Олимпиада СПбГУ по информатике 2020/21 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	100	25	525

Task A ()

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

using namespace std;

typedef int ll;

#define sz(x) ((long long)(x).size())
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define pb push_back
#define f first
#define s second

void initial(){
#ifdef PC
    freopen("../input.txt", "r", stdin);
    freopen("../output.txt", "w", stdout);
#endif
    cin.tie(nullptr);
    cout.tie(nullptr);
    ios::sync_with_stdio(false);
}



signed main() {
    initial();
    //_____
    string s = "987654321";
    string s1 = "987654320";
    reverse(all(s));
    reverse(all(s1));
    ll k;
    cin >> k;
    k--;
    if (k >= sz(s))
    {
        k -= sz(s);
        cout << s1[k % sz(s1)];
    }
    else
        cout << s[k];
    //_____
    return 0;
}
```

Task B ()

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

using namespace std;

typedef long long ll;
typedef unsigned long long ull;
typedef long double ld;

#define sz(x) ((long long)(x).size())
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define pb push_back
#define f first
#define s second

const ld eps = 1e-9;
const ld pi = acosl(-1);
const int mod998 = 998244353;
const int mod197 = 1e9 + 7;
void initial(){
#ifdef PC
    freopen("../input.txt", "r", stdin);
    freopen("../output.txt", "w", stdout);
#endif
    cin.tie(nullptr);
    cout.tie(nullptr);
    ios::sync_with_stdio(false);
}

mt19937_64 rnd(time(0));


signed main() {
    initial();
    /*__*/double start = clock();/*__*/
    //_____
    ll n, k;
    cin >> n >> k;
    string s;
    cin >> s;
    ll cnt = 0;
    for (int i = 0; i < sz(s); i++)
    {
        set <char> was;
        ll sum = 0;
        bool ws = false;
        for (int j = i; j < sz(s); j++)
        {
            was.insert(s[j]);
            sum++;
            if (sum == k + 1 || sz(was) > 3)
            {
                cnt++;
                ws = true;
                i = j - 1;
                break;
            }
        }
        if (!ws)
        {
            cnt++;
            break;
        }
    }
    cout << cnt << endl;
    //_____
    cerr << "Time " << (clock() - start) * 1.0 / CLOCKS_PER_SEC << "s\n";
    return 0;
}
```

Task C ()

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

using namespace std;

typedef int ll;

#define sz(x) ((long long)(x).size())
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define pb push_back
#define f first
#define s second

void initial(){
#ifdef PC
    freopen("../input.txt", "r", stdin);
    freopen("../output.txt", "w", stdout);
#endif
    cin.tie(nullptr);
    cout.tie(nullptr);
    ios::sync_with_stdio(false);
}

int dp[2][250001];
bool br[501][250001];
int ob[501];
int vs[501];
bool ans[501];
signed main() {
    initial();
    //_____
    ll n, x, y;
    cin >> n >> x >> y;
    ll sum = 0;
    for (int i = 1; i <= n; i++)
        cin >> ob[i];
    for (int i = 1; i <= n; i++)
    {
        cin >> vs[i];
        sum += vs[i];
    }
    ll maxn = 0;
    for (int i = 1; i <= n; i++) {
        for (int j = 1; j <= x; j++) {
            ll nw = (i % 2);
            if (j >= ob[i] && dp[nw ^ 1][j] < dp[nw ^ 1][j - ob[i]] + vs[i])
            {
                dp[nw][j] = dp[nw ^ 1][j - ob[i]] + vs[i];
                br[i][j] = true;
            }
            else
                dp[nw][j] = dp[nw ^ 1][j];
            maxn = max(maxn, dp[nw][j]);
        }
    }
    if (sum - maxn > y)
    {
        cout << -1;
        return 0;
    }
    ll i = n, j = x;
    while (i > 0 && j > 0)
    {
        if (br[i][j])
        {
            ans[i] = true;
            j -= ob[i];
            i--;
        }
        else
            i--;
    }
```

```cpp
    for (i = 1; i <= n; i++)
    {
        if (ans[i])
            cout << 'x';
        else
            cout << 'y';
    }
    //_____
    return 0;
}
```

Task D ()

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

using namespace std;

typedef int ll;

#define sz(x) ((long long)(x).size())
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define pb push_back
#define f first
#define s second

void initial(){
#ifdef PC
    freopen("../input.txt", "r", stdin);
    freopen("../output.txt", "w", stdout);
#endif
    cin.tie(nullptr);
    cout.tie(nullptr);
    ios::sync_with_stdio(false);
}



signed main() {
    initial();
    //_____
    ll n;
    cin >> n;
    string s;
    cin >> s;
    string s1 = "";
    for (auto i : s)
    {
        if (i == '(' || i == ')')
            s1 += '1';
        else
            s1 += '0';
    }
    deque <char> was;
    for (auto i : s1)
    {
        if (!was.empty() && was.back() == i)
            was.pop_back();
        else
            was.push_back(i);
    }
    cout << sz(was) / 2;
    //_____
    return 0;
}
```

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Task E ()

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

using namespace std;

typedef long long ll;

#define sz(x) ((long long)(x).size())
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define pb push_back
#define f first
#define s second

void initial(){
#ifdef PC
    freopen("../input.txt", "r", stdin);
    freopen("../output.txt", "w", stdout);
#endif
    cin.tie(nullptr);
    cout.tie(nullptr);
    ios::sync_with_stdio(false);
}

void solve5(ll n, ll k)
{
    ll mn = 0;
    vector <ll> a(k);
    ll sum = 0;
    for (int i = 0; i < k; i++)
    {
        cin >> a[i];
        sum += a[i];
    }
    sort(all(a));
    ll nw = 0;
    for (int i = 1; i <= n; i++)
    {
        if (a[nw] == i) {
            nw++;
            continue;
        }
        if ((sum + i) % (k + 1) == nw)
        {
            cout << i << "_";
            return;
        }
    }
    assert(false);
}
void solve6(ll n, ll k)
{
    vector <ll> a(k + 1);
    ll sum = 0;
    for (int i = 0; i <= k; i++)
    {
        cin >> a[i];
        sum += a[i];
    }
    k++;
    sort(all(a));
    for (int i = 0; i < k; i++)
    {
        if (i == sum % k) continue;
        cout << a[i] << '_';
    }
}
signed main() {
    initial();
    //_____
    string s;
    cin >> s;
    ll t;
```

```cpp
    cin >> t;
    while (t--)
    {
        ll n, k;
        cin >> n >> k;
        if (s == "add")
            solve5(n, k);
        else
            solve6(n, k);
        cout << '\n';
    }
    //_____
    return 0;
}
```

Task F ()

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

using namespace std;

typedef long long ll;
typedef long double ld;
#define sz(x) ((long long)(x).size())
#define all(x) (x).begin(), (x).end()
#define rall(x) (x).rbegin(), (x).rend()
#define pb push_back
#define f first
#define s second

void initial(){
#ifdef PC
    freopen("../input.txt", "r", stdin);
    freopen("../output.txt", "w", stdout);
#endif
    cin.tie(nullptr);
    cout.tie(nullptr);
    ios::sync_with_stdio(false);
}
ll n;
void solve()
{
    vector <pair <ld, ld> > kek = {
            {4, 0},
            {-4, 0},
            {0, 3},
            {0, -3},
            {-4, 3},
            {4, 3},
            {4, -3},
            {-4, -3},
    };
    cout << 4 << endl;
    cout << "0_0\n4_0\n4_3\n0_3\n";
    for (int i = 0; i < n; i++)
        cout << kek[i].f << "_" << kek[i].s << '\n';
}
signed main() {
    initial();
    //_____
    cin >> n;
    if (n <= 8)
    {
        solve();
    }
    //_____
    return 0;
}
```