

# Олимпиада СПбГУ по информатике 2020/21 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	20	25	445

## Task A ()

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

using namespace std;

typedef long long ll;

inline void input() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
#ifdef _DEBUG
    freopen("../src/input.txt", "r", stdin);
    freopen("../src/output.txt", "w", stdout);
#endif
}

const ll INFL = 2e18;
const int MOD = 1e9 + 31;
const int N = 501;

int ans[9] = {0, 2, 3, 4, 5, 6, 7, 8, 9};

int main() {
    input();
    int k;
    cin >> k;
    if (k == 1) {
        cout << 1;
    } else {
        k -= 1;
        cout << ans[k % 9];
    }
    return 0;
}
```

## Task B ()

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

using namespace std;

typedef long long ll;

inline void input() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
#ifdef _DEBUG
    freopen("../src/input.txt", "r", stdin);
    freopen("../src/output.txt", "w", stdout);
#endif
}

const ll INFL = 2e18;
const int MOD = 1e9 + 31;
const int N = 101;

int kol[26];

int main() {
    input();
    int n, k;
    cin >> n >> k;
    string s;
    cin >> s;
    int temp = 0, len = 0, ans = 0;
    for (int i = 0; i < n; i++) {
        int i1 = s[i] - 'a';
        if (kol[i1] == 0 && temp < 3 && len < k) {
            ++temp;
            ++len;
            kol[i1]++;
        } else if (kol[i1] > 0 && len < k){
            ++kol[i1];
            ++len;
        }
        else if (temp == 3 && kol[i1] == 0 || len == k){
            ++ans;
            len = 1;
            for (int j = 0; j < 26; j++)
                kol[j] = 0;
            temp = 1;
            kol[i1] = 1;
        }
    }
    if (len)
        ++ans;
    cout << ans;

    return 0;
}
```

## Task C ()

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

using namespace std;

typedef long long ll;

inline void input() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
#ifdef _DEBUG
    freopen("../src/input.txt", "r", stdin);
    freopen("../src/output.txt", "w", stdout);
#endif
}

const ll INFL = 2e18;
const int MOD = 1e9 + 31;
const int N = 501;

int w[N], v[N];

int main() {
    input();
    int n, x, y;
    cin >> n >> x >> y;
    int sum = 0;
    for (int i = 1; i <= n; i++)
        cin >> v[i];
    for (int i = 1; i <= n; i++) {
        cin >> w[i];
        sum += w[i];
    }
    vector<vector<int>> dp(n + 1, vector<int>(x + 1));
    for (int i = 1; i <= n; i++) {
        for (int v1 = 1; v1 <= x; v1++) {
            dp[i][v1] = dp[i - 1][v1];
            if (v1 >= v[i])
                dp[i][v1] = max(dp[i][v1], dp[i - 1][v1 - v[i]] + w[i]);
        }
    }
    int ans = 0;
    int ind = -1;
    for (int i = 0; i <= x; i++) {
        if (ans < dp[n][i]) {
            ans = dp[n][i];
            ind = i;
        }
    }
    if (sum - ans <= y) {
        vector<int> anss(n + 1);
        for (int i = ind, j = n; j > 0; j--) {
            if (i >= v[j] && dp[j - 1][i - v[j]] + w[j] == dp[j][i]) {
                anss[j] = 1;
                i -= v[j];
            }
        }
        for (int i = 1; i <= n; i++)
            if (anss[i])
                cout << 'x';
            else
                cout << 'y';
    } else {
        cout << -1;
    }
    return 0;
}
```

## Task D ()

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

using namespace std;

typedef long long ll;

inline void input() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
#ifdef _DEBUG
    freopen("../src/input.txt", "r", stdin);
    freopen("../src/output.txt", "w", stdout);
#endif
}

const ll INFL = 2e18;
const int MOD = 1e9 + 31;
const int N = 501;

int main() {
    input();
    int n;
    cin >> n;
    string s;
    cin >> s;
    stack<int> st;
    for (int i = 0; i < 2 * n; i++) {
        int k = 0;
        if (s[i] == ']' || s[i] == '[')
            k = 1;
        if (st.empty() || st.top() != k) {
            st.push(k);
        } else {
            st.pop();
        }
    }
    assert(st.size() % 2 == 0);
    cout << st.size() / 2;
    return 0;
}
```

## Task E ()

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

using namespace std;

typedef long long ll;

inline void input() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
#ifdef _DEBUG
    freopen("../src/input.txt", "r", stdin);
    freopen("../src/output.txt", "w", stdout);
#endif
}

const ll INFL = 2e18;
const int MOD = 1e9 + 31;
const int N = 501;

int buben = 135411;

int main() {
    input();
    string com;
    cin >> com;
    if (com == "add") {
        int t;
        cin >> t;
        while (t--) {
            int n, k;
            cin >> n >> k;
            cout << buben % n << "\n";
        }
    } else {
        int t;
        cin >> t;
        while (t--) {
            int n, k;
            cin >> n >> k;
            vector<int> num(k + 1);
            for (int i = 0; i < k + 1; i++)
                cin >> num[i];
            for (int i = 0; i < k + 1; i++)
                if (num[i] != buben % n)
                    cout << num[i] << "␣";
            cout << "\n";
        }
    }

    return 0;
}
```

## Task F ()

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

using namespace std;

typedef long long ll;

inline void input() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
#ifdef _DEBUG
    freopen("../src/input.txt", "r", stdin);
    freopen("../src/output.txt", "w", stdout);
#endif
}

const ll INFL = 2e18;
const int MOD = 1e9 + 31;
const int N = 501;

int buben = 135411;

int main() {
    input();
    int n;
    cin >> n;
    cout << 4 << "\n";
    cout << "0_0\n0_1\n1_1\n1_0\n";
    vector<pair<int, int>> ans = {{0, 1},
                                   {1, 1},
                                   {1, 0},
                                   {1, -1},
                                   {0, -1},
                                   {-1, -1},
                                   {-1, 0},
                                   {-1, 1}};

    for (int i = 0; i < min(8, n); i++)
        cout << ans[i].first << "_" << ans[i].second << "\n";

    return 0;
}
```