

Олимпиада СПбГУ по информатике 2021/22 учебного года

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

Task A ()

```
#include <bits/stdc++.h>
using namespace std;

#define pb push_back
#define int long long

signed main() {
    int n;
    cin >> n;
    vector <pair <int, int>> a(n);
    for (int i = 0; i < n; i++) {
        cin >> a[i].second >> a[i].first;
    }
    int kek[18];
    kek[0] = 1;
    for (int i = 1; i < 18; i++) {
        kek[i] = kek[i - 1] * 10;
    }
    sort(a.begin(), a.end());
    vector <pair <int, int>> b;
    int ns = a[0].second;
    int pr = a[0].first;
    for (int i = 1; i < n; i++) {
        if (a[i].first == pr) {
            ns += a[i].second;
        } else {
            b.pb ({pr, ns});
            pr = a[i].first;
            ns = a[i].second;
        }
    }
    b.pb ({pr, ns});
    int m = b.size();
    int sum = b[0].second;
    for (int i = 1; i < m; i++) {
        int cnt = 0;
        int uy = sum;
        while (uy % 10 == 0) {
            cnt++;
            uy /= 10;
        }
        if (cnt + b[i - 1].first < b[i].first) {
            cout << cnt + b[i - 1].first;
            return 0;
        }
        sum = b[i].second + sum / kek[(b[i].first - b[i - 1].first)];
    }
    int cnt = 0;
    int uy = sum;
    while (uy % 10 == 0) {
        cnt++;
        uy /= 10;
    }
    cout << b[m - 1].first + cnt;
}
```

Task B ()

```
#include <bits/stdc++.h>
using namespace std;

#define pb push_back
#define int long long

signed main() {
    int n;
    cin >> n;
    vector<int> a(n);
    for (int i = 0; i < n; i++) {
        cin >> a[i];
    }
    for (int i = n - 1; i >= 0; i--) {
        if (a[i] == 0) {
            continue;
        }
        int cnt = i + 1;
        for (int j = 0; j < a[i]; j++) {
            cout << "Flip_and_wait" << endl;
            int uy = 0;
            while (1) {
                string h;
                cin >> h;
                int now = ((int) h.size() / 2) - 1;
                uy += now;
                if (uy >= cnt) {
                    break;
                }
                cout << "Wait" << endl;
            }
        }
    }
    cout << "Stop" << endl;
    return 0;
}
```

Task C ()

```
#include <bits/stdc++.h>
using namespace std;

#define pb push_back
#define int long long

void kon (string h, int uy) {
    char r = (uy + '0');
    for (int i = 0; i < h.size(); i++) {
        if (h[i] == '?') {
            h[i] = r;
        }
    }
    cout << h << '\n';
    return;
}

signed main() {
    int t;
    cin >> t;
    while (t--) {
        string h;
        cin >> h;
        int n = h.size();
        bool ok = 0;
        for (int i = 0; i < n; i++) {
            if (h[i] == '?') {
                ok = 1;
                break;
            }
        }
        if (ok) {
            int cnt = 0;
            bool y0 = 0;
            bool y1 = 0;
            for (int i = 0; i < n; i++) {
                if (h[i] == '?') {
                    cnt++;
                } else if (h[i] == '0') {
                    y0 = 1;
                } else {
                    y1 = 1;
                }
            }
            if (cnt == n) {
                kon (h, 0);
            } else if (!y0) {
                kon (h, 1);
            } else if (y1) {
                kon (h, 0);
            } else {
                kon (h, 1);
            }
        } else {
            int cnt0 = 0;
            int cnt1 = 0;
            for (int i = 0; i < n; i++) {
                if (h[i] == '0') {
                    cnt0++;
                } else {
                    cnt1++;
                }
            }
            if (cnt1 == 0) {
                for (int i = 0; i < n; i++) {
                    cout << '?';
                }
                cout << '\n';
            } else if (cnt0 == 0) {
                for (int i = 0; i < n - 1; i++) {
                    cout << '?';
                }
            }
        }
    }
}
```

```

        cout << '1' << '\n';
    } else if (cnt1 >= cnt0) {
        for (int i = 0; i < n; i++) {
            if (h[i] == '1') {
                cout << '?';
            } else {
                cout << '0';
            }
        }
        cout << '\n';
    } else {
        int le0 = 0;
        int le1 = 0;
        for (int i = 0; i < n; i++) {
            if (h[i] == '0') {
                le0 = i;
                break;
            }
        }
        for (int i = 0; i < n; i++) {
            if (h[i] == '1') {
                le1 = i;
                break;
            }
        }
        for (int i = 0; i < n; i++) {
            if (h[i] == '0') {
                h[i] = '?';
            }
        }
        h[le0] = '0';
        cout << h << '\n';
    }
}
}
}
}

```

Task D ()

```
#include <bits/stdc++.h>
using namespace std;

#define pb push_back
#define int long long

int mod1 = 998244353;
int del = 1000000;

vector <int> pr = {1, 373341033, 45596018, 834980587, 623627864, 428937595, 442819817, 499710224,
833655840, 83857087, 295201906, 788488293, 671639287, 849315549, 597398273, 813259672,
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```
int getans (int n) {
    int k = n / del;
    int kek = n % del;
    int ans = pr[k];
    for (int i = n - kek + 1; i <= n; i++) {
        ans *= i;
        ans %= mod1;
    }
    return ans;
}
```

```

int ans1 = 0;

int get1 (int n) {
    ans1 += n / mod1;
    int ans2 = getans (n % mod1);
    int lol = n / mod1;
    ans2 *= getans (lol);
    ans2 %= mod1;
    if (lol % 2 == 1) {
        ans2 = (ans2 * (mod1 - 1)) % mod1;
    }
    return ans2;
}

int get (int n) {
    ans1 += n / mod1;
    int ans2 = getans (n % mod1);
    int lol = n / mod1;
    if (lol >= mod1) {
        ans2 *= get1(lol);
    } else {
        ans2 *= getans (lol);
    }
    ans2 %= mod1;
    if (lol % 2 == 1) {
        ans2 = (ans2 * (mod1 - 1)) % mod1;
    }
    return ans2;
}

signed main() {
    int n;
    cin >> n;
    n++;
    int ans2 = get (n);
    if (ans2 == 0) {
        while (1);
    }
    cout << ans1 << "␣" << ans2;
}

```

Task E ()

```
#include <bits/stdc++.h>
using namespace std;

#define pb push_back
#define int long long

signed main() {
    int n;
    cin >> n;
    vector<int> a(n);
    for (int i = 0; i < n; i++) {
        cin >> a[i];
    }
    int q;
    cin >> q;
    for (int i = 0; i < q; i++) {
        int l, r, d;
        cin >> l >> r >> d;
        int ans = 0;
        for (int j = l; j < r; j++) {
            ans += (d - 1) / a[j];
        }
        ans += (r - l);
        cout << ans << '\n';
    }
}
```


Task F ()

```
#include <bits/stdc++.h>
using namespace std;

#define pb push_back

const int maxn = 10001;

int dp[maxn];

signed main() {
    int n;
    cin >> n;
    for (int i = 0; i < n + 1; i++) {
        dp[i] = 1;
    }
    vector <pair <int, int>> a(n);
    for (int i = 0; i < n; i++) {
        cin >> a[i].first >> a[i].second;
    }
    for (int i = 0; i < n; i++) {
        long long le = 0;
        long long ri = 0;
        for (int j = i; j >= 0; j--) {
            le += a[j].first;
            ri += a[j].second;
            if (le <= 0 && 0 <= ri) {
                dp[i + 1] = max(dp[i + 1], dp[j] + 1);
            }
        }
    }
    int ans = 0;
    for (int i = 0; i < n + 1; i++) {
        ans = max(ans, dp[i]);
    }
    cout << ans;
}
```