Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	60	58	31	449

Task A ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <algorithm>
#include <cmath>
#include <queue>

#define up(i, a, b) for (int i = a; i < b; ++i)

using namespace std;

typedef long long ll;
typedef pair<int, int> pii;
typedef pair<ll, ll> pll;
typedef vector <int> vi;
typedef vector <ll> vl;

void main2() {
    int n;
    cin >> n;

    priority_queue <pll> t;
    for (int i = 0; i < n;++i) {
        ll a, b;
        cin >> a >> b;
        while (a % 10 == 0) {
            b++;
            a /= 10;
        }
        t.push({-b, a});
    }


    while (t.size() != 1) {
        ll a1 = -t.top().first, a2 = t.top().second;
        t.pop();
        ll a3 = -t.top().first, a4 = t.top().second;
        t.pop();
        if (a1 != a3) {
            cout << min(a1, a3);
            return;
        }
        else {
            ll t1 = a1, t2 = a2 + a4;
            while (t2 % 10 == 0) {
                t2 /= 10;
                t1++;
            }
            t.push({-t1, t2});
        }
    }
    cout << -t.top().first;
}

int main() {
    ios_base::sync_with_stdio(false);
```

```
    cin.tie(nullptr);

    main2();
}
```

Task B ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <algorithm>
#include <cmath>

using namespace std;

void main2() {
    int n;
    cin >> n;
    int mi_id;
    vector <int> a(n);
    for (int i = 0; i < n;++i) {
        cin >> a[i];
        if (a[i] > 0) {
            mi_id = i;
        }
    }

    vector <int> t;
    cout << "Flip_and_wait" << endl;
    int id = 0;
    while(true) {
        string s;
        cin >> s;
        int kol = (s.size() - 3) / 2;
        int temp = 0;
        for (int i = id; i < id + kol; ++i) {
            temp += a[i];
        }
        t.push_back(temp);
        id += kol;
        if (mi_id < id) {
            break;
        }
        cout << "Wait" << endl;
    }

    id = t.size() - 1;
    t[id]--;
    while (id >= 0 && t[id] == 0) {
        id--;
    }
    while (id >= 0) {
        int temp = id;
        cout << "Flip_and_wait" << endl;
        string s;
        while (temp--) {
            cin >> s;
            cout << "Wait" << endl;
        }
        cin >> s;
        t[id]--;
        while (id >= 0 && t[id] == 0) {
            id--;
        }
    }
    cout << "Stop" << endl;
}

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);

    main2();
}
```

Task C ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <algorithm>
#include <cmath>

using namespace std;

void rash(string s) {
    string otv = "";
    for (int i = 1; i < s.size(); i += 2) {
        if (s[i - 1] == '?') {
            if (s[i] == '0') {
                otv += "00";
            }
            else {
                otv += "11";
            }
        }
        else {
            if (s[i - 1] == '0') {
                otv += "01";
            }
            else {
                otv += "10";
            }
        }
    }
    if (s.size() % 2 == 1) {
        otv += s[s.size() - 1];
    }
    cout << otv;
}

void main2() {
    string s;
    cin >> s;
    for (int i = 0; i < s.size(); ++i) {
        if (s[i] == '?') {
            rash(s);
            return;
        }
    }

    string otv = "";
    for (int i = 1; i < s.size(); i += 2) {
        if (s[i - 1] == '0') {
            if (s[i] == '0') {
                otv += "?0";
            }
            else {
                otv += "0?";
            }
        }
        else {
            if (s[i] == '0') {
                otv += "1?";
            }
            else {
                otv += "?1";
            }
        }
    }
    if (s.size() % 2 == 1) {
        otv += s[s.size() - 1];
    }
    cout << otv;
}

void main3() {
    int t;
    cin >> t;
```

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```cpp
    while (t--) {
        main2();
        cout << "\n";
    }
}

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);

    main3();
}
```

Task D ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <algorithm>
#include <cmath>

#define up(i, a, b) for (int i = a; i < b; ++i)

using namespace std;

typedef long long ll;
typedef pair<int, int> pii;
typedef pair<ll, ll> pll;
typedef vector <int> vi;
typedef vector <ll> vl;

ll mod = 998244353;

void main2() {
    int n;
    cin >> n;
    n++;
    ll otv = 1;
    for (ll i = 2; i <= n; ++i) {
        otv = (otv * i) % mod;
    }
    cout << n / mod << "_" << otv;
}

void main3() {
    int t;
    cin >> t;
    while (t--) {
        main2();
        cout << "\n";
    }
}

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);

    main2();
}
```

Task E ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <algorithm>
#include <cmath>

#define up(i, a, b) for (int i = a; i < b; ++i)

using namespace std;

typedef long long ll;
typedef pair<int, int> pii;
typedef pair<ll, ll> pll;
typedef vector <int> vi;
typedef vector <ll> vl;

void main2() {
    int n;
    cin >> n;
    vl v(n);
    up (i, 0, n) {
        cin >> v[i];
    }

    int q;
    cin >> q;
    while (q--) {
        ll a, b, d;
        cin >> a >> b >> d;
        ll otv = 0;
        up (i, a, b) {
            otv += d / v[i] + (d % v[i] != 0);
        }
        cout << otv << "\n";
    }

}

void main3() {
    int t;
    cin >> t;
    while (t--) {
        main2();
        cout << "\n";
    }
}

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);

    main2();
}
```

Task F ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <algorithm>
#include <cmath>

#define up(i, a, b) for (int i = a; i < b; ++i)
#define down(i, a, b) for (int i = b - 1; i >= a; --i)

using namespace std;

typedef long long ll;
typedef pair<int, int> pii;
typedef pair<ll, ll> pll;
typedef vector <int> vi;
typedef vector <ll> vl;

ll mod = 998244353;

void main2() {
    int n;
    cin >> n;
    vector <pll> a(n);
    up (i, 0, n) {
        cin >> a[i].first >> a[i].second;
    }

    vl otv(n + 1, 1);
    up (i, 0, n) {
        ll l = 0, r = 0;
        down(j, 0, i + 1) {
            l += a[j].first, r += a[j].second;
            if (l <= 0 && 0 <= r) {
                otv[i + 1] = max(otv[i + 1], otv[j] + 1);
            }
        }
    }

    ll otv1 = 0;
    up (i, 0, n + 1) {
        otv1 = max(otv1, otv[i]);
    }
    cout << otv1;
}

void main3() {
    int t;
    cin >> t;
    while (t--) {
        main2();
        cout << "\n";
    }
}

int main() {
    ios_base::sync_with_stdio(false);
    cin.tie(nullptr);

    main2();
}
```