MaxMinSum

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;

int a[N], p[N];

int supow(int a, int b, int m){
    int res = 1;
    while (b){
        if (b & 1) res = res * a % m;
        a = a*a % m;
        b >>= 1;
    }
    return res;
}

int C(int k, int n){
        return p[n]*supow(p[k],mod-2,mod)%mod*supow(p[n-k],mod-2,mod)%mod;
}

signed main(){
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")){
    freopen("TASK.INP", "r", stdin);
    freopen("TASK.OUT", "w", stdout);}
    int n, k;
    cin >> n >> k;
        for(int i = 1; i <= n; i++){
        cin >> a[i];
    }
        sort(a+1, a+n+1);
        p[0] = 1;
        for(int i = 1; i <= n; i++) {
                p[i] = p[i-1] * i % mod;
        }
    int ans = 0;
        sort(a+1, a+n+1, greater<int>());
    for (int i = 1; i <= n; i ++){
        if (n - i >= k - 1){
            ans = (ans + a[i] * C(k - 1, n - i) % mod) % mod;
        }
    }
    sort(a+1, a+n+1);
    for (int i = 1; i <= n; i ++)
```

```
        if (n - i >= k - 1)
                ans = (ans - a[i] * C(k - 1, n - i) % mod + mod) % mod;
    cout << (ans + mod) % mod;
}
```

khangtd.Login1

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;



signed main(){
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")){
    freopen("TASK.INP", "r", stdin);
    freopen("TASK.OUT", "w", stdout);}

    int n, k;
    cin >> n >> k;
    map<string, string> m;
    for (int i=1; i <= n; i++){
        string a, b;
        cin >> a >> b;
        m[a] = b;
    }
    for (int i=1; i <= k; i++){
        string a;
        cin >> a;
        if (m[a] == ""){
            cout << "Chua Dang Ky!\n";
        }
        else cout << m[a] << "\n";
    }
}
```

khangtd.Login2

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
```

```
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;



signed main(){
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")){
    freopen("TASK.INP", "r", stdin);
    freopen("TASK.OUT", "w", stdout);}

    int n, k;
    cin >> n >> k;
    map<string, vector<string>> m;
    for (int i=1; i <= n; i++){
        string a, b;
        cin >> a >> b;
        m[a].push_back(b);
    }
    for (int i=1; i <= k; i++){
        string a;
        cin >> a;
        if (m[a].size() == 0){
            cout << "Chua Dang Ky!";
        }
        else{
            for (auto it : m[a]){
                cout << it << " ";
            }
        }
        cout << "\n";
    }
}
```

khangtd.DetectVirus2

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;

vector<int> prefix_func(string s) {
    int n = s.length();
    vector<int> pi(n, 0);
    for (int i = 1; i < n; i++) {
        int k = pi[i - 1];
        while (k > 0 && s[i] != s[k])
            k = pi[k - 1];
        pi[i] = (s[i] == s[k]) ? ++k : k;
    }
```

```
    return pi;
}

signed main() {
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")) {
        freopen("TASK.INP", "r", stdin);
        freopen("TASK.OUT", "w", stdout);
    }

    string s, t;
    cin >> s >> t;
    string tmp = t + '#' + s;
    vector<int> pi = prefix_func(tmp);
    bool flag = 0;
    for (int i = t.size() + 1; i < pi.size(); i++) {
        if (pi[i] == t.size()) {
            flag = 1;
        }
    }
    if (!flag) {
        cout << "NO\n";
        return 0;
    }
    else{
        cout << "YES\n";
    }
    for (int i = t.size() + 1; i < pi.size(); i++) {
        if (pi[i] == t.size()) {
            cout << i - 2 * t.size() + 1 << " ";
        }
    }
}
```

khangtd.DetectVirus

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;

vector<int> prefix_func(string s) {
    int n = s.length();
    vector<int> pi(n, 0);
    for (int i = 1; i < n; i++) {
        int k = pi[i - 1];
        while (k > 0 && s[i] != s[k])
            k = pi[k - 1];
        pi[i] = (s[i] == s[k]) ? ++k : k;
    }
```

```
    return pi;
}

signed main() {
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")) {
        freopen("TASK.INP", "r", stdin);
        freopen("TASK.OUT", "w", stdout);
    }

    string s, t;
    cin >> s >> t;
    string tmp = t + '#' + s;
    vector<int> pi = prefix_func(tmp);
    bool flag = 0;
    for (int i = t.size() + 1; i < pi.size(); i++) {
        if (pi[i] == t.size()) {
            flag = 1;
        }
    }
    if (!flag) {
        cout << "NO\n";
        return 0;
    }
    else{
        cout << "YES\n";
    }
    for (int i = t.size() + 1; i < pi.size(); i++) {
        if (pi[i] == t.size()) {
            cout << i - 2 * t.size() + 1 << " ";
        }
    }
}
```

Linear Search 4

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;

signed main() {
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")) {
        freopen("TASK.INP", "r", stdin);
        freopen("TASK.OUT", "w", stdout);
    }

    int T;
```

```
    cin >> T;
    while (T--) {
        int n, k;
        cin >> n >> k;
        map<int, int> m;
        for (int i=1; i<=n; i++){
            int x;
            cin >> x;
            m[x]++;
        }
        int s = 0;
        for (auto it : m){
            s += min(it.se, 2LL);
        }
        if (m.size() > 2 * k){
            cout << "NO\n";
            continue;
        }
        if (s >= 2 * k) cout << "YES\n";
        else cout << "NO\n";
    }
    return 0;
}
```

Vượt mức Pickleball v2 (time limit: 0.5s)

```
const int N = 1e6 + 9;
signed main() {
    int n, d;
    cin >> n >> d;
    vector<int> a(N), p(N);
    for (int i = 1; i <= n; i++){
        cin >> a[i];
    }
    for (int i = 1; i <= d; i++){
        p[a[i]]++;
    }
    int ans = 0;
    for (int i = d+1; i <= n; i++) {
        int c = 0, tmp = 0, tmp1 = -1, tmp2 = -1;
        for (int j = 0; j <= 200; j++) {
            c += p[j];
            if (tmp1 == -1 && c >= (d+1)/2){
                tmp1 = j;
            }
            if (tmp2 == -1 && c >= (d/2)+1){
                tmp2 = j;
            }
            if (tmp1 != -1 && tmp2 != -1) break;
        }

        if (d&1){
            tmp = tmp2 * 2;
        }
        else{
            tmp = tmp1 + tmp2;
```

```
        }

        if (a[i] >= tmp) ans++;
        p[a[i - d]]--; p[a[i]]++;
    }
    cout << ans;
}
```

Bốn ông điên

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;

int solve(vector<int> a) {
    vector<pair<int, int>> b;
    for (int i = 0; i < a.size(); i++) {
        b.push_back({a[i], i});
    }
    sort(b.begin(), b.end());
    vector<bool> visited(a.size(), 0);
    int s = 0;
    for (int i = 0; i < a.size(); i++) {
        if (visited[i] || b[i].second == i) continue;
        int c = 0, j = i;
        while (!visited[j]) {
            visited[j] = true;
            j = b[j].second;
            c++;
        }
        if (c > 1) {
            s += c - 1;
        }
    }
    return s;
}

vector<int> rev(vector<int> a){
    vector<int> tmp;
    for(auto it:a){
        tmp.push_back(2e9-it);
    }
    return tmp;
}

signed main(){
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")){
    freopen("TASK.INP", "r", stdin);
```

```
    freopen("TASK.OUT", "w", stdout);}

    int n;
    cin >> n;
    vector<int> v(n);
    for (int i = 0; i < n; ++i) {
        cin >> v[i];
    }
    vector<int> vr = rev(v);
    cout << min(solve(v), solve(vr));
}
```

Huấn luyện chuột

```
#include <bits/stdc++.h>
using namespace std;
#define int long long
#define fi first
#define se second
const int N = 1e6 + 9;
const int N2 = N * 10;
const int mod = 1e9 + 7;
const int inf = LLONG_MAX;

int f[N], inv[N];

int supow(int a, int b, int m){
    int res = 1;
    while (b){
        if (b & 1) res = res * a % m;
        a = a*a % m;
        b >>= 1;
    }
    return res;
}

int C(int k, int n, int p){
    if (k > n) return 0;
    return f[n] * inv[k] % p * inv[n-k] % p;
}

void precompute(int p){
    f[0] = f[1] = 1;
    for(int i = 2; i < p; i++){
        f[i] = f[i-1] * i % p;
    }
    inv[p-1] = supow(f[p-1], p - 2, p);
    for(int i = p - 2; i >= 0; i--){
        inv[i] = inv[i+1] * (i + 1) % p;
    }
}

signed main(){
    ios::sync_with_stdio(false);
    cin.tie(NULL);
    if (fopen("TASK.INP", "r")){
```

```
    freopen("TASK.INP", "r", stdin);
    freopen("TASK.OUT", "w", stdout);}

    int T, n, ans, p; cin >> T >> p;
    precompute(p);
    while(T--){
        cin >> n;
        int ans = 1, cur = p;
        int m = 2*n - 1;
        for(int i = 0; i <= 1e5; i++){
            if (m*p < cur) break;;
            int tmp1 = (n % cur) * p / cur;
            int tmp2 = (m % cur) * p / cur;
            ans = ans * C(tmp1, tmp2, p) % p;
            cur = cur * p;
        }
        cout << ans << "\n";
    }
}
```