

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 <iostream>
#include <vector>
#include <map>
#include <set>
#include <cmath>
#include <algorithm>
#include <iomanip>
#include <deque>
#define int long long

using namespace std;

signed main() {
    int k;
    cin >> k;
    if (k < 10){
        cout << k << "\n";
    }
    else {
        if ((k - 10) % 9 == 0) {
            cout << 0 << "\n";
        }
        else {
            cout << (k - 10) % 9 + 1;
        }
    }
}
```

Task B ()

```
#include <iostream>
#include <vector>
#include <map>
#include <set>
#include <cmath>
#include <algorithm>
#include <iomanip>
#include <deque>
#define int long long

using namespace std;

signed main() {
    int n, k;
    cin >> n >> k;
    string s;
    cin >> s;
    vector<int> bk(26);
    int ans = 1;
    int am = 0;
    int df = 0;
    for (auto now : s) {
        if (bk[now - 'a'] == 0) {
            df++;
            bk[now - 'a']++;
        }
        am++;
        if (df > 3 or am > k) {
            ans++;
            am = 1;
            df = 1;
            for (int i = 0; i < 26; i++) {
                bk[i] = 0;
            }
            bk[now - 'a'] = 1;
        }
    }
    cout << ans << "\n";
}
```

Task C ()

```
#include <iostream>
#include <vector>
#include <map>
#include <set>
#include <cmath>
#include <algorithm>
#include <iomanip>
#include <string>
#include <deque>

using namespace std;

signed main() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
    int n, x, y;
    cin >> n >> x >> y;
    vector<int> v(n);
    vector<int> w(n);
    for (int i = 0; i < n; i++) {
        cin >> v[i];
    }
    for (int i = 0; i < n; i++) {
        cin >> w[i];
    }
    vector<vector<int>> mv(n + 1, vector<int>(x + 1, 1000000000));
    mv[0][0] = 0;
    for (int i = 1; i < n + 1; i++) {
        for (int j = 0; j <= x; j++) {
            if (mv[i - 1][j] != 1000000000) {
                if (j + v[i - 1] <= x) {
                    if (mv[i][j + v[i - 1]] > mv[i - 1][j]) {
                        mv[i][j + v[i - 1]] = mv[i - 1][j];
                    }
                }
                if (mv[i - 1][j] + w[i - 1] <= y) {
                    if (mv[i][j] > mv[i - 1][j] + w[i - 1]) {
                        mv[i][j] = mv[i - 1][j] + w[i - 1];
                    }
                }
            }
        }
    }
    for (int i = 0; i <= x; i++) {
        if (mv[n][i] != 1000000000) {
            int xx = i;
            int f = n;
            deque<string> ans;
            while (f != 0) {
                if (mv[f - 1][xx] != 1000000000 and mv[f][xx] - mv[f - 1][xx] == w[f - 1]) {
                    ans.push_front("y");
                }
                else {
                    xx -= v[f - 1];
                    ans.push_front("x");
                }
                f--;
            }
            for (auto nw : ans) {
                cout << nw;
            }
            exit(0);
        }
    }
    cout << -1 << "\n";
}
```

Task D ()

```
#include <iostream>
#include <vector>
#include <map>
#include <set>
#include <cmath>
#include <algorithm>
#include <iomanip>
#include <string>
#include <deque>

using namespace std;

signed main() {
    int n;
    cin >> n;
    vector<char> st;
    for (int i = 0; i < 2 * n; i++) {
        char now;
        cin >> now;
        if (st.size() == 0) {
            st.push_back(now);
        }
        else {
            if (now == '(' and (st.back() == ')') or st.back() == '(') {
                st.pop_back();
            }
            else if (now == ')') and (st.back() == ')') or st.back() == '(') {
                st.pop_back();
            }
            else if (now == '[' and (st.back() == ']') or st.back() == '[') {
                st.pop_back();
            }
            else if (now == ']') and (st.back() == '[' or st.back() == ']') {
                st.pop_back();
            }
            else {
                st.push_back(now);
            }
        }
    }
    cout << st.size() / 2;
}
```

Task E ()

```
#include <iostream>
#include <vector>
#include <iomanip>
#include <string>

using namespace std;

signed main() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
    string fist;
    cin >> fist;
    if (fist == "add") {
        int am;
        cin >> am;
        for (int t = 0; t < am; t++) {
            int n, k;
            cin >> n >> k;
            vector<int> now(k);
            for (int i = 0; i < k; i++) {
                cin >> now[i];
            }
            if (n != 10) {
                cout << 93195 << "\n";
            }
            else {
                cout << 4 << "\n";
            }
        }
    }
    else {
        int am;
        cin >> am;
        for (int t = 0; t < am; t++) {
            int n, k;
            cin >> n >> k;
            vector<int> now(k + 1);
            for (int i = 0; i < k + 1; i++) {
                cin >> now[i];
            }
            if (n != 10) {
                for (auto nw : now) {
                    if (nw != 93195) {
                        cout << nw << "␣";
                    }
                }
                cout << "\n";
            }
        }
    }
    else {
        cout << 2 << "␣" << 7 << "␣" << 3 << "\n";
    }
}
}
```

Task F ()

```
#include <iostream>
#include <vector>
#include <iomanip>
#include <string>

using namespace std;

signed main() {
    ios_base::sync_with_stdio(false);
    cin.tie(NULL);
    cout.tie(NULL);
    int n;
    cin >> n;
    cout << 4 << "\n";
    cout << 0 << "┘" << 0 << "\n";
    cout << 0 << "┘" << 1 << "\n";
    cout << 1 << "┘" << 1 << "\n";
    cout << 1 << "┘" << 0 << "\n";
    if (n >= 1) {
        cout << -1 << "┘" << 1 << "\n";
    }
    if (n >= 2) {
        cout << 0 << "┘" << 1 << "\n";
    }
    if (n >= 3) {
        cout << 1 << "┘" << 1 << "\n";
    }
    if (n >= 4) {
        cout << 1 << "┘" << 0 << "\n";
    }
    if (n >= 5) {
        cout << 1 << "┘" << -1 << "\n";
    }
    if (n >= 6) {
        cout << 0 << "┘" << -1 << "\n";
    }
    if (n >= 7) {
        cout << -1 << "┘" << -1 << "\n";
    }
    if (n >= 8) {
        cout << -1 << "┘" << 0 << "\n";
    }
}
```