio(0); cin.tie(0); cout.tie(0);
        int n, x1, y1, x2, y2;
        vector<pair<int, int>> a;
        cin >> n;
        int inf = 1000000;
        int mx = -INT_MAX, ind, my = INT_MAX;
        bool f = true;
        rep(i, n){
                int x, y;
                cin >> x >> y;
                if (!(x <= 100 && x >= 0 && y <= 100 && y >= 0)){
                        f = false;
                }
                a.eb(x, y);
        }
        cin >> x1 >> y1 >> x2 >> y2;
        if (x1 == 0 && y2 == 0 && y1 == 0 && x2 <= 100 && x2 >= 0){
                f = false;
        }
        if (f){
                int tx, ty, tx1, ty1;
                tx = -inf;
                ty = y1 + (tx - x1)*(y2 - y1) / (x2 - x1);
                double dist = sqrt((x1 - tx)*(x1 - tx) + (y1 - ty)*(y1 - ty));
                ty1 = inf;
                tx1 = x1 + (ty - y1)*(x2 - x1) / (y2 - y1);
                double dist1 = sqrt((x1 - tx1)*(x1 - tx1) + (y1 - ty1)*(y1 - ty1));
                if (dist1 < dist){
                        tx = tx1;
                        ty = ty1;
                }
                int count = 0;
                double d = -1;
                rep(i, n){
                        int x = a[i].first;
                        int y = a[i].second;
                        double dist = sqrt((x - tx)*(x - tx) + (y - ty)*(y - ty));
                        if (dist < d || d == -1){
                                d = dist;
                                ind = i;
                                count = 0;
                        }
                        else if ((dist - d) < 2){
                                count++;
                        }
                }
                if (count > 0){
                        cout << -1;
                        return 0;
```

```cpp
		}
		cout << (ind + 1);
		return 0;
	}
	int count = 0;
	rep(i, n){
		int x = a[i].first;
		int y = a[i].second;
		if (x > mx){
			mx = x;
			my = abs(y);
			ind = i;
		}
		else if (x == mx){
			if (abs(y) < my){
				mx = x;
				ind = i;
				my = abs(y);
			}
		}
	}
	rep(i, n){
		int x = a[i].first;
		int y = a[i].second;
		if (y == 0)
			break;
		if (x == mx){
			if (abs(y) == my)
				count++;
		}
	}
	if (count > 1){
		cout << -1;
		return 0;
	}
	cout << (ind + 1);
}
```

Task F (—)