

Олимпиада СПбГУ по информатике 2018/19 учебного года

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A	B	C	D	E	F	Sum
100	100	100	30	0	24	354

Task A (100)

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

using namespace std;

int n,m;

int main(){
    cin >> n >> m;
    while(n < m){
        n *= 2;
    }
    if(n == m) cout << "Yes";
    else cout << "No";
}
```

Task B (100)

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

using namespace std;

int n;
string s;

int main(){
    cin >> n;
    cin >> s;
    bool b = 0;
    for(int i = 0; i < n-1; i++){
        if(s[i] == 'o' && s[i+1] == 'r') b = 1;
        if(s[i] == 'r' && s[i+1] == 'o') b = 1;
        if(i < n-2 && s[i] == 'o' && s[i+2] == 'r') b = 1;
    }
    if(b) cout << "Yes";
    else cout << "No";
}
```

Task C (100)

```
#include <bits/stdc++.h>
using namespace std;

int N = 1e5+7;

map<pair<int,int> ,int> dp;
int n;
vector<int> path[100007];

void DFS(int x,int p){
    int s = 0;
    for(int i : path[x]){
        if(i == p) continue;
        if(dp[{x,i}] == 0) DFS(i,x);
        s += dp[{x,i}];
    }
    for(int i : path[x]){
        if(i == p) continue;
        dp[{i,x}] = s - dp[{x,i}]+1;
    }
    dp[{p,x}] = s+1;
}

int main(){
    cin >> n;
    for(int i = 0; i < n-1; i++){
        int a,b;
        cin >> a >> b;
        a--;b--;
        path[a].push_back(b);
        path[b].push_back(a);
    }
    for(int i = 0; i < n; i++){
        DFS(i,i);
        int m = 0;
        for(int j : path[i])
            m = max(m,dp[{i,j}]);
        cout << m+1 << ' ';
    }
}
```

Task D (30)

```
#include <bits/stdc++.h>
using namespace std;

int N = 1e5+7;

int main(){
    string s;
    cin >> s;
    if(s == "split"){
        int t,n,p;
        cin >> t >> n >> p;
        if(n == 3){
            while(t--){
                cin >> s;
                cout << 'o';
                for(int i = 0; i < 6; i++) cout << s[i];
                cout << "\n";
                cout << 't' << s[0] << s[1] << s[2] << s[6] << s[7] << s[8];
                cout << '\n';
                cout << 'r';
                for(int i = 3; i < 9; i++) cout << s[i];
                cout << endl;
            }
        }
    } else {
        int t,n,p;
        cin >> t >> n >> p;
        if(n == 3){
            while(t--){
                string a,b;
                cin >> a >> b;
                string ans = "aaaaaaaa";
                s = a;
                if(s[0] == 'o'){
                    for(int i = 0; i < 6; i++) ans[i] = s[i+1];
                } else if(s[0] == 'r'){
                    for(int i = 3; i < 9; i++) ans[i] = s[i-2];
                } else {
                    ans[0] = s[1];
                    ans[1] = s[2];
                    ans[2] = s[3];
                    ans[6] = s[4];
                    ans[7] = s[5];
                    ans[8] = s[6];
                }
                s = b;
                if(s[0] == 'o'){
                    for(int i = 0; i < 6; i++) ans[i] = s[i+1];
                } else if(s[0] == 'r'){
                    for(int i = 3; i < 9; i++) ans[i] = s[i-2];
                } else {
                    ans[0] = s[1];
                    ans[1] = s[2];
                    ans[2] = s[3];
                    ans[6] = s[4];
                    ans[7] = s[5];
                    ans[8] = s[6];
                }
                cout << ans << endl;
            }
        }
    }
}
```

Task E (0)

```
#include <bits/stdc++.h>
using namespace std;

int main(){
    int n;
    long long INF = 1e9;
    long long x1,y1,x2,y2;
    long long x,y;
    cin >> n >> x1 >> y1 >> x2 >> y2;
    long long xx1,xx2,yy1,yy2;
    cin >> xx1 >> yy1 >> xx2 >> yy2;
    if((xx1-INF)*(xx1-INF)+yy1*yy1 > (xx2-INF)*(xx2-INF)+yy2*yy2) cout << 2;
    else if((xx1-INF)*(xx1-INF)+yy1*yy1 < (xx2-INF)*(xx2-INF)+yy2*yy2) cout << 1;
    else cout << -1;
}
```

Task F (24)

```
#include <bits/stdc++.h>
using namespace std;

int n,k;
int mas[40][2];

int dp[40][1000][1000];

int used[40][1000][1000];

int rec(int d,int r,int b){
    if(d == n) return 0;
    if(!used[d][r][b]){
        used[d][r][b] = 1;
        int rr = r+k;
        int nr = max(0,rr-mas[d][0]);
        int nb = max(0,b-mas[d][1]);
        int m = rec(d+1,nr,nb)+b-nb+rr-nr;

        int bb = b+k;
        nr = max(0,r-mas[d][0]);
        nb = max(0,bb-mas[d][1]);
        m = max(m,rec(d+1,nr,nb)+bb-nb+r-nr);
        dp[d][r][b] = m;
    }
    return dp[d][r][b];
}

int main(){
    cin >> n >> k;
    for(int i = 0; i < n; i++) cin >> mas[i][0] >> mas[i][1];
    cout << rec(0,0,0);
}
```