Олимпиада СПбГУ по информатике 2020/21 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	55	25	480

Task A ()

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

#define f first
#define s second

using namespace std;
using li = long long;
using ld = long double;
using pii = pair<int, int>;

int main() {
    int k;
    cin >> k;

    li cur = 0;
    for(int i = 1; i < k; i++) {
        cur += i;
        cur /= 10;
    }

    cout << (cur + k) % 10 << endl;
}
```

Task B ()

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

#define f first
#define s second

using namespace std;
using li = long long;
using ld = long double;
using pii = pair<int, int>;

int main() {
    int n, k;
    cin >> n >> k;

    string s;
    cin >> s;

    int ans = 1;

    set<char> st;
    int cur = 0;
    for(int i = 0; i < n; i++) {
        if((st.count(s[i]) > 0 || st.size() < 3) && cur < k) {
            st.insert(s[i]);
            cur++;
        } else {
            st.erase(st.begin(), st.end());
            st.insert(s[i]);
            ans++;
            cur = 1;
        }
    }

    cout << ans << endl;
}
```

Task C ()

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

#define f first
#define s second

using namespace std;
using li = long long;
using ld = long double;
using pii = pair<int, int>;

const int INF = 1e9 + 13;
const int N = 513;
const int A = 250013;

int a[N], b[N];
int dp[A];
bool p[N][A];

int main() {
    int n, x, y;
    cin >> n >> x >> y;

    for(int i = 0; i < n; i++) {
        cin >> a[i];
    }

    int sb = 0;
    for(int j = 0; j < n; j++) {
        cin >> b[j];
        sb += b[j];
    }

    dp[x] = 0;
    for(int i = 0; i < n; i++) {
//        for(int j = 0; j <= x; j++)
//            dp[i + 1][j] = dp[i][j];
        for(int j = a[i]; j <= x; j++) {
            if(dp[j - a[i]] < dp[j] + b[i]) {
                dp[j - a[i]] = dp[j] + b[i];
                p[i + 1][j - a[i]] = true;
            }
        }
    }

    for(int i = 0; i <= x; i++) {
        if(dp[i] + y >= sb) {
            vector<int> ans(n, 0);
            int j = n;
            int k = i;
            while(j > 0) {
                ans[j - 1] = p[j][k];
                if(p[j][k] == 1)
                    k += a[j - 1];
                j--;
            }

            for(auto an : ans)
                cout << (an == 1 ? 'x' : 'y');
            cout << endl;

            return 0;
        }
    }

    cout << -1 << endl;
}
```

Task D ()

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

#define f first
#define s second

using namespace std;
using li = long long;
using ld = long double;
using pii = pair<int, int>;

const int INF = 1e9 + 13;
const int N = 213;

int main() {
    int n;
    cin >> n;

    string s;
    cin >> s;

    for(int i = 0; i < s.size(); i++) {
        if(s[i] == ')')
            s[i] = '(';
        else if(s[i] == ']')
            s[i] = '[';
    }

    stack<char> st;
    for(int i = 0; i < n * 2; i++) {
        if(!st.empty() && st.top() == s[i]) {
            st.pop();
        } else {
            st.push(s[i]);
        }
    }

    cout << st.size() / 2 << endl;
}
```

Task E ()

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

#define f first
#define s second

using namespace std;
using li = long long;
using ld = long double;
using pii = pair<int, int>;

const int INF = 1e9 + 13;
const int N = 513;
const int A = 250013;

int b[1000] = {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 3, 4, 2, 2, 2, 2, 2, 2, 0, 0, 0, 4, 5, 3, 3,
               3, 3, 3, 0, 0, 0, 0, 5, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0
               , 0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 4, 5, 3, 3, 3, 3, 3, 0, 0, 0, 0
               , 5, 6, 4, 4, 4, 4, 0, 0, 0, 0, 0, 6, 2, 2, 2, 2, 0, 0, 0, 0, 0, 0, 2, 2, 2, 2,
               0, 0, 0, 0, 0, 0, 0, 2, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
               , 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 5, 6, 4, 4, 4, 4,
               0, 0, 0, 0, 0, 6, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
               , 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 6, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
               , 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
               , 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
               , 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
               , 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
               0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0};

int get(int x, int y, int z) {
    vector<int> a = {x, y, z};

    sort(a.begin(), a.end());

    return a[0] * 100 + a[1] * 10 + a[2];
}


namespace add {
    void solve() {
        int n, k;
        cin >> n >> k;

        vector<int> a(k);
        for(int i = 0; i < k; i++) {
            cin >> a[i];
            a[i]--;
        }
```

```cpp
            if (n == 10) {
                cout << b[get(a[0], a[1], a[2])] + 1 << endl;
            } else {
                cout << 154693 << endl;
            }

            return;

//          sort(a.begin(), a.end());
    }
};

/*
clear
1
10 3
2 7 3 1

*/

namespace cle {
    void solve() {
        int n, k;
        cin >> n >> k;

        vector<int> a(k + 1);
        for (int i = 0; i < k + 1; i++) {
            cin >> a[i];
            a[i]--;
        }

        int val;

        if (n == 10) {
            for (int i = 0; i <= k; i++) {
                vector<int> c;
                for (int j = 0; j <= k; j++)
                    if (j != i)
                        c.push_back(a[j]);

                if (b[get(c[0], c[1], c[2])] == a[i]) {
                    val = a[i];
                    break;
                }
            }
        } else {
            val = 154692;
        }

        for (int i = 0; i <= k; i++)
            if (a[i] != val)
                cout << a[i] + 1 << '␣';
        cout << endl;
//      cout << (n == 10 ? "2 7 3" : "154693") << endl;
    }
};

int main() {
    string s;
    cin >> s;

    int t;
    cin >> t;

    while (t--)
        if (s == "add")
            add::solve();
        else
            cle::solve();
}
```

Task F ()

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

#define f first
#define s second

using namespace std;
using li = long long;
using ld = long double;
using pii = pair<int, int>;

const int INF = 1e9 + 13;
const int N = 513;
const int A = 10013;//250013;

int main() {
    int n;
    cin >> n;

    cout << 4 << endl;
    cout << 0 << '_' << 0 << endl;
    cout << 10 << '_' << 0 << endl;
    cout << 10 << '_' << 10 << endl;
    cout << 0 << '_' << 10 << endl;

    if(n > 0)
        cout << -10 << '_' << -10 << endl;
    if(n > 1)
        cout << 0 << '_' << -10 << endl;
    if(n > 2)
        cout << -10 << '_' << 0 << endl;
    if(n > 3)
        cout << -10 << '_' << 10 << endl;
    if(n > 4)
        cout << 0 << '_' << 10 << endl;
    if(n > 5)
        cout << 10 << '_' << 10 << endl;
    if(n > 6)
        cout << 10 << '_' << 0 << endl;
    if(n > 7)
        cout << 10 << '_' << -10 << endl;

}
```