

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)

```
n = int(input())
m = int(input())
if m % n == 0:
    x = m // n
    while x % 2 != 1:
        x = x // 2
    if x == 1:
        print("Yes")
    else:
        print("No")
else:
    print("No")
```

Task B (100)

```
n = int(input())
s = input()
c = False
for i in range(n):
    if s[i] == 'o':
        if i > 0:
            if s[i - 1] == 'r':
                c = True
        if i < n - 1:
            if s[i + 1] == 'r':
                c = True
        if i < n - 2:
            if s[i + 2] == 'r':
                c = True
    if c:
        print("Yes")
        break
else:
    print("No")
```

Task C (100)

```
#include <iostream>
#include <vector>
#include <algorithm>
#include <map>
using namespace std;

const int N = 100010;
vector<int> S(N, 0);
vector<vector<int>> V(N);
vector<int> K(N, 1);
vector<int> Sum(N, 1);
vector<bool> us(N, true);

void dfs(int v, int n){
    us[v] = false;
    K[v] = max(K[v], n - Sum[v]);
    for (int i = 0; i < int(V[v].size()); i++){
        if (us[V[v][i]]){
            int a = V[v][i];
            S[a] -= 1;
            Sum[a] += Sum[v];
            K[a] = max(K[a], Sum[v]);
            if (S[a] == 1)
                dfs(a, n);
        }
    }
}

int main(){
    int n;
    cin >> n;
    if (n == 1){
        cout << 1;
        return 0;
    }
    for (int i = 0; i < n - 1; i++){
        int a, b;
        cin >> a >> b;
        a -= 1;
        b -= 1;
        V[a].push_back(b);
        V[b].push_back(a);
        S[a] += 1;
        S[b] += 1;
    }
    vector<int> H0;
    for (int i = 0; i < n; i++){
        if (S[i] == 1)
            H0.push_back(i);
    }
    for (int i = 0; i < int(H0.size()); i++){
        if (us[H0[i]])
            dfs(H0[i], n);
    }
    for (int i = 0; i < n; i++){
        cout << K[i] + 1 << " ";
    }
    return 0;
}
```

Task D (60)

```

x = (input())
t, n, p = map(int, input().split())
if x == 'split':
    if n == 3:
        for i in range(t):
            s = (input())
            print('a', end = '')
            print(s[0] + s[1] + s[2] + s[4] + s[6] + s[7] + '␣' + 'b' + s[0] + s[2] + s[3], end =
                '')
            print(s[5] + s[6] + s[8] + '␣' + 'c' + s[1] + s[3] + s[4] + s[5] + s[7] + s[8])
    elif n == 5:
        for i in range(t):
            s = input()
            A = 'a' + s[:6]
            B = '␣b' + s[0] + s[2] + s[4] + s[6:]
            C = '␣c' + s[1] + s[3] + s[5:]
            print(A + B + B + C + C)
else:
    if n == 3:
        for i in range(t):
            a = '1'
            b = '1'
            c = '1'
            a1, b1 = input().split()
            X = [0] * 10
            if a1[0] == 'a':
                a = a1
            elif a1[0] == 'b':
                b = a1
            else:
                c = a1
            if b1[0] == 'a':
                a = b1
            elif b1[0] == 'b':
                b = b1
            else:
                c = b1
            if a[0] == 'a':
                X[1] = a[1]
                X[2] = a[2]
                X[3] = a[3]
                X[5] = a[4]
                X[7] = a[5]
                X[8] = a[6]
            if b[0] == 'b':
                X[1] = b[1]
                X[3] = b[2]
                X[4] = b[3]
                X[6] = b[4]
                X[7] = b[5]
                X[9] = b[6]
            if c[0] == 'c':
                X[2] = c[1]
                X[4] = c[2]
                X[5] = c[3]
                X[6] = c[4]
                X[8] = c[5]
                X[9] = c[6]
            print(X[1] + X[2] + X[3] + X[4] + X[5] + X[6] + X[7] + X[8] + X[9])
    elif n == 5:
        for i in range(t):
            a = '1'
            b = '1'
            c = '1'
            a1, b1, c1 = input().split()
            X = [0] * 10
            if c1[0] == 'a':
                a = c1
            elif c1[0] == 'b':

```

```

        b = c1
    else:
        c = c1
    if a1[0] == 'a':
        a = a1
    elif a1[0] == 'b':
        b = a1
    else:
        c = a1
    if b1[0] == 'a':
        a = b1
    elif b1[0] == 'b':
        b = b1
    else:
        c = b1
    if a[0] == 'a':
        X[1] = a[1]
        X[2] = a[2]
        X[3] = a[3]
        X[4] = a[4]
        X[5] = a[5]
        X[6] = a[6]
    if b[0] == 'b':
        X[1] = b[1]
        X[3] = b[2]
        X[5] = b[3]
        X[7] = b[4]
        X[8] = b[5]
        X[9] = b[6]
    if c[0] == 'c':
        X[2] = c[1]
        X[4] = c[2]
        X[6] = c[3]
        X[7] = c[4]
        X[8] = c[5]
        X[9] = c[6]
    print(X[1] + X[2] + X[3] + X[4] + X[5] + X[6] + X[7] + X[8] + X[9])

```

Task E (100)

```
n = int(input())
S = [[0,0] for i in range(n)]
for i in range(n):
    a,b = map(int,input().split())
    S[i][0] = a
    S[i][1] = b
x1, y1 = map(int,input().split())
x2, y2 = map(int,input().split())
A = y2 - y1
B = x1 - x2
C = -(A * x1 + B * y1)
d = abs(10**30 // (x2 - x1))
X = d * (x2 - x1) - C
Y = -(A * X + C) // B
k = abs(S[0][0] - X) ** 2 + abs(S[0][1] - Y) ** 2
g = 1
for i in range(1,n):
    k1 = abs(S[i][0] - X) ** 2 + abs(S[i][1] - Y) ** 2
    if k > k1:
        k = k1
        g = i + 1
    elif k == k1:
        g = -1
print(g)
```

Task F (0)

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

using namespace std;

int main()
{
    int n, k;
    cin >> n >> k;
    vector<int> R(n, 0);
    vector<int> B(n, 0);
    for (int i = 0; i < n; i++){
        int a, b;
        cin >> a >> b;
        R[i] = a;
        B[i] = b;
    }
    vector<long long> Din(n + 1, 0);
    vector<long long> DinR(n + 1, 0);
    vector<long long> DinB(n + 1, 0);
    Din[0] = 0;
    int n1 = 1;
    long long s = 0;
    for (int i = 0; i < n; i++){
        int s1 = min(n1, (B[i] / k + R[i] / k));
        n1 -= s1;
        Din[i] = n1;
        s += s1;
        B[i] = B[i] % k;
        R[i] = R[i] % k;
        n1 += 1;
    }
    n1 -= 1;
    s = s * k;
    long long x = 0;
    for (int i = n - 1; i >= 0; i--){
        DinR[Din[i]] += R[i];
        DinB[Din[i]] += B[i];
        x = max(x, Din[i]);
    }
    int r = 0, b = 0;
    for (int i = 1; i <= x; i++){
        if (DinR[i] < r){
            s += DinR[i];
            DinR[i] = 0;
            r -= DinR[i];
        } else {
            s += r;
            DinR[i] -= r;
            r = 0;
        }
        if (DinB[i] < b){
            s += DinB[i];
            DinB[i] = 0;
            b -= DinB[i];
        } else {
            s += b;
            DinB[i] -= b;
            b = 0;
        }
        if (DinR[i] >= DinB[i]){
            s += DinR[i];
            r += 0;
        } else {
            s += DinB[i];
            b += 0;
        }
    }
}
```

```
    }  
    cout << s;  
    return 0;  
}
```