Олимпиада СПбГУ по информатике 2018/19 учебного года

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A	B	C	D	E	F	Sum
100	100	60	0	0	100	360

Task A (100)

```cpp
#include <bits/stdc++.h>
#define bst ios_base::sync_with_stdio(0); cin.tie(0); cout.tie(0);
#define ll long long
#define ld long double
#define pb push_back
#define ins insert
#define f first
#define s second
#define endl '\n'

using namespace std;

ll n, m, i, j, a, b, x, y, k;

int main() { bst
    cin >> a >> b;
    while (a < b) {
        a *= 2;
        if (a == b) {
            return cout << "Yes", 0;
        } else if (a > b) {
            break;
        }
    }
    if (a == b) {
        return cout << "Yes", 0;
    }
    cout << "No";
    return 0;
}
```

Task B (100)

```cpp
#include <bits/stdc++.h>
#define bst ios_base::sync_with_stdio(0); cin.tie(0); cout.tie(0);
#define ll long long
#define ld long double
#define pb push_back
#define ins insert
#define f first
#define s second
#define endl '\n'

using namespace std;

ll n, m, i, j, a, b, x, y, k;
string s;
bool otv;

int main() { bst
    cin >> n;
    cin >> s;
    for (i = 0; i < s.size() - 1; i++) {
        if ((s[i] == 'o' && s[i + 1] == 'r') || (s[i] == 'r' && s[i + 1] == 'o')) {
            otv = true;
        }
        if (s[i] == 'o' && i + 2 < s.size() && s[i + 2] == 'r') {
            otv = true;
        }
    }
    (otv) ? cout << "Yes" : cout << "No";
    return 0;

}
```

Task C (60)

```cpp
#include <iostream>
#include <vector>
#include <map>
#define bst ios_base::sync_with_stdio(0); cin.tie(0); cout.tie(0);
#define ll long long
#define ld long double
#define pb push_back
#define ins insert
#define f first
#define s second
#define mp make_pair
#define endl '\n'

using namespace std;

ll n, m, k, i, j, x, y, cnt, otv;
vector<vector<ll> > g;
map<pair<ll, ll>, ll> h;
bool opa = true;

inline void dfs(ll v, ll fr) {
    cnt++;
    for (ll r = 0; r < g[v].size(); r++) {
        if (g[v][r] != fr) {
            ll pe = h[mp(v, g[v][r])];
            if (pe != 0) {
                cnt += pe;
                continue;
            }
            dfs(g[v][r], v);
        }
    }
}

int main() { bst
    cin >> n;
    g.resize(n + 10);
    for (i = 0; i < n - 1; i++) {
        cin >> x >> y;
        if (x + 1 != y) {
            opa = false;
        }
        g[x].pb(y);
        g[y].pb(x);
    }
    if (opa) {
        for (i = 1; i <= n; i++) {
            cout << max(i - 1, n - i) + 1 << " ";
        }
        return 0;
    }
    for (i = 1; i <= n; i++) {
        otv = 0;
        if (g[i].size() == 1) {
            cout << n << " ";
            continue;
        }
        for (j = 0; j < g[i].size(); j++) {
            cnt = 0;
            ll po = h[mp(i, g[i][j])];
            if (po != 0) {
                cnt = po;
            } else {
                dfs(g[i][j], i);
                h[{i, g[i][j]}] = cnt;
            }
            otv = max(otv, cnt);
        }
        cout << otv + 1 << " ";
```

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```
    }
    return 0;
}
```

Task D (—)

Task E (—)

Task F (100)

```cpp
#include <bits/stdc++.h>
#define bst ios_base::sync_with_stdio(0); cin.tie(0); cout.tie(0);
#define ll long long
#define ld long double
#define pb push_back
#define ins insert
#define f first
#define s second
#define endl '\n'

using namespace std;

const ll MX = 1e5+100;
ll n, m, k, i, j, otv, a[MX], b[MX], dp[MX][3];
vector<vector<pair<ll, ll> > > cnt(MX, vector<pair<ll, ll> > (5));
bool check;

int main() { bst
    cin >> n >> k;
    for (i = 1; i <= n; i++) {
        cin >> a[i] >> b[i];
    }
    for (ll r = 0; r < 2; r++) {
    for (i = 0; i <= n; i++) {
        dp[i][0] = dp[i][1] = 0;
        cnt[i][0] = cnt[i][1] = {0, 0};
    }
    for (i = 1; i <= n; i++) {
        if (r == 0) {
            check = (min(a[i], cnt[i-1][0].f + k) + min(b[i], cnt[i-1][0].s) + dp[i-1][0] >= min(a
                [i], cnt[i-1][1].f + k) + min(b[i], cnt[i-1][1].s) + dp[i-1][1]);
        } else {
            check = (min(a[i], cnt[i-1][0].f + k) + min(b[i], cnt[i-1][0].s) + dp[i-1][0] > min(a[
                i], cnt[i-1][1].f + k) + min(b[i], cnt[i-1][1].s) + dp[i-1][1]);
        }
        if (check) {
            dp[i][0] = min(a[i], cnt[i-1][0].f + k) + min(b[i], cnt[i-1][0].s) + dp[i-1][0];
            cnt[i][0].f = (cnt[i-1][0].f + k) - min(a[i], cnt[i-1][0].f + k);
            cnt[i][0].s = (cnt[i-1][0].s) - min(b[i], cnt[i-1][0].s);
        } else {
            dp[i][0] = min(a[i], cnt[i-1][1].f + k) + min(b[i], cnt[i-1][1].s) + dp[i-1][1];
            cnt[i][0].f = (cnt[i-1][1].f + k) - min(a[i], cnt[i-1][1].f + k);
            cnt[i][0].s = (cnt[i-1][1].s) - min(b[i], cnt[i-1][1].s);
        }
        if (r == 0) {
            check = (min(b[i], cnt[i-1][0].s + k) + min(a[i], cnt[i-1][0].f) + dp[i-1][0] >= min(b
                [i], cnt[i-1][1].s + k) + min(a[i], cnt[i-1][1].f) + dp[i-1][1]);
        } else {
            check = (min(b[i], cnt[i-1][0].s + k) + min(a[i], cnt[i-1][0].f) + dp[i-1][0] > min(b[
                i], cnt[i-1][1].s + k) + min(a[i], cnt[i-1][1].f) + dp[i-1][1]);
        }
        if (check) {
            dp[i][1] = min(b[i], cnt[i-1][0].s + k) + min(a[i], cnt[i-1][0].f) + dp[i-1][0];
            cnt[i][1].s = (cnt[i-1][0].s + k) - min(b[i], cnt[i-1][0].s + k);
            cnt[i][1].f = (cnt[i-1][0].f) - min(a[i], cnt[i-1][0].f);
        } else {
            dp[i][1] = min(b[i], cnt[i-1][1].s + k) + min(a[i], cnt[i-1][1].f) + dp[i-1][1];
            cnt[i][1].s = (cnt[i-1][1].s + k) - min(b[i], cnt[i-1][1].s + k);
            cnt[i][1].f = (cnt[i-1][1].f) - min(a[i], cnt[i-1][1].f);
        }
    }
        //cout << max(dp[n][0], dp[n][1]);
        otv = max(otv, max(dp[n][0], dp[n][1]));
    }
    cout << otv;
    return 0;

}
```