

# Олимпиада СПбГУ по информатике 2018/19 учебного года

Строганов Никита Сергеевич

A	B	C	D	E	F	Sum
100	100	100	60	100	7	467

## Task A (100)

```
n = int(input())
m = int(input())
while n < m:
    n *= 2
if n == m:
    print('Yes')
else:
    print('No')
```

## Task B (100)

```
n = int(input())
s = input()

f = False
for i in range(n - 2):
    if s[i] == 'o' and s[i + 2] == 'r':
        f = True

if s.count('or') != 0 or s.count('ro') or f:
    print('Yes')
else:
    print('No')
```

## Task C (100)

```
#include <iostream>
#include <vector>

using namespace std;

int n;
vector<int> sz, ans;
vector<vector<int>> a;

void tree(int r, int p = -1) {
    //cout << r << ' ' << p << ' ';
    if (a[r].size() == 0) {
        ans[r] = n;
        return;
    }

    int p1 = n - sz[r];
    for (int u : a[r]) {
        if (u != p) p1 = max(p1, sz[u]);
    }
    ans[r] = p1 + 1;

    for (auto u : a[r]) {
        //cout << u << ' ';
        if (u != p) tree(u, r);
    }
}

int dfs(int v, int p = -1) {
    sz[v] = 1;
    for (auto u : a[v]) {
        if (u != p) sz[v] += dfs(u, v);
    }
    return sz[v];
}

int main() {
    cin >> n;

    a.resize(n);
    for (int i = 0; i < n - 1; ++i) {
        int v, u;
        cin >> v >> u;
        v--, u--;
        a[v].push_back(u);
        a[u].push_back(v);
    }
    /*for (int i = 0; i < n; ++i) {
        cout << i + 1 << ": ";
        for (auto e : a[i]) cout << e + 1 << ' '; cout << endl;
    }
    cout << endl;*/

    sz.resize(n);
    dfs(0);

    ans.resize(n);
    tree(0);

    for (int i : ans) cout << i << '␣';
}
/*
6
1 2
1 3
2 4
2 5
3 6
*/
```

## Task D (60)

```
q = input()
t, n, p = map(int, input().split())

if q == 'split':
    if n == 3:
        for i in range(t):
            s = input()

            cnt = [0] * 27
            for i in s:
                if 0 <= ord(i) - ord('a') < 26:
                    cnt[ord(i) - ord('a')] = 1
            z = [''] * 3
            j = 0
            for i in range(26):
                if cnt[i] != 1 and j < 3:
                    z[j] = chr(i + ord('a'))
                    j += 1

            r1 = z[0] + s[:6]
            r2 = z[1] + s[3:]
            r3 = z[2] + s[:3] + s[6:]
            print(r1, r2, r3)

    if n == 5:
        for i in range(t):
            s = input()

            cnt = [0] * 27
            for i in s:
                if 0 <= ord(i) - ord('a') < 26:
                    cnt[ord(i) - ord('a')] = 1
            z = [''] * 3
            j = 0
            for i in range(26):
                if cnt[i] != 1 and j < 3:
                    z[j] = chr(i + ord('a'))
                    j += 1

            r1 = z[0] + s[:6]
            r2 = z[1] + s[3:]
            r3 = z[2] + s[:3] + s[6:]
            print(r1, r2, r3, r1, r2)

    if n == 7:
        for i in range(t):
            s = input()

            cnt = [0] * 27
            for i in s:
                if 0 <= ord(i) - ord('a') < 26:
                    cnt[ord(i) - ord('a')] = 1
            z = [''] * 3
            j = 0
            for i in range(26):
                if cnt[i] != 1 and j < 3:
                    z[j] = chr(i + ord('a'))
                    j += 1

            r1 = z[0] + s[:3]
            r2 = z[1] + s[3:6]
            r3 = z[2] + s[6:9]
            print(r2, r3, r3, r1, r2, r1, r1)

else:
    if n == 3:
        for i in range(t):
            r1, r2 = input().split()
            r1, r2 = min(r1, r2), max(r1, r2)

            cnt = [0] * 26
```

```

for i in r1[1:] + r2[1:]:
    if 0 <= ord(i) - ord('a') < 26:
        cnt[ord(i) - ord('a')] = 1
z = [''] * 3
j = 0
for i in range(26):
    if cnt[i] != 1 and j < 3:
        z[j] = chr(i + ord('a'))
        j += 1

s = ''
if r1[0] == z[0]:
    s = r1[1:] + r2[4:]
else:
    s = r2[1:4] + r1[1:]
print(s)
if n == 5:
    for i in range(t):
        r1, r2, r3 = input().split()
        if r1 == r2:
            r1 = r3
        r1, r2 = min(r1, r2), max(r1, r2)

cnt = [0] * 26
for i in r1[1:] + r2[1:]:
    if 0 <= ord(i) - ord('a') < 26:
        cnt[ord(i) - ord('a')] = 1
z = [''] * 3
j = 0
for i in range(26):
    if cnt[i] != 1 and j < 3:
        z[j] = chr(i + ord('a'))
        j += 1

s = ''
if r1[0] == z[0]:
    s = r1[1:] + r2[4:]
else:
    s = r2[1:4] + r1[1:]
print(s)
if n == 7:
    for i in range(t):
        r = list(input().split())
        r.sort()
        rr = [r[0]]
        for i in range(1, 4):
            if r[i] != r[i - 1]:
                rr.append(r[i])
        if len(rr) <= 2:
            print(0 // 0)
        r1, r2, r3 = r[0], r[1], r[2]

cnt = [0] * 26
for i in r1[1:] + r2[1:]:
    if 0 <= ord(i) - ord('a') < 26:
        cnt[ord(i) - ord('a')] = 1
s = r1[1:] + r2[1:] + r3[1:]
print(s)

```

## Task E (100)

```
def d(x, y):
    return x * x + y * y

n = int(input())
x = [0] * n
y = [0] * n
for i in range(n):
    x[i], y[i] = map(int, input().split())
xp, yp = map(int, input().split())
xq, yq = map(int, input().split())

xq = xq + (xq - xp) * 10 ** 20
yq = yq + (yq - yp) * 10 ** 20

a = [d(x[i] - xq, y[i] - yq) for i in range(n)]
mn = min(a)
cnt = 0
idx = 0
for i in range(n):
    if a[i] == mn:
        cnt += 1
        idx = i + 1
if cnt == 1:
    print(idx)
else:
    print(-1)
```

## Task F (7)

```
#include <iostream>
#include <vector>

using namespace std;

int n, ans, k;
vector<int> l, r, p;

int main() {
    cin >> n >> k;
    l.resize(n);
    r.resize(n);
    for (int i = 0; i < n; ++i) {
        cin >> l[i] >> r[i];
    }
    ans = 0;

    for (int mask = 0; mask < (1 << n); ++mask) {
        int kr = 0, sin = 0, cnt = 0;
        for (int i = 0; i < n; ++i) {
            if ((mask >> i) & 1) sin += k;
            else kr += k;
            cnt += min(kr, l[i]) + min(sin, r[i]);
            kr = max(0, kr - l[i]);
            sin = max(0, sin - r[i]);
        }
        ans = max(ans, cnt);
    }

    cout << ans;
}
```