Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	80	58	0	438

Task A ()

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

using namespace std;

#define push_back pb
#define pop_back pp
#define int long long
#define here cout << "here" << endl;
#define ss second
#define ff first

void solve() {
    int n;
    cin >> n;
    vector <pair <int, int>> arr(n);
    for (int i = 0; i < n; i++) {
        cin >> arr[i].ss >> arr[i].ff;
        while ((arr[i].ss % 10) == 0) {
            arr[i].ff++;
            arr[i].ss /= 10;
        }
    }
    sort(arr.begin(), arr.end());
    int tmp = arr[0].ss;
    int st = arr[0].ff;
    for (int i = 1; i < n; i++) {
        if (arr[i].ff > st) {
            int dif = arr[i].ff - st;
            int t = 0;
            while (tmp % 10 == 0) {
                t++;
                tmp /= 10;
                if (t == dif) break;
            }
            if (t < dif) {
                cout << st + t;
                return;
            }
            st = arr[i].ff;
            tmp += arr[i].ss;
        } else {
            tmp += arr[i].ss;
        }
    }
    int t = 0;
    while(tmp % 10 == 0) {
        t++;
        tmp /= 10;
    }
    cout << st + t;
}

signed main() {
    ios_base::sync_with_stdio(false); cin.tie(nullptr); cout.tie(nullptr);
    int tt = 1;
    //cin >> tt;
```

```
    while ( tt −−) {
        solve ();
    }
}
```

Task B ()

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

using namespace std;

#define push_back pb
#define pop_back pp
#define int long long
#define here cout << "here" << endl;
#define ss second
#define ff first

void solve() {
    int n = 1;
    cin >> n;
    vector <int> k(n);
    int all = 0;
    for (int i = 0; i < n; i++) {
        cin >> k[i];
        all += k[i];
    }
    string s;
    while(1) {
        int idx = -1;
        for (int i = n - 1; i >= 0; i--) {
            if (k[i] != 0) {
                idx = i;
                break;
            }
        }
        if (idx == -1) {
            cout << "Stop" << endl;
            return;
        }
        int start = 0;
        cout << "Flip_and_wait" << endl;
        cin >> s;
        int cnt = (s.size() - 3) / 2;
        int t = 0;
        while(start + cnt - 1 < idx) {
            t++;
            cout << "Wait" << endl;
            cin >> s;
            start = start + cnt;
            cnt = (s.size() - 3) / 2;
        }
        int sum = 0;
        for (int i = start; i < start + cnt; i++) sum += k[i];
        for (int i = 1; i < sum; i++) {
            cout << "Flip_and_wait" << endl;
            cin >> s;
            for (int j = 0; j < t; j++) {
                cout << "Wait" << endl;
                cin >> s;
            }
        }
        for (int i = start; i < start + cnt; i++) k[i] = 0;
    }
}

signed main() {
    ios_base::sync_with_stdio(false); cin.tie(nullptr); cout.tie(nullptr);
    int tt = 1;
    //cin >> tt;
    while(tt--) {
        solve();
    }
}
```

Task C ()

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

using namespace std;

#define push_back pb
#define pop_back pp
#define int long long
#define here cout << "here" << endl;
#define ss second
#define ff first

void solve() {
    int n;
    cin >> n;
    for (int i = 0; i < n; i++) {
        string s;
        cin >> s;
        if (s.size() == 1) {
            cout << s << '\n';
            break;
        }
        string ans;
        if (s[0] == '?' || s[1] == '?') {
            for (int j = 0; j + 1 < s.size(); j += 2) {
                if (s[j] == '0' && s[j + 1] == '?') ans += "01";
                if (s[j] == '1' && s[j + 1] == '?') ans += "10";
                if (s[j] == '?' && s[j + 1] == '0') ans += "00";
                if (s[j] == '?' && s[j + 1] == '1') ans += "11";
            }
        } else {
            for (int j = 0; j + 1 < s.size(); j += 2) {
                if (s[j] == '0' && s[j + 1] == '0') ans += "?0";
                if (s[j] == '0' && s[j + 1] == '1') ans += "0?";
                if (s[j] == '1' && s[j + 1] == '0') ans += "1?";
                if (s[j] == '1' && s[j + 1] == '1') ans += "?1";
            }
        }
        if (s.size() % 2 != 0) ans += s[s.size() - 1];
        cout << ans << '\n';
    }
}

signed main() {
    ios_base::sync_with_stdio(false); cin.tie(nullptr); cout.tie(nullptr);
    int tt = 1;
    //cin >> tt;
    while(tt--) {
        solve();
    }
}
```

Task D ()

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

using namespace std;

#define push_back pb
#define pop_back pp
#define int long long
#define here cout << "here" << endl;

typedef long long ll;

void solve() {
    int n;
    cin >> n;
    int mod = 998244353;
    int mid = (mod - 1) / 2;
    int r = mid + 2;
    n++;
    if (n < mod) {
        if (mid < n) {
            int tmp = 1;
            int cnt = 1;
            for (int i = mid; i > 0; i -= 2) {
                if (r <= n) {
                    tmp *= i;
                    tmp %= mod;
                    tmp *= (i - 1);
                    tmp %= mod;
                } else {
                    cnt *= i;
                    cnt %= mod;
                    cnt *= (i - 1);
                    cnt %= mod;
                }
                r += 2;
            }
            tmp = tmp * tmp;
            tmp %= mod;
            tmp = cnt * tmp;
            tmp %= mod;
            if (n % 2 != 0) {
                tmp *= n;
                tmp %= mod;
            }
            cout << 0 << '_' << tmp;
        } else {
            int ans = 1;
            for (int i = 1; i <= n; i++) {
                ans *= i;
                ans %= mod;
            }
            cout << 0 << '_' << ans;
            return;
        }
    } else {
        if (mid < n) {
            int tmp = 1;
            int cnt = 1;
            int tmp_2 = 0;
            int cnt_2 = 0;
            for (int i = mid; i > 0; i -= 2) {
                if (r <= n) {
                    tmp *= i;
                    tmp_2 += (tmp / mod);
                    tmp_2 %= mod;
                    tmp %= mod;
                    tmp *= (i - 1);
                    tmp_2 += (tmp / mod);
                    tmp_2 %= mod;
                    tmp %= mod;
                } else {
                    cnt *= i;
```

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```cpp
                cnt_2 += (cnt / mod);
                cnt_2 %= mod;
                cnt %= mod;
                cnt *= (i - 1);
                cnt_2 += (cnt / mod);
                cnt_2 %= mod;
                cnt %= mod;
            }
            r += 2;
        }
        tmp = tmp * tmp;
        tmp_2 += (tmp / mod);
        tmp_2 %= mod;
        tmp %= mod;
        tmp = cnt * tmp;
        tmp_2 += (tmp / mod);
        tmp_2 %= mod;
        tmp %= mod;
        if (n % 2 != 0) {
            tmp *= n;
            tmp_2 += (tmp / mod);
            tmp_2 %= mod;
            tmp %= mod;
        }
        cout << 1 << '_' << tmp_2;
    } else {
        int ans = 1;
        int ans_2 = 0;
        for (int i = 1; i <= n; i++) {
            ans *= i;
            ans_2 += (ans / mod);
            ans_2 %= mod;
            ans %= mod;
        }
        cout << 1 << '_' << ans;
        return;
    }
    }
}

signed main() {
    ios_base::sync_with_stdio(false); cin.tie(nullptr); cout.tie(nullptr);
    int tt = 1;
    //cin >> tt;
    while(tt--) {
        solve();
    }
}
```

Task E ()

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

using namespace std;

#define push_back pb
#define pop_back pp
#define int long long
#define here cout << "here" << endl;
#define ss second
#define ff first

void solve() {
    int n;
    cin >> n;
    vector <int> arr(n + 1);
    for (int i = 1; i <= n; i++) cin >> arr[i];
    int q;
    cin >> q;
    while(q--) {
        int a, b, d;
        cin >> a >> b >> d;
        int ans = 0;
        for (int i = a + 1; i <= b; i++) {
            ans += (d / arr[i]);
            if (d % arr[i] != 0) ans++;
        }
        cout << ans << '\n';
    }
}

signed main() {
    ios_base::sync_with_stdio(false); cin.tie(nullptr); cout.tie(nullptr);
    int tt = 1;
    //cin >> tt;
    while(tt--) {
        solve();
    }
}
```

Task F ()