

# Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	60	100	0	460

## Task A ()

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

using namespace std;
#define int long long
vector<int> a, b;

bool comp(int i, int j) {
    return b[i] < b[j];
}

signed main() {
    cin.tie();
    cout.tie();
    ios_base::sync_with_stdio(false);
#ifdef foo
    freopen("input.txt", "r", stdin);
#endif
    int n;
    cin >> n;
    a.resize(n);
    b.resize(n);
    vector<int> id;
    for (int i = 0; i < n; ++i) {
        cin >> a[i] >> b[i];
        id.push_back(i);
    }
    sort(id.begin(), id.end(), comp);
    int now = 0;
    int cnt = 0;
    for (int j = 0; j < n; ++j) {
        int ind = id[j];
        if (now == 0) {
            cnt = b[ind];
        }
        while (cnt != b[ind]) {
            if (now % 10 != 0) {
                cout << cnt << '\n';
                exit(0);
            }
            now /= 10;
            cnt++;
        }
        now += a[ind];
    }
    while (now % 10 == 0) {
        now /= 10;
        cnt++;
    }
    cout << cnt << '\n';
}
```

## Task B ()

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

using namespace std;
#define int long long

int get_cnt() {
    string s;
    cin >> s;
    int cnt_e = 0;
    for (int i = 0; i < s.size(); ++i) {
        if (s[i] == 'e') cnt_e++;
    }
    return cnt_e / 2;
}

void flip_wait() {
    cout << "Flip_and_wait" << endl;
}

void wait() {
    cout << "Wait" << endl;
}

signed main() {
    cin.tie();
    cout.tie();
    ios_base::sync_with_stdio(false);
#ifdef foo
    // freopen("input.txt", "r", stdin);
#endif
    int n;
    cin >> n;
    vector<int> k(n);
    for (int i = 0; i < n; ++i) {
        cin >> k[i];
    }
    for (int j = n - 1; j >= 0; --j) {
        while (k[j] != 0) {
            flip_wait();
            int cnt = 0;
            while (cnt <= j) {
                cnt += get_cnt();
                if (cnt <= j) {
                    wait();
                }
            }
            k[j]--;
        }
    }
    cout << "Stop" << endl;
}
```

## Task C ()

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

using namespace std;
#define int long long

signed main() {
    cin.tie();
    cout.tie();
    ios_base::sync_with_stdio(false);
#ifdef foo
    freopen("input.txt", "r", stdin);
#endif
    int t;
    cin >> t;
    for (int i = 0; i < t; ++i) {
        string s;
        cin >> s;
        int n = s.size();
        bool qw = false;
        for (int j = 0; j < s.size(); ++j) {
            if (s[j] == '?') {
                qw = true;
            }
        }
        if (qw) {
            string control = "";
            string control2 = "";
            for (int k = 0; k < n; ++k) {
                control2.push_back('?');
                if (k < n / 2)
                    control.push_back('?');
                else {
                    control.push_back('1');
                }
            }
            bool ones = false;
            for (int j = 0; j < s.size(); ++j) {
                if (s[j] == '1') ones = true;
            }
            if (control2 == s || (ones && control != s)) {
                for (int j = 0; j < s.size(); ++j) {
                    if (s[j] == '?') s[j] = '0';
                }
            } else {
                for (int j = 0; j < s.size(); ++j) {
                    if (s[j] == '?') s[j] = '1';
                }
            }
            cout << s << "\n";
        } else {
            int cnt_ones = 0;
            for (int j = 0; j < s.size(); ++j) {
                cnt_ones += s[j] - '0';
            }
            if (cnt_ones == n) {
                for (int j = 0; j < n / 2; ++j) {
                    s[j] = '?';
                }
                cout << s << '\n';
                continue;
            }
            if (cnt_ones >= s.size() - cnt_ones) {
                for (int j = 0; j < s.size(); ++j) {
                    if (s[j] == '1') s[j] = '?';
                }
            } else {
                for (int j = 0; j < s.size(); ++j) {
                    if (s[j] == '0') {
                        s[j] = '?';
                    }
                }
            }
        }
    }
}
```

```
        cout << s << '\n';  
    }  
}
```

## Task D ()

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

using namespace std;
#define int long long
const int mod = 998244353;

signed main() {
    cin.tie();
    cout.tie();
    ios_base::sync_with_stdio(false);
#ifdef foo
    freopen("input.txt", "r", stdin);
#endif
    int n;
    cin >> n;
    int f1 = 1;
    f1 = 1;
    int f2 = 2;
    if (n == 1) {
        cout << "0_" << f2 << '\n';
        exit(0);
    }
    for (int j = 2; j <= n; ++j) {
        int f = f2 + f1 * j % mod * j % mod;
        if (f >= mod) f -= mod;
        f1 = f2;
        f2 = f;
    }
    cout << "0_" << f2;
}
```

## Task E ()

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

using namespace std;
const int maxn = 3e5 + 10;
const int mxD = 1e6 + 10;
const int len = 5000;
const int cnt = (maxn + len - 1) / len + 1;
int u[maxn];
long long blocks[cnt][mxD + 1];
int n;
long long cnt_del[mxD + 1];

void calc(int bl) {
    for (int i = 0; i < mxD + 1; ++i) {
        cnt_del[i] = 0;
    }
    vector<long long> all;
    for (int j = bl * len; j < min(n, (bl + 1) * len); ++j) {
        long long x = u[j];
        all.push_back(x);
    }
    sort(all.begin(), all.end());
    vector<pair<long long, long long>> f;
    for (int l = 0; l < all.size(); ++l) {
        if (f.size() == 0 || f[(int)f.size() - 1].first != all[l]) {
            f.push_back({all[l], 1});
        } else {
            f[(int)f.size() - 1].second++;
        }
    }
    for (int m = 0; m < f.size(); ++m) {
        long long x = f[m].first;
        long long val = f[m].second;
        for (int i = 0; i <= mxD; i += x) {
            cnt_del[i] += val;
        }
    }
    long long now = 0;
    for (int k = 1; k <= mxD; ++k) {
        now += cnt_del[k - 1];
        blocks[bl][k] = now;
    }
}

long long ans(int l, int d) {
    if (l == -1)
        return 0;
    int bl = l / len;
    long long sum = 0;
    for (int i = 0; i < bl; ++i) {
        sum += blocks[i][d];
    }
    for (int j = bl * len; j <= l; ++j) {
        sum += (d + u[j] - 1) / u[j];
    }
    return sum;
}

signed main() {
    cin.tie();
    cout.tie();
    ios_base::sync_with_stdio(false);
#ifdef foo
    freopen("input.txt", "r", stdin);
#endif
    cin >> n;
    for (int i = 0; i < n; ++i) {
        cin >> u[i];
    }
    for (int k = 0; k < cnt; ++k) {
        calc(k);
    }
}
```

```

    }
    int q;
    cin >> q;
    for (int j = 0; j < q; ++j) {
        int a, b, d;
        cin >> a >> b >> d;
        b--;
        long long sum = ans(b, d) - ans(a - 1, d);
        cout << sum << '\n';
    }
}

```

## Task F ()