

Олимпиада СПбГУ по информатике 2018/19 учебного года

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A	B	C	D	E	F	Sum
100	100	100	60	100	0	460

Task A (100)

```
#include <bits/stdc++.h>

using namespace std;

using ll = long long;
using ld = double;

template<typename T>void mi(T &a, T b){a = min(a, b);}
template<typename T>void ma(T &a, T b){a = max(a, b);}

#define all(x) (x).begin(), (x).end()

void drop(char const *str){
    printf("%s", str);
    exit(0);
}

ll gcd(ll a, ll b){
    if(b == 0) return a;
    return gcd(b, a % b);
}

ld const eps = 0.000000001L;
ld const pi = acos(-1.L);

int const mod = (int)1e9+7;

/*

*/

int main(){

    int n, m;
    cin >> n >> m;

    while(m){
        if(m == n) drop("Yes");
        if(m & 1) break;
        m/=2;
    }
    drop("No");

    return 0;
}
```

Task B (100)

```
#include <bits/stdc++.h>

using namespace std;

using ll = long long;
using ld = double;

template<typename T>void mi(T &a, T b){a = min(a, b);}
template<typename T>void ma(T &a, T b){a = max(a, b);}

#define all(x) (x).begin(), (x).end()

void drop(char const *str){
    printf("%s", str);
    exit(0);
}

ll gcd(ll a, ll b){
    if(b == 0) return a;
    return gcd(b, a % b);
}

ld const eps = 0.000000001L;
ld const pi = acos(-1.L);

int const mod = (int)1e9+7;

/*

*/

int main(){
    int n;
    cin >> n;
    string str;
    cin >> str;
    for(int i = 0 ; i < n-1 ; i++){
        if(str[i] == 'o' && str[i+1] == 'r' || str[i] == 'r' && str[i+1] == 'o' ){
            cout << "Yes";
            return 0;
        }
    }
    for(int i = 0; i < n-2; i++){
        if(str[i] == 'o' && str[i+2] == 'r'){
            cout << "Yes";
            return 0;
        }
    }
    cout << "No";
    return 0;
}
```

Task C (100)

```
#include <bits/stdc++.h>

using namespace std;

using ll = long long;
using ld = double;

template<typename T>void mi(T &a, T b){a = min(a, b);}
template<typename T>void ma(T &a, T b){a = max(a, b);}

#define all(x) (x).begin(), (x).end()
#define pb push_back
#define len(x) (int)(x).size()

void drop(char const *str){
    printf("%s", str);
    exit(0);
}

ll gcd(ll a, ll b){
    if(b == 0) return a;
    return gcd(b, a % b);
}

ld const eps = 0.000000001L;
ld const pi = acos(-1.L);

int const mod = (int)1e9+7;

/*
5
1 2
2 3
2 4
1 5
*/

int n;
vector<int> g[100005];
int sz[100005];
int res[100005];
int used[100005];

int predfs(int ind){
    int cu = 1;
    used[ind] = 1;
    for(auto &i: g[ind]){
        if(!used[i]){
            cu += predfs(i);
        }
    }
    return sz[ind] = cu;
}

void dfs(int ind, int prev){
    used[ind] = 1;

    int prevval;
    int cuval;
    if(len(g[ind]) == 1) res[ind] = n;
    if(prev == -1){
        if(len(g[ind]) != 1){
            int mx = -1;
            for(auto &i: g[ind]) ma(mx, sz[i]);
            res[ind] = mx + 1;
        }
    }
}
```

```

    }
    else{
prevval = sz[prev];
    cuval = sz[ind];
    sz[prev] -= sz[ind];
    sz[ind] = n;

    if(len(g[ind]) != 1){
        int mx = -1;
        for(auto &i: g[ind])ma(mx, sz[i]);
        res[ind] = mx + 1;
    }

}
for(auto &x: g[ind]){
    if(!used[x]){
        dfs(x, ind);
    }
}

sz[prev] = prevval;
sz[ind] = cuval;
}

int main(){

scanf("%d", &n);
if(n == 1)return !printf("1");

for(int i = 0 ; i < n -1; i++){
    int a, b;
    scanf("%d_%d", &a, &b);
    a--;
    b--;
    g[a].pb(b);
    g[b].pb(a);
}

predfs(0);
for(auto &x: used)x = 0;
dfs(0, -1);
for(int i=0 ; i < n; i++)printf("%d_", res[i]);

return 0;
}

```

Task D (60)

```
#include <bits/stdc++.h>

using namespace std;

using ll = long long;
using ld = long double;

template<typename T>void mi(T &a, T b){a = min(a, b);}
template<typename T>void ma(T &a, T b){a = max(a, b);}

#define x1 fasdfsalkf
#define y1 fasdfsalkf4324
#define x2 fasdfsalkfsfas
#define y2 fasdfsalkft423423

#define all(x) (x).begin(), (x).end()
#define pb push_back
#define len(x) (int)(x).size()

void drop(char const *str){
    printf("%s", str);
    exit(0);
}

ll gcd(ll a, ll b){
    if(b == 0) return a;
    return gcd(b, a % b);
}

ld const eps = 0.000001L;
ld const pi = acos(-1.L);

int t, n, p;

void sol(){
    string mode;
    cin >> mode;
    if(mode == "split"){
        cin >> t >> n>>p;
        if(n == 3){
            for(int q = 0; q < t; q++){
                string str;
                cin >> str;
                cout << str[0] << 'a';
                for(int i = 1; i < 6; i++)cout << str[i];
                cout << "_";
                cout << str[3] << 'b';
                for(int i = 4; i < 9; i++)cout << str[i];
                cout << "_";
                cout << str[0] << 'c' << str[1] << str[2] << str[6] << str[7] << str[8];
                cout << endl;
            }
        }
        else{
            for(int q = 0; q < t; q++){
                string str;
                cin >> str;
                cout << 'a';
                for(int i = 0; i < 6; i++)cout << str[i];
                cout << "_";

                cout << 'a';
                for(int i = 0; i < 6; i++)cout << str[i];
                cout << "_";

                cout << 'b';
                for(int i = 0; i < 3; i++)cout << str[i];
                for(int i = 6; i < 9; i++)cout << str[i];
                cout << "_";
            }
        }
    }
}
```

```

        cout << 'b';
        for(int i = 0 ; i < 3; i++)cout << str[i];
        for(int i = 6; i < 9; i++)cout << str[i];
        cout << "\n";

        cout << 'c';
        for(int i = 3; i < 9; i++)cout << str[i];
        cout << endl;
    }
}
else{
    cin >> t >> n >> p;
    if(n == 3){
        for(int q = 0 ; q < t; q++){
            string a, b;
            cin >> a >> b;
            if(a[1] > b[1])swap(a,b);

            if(a[1] == 'a'){
                cout << a[0];
                for(int i = 2; i < 7; i++)cout << a[i];
                for(int i = 4; i < 7; i++)cout << b[i];
            }
            if(a[1] == 'b' && b[1] == 'c'){
                cout << b[0] << b[2] << b[3] << a[0];
                for(int i = 2; i < 7; i++)cout << a[i];
            }
            cout << endl;
        }
    }
    else{
        for(int q = 0 ; q < t; q++){
            string arr[3];
            for(int j = 0 ; j < 3; j++)cin >> arr[j];
            sort(arr, arr + 3, [&](string l, string r){return l[0] < r[0];});
            if(arr[0][0] == 'a'){
                for(int i = 1; i < 7; i++)cout << arr[0][i];
                for(int j = 4; j < 7; j++)cout << arr[2][j];
            }
            if(arr[0][0] == 'b'){
                for(int i = 1; i < 4; i++)cout << arr[0][i];
                for(int i = 1; i < 7; i++)cout << arr[2][i];
            }
            cout << endl;
        }
    }
}
}

int main(){
    //freopen("output.txt", "w", stdout);
    sol();

    return 0;
}

```

Task E (100)

```
#include <bits/stdc++.h>

using namespace std;

using ll = long long;
using ld = long double;

template<typename T>void mi(T &a, T b){a = min(a, b);}
template<typename T>void ma(T &a, T b){a = max(a, b);}

#define x1 fasdfsalkf
#define y1 fasdfsalkf4324
#define x2 fasdfsalkfsfas
#define y2 fasdfsalkft423423

#define all(x) (x).begin(), (x).end()
#define pb push_back
#define len(x) (int)(x).size()

void drop(char const *str){
    printf("%s", str);
    exit(0);
}

ll gcd(ll a, ll b){
    if(b == 0) return a;
    return gcd(b, a % b);
}

ld const eps = 0.00001L;
ld const pi = acos(-1.L);

int const mod = (int)1e9+7;

int n;
pair<ll, ll> p[100005];

ll x1, y1, x2, y2;

ll kek[100005];

ll di(ll a, ll b, ll c, ll d){
    return (c - a)*(c-a) + (b-d)*(b-d);
}

int main(){
    scanf("%d", &n);
    for(int i = 0; i < n; i++){
        scanf("%lld_%lld", &p[i].first, &p[i].second);
    }
    scanf("%lld_%lld_%lld_%lld", &x1, &y1, &x2, &y2);

    for(int i = 0; i < n; i++){
        kek[i] = (x2-x1)*(p[i].first - x1) + (y2-y1)*(p[i].second - y1);
        // printf("%lld\n", kek[i]);
    }

    ll mx = LLONG_MIN;

    for(int i = 0; i < n; i++) ma(mx, kek[i]);

    vector<int> cond;
    for(int i = 0; i < n; i++) if(kek[i] == mx) cond.pb(i);

    mx = LLONG_MAX;

    for(auto &ind: cond){
        mi(mx, di(x1, y1, p[ind].first, p[ind].second));
    }
}
```

```

}

int last = -1;

for(auto &ind: cond){
    if(mx == di(x1,y1,p[ind].first , p[ind].second)){
        if(last == -1)last = ind + 1;
        else {
            last = -1;
            break;
        }
    }
}
printf("%d", last);

return 0;
}

```


Task F (—)